



UNIVERSITY OF
KELANIYA | Faculty of Commerce
& Management Studies



15th International Conference on Business and Information

"Beyond Excellence: Integrating AI for Sustainable Business Innovations"



ICBI

UNIVERSITY OF **KELANIYA**
SRI LANKA **2024**

ICBI 2024 Conference Proceedings

Organized by
Faculty of Commerce and Management Studies
University of Kelaniya

**15th International Conference
on
Business and Information
ICBI - 2024**

**“Beyond Excellence: Integrating AI for Sustainable
Business Innovations”**

Conference Proceedings

**Faculty of Commerce and Management Studies
University of Kelaniya
Sri Lanka**

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15th International Conference on Business & Information

“Beyond Excellence: Integrating AI for Sustainable Business Innovations”

Conference Proceedings

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EDITORIAL NOTE



On behalf of the editorial board of the 15th International Conference on Business and Information 2024 organized by the Faculty of Commerce and Management Studies, University of Kelaniya, Sri Lanka, I am delighted to present the conference proceedings with the theme of Integrating AI for Sustainable Business Innovations. This edition contains abstracts and full papers accepted for ICBI 2024. In this year, a large number of papers were submitted to the conference. The papers came from across different countries, from academia, students, and government

institutions. Ensuring the quality, all the papers went through a rigorous review process, including double-blind review and similarity checks. After the double-blind peer review process, only around 60% of the submitted papers were accepted for the conference.

Papers represent diverse areas of research including, Accounting, Finance and Economics, Education and Learning, Entrepreneurship, Innovation and Small business management, Marketing, International Business and Strategy, Organizational behavior and Human resource management, Operations management, Social distancing, Technology, Tourism, and Multidisciplinary areas.

We would like to express our sincere appreciation to the paper reviewers and the authors of papers whose theoretical and empirical contributions are presented in these proceedings. The studies in these proceedings will bring new insights to the theories, methods, and techniques.

Dr. Chatura Liyanage

Editor in Chief – ICBI 2024

Faculty of Commerce and Management Studies

University of Kelaniya, Sri Lanka.

MESSAGE FROM THE CONFERENCE SECRETARY



It is indeed a great pleasure for me to convey this congratulatory note as the Secretary of the 15th International Conference on Business and Information (ICBI), organized by the Faculty of Commerce and Management Studies, University of Kelaniya, and held on November 1, 2024. This year's conference theme, "Beyond Excellence: Integrating AI for Sustainable Business Innovations," emphasizes the transformative potential of artificial intelligence in reshaping industries, advancing

sustainability, and delivering innovative solutions to complex global challenges.

ICBI 2024 has reached new heights with global partnerships forged with Prince Mohammad bin Fahd University, Saudi Arabia, and Universiti Putra Malaysia, broadening the international impact of our conference. Additionally, we are delighted to introduce two new events, the Meet the Editors Session and the SDG Youth Challenge—further enriching the scope of ICBI. Alongside these exciting additions, the Main Research Conference and Doctoral Colloquium continue to serve as platforms for academics, practitioners, and policymakers to present their research and engage in discussions on pressing issues in business and management.

I strongly believe that ICBI 2024 has provided an invaluable platform for participants to exchange ideas, share their research with a global audience, and foster new academic and professional collaborations. This proceedings book encapsulates the essence of our collective endeavors, documenting the innovative and intellectual contributions made during this event. It is my sincere hope that the insights contained in these proceedings will inspire further exploration, critical discussion, and groundbreaking discoveries in your respective disciplines.

Thank you all for your active participation, invaluable contributions, and unwavering dedication to advancing innovation and excellence. I am confident that the outcomes of our collective efforts will have a lasting impact, shaping the future of our fields and contributing meaningfully to society.

L. A. Shanaka Perera

Secretary - ICBI 2024

Faculty of Commerce and Management Studies

University of Kelaniya. Sri Lanka

MESSAGE FROM THE CONFERENCE CO-CHAIR



As the co-chair of the 15th International Conference on Business and Information (ICBI 2024), it is my distinct pleasure to welcome participants and contributors from around the globe to this seminal gathering. Held on the 1st and 2nd of November 2024 in Sri Lanka, this year's theme, “Beyond Excellence: Integrating AI for Sustainable Business Innovations,” perfectly encapsulates our ambitious goal: to forge new paths in the integration of artificial intelligence within the business sector.

Hosted by the Faculty of Commerce and Management Studies at the University of Kelaniya, ICBI 2024 not only continues the tradition of excellence expected at this conference but also expands its boundaries. This year, we have seen unprecedented submissions of high-quality research that demonstrates profound insights into the sustainable applications of new technologies. These discussions are crucial as we navigate the complexities of modern business environments and seek solutions that are not only innovative but also sustainable and ethically sound.

This proceedings book contains a curated selection of peer-reviewed papers that represent a forward-thinking community dedicated to leveraging technology for the betterment of society. As you peruse these pages, I invite you to engage with the ideas and innovations that promise to shape the future of business.

We eagerly anticipate your engagement and participation in the 16th edition of the International Conference on Business and Information (ICBI 2025). With a commitment to fostering inspiring and engaging discourse, we further aim to address the dynamic challenges and opportunities within the evolving business and industrial landscapes.

Dr. Sugeeth Patabendige

Conference Co-chair – ICBI 2024

Faculty of Commerce and Management Studies

University of Kelaniya, Sri Lanka

MESSAGE FROM THE CONFERENCE CHAIR



The International Conference on Business and Information (ICBI) is the flagship conference of the Faculty of Commerce and Management Studies (FCMS) of the University of Kelaniya. The conference was held for the 15th consecutive time since its inception in 2010. For this year, we have collaborated with Prince Mohammad Bin Fahd University, Saudi Arabia and, Universiti Putra Malaysia. Further ICBI 2024 has joined with four SCOPUS indexed journals namely, Journal of International Financial Management & Accounting, South Asian Journal of Human Resource Management and Journal of Management, Spirituality & Religious; and Pertanika Journal of Social Sciences and which will provide authors with the opportunity to publish their articles in Indexed journals.

The theme of the fifteenth edition of the ICBI is “Beyond Excellence: Integrating AI for Sustainable Business Innovations conference. This year’s theme has sparked engaging discussions and inspiring insights into how artificial intelligence (AI) can drive sustainability and foster innovation within business practices. As we look towards a future where technological advancements intersect with sustainability goals.

In addition to the thought-provoking keynote sessions and panel discussions, we were thrilled to include a range of enriching events. The Meet the Editors session provided an opportunity for in-depth dialogue on publishing in high quality journals. The SDG Youth Challenge highlighted the critical role of young leaders in advancing the United Nations' Sustainable Development Goals, inspiring fresh ideas and approaches. The 3MT Competition (Three-Minute Thesis) showcased the next generation of researchers who demonstrated their ability to communicate complex topics in an accessible and engaging way. Further, Doctoral Colloquium has been another feature of the ICBI. The colloquium invites doctoral and higher degree research students in the field of Commerce and Management to present thesis proposals and the progress of the ongoing thesis.

I would like to express my deepest gratitude to all our speakers, participants, and collaborators for making this conference a success. Their contributions have not only enriched the conversations but have also helped us move closer to a future where AI plays a central role in building sustainable, innovative businesses.

Thank you for your continued support and for being part of this exciting journey. I invite the conference presenters and attendees to join us in the next edition of the ICBI in 2025.

Professor J M Ruwani Fernando

Conference Chair – ICBI 2024

Faculty of Commerce and Management Studies

University of Kelaniya, Sri Lanka.

MESSAGE FROM THE DEAN OF THE FACULTY



I am delighted to send this message to the International Conference on Business and Information (ICBI) 2024, which is hosted by the Faculty of Commerce and Management Studies at the University of Kelaniya. It is widely acknowledged that societal and industrial progress is fueled by research. However, it is crucial for researchers to have suitable platforms to share and discuss their discoveries for mutual benefit. Therefore, the continuous organization of this research conference

for the fifteenth year in a row, starting in 2010, is truly commendable and serves as a valuable avenue for scholars, academics, and practitioners.

This conference will not only bring recognition to the faculty but also to the University as a whole. Additionally, I firmly believe that the future of our nation depends on the work of young researchers. Consequently, the Faculty of Commerce and Management Studies remains committed to nurturing the capabilities of these emerging scholars through various means. Research in applied fields directly influences economic development. Hence, the theme, "Beyond Excellence: Integrating AI for Sustainable Business Innovations" is not only sensible but also highly relevant to the Sri Lankan economy. This initiative will undoubtedly assist both academics and professionals in reshaping their perspectives towards achieving sustainable development in the country.

As the Dean, I would like to take this opportunity to express my gratitude to Prof. Ruwani Fernando, the Chair of ICBI 2024, Mr. Shanaka Perera, the conference secretary, and all others who have made significant contributions to the success of this event. I would also like to extend my heartfelt congratulations to both local and international researchers who have submitted their research articles to this conference. I wish this conference every success.

Professor Bandara Wanninayake
Dean
Faculty of Commerce and Management Studies
University of Kelaniya, Sri Lanka

MESSAGE FROM THE CHAIRMAN OF THE RESEARCH COUNCIL



It is with great pleasure that I write this message to the proceedings of the 15th International Conference on Business and Information, ICBI 2024 organized by the Faculty of Commerce and Management Studies of the University of Kelaniya. The ICBI has become a major research event of the University of Kelaniya that supports and nurtures the research culture of the university. The conference presentations are communications based on comprehensive studies that have the potential to be published as full research articles in both local and international journals.

The main aims of the Research Council of the university are to enrich research culture in the university and promote multidisciplinary research. The Research Council provides incentives and necessary support to the researchers who publish in high quality journals. The research Council also expects that a considerable percentage of the studies presented in the form of abstracts in the conferences organized by the university to end up as full research articles soon.

It is well understood that modern day research needs a multidisciplinary approach to produce high quality results of importance to academics and other communities. As reflected by the theme “Beyond Excellence: Integrating AI for Sustainable Business Innovations”, the multidisciplinary approach is highlighted in the present conference. I congratulate the Faculty of Commerce and Management Studies for organizing this conference annually and making it an excellent platform for researchers to present their novel findings.

My best wishes for a very fruitful and rewarding conference!

Professor Sachith Mettananda

Chairman

Research Council

University of Kelaniya, Sri Lanka.

MESSAGE FROM THE VICE CHANCELLOR



As the Faculty of Commerce and Management Studies at the University of Kelaniya prepares to host the 15th consecutive annual International Conference on Business & Information 2024, I am pleased to convey a brief message to the conference participants.

The University of Kelaniya regards its primary mission as the dissemination of knowledge to support the sustainable development of our nation. Sharing new knowledge found through research is integral to this mission.

Each generation of researchers builds upon the strong foundation laid by scholars from various disciplines in the past, propelling the University on an enduring path toward excellence. Each Faculty bears a share of responsibility in this mission, and organizing international conferences to share fresh knowledge with interested parties in specific fields stands as a vital means to fulfill this duty.

This conference offers a unique opportunity for participants from around the world to come together and engage in fruitful discussions, share cutting-edge research, and collaborate on solutions to some of the most pressing challenges in the management field.

I deeply appreciate the remarkable efforts made by the academics of the Faculty of Commerce and Management Studies to organize this conference. I seize this opportunity to extend my best wishes to the Chair, Co-Chair, Organizing Committee, and all those participating in the 15th International Conference on Business & Information, for productive and fruitful deliberations.

Senior Professor Nilanthi de Silva

Vice Chancellor

University of Kelaniya, Sri Lanka.

KEYNOTE ABSTRACT



Navigating the AI Revolution for Transformative Strategies in Business and Information Systems

Artificial Intelligence (AI) stands as a transformative force in technological innovation that is helping to drive significant advancements across industries.

In my talk, I highlighted the current state of AI and discussed its role in addressing critical challenges in business and societal sustainability. Notable applications, such as AI driven advancements in healthcare diagnostics and biometric systems, were discussed to illustrate the potential of AI to enhance operational efficiency, trust, and reliability, particularly in complex domains requiring precision as well as scalability.

As AI matures and takes shape within many facets of our everyday lives, it is important to understand its evolution from predictive analytics to generative systems, which has expanded its capabilities in automation, decision making and problem solving. And, as AI integrates seamlessly into business ecosystems, it is transforming traditional processes, from optimising supply chains to delivering hyper-personalised customer interactions. As a result, emerging developments, such as autonomous AI agents, are increasingly likely to play pivotal roles in the next step in workplace automation. These agents are poised to assume tasks involving software interactions—managing tools, documents, routine reviews, and project updates—freeing humans to focus on collaborative and human-centric activities. This shift could redefine workplace dynamics, enhancing productivity while fostering richer interpersonal engagement.

Thus, looking ahead, the trajectory of AI points toward even greater autonomy and adaptability, powered by emerging innovations in quantum computing and bio-inspired systems. However, this progress must be considered with care and a commitment to ethical practices, addressing transparency, data privacy, and algorithmic fairness. Such considerations are essential for aligning the capabilities of AI with sustainability, inclusivity, and equity.

A key message to anyone working in utilising AI, especially those working to develop transformative strategies for business and information systems, is to critically reflect on the implications of AI in their respective fields. It is crucial for us all to foster interdisciplinary collaboration between academia, industry, and policymakers to ensure the adoption of responsible AI. Thus, by embedding ethical foresight and sustainability at the core of AI innovation, the communities as a whole can lead the charge in shaping a future where AI enhances human potential and drives equitable, transformative solutions for global challenges.

Professor Hassan Ugail

Director, Centre for Visual Computing and Intelligent Systems
University of Bradford, United Kingdom

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ICBI JOURNEY

Since 2010

ICBI - 2010

Theme: *Researching Realities of Management Phenomenon*

Date: 4th June 2010

Conference Chair: Dr. (Mrs) R. P. C. Ranjani

Conference Coordinator: Mr. Ajith Medis

Keynote Speaker: Prof. Dinesh Kumar Gupta

ICBI - 2011

Theme: *Steering Excellence of Business Knowledge*

Date: 20th October 2011

Conference Chair: Dr. (Mrs.) R. P. C. Ranjani

Conference Coordinator: Dr. D. M. Semasinghe

Keynote Speaker: Prof. Per Davidsson

ICBI - 2012

Theme: *Challenges and Opportunities in the 21st Century*

Date: 30th November 2012

Conference Chair: Dr. (Mrs.) R. P. C. Ranjani

Conference Co-chairs: Dr. C. N. Wickramasinghe and Dr. M. W. Madurapperuma

Keynote Speaker: Dr. Koshy Mathai

ICBI - 2013

Theme: *Developing Business for sustainable Growth: Research Innovation and Practice*

Date: 2nd December 2013

Conference Chair: Dr. D. M. Semasinghe

Conference Co-chair: Dr. D. U. Mohan

Conference Secretary: Ms. J. M. R. Fernando

Keynote Speaker: Dr. Peter Walter Cunnigham

ICBI - 2014

Theme: *Discovering New Knowledge to Co-operate with Competition towards Business Success: Prizing the Present and shaping the Future*

Date: 22nd November 2014

Conference Chair: Dr. D. M. Semasinghe

Conference Co-chair: Dr. P. N. D. Fernando

Conference Secretary: Ms. K. G. M. Nanayakkara

Keynote Speaker: Prof. Anona Armstrong

ICBI - 2015

Theme: *Transcendence in Business – Knowledge Immersed in Practice*

Date: 22nd November 2015

Conference Chair: Dr. D. M. Semasinghe

Conference Co-chair: Dr. R. A. S. Weerasiri

Conference Secretary: Dr. H. M. R. P. Herath

Keynote Speaker: Prof. (Dr) Markus Blut

ICBI - 2016

Theme: *Triumphing Business Excellence through Knowledge Exploration*

Date: 19th November 2016

Conference Chair: Dr. D. M. Semasinghe

Conference Co-chair: Dr. W. V. A. D. Karunaratne

Conference Secretary: Dr. D. K. Y. Abeywardena

Keynote Speaker: Prof. (Dr.) David Dickinson

ICBI - 2017

Theme: *Exploring Disruptive Opportunities for Exponential Business Growth*

Date: 17th November 2017

Conference Chair: Dr. P. N. D. Fernando

Conference Co-chair: Dr. S. M. A. K. Samarakoon

Conference Secretary: Dr. H. A. K. N. S. Surangi

Keynote Speaker: Prof. David Rae

ICBI - 2018

Theme: *Enriching Multidisciplinary Research Potential of International Collaboration towards Sustainable Development*

Date: 23rd November 2018

Conference Chair: Dr. P. N. D. Fernando

Conference Co-chairs: Prof. A. C. De Alwis and Prof. Hareesh N. Ramanathan

Conference Secretaries: Mr. Tharindu D. Weerasinghe and Dr. George C. Mathew

Keynote Speaker: Prof. (Dr). Sanjeev Prashar

ICBI - 2019

Theme: *Business Transformation in Emerging Technology Landscape*

Date: 17th October 2019

Conference Chair: Prof. (Dr.) R. P. C. Ranjani

Conference Co-chair: Dr. A. P. Medis

Conference Secretary: Prof. (Dr.) S. S. Weligamage

Keynote Speaker: Professor (Dr.) Prashanta Kumer Banerjee

ICBI – 2020

Theme: “Transforming Business Strategies for Economic Resilience

Date: 19th November 2020

Conference Chair: Dr. W. M. C. B. Wanninayake

Conference Co-Chair: Dr. Ravi Dissanayake

Conference Secretary: Mrs. Bimali Wijesundara

Key-note Speaker: Dr. Noel Scott

ICBI - 2021

Theme: Reinventing Business Strategies in the Next Normal

Date: 11th November 2021

Conference Chair: Professor P.M.C. Thilakerathne

Conference Co-Chair: Dr. M.A.T.K. Munasinghe

Conference Secretary: Dr. Nisansala Wijekoon

Key-note Speaker: His Excellency David Holly

ICBI - 2022

Theme: "Building Business Resilience to Climate Change in Frontier Markets"

Date: 18th November 2022

Conference Chair: Dr. M. M. M. Shamil

Conference Co-Chair: Dr. Saroja Wanigasekara

Conference Secretary: Dr. Tishani Herath

Key-note Speaker: Sean Kidney

ICBI - 2023

Theme: "Advancing Digital Transformation, Well-being, and Sustainability in Business"

Date: 10th November 2023

Conference Chair: Dr. Saroja Wanigasekara

Conference Co-Chair: Dr. Ruwani Fernando

Conference Secretary: Dr. Chathuni Jayasinghe

Key-note Speaker: Professor Ying Zhou

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The Impact of Integrated Reporting on Firm’s Performance: Comparison between Financial and Non-Financial Listed Companies in Sri Lanka

Nishantha, A. C.¹ and Wanigasekara, W. A. D. K. J.²

The purpose of this study is to examine the impact of IR adoption on the firm’s performance of Financial and Non-Financial public listed companies (PLCs) in the Colombo Stock Exchange (CSE) Sri Lanka and observe the disclosure pattern of integrated reporting (IR). For this quantitative study, sample panel data were collected from the integrated annual reports of 56 PLCs (23 financial PLCs and 33 non-financial PLCs) published from 2018 to 2022. The level of IR adoption (IRDIN) was used as the independent variable, while Return on Assets (ROA), Return on Equity (ROE), and total sales growth (GRO) are considered the financial, operational, and growth variables respectively. Tobin’s Q and Price Earning (PE) ratio were selected as market-related variables. The control variables were Firm size (FIRMSIZE) and Leverage (LEV). Descriptive analysis was performed in this study with the help of Eviews latest version and Robust regression analysis was employed to analyze the impact of the level of IR adoption on firms’ performance. Findings deduced from the empirical results show that IRDIN positively and significantly impacts all four performance variables (ROA, ROE, GRO, Tobin’s Q) of non-financial PLCs. IRDIN on Financial PLCs positively and significantly affected financial (ROA) and operational (ROE) based variables. Furthermore, the content analysis shows an increasing pattern of revealing the indicator elements constructed by the sample PLCs. This study adds value to the existing limited literature on IR disclosure and firm performance in Sri Lanka by incorporating content analysis and regression analysis to understand how firms respond to the stakeholders' demand for value creation. Using data mining and applying big data analytics of annual reports in eXtensible Business Reporting Language (XBRL) format are highly promising for future research.

Keywords: *Financial and non-financial PLCs, Firm’s performance, Integrated Reporting.*

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Analysing the Factors Affecting to Women’s Engagement in Sri Lankan Labor Force

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Women's engagement in the workforce is a key factor in driving economic growth in Sri Lanka. Despite the country's advancements in recent years, women still face significant challenges that prevent them from fully participating in the workforce. The objective of this study is to explore the potential labor force of women in Sri Lanka and the factors affecting their participation, using data from the Labor Force Survey 2021. Analyzing data from 41,171 women out of 77,869 individuals using a binary logistic regression model, the study considered factors such as marital status, education level, age group, relationship to the head of the household, district, sector, ethnic group, religion, Sinhala literacy, and English literacy. The results showed that all the variables except for Religion, are statistically significant. Married and widowed women are less likely to participate in the labor force compared to never-married women, while separated and divorced women are more likely to participate. Women in districts like Nuwara Eliya, Kilinochchi, Kurunegala, Anuradhapura, Badulla, and Rathnapura have higher labor force participation rates. There is a notable gender gap in labor force participation, with males participating more actively than females; over half of the working-age female population remains economically inactive. Females constitute most of the unemployed demographic. Despite being more prevalent in urban and rural areas, labor force participation rates are higher in the estate sector. Most women abstain from job searches due to household responsibilities and education levels. Nearly half of discouraged women are concentrated in younger age groups, with 26% aged 25-34 and 21% aged 35-54. The study underscores the necessity of policy interventions to address barriers to women's labor market participation, especially in household duties and education, to enhance Sri Lanka's female workforce potential and contribute to its economic and social development.

Keywords: *Binary Logistic Regression, Economic Growth, Gender Gap, Women’s Labor force participation.*

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An Examination of Valuers’ Perceptions on Property Valuation during an Economic Crisis: Evidence from Sri Lanka

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Uncertainty, an inherent characteristic of property valuation, is a common phenomenon that cannot be avoided. Nevertheless, the material uncertainty in property valuation should be treated with special professional consideration by valuers. Most recently, Sri Lanka faced a severe economic crisis, increasing the likelihood of presence of material uncertainty in the valuation process. This paper aims to investigate whether there was an abnormal uncertainty in property valuation during the economic crisis of Sri Lanka and to identify the behavioural changes of professionals prompted by the crisis. Data for the study was collected through semi-structured interviews with 12 professional valuers who were selected purposively and analyzed using thematic analysis techniques in conjunction with the theoretical lens of prospect theory. The findings revealed that the valuers indeed experienced abnormal uncertainty in property valuation due to the economic crisis, leading to behavioural changes in valuers which were more subjective in nature. This paper recommends establishing a framework for addressing abnormal uncertainty in property valuation to ensure consistency within the profession. Furthermore, it recommends further investigations into abnormal uncertainty regarding specific property categories and valuation types, including statutory valuations.

Keywords: *Economic Crisis, Professional Valuers, Property Valuation, Valuation Uncertainty*

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Information System Success Factors and Its Influence On The Adoption Of E-Government Services In Sri Lanka

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In the contemporary landscape, the Sri Lankan government places great emphasis on harnessing digital technology to enhance the efficiency and effectiveness of its services (ICTA, 2020). However, the mere integration of digital technology into government services does not inherently guarantee substantial improvements; rather, its impact largely hinges on citizens' willingness to utilize these e-government services (Dayaratna-Banda & Dissanayake, 2022). Furthermore, the uptake of e-government services remains relatively low in Sri Lanka (Withanage et al., 2022). Hence, it becomes imperative to explore the factors that influence a citizens' intention to adopt e-government services. Drawing on the DeLone and McLean IS success (D&M) model, the study aims to examine the influence of Security, System Quality, Information Quality and Service Quality on the citizens' intention to use e-government services.

The study adopts a deductive approach and follows a quantitative research design. To examine the hypotheses, we distributed 350 questionnaires to Sri Lankan citizens who have internet access and have utilized online passport application, birth/marriage/death certificate, and vehicle revenue license services. The sample size was calculated using Cochran's Sample Size Formula. The survey was conducted via a Google Form, and we received responses from 250 individuals. Analysis of the data indicated that Security, Service Quality, and Information Quality shows a significant impact on the intention to use e-government services. However, our findings did not show a significant impact of System Quality on the intention to use e-government services.

This research fills a theoretical gap by revealing the influence of security and quality-related factors on the intention to use e-government services in Sri Lanka. Understanding these key factors will guide policymakers in formulating strategies to enhance the citizens' intention to use government websites for information and transactions. The study could be further extended to include other e-government services and a larger sample size representing the population.

Keywords: *System quality, Information Quality, Service Quality, Security, E-government services*

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The Role of Investor Perspectives on Cryptocurrency Integration in Sri Lankan Investment Portfolios Using the Black-Litterman Model

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The study examines the integration of cryptocurrencies into investment portfolio diversification, emphasizing the influence of investor opinions on their portfolio strategy in Sri Lanka. The study has investigated how investor views impact portfolio optimization when cryptocurrencies are included into their investment portfolios. The Black-Litterman model was employed to assess this influence, incorporating historical prices of conventional equities, cryptocurrencies and other relevant financial data. The S&P20 index of the Colombo Stock Exchange represents the conventional equities while Bitcoin and Ethereum were used to benchmark cryptocurrencies for the study period of 2021 to 2023. The timeframe was strategically chosen to encapsulate both the pre-and post-COVID eras in Sri Lanka, thereby capturing the nuances of economic recovery from the crisis and the economic downfall. The findings from this timeframe indicate that incorporating investor views produced superior risk-return outcomes that significantly enhanced portfolio performance. The analysis emphasized that the post-implementation of investor viewpoints, the portfolio's volatility and anticipated returns align more closely with the investors' expectations. Accordingly, even with the high volatility of cryptocurrencies, the portfolio achieves optimal returns and Sharpe ratios with reduced overall volatility. This demonstrates the Black-Litterman model's efficacy in addressing the challenges posed by integrating cryptocurrencies into investment portfolios. The study highlights the potential of investor-informed strategies to improve portfolio diversification and the performance of their stock portfolio by incorporating cryptocurrencies. This provides novel insights to Sri Lankan investors, policymakers and portfolio managers on optimizing portfolio performances encompassing investor views and cryptocurrency investments.

Keywords: *Bitcoin, Black-Litterman, Cryptocurrency, Ethereum, Investor views, Portfolio diversification, Portfolio optimization*

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Simulating Stock Prices Using Geometric Brownian Motion in the Malaysian Stock Market

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Among these mathematical models, the Geometric Brownian Motion (GBM) model plays a pivotal role in predicting stock prices. Bursa Malaysia, the financial sector's foundation, offers a vibrant venue for securities trading, which is essential to the growth of the country's economy. This study aims to evaluate the GBM model's performance in various market contexts in Malaysia, particularly considering different market capitalizations and industry sectors over various time frames. The sample for this study includes companies from the sectors of Financial Services, Property, Industrial Products & Services, and Transportation & Logistics and Daily stock price data obtained from Yahoo Finance from 2019 to 2023 used in the study. The methodology involves applying GBM to simulate short-term and long-term stock prices and evaluating the accuracy using statistical measures MAPE and RMSE. The findings reveal that the GBM model exhibits high accuracy in short-time forecasting across a diverse range of stocks, however, its efficiency diminishes over more extended forecasting periods also large-cap stocks yield more stocks and more accurate short-term predictions, also the model's effectiveness varies significantly across the sector. This study establishes the model's effectiveness in short-term forecasting but cautions against its reduced accuracy for long-term predictions under varying market conditions. The research emphasizes the importance of a multifaceted approach to financial modelling, highlighting the need for careful application in long-term investment strategies and policy development within markets like Bursa Malaysia.

Keywords: *Geometric Brownian Motion, Simulation, Stock prices*

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Assessing Profitability of Sri Lankan Commercial Banks Amidst Crisis

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This study aims to examine whether the Covid 19 pandemic and the post pandemic economic crisis have damaged the primary profitability of commercial banks. This study uses annual data from 2011 to 2023 for ten leading public and private domestic commercial banks in Sri Lanka. The results have been obtained using panel regression models and mean comparison tests. This study identified that the primary profitability measured by ROA is lower during health crisis and economic crisis periods and it achieves statistical support under comparison tests. The negative impact on ROA is dominant in the first Covid 19 year (2020) and the first economic crisis year (2022) than other periods. Further, comparison tests show that the impacts of any crisis are not superior to one another. However, when controlled for the bank-specific and macroeconomic factors, the negative differential effect of both crises fails to achieve statistical significance, indicating that Covid 19 and post-pandemic economic crisis have impacted domestic commercial banks weakly. This is the first kind of study to uncover that the domestic commercial banks have managed to maintain their primary profitability without a large injury to ROA during the health crisis and economic crisis years, helping them remain resilient during the crisis period.

Keywords: *Commercial Banks, Covid-19, Economic Crisis, Post Pandemic, ROA*

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Psychological Consideration to Engage Employees for Knowledge Sharing in Service Organizations

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Knowledge is the most incremental asset for organizations. Researchers, practitioners, and academics are establishing different arguments on the thought and established different models and concepts to make the organizations effective. Sharing knowledge among employees is an effective way for an organization to produce innovativeness. Engaging employees in this exercise is often difficult for organizations since employees hoard knowledge and have a fear of future consequences. Different studies address these issues and emphasize the importance of employees' psychological considerations in enhancing employee knowledge-sharing behavior within organizations. Psychological considerations determine long-term employability. However, psychological elements like employee well-being and empowerment positively affect employee behavior. Psychological well-being refers to employees' personal progress and life happiness. Psychological empowerment involves autonomy, knowledge, meaningfulness, and employee commitment to managerial techniques. Thus, psychological well-being and empowerment improve employee satisfaction, ethics, and work engagement to ensure employee knowledge-sharing behavior. Though the psychological elements manifest strong ties with knowledge sharing, the availability of the literature is scanty, especially in countries like Bangladesh. The study objective is to address these gaps and develop a research model where psychological well-being and empowerment are considered influencing factors to reduce the fear of sharing and improve knowledge-sharing behavior in service organizations in Bangladesh. This study utilized a quantitative approach, employing Partial Least Squares regression (PLS)-based Structural Equation Modeling (SEM) to test the hypotheses. A survey questionnaire was used to collect data from various service organizations, e.g., banks, telecom, etc. The result of this study also confirms that psychological considerations impact employee knowledge-sharing behavior across organizations. The finding of this study produces an interesting outcome for policymakers, practitioners, and academic and industry-related people who are connecting knowledge-sharing behavior in the context of Bangladesh and showing a unique way to manage the organization to become competitive. The results also demand future research initiatives, and the model can be used in a similar economy to develop a generalized understanding to make the organization effective.

Keywords - *Bangladesh, Knowledge sharing, psychological well-being, psychological empowerment.*

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Impact of Financial Literacy, Financial Stress, Self-Efficacy, and Coping Strategy on Help-Seeking Behavior and Academic Performance During Economic Crisis in Sri Lanka: With Special Reference to University of Kelaniya Undergraduates

K.P.G. Sathsarani¹ and S.S.Weligamage¹

Sri Lankan citizens, including university students, have faced significant economic challenges, financial instability and maintaining their academic performance during the financial and economic challenges period. This study aimed to examine the impact of financial literacy, financial stress, self-efficacy, and coping strategy on help-seeking behavior and academic performance among undergraduates during an economic crisis in Sri Lanka. Data were collected from 324 students at the University of Kelaniya using a questionnaire consisting of both close-ended questions and 5-point Likert scale-type questions. The convenience sampling technique was used to ensure practical accessibility and was placed on the sample's representativeness, considering students from diverse socioeconomic backgrounds, academic disciplines, and various academic levels. Financial Literacy, Financial Stress, Self-Efficacy and Coping Strategy, and Help-seeking Behavior were used as the independent variables, and help-seeking behaviour and academic performance were used as Dependent variables. Data was tested using frequency distribution, descriptive, validity and reliability checking, correlation and regression analysis through inferential statistics. All variables, including financial stress, financial self-efficacy, financial literacy, coping strategy, help-seeking behaviour, and academic performance, exhibit alpha values above 0.7, meeting the accepted threshold for reliability. Correlation analysis results reveal significant relationships between help-seeking behavior and various factors. Strong positive correlations were observed with all independent variables, and all are statistically significant at the 0.05 level. These results imply that individuals facing higher financial stress are more inclined to seek help, linked to perceived financial self-efficacy, financial literacy, and coping strategies. The findings highlight the interconnected nature of these variables in influencing help-seeking behavior during economic challenges. The study's findings also revealed that financial stress and coping strategies significantly impact students' help-seeking behavior and academic performance. The study also found that financial self-efficacy and financial literacy had a significant impact only on academic performance. This study recommended developing comprehensive financial wellness awareness programs among undergraduates and enhancing financial literacy and coping skills to manage their academic performance.

Keywords - *Academic performance, Coping strategy, Financial literacy, Financial stress, Self-efficacy, Help-seeking behaviour.*

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Determinants of Hydrogen Bond Financing Costs: Gender Balanced Boards & Bond Maturity Type Risk

Dr. Geeta Duppati¹

This study examines whether board female representation and bond maturity type risk individually or jointly affect the issuing firms' hydrogen bonds financing costs. It predicts that corporations with higher female representation on their boards have lower financing costs than issuing organizations with lower female representation. This paper addresses its research issues by examining a sample of 212 corporate and government institutions across 36 countries engaged in the issuing of Hydrogen green bonds, namely callable bonds or maturity bonds. The data is obtained from the Bloomberg database. This study addresses the research concerns mentioned using a variety of statistical estimating techniques, including regression techniques (OLS and Quantile) and propensity score matching tests. The theories considered in the study include masculinity theory, agency theory, and the study's findings. The study results confirm that female representation is a very important determinant of the hydrogen bond financing costs and are robust to testing with different samples, specifications, and explanations. Despite a significant negative relationship between female board representation and financing costs, firms in the lower segment of the bond coupon rate distribution experience a decrease in bond coupon rates with increased female board representation, as compared to the 50th, 75th, and overall average distributions. This suggests that gender diversity may have differential effects depending on the firm's bond financing conditions.

Keywords: *Hydrogen Green Bonds, Financing Costs, Female Board Representation, Maturity Type Risk*

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Pushed To the Brink: A Conceptual Paper on How Overwork Climate and Abusive Supervision Fuel the Intention to Quit Among Employees in Malaysian Banks

Mohd Fuzi, N.¹ Mohd Rasdi, R.² and Wan Abdullah, W. A.³

This study investigates the predictors of turnover intention among employees in the Malaysian banking sector, focusing on the role of overwork climate and abusive supervision. The banking industry in Malaysia is characterized by high work pressure and competitive demands, making turnover intention a critical concern for organizational performance and human resource management costs. The emphasis on overwork climate and abusive supervision as primary predictors stems from their pronounced influence on stress levels and job dissatisfaction within this high-pressure context. These factors are posited to be more salient in determining employees' decisions to leave, compared to other potential predictors. This study will employ a quantitative research approach, employing a cross-sectional survey design to collect data from a representative sample of banking employees in Malaysia. The data will be analyzed using Structural Equation Modelling (SEM) to assess the direct and indirect effects of overwork climate and abusive supervision on turnover intention. By understanding the relationships between these variables and turnover intention, this study seeks to contribute to the existing body of literature, offering a nuanced understanding of the unique work dynamics present in the Malaysian banking sector. The anticipated findings aim to inform management practices by highlighting the importance of addressing overwork and abusive supervision as key strategies for reducing turnover rates. Ultimately, this research aspires to enhance employee satisfaction and commitment, thereby promoting a more stable and productive workforce.

Keywords- *Abusive Supervision, Bank, Financial Institution, Overwork Climate, Turnover Intention.*

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Learning from Career Preparedness: Examining the Influence of Person-Environment Fit on Decent Work Expectations

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The impact of person-environment fit on decent work expectations was less explored among economically disadvantaged students. The main purpose of the study is to investigate the influence of person-environment fit on decent work expectations, and to examine the mediating effect of career preparedness on this relationship among Chinese students with financial constraints. Data were collected from several universities in China consisting of 356 economically disadvantaged college students ($M_{\text{age}} = 20.3$ years, $SD = 1.27$, 71.9% female). Structural equation modelling analysis was employed to examine the hypotheses of the study. The findings showed that person-environment fit significantly influenced decent work expectations directly and indirectly through career preparedness. A new contextual support (i.e. person-environment fit) was identified, and revealed the learning mechanism of career preparedness between P-E fit and decent work expectations. Insights into theory and practice are put forward.

Keywords: *career preparedness, decent work expectation, person-environment fit, social cognitive model of career self-management.*

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AI Evolution: Assessing Maturity, Addressing Challenges, and Seizing Opportunities

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This article investigates the impact of AI-based automation technologies on workplace maturity levels, emphasizing the challenges and opportunities arising from their integration. Utilizing triangulation approaches, six case studies from various service industries, such as consulting, insurance, e-commerce, healthcare, education, and telecommunications were analyzed, focusing on the phases of experimentation and optimization in AI application. The primary challenges identified include ethical and legal concerns, resource constraints, resistance to AI adoption, and complexities in human-AI relationships. Conversely, the implementation of AI offers benefits such as increased productivity, enhanced customer satisfaction, and improved safety protocols. These findings are particularly relevant to the Sustainable Development Goal (SDG) of decent work, suggesting that AI can significantly contribute to equitable, inclusive, and sustainable economic growth by improving job conditions and workplace quality. The study provides practical insights for policymakers to develop incentives and regulations for Industry 4.0, promoting a holistic approach to AI utilization. Human resource professionals can leverage this research to devise tailored strategies based on their organization's AI maturity level, addressing challenges and seizing opportunities to advance AI implementation efforts. This study highlights the dual impact of AI in the workplace, demonstrating its potential to both disrupt and enhance various organizational practices, and aligns its findings with the global focus on promoting equitable employment opportunities.

Keywords: *Artificial intelligence maturity, decent work, digitalization, human resource, multiple case study*

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Corporate Characteristics, Governance And Climate Change Disclosures In South Asian Context: A Signaling Theory Perspective

V. D. V. Sonali¹, M.P.G. Vijerathna², S.D.P.P. Kannangara³

Climate change has become a favorable and ponderable topic due to its irrevocable impact on human beings. People worldwide are experiencing horrible circumstances due to global warming. At present, researchers are considering climate change and its methods of mitigation, but the plethora of research studies has put off financial sector firms without considering their direct and indirect impact. Indeed, the banking sector influences climate change subtly and unswervingly. This study aims to investigate the extent of climate change disclosure level and the influence of corporate characteristics and governance on climate change-related disclosure in the banking sector in the South Asian region based on the signaling theory. This research has adopted a quantitative research methodology. Data were collected from a sample of 63 banks for the period from 2013 to 2021 in South Asian countries such as India, Pakistan, Bangladesh, and Sri Lanka, and R programming (R 4.30) and Python were used for the panel data analysis to validate the hypothesis. Findings revealed that bank age, size of the bank, and independence of the board provide favorable signals to influence climate change disclosures in South Asian countries. This study adds to the existing body of knowledge on corporate characteristics including corporate governance and climate change-related disclosure in the banking sector because climate change practices are an upcoming and inescapable problem that humans can come across. Therefore, reporting the impact of climate change is very vital within the organizational context. For future research studies, the period and sample can further be increased by future researchers to broaden the scope of the study.

Keywords: *Board Independence, Board Size, Climate Change Disclosure, South Asia*

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Why do Consumers Return Products?: Online Product Return Behavior of Young Female Consumers with Special Reference to the Fashion Industry in Sri Lanka

Bandara W.M.H.P¹ and Geethanjali W.M.D.K²

E-commerce is getting increasingly popular around the world. Following the COVID-19 epidemic, e-commerce in Sri Lanka surged considerably. The fashion industry is a well-known industry that sells products to consumers via online channels such as social media and websites. Young, tech-savvy female consumers are becoming increasingly important in online retailing specifically in the fashion industry. Online product returns are a relatively new field in the Sri Lankan setting, therefore researchers utilized qualitative methodology to study the unique phenomena. In this study, the researchers identified the factors influencing online product returns among young female (Gen Z) consumers in the Sri Lankan context. 20 semi-structured interviews were conducted with both buyers and sellers to gather data for the study. The purposive sampling technique is used to select the respondent for the study. A thematic analysis was used to analyze the interview data. Researchers categorized the factors under three main themes such as customer requirement mismatch, cultural issues, and late deliveries. In addition, the researchers discovered customer recommendations for online fashion retailers to reduce online product returns. Furthermore, the researchers explored the fraudulent practices of consumers such as intentional damage to the product by reviewing bad comments, not paying for the delivery, placing the order without paying upfront, and not buying the product. In addition to that, researchers identified recommendations from customers to retailers to reduce online product returns. The implications of this study will help online fashion retailers reduce product returns by understanding customer expectations.

Keywords: *Fashion industry, Fashion products, Female consumers, Product return behavior*

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How Does Firm Specific Risk Impact for the Firm Performance of Insurance Industry in Sri Lanka

Sooriyaarachchi S.K.R.N¹ and Buddhika H.J.R²

Risks and uncertainties unique to the operations and functioning of insurance businesses are referred to as insurance-specific risks. Thus, using a sample size of 27 companies, the study examines how these insurance-specific risks affect profitability in Sri Lanka over an 11-year period (2012–2022). Insurance-specific risk for independent variables has been measured using three variables: reinsurance, technical provisions, and underwriting risks. Firm performance was assessed using the return on equity as the dependent variable. The Ex-Post Facto Research Design, on which the study is based, makes use of previously gathered data. Their yearly reports provided secondary data for the study. The fixed effect regression model's findings demonstrated that, whilst underwriting risk had a negative and negligible effect on return on equity, technical provision risk and reinsurance risk had a negative and significant influence. According to the study's findings, the insurance companies listed in Sri Lanka will become less profitable as reinsurance and technical provision risks rise. According to the study, insurance companies in Sri Lanka should adequately account for unpaid claims by evaluating their liabilities and considering their experience in order to create a thorough process for efficiently tracking and managing their unpaid claims. Additionally, Sri Lankan listed insurance companies will take into account their risk retention ratios and reinsurance policies. Listed insurance companies must also improve their capacity to pay the majority of claims on their own.

Keywords: Profitability, Re-insurance Risk, Technical Provision Risk, Underwriting Risk

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How Does Loss Aversion Mediate the Relationship between Personality Traits and Investment Decision-Making?

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This research finds evidence of the mediating role of loss aversion in the relationship between personality traits and investment decision-making among individual investors of the Colombo Stock Exchange. In Behavioural Finance expected utility maximization is replaced by the Prospect Theory, and it emerges as a fundamental descriptive theory for the study, attempting to uncover the subtle interplay between big five personality traits—conscientiousness, extraversion, agreeableness, neuroticism, and openness to experience— and investment decision making. The study employed a quantitative research approach utilizing a convenience sampling technique, with 351 individual investors contributing to the research. Data collection was carried out through a structured questionnaire. The study adopts a cross-sectional time horizon, and Structural Equation Modelling was used to analyze the data with the help of SmartPLS4 statistical software. The study identified significant relationships between personality traits and investment decision-making. Specifically, openness to experience and agreeableness were positively associated with investment decision-making, while extraversion, openness to experience, and conscientiousness were significantly related to loss aversion. Mediating analysis revealed that loss aversion fully mediates the relationship between extraversion and conscientiousness with investment decision-making, and partially mediates the relationship between openness to experience and investment decision-making. The study's findings highlight that considering personality traits in investment decision-making can help financial practitioners in Sri Lanka and similar economies tailor investment strategies, improve investor education

Keywords: *investment decision making, loss aversion, personality traits*

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Understanding GCC Banks: Credit risk, Interest Charges, and Operating efficiency

Duppati, G.¹ and Maamari, B. E.²

This study empirically examines two research questions: First, whether the Credit Risk increases the operating efficiency of banks? And second, whether Interest Charges Influences the relationship between Credit Risk and Operating Efficiency? This study uses the secondary data and it is drawn from EIKON DataStream for the period 2005 to 2022. The sample size of the study includes 50 banks of the GCC region, covering eight states, which includes: Abu Dhabi, Dubai, Saudi Arabia, Sharjah, Kuwait, Oman, Qatar and UAE. For addressing the research questions raised in this study, we employ different regression techniques that include the fixed effects (FE) model and System dynamic panel-data estimation test to ensure robustness of the results. Our results show that high interest rates benefit the 25th and 75th percentiles, but the firm's ability to adapt, innovate, and restructure in response to the changing financial environment will determine how much they benefit lower efficiency quantiles. Banks that overcome these challenges may become more competitive, efficient, and streamlined. While higher interest rates increase financing costs and financial constraints for lower-efficiency banks, they can also spur good transformation.

Keywords: *Credit Risk, GCC-Banks, Operating Efficiency, Systems-GMM*

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Environmental Accounting Disclosure and Financial Performance: Evidence from Listed Manufacturing and Service Sector Companies in Sri Lanka

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The most challenging environmental issues that the world is facing today are climate change and global warming, which stem from business operations. Hence, it is the responsibility of the business sector to protect the environment and society. Thus, the observation intends to examine the impact of environmental accounting disclosure on the financial performance of manufacturing and services sector companies listed in the Colombo Stock Exchange, Sri Lanka. The methodology was a quantitative survey approach involving a sample of 28 manufacturing and 17 service sector companies over consecutive financial years from 2012 to 2022. The content analysis technique was used to measure the level of environmental accounting disclosures. The Environmental Accounting Disclosure Index (EADI) was prepared based on eight environmental accounting disclosure items. The regression analysis revealed a significant positive impact of environmental accounting disclosures and the firm's financial performance of manufacturing companies but not service companies. The results of this study will make it easier for regulators and those who prepare annual reports for highly environmentally sensitive industries to set the foundation for environmental accounting disclosure practices that lead to improved financial performance.

Keywords: *Content Analysis, Environmental Accounting Disclosure, Financial Performance, Manufacturing and Service Sector*

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Design and Development of a Reusable Chatbot for Fashion Recommendations: Sinhala Language as a Case Study

Sugathadasa P.D.C.M ¹, Yatigammana M.R.K.N ² and Wijayarathna G. ³

People communicate about their lifestyles, ideas, and social standing through fashion. Due to the ever-evolving desires and personal preferences and the availability of a wide range of options, selecting the ideal fashion design becomes difficult for customers. As a result, recommendation systems and chatbots have come to the market. In Sri Lanka, these chatbots are only available in English; thus, they are restricted in their ability to serve most Sinhala-speaking community in Sri Lanka. To solve the said problem, this study builds a Sinhala fashion recommendation chatbot. This research focuses on the development of a chatbot developed using Python Flask. It uses OpenAI's GPT-3.5 Turbo to understand and generate human-like responses and Bing Translator to communicate in Sinhala language. The fashion problem solution was developed using the Soft Design Science Research Methodology (SDSRM). The chatbot was designed and developed using component-based software engineering (CBSE), which allows one to easily develop a complex application like a chatbot and export it to other domains. This makes it easy to deploy the chatbot for different purposes in business, education, or any other field with minimal modification. A hosted chatbot prototype was evaluated using a Google Form to obtain feedback. Users reported satisfaction with the personalized style suggestions, indicating the system's potential effectiveness. The unique achievement of this study was building a reusable chatbot module by combining several components; therefore, with minimum modifications, the chatbot can be customized to other domains as well.

Keywords: *Chatbot, Fashion Design, Re-usable, Sinhala Language*

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Introduction

The fashion industry is a diverse global business involving producing, marketing, selling, and consuming clothing, accessories, and footwear. It is a dynamic and ever-evolving industry driven by creativity, innovation, and consumer demand. The sector includes designers, manufacturers, wholesalers, retailers, and consumers, each playing a pivotal role in shaping fashion trends and styles. Fashion is a means of self-expression and reflects cultural, social, and economic values. With the advent of e-commerce, marketing has made the fashion industry more accessible and inclusive, allowing individuals to express their style and draw inspiration from worldwide.

One of the significant technological advancements in fashion design is Computer-Aided Design (CAD) software, which has enabled fashion designers to create and manufacture their fashion ideas. With the help of this CAD software, designers can simplify the design process, improve design quality, and reduce production time (Sayem et al., 2010).

On the other hand, the way consumers access fashion information has changed. With the advancement of the internet, many digital media channels are now becoming popular among fashion consumers (Chu & Seock, 2020). Consumers can now access fashion blogs, social media, magazines, events, and personal stylists as sources of information on the latest fashion trends (Michaela & Orna, 2015). On the other hand, fashion marketers have changed their marketing strategies and evolved to include influencer marketing, a popular trend among consumers, especially the younger population (Zietek, 2016). With the help of influencer endorsements, brands can quickly and effectively reach their target audience and lead to higher sales and customer engagement.

Recommendation System

A recommendation system is a computer program that uses machine learning upon data analysis to identify what a user is searching for among an ever-increasing number of options. The system predicts, narrows down, and presents suggestions based on a user's past behaviours and preferences. The recommendation system can offer a range of options and recommendations based on their purchase history, new trends, in-depth information, real-world exhibitions, and personalized advice. However, these recommendation systems have issues such as cold start problems, scalability concerns, data sparsity, and over-specialization issues. (Sharma & Gera, 2013).

Recommendation Chatbots

Recommendation chatbots emerged as a promising solution for the problems in recommendation systems, as they can handle a wide range of inquiries and tasks. The AI-powered assistants are particularly adept at answering frequently asked questions, booking appointments, and making personalized user recommendations. Compared with other recommendation systems, chatbots could be deployed through several platforms, such as websites, social media, and messenger platforms. Further, chatbots' smartphone compatibility facilitates most citizens' use of chatbots in their daily activities (Lin et al., 2023).

Problem Statement

Fashion has become essential to our lives, enabling us to express our personality, culture, and identity. People choose their fashion based on various factors, such as personal style, trendiness, comfort, price, and occasion (Ray & Nayak, 2023).

However, the process of choosing fashion designs has several challenges and difficulties. These include finding fashion designs with the right size that fits a person's body type, choosing the latest fashion designs with constantly changing

trends and styles, limited availability of fashion designs in certain regions, and difficulty in finding fashion designs for a unique personal style (Wang et al., 2015).

To address these issues, recommendation systems were developed. However, these systems faced their own limitations, such as the cold start problem, scalability concerns, data sparsity, and over-specialization issues (Sharma & Gera, 2013).

As a solution to these persistent problems, chatbots emerged as a promising technology. Chatbots offer several advantages over traditional recommendation systems. They can be deployed across multiple platforms, including websites, social media, and messaging apps, making them highly accessible. This accessibility is particularly important given the prevalence of mobile devices in modern society. According to Statista, there were 6.92 billion smartphone users worldwide in 2023 (*How Many People Have Smartphones Worldwide (May 2023)*, n.d.). In Sri Lanka specifically, the CEIC reports 30.764 million mobile cellular users (*Sri Lanka Number of Subscriber Mobile, 1960 – 2023 | CEIC Data*, n.d.).

The widespread use of mobile devices makes chatbots an ideal solution for reaching a broad audience, including rural citizens of Sri Lanka, with personalized fashion design recommendations. However, despite the potential of chatbots, there isn't a fashion design suggestion chatbot in Sri Lanka that can support the Sinhala-speaking community. Various chatbots recommend fashion designs that are built in the English language, which prevents most of the Sinhala-speaking community from using them.

Landim et al. (2022) also state that implanting such a bot is challenging because it focuses on how difficult human language is and how well the chatbot performs in a fashion environment.

Therefore, this study intends to improve user access to fashion advice in Sri Lanka and other countries where the Sinhala language is prevalent by building and developing a chatbot that can support the Sinhala language.

Thus, the objectives of this study are to:

1. Design and develop a reusable Sinhala Chatbot to provide Fashion Design recommendations for the Sinhala-speaking community.
2. Evaluate the prototype of the Fashion Chatbot with the potential users.

Literature review

Chatbots can emulate human conversations and entertain users. They can also be used in education, information retrieval, business, and e-commerce (Abu Shawar & Atwell, 2007). Chatbot can assist, solve, or automate tasks under the given information (Commands) (Lewandowski et al., 2021). Looking back to the history of Chatbots, the first Chatbot was developed in 1966. That Chatbot is called Eliza. Eliza aimed to act as a psychotherapist and return the user's words as a question (Weizenbaum, 1966). After Eliza Chatbot named ALICE was developed in 1995. ALICE is built on the Artificial Intelligence Markup Language (AIML) and uses a straightforward pattern-matching algorithm. Chatbots were developed inside messenger platforms in 2001. As a result, developers started to build virtual personal assistants like Apple Siri, Microsoft Cortana, Amazon Alexa, Google Assistant, and IBM Watson were developed as the next steps (Adamopoulou & Moussiades, 2020). According to Gümüş & Çark (2021) there are four types of Chatbots that organizations use to handle their customer services. They are flow-based chatbots, AI chatbots, hybrid chatbots, and Human-powered chatbots.

Shoufan (2023) observed that students like ChatGPT's features and find it helpful for school and jobs. Its human-like interface and well-structured responses and explanations make it straightforward to use. However, many students believe ChatGPT's answers are not always accurate and require solid foundation knowledge since technology cannot replace human intelligence.

The first Sinhala chatbot was developed in 2006. This chatbot was constructed as an implementation of the Sinhala language parsing system. Simple inquiries can be answered using this system. It does not cover a specific domain, and the development purpose was to implement a Chatbot system that uses a Sinhala language and motivates future Sinhala Chatbot developments. The chatbot was created with Java and SWI-Prolog, and its knowledge base is made from the Windows Operating System (Hettige & Karunananda, 2006).

After that system, a domain-specific Sinhala chatbot was developed to answer user inquiries about the Degree Programs at the University of Ruhuna. So, users can effectively answer their inquiries and solve problems with a domain-specific chatbot since they can ask questions directly and reference specific topics, saving time on internet searches. The developer uses an open-source dialogue management tool called RASA to develop this chatbot. There are two main parts of the RASA framework: RASA Core and RASA NLU. Users are empowered by RASA Core's sophisticated interactions and chats. The chatbot deployed in the university website widget and the university's Facebook page as a messenger bot (Kumanayake, 2021).

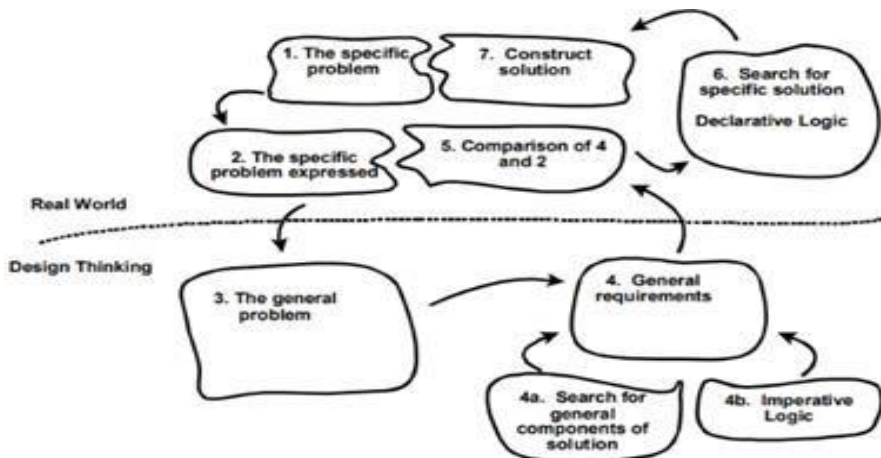
When looking at the recommendation for the Sinhala chatbot, there is one chatbot. It was built for a specific domain, and it is on "Sri Lankan Traditional Dancers." Researchers make a system for traditional dancers to find creators of dance tracks, costume designers, prop suppliers, and choreographers. So, the article presents a website that offers data based on geography and rating, acting as a system for service providers' recommendations. The "cold start problem" can be resolved by this system (Chandrasena et al., 2021).

Methods

This research used the soft design science research methodology (SDSRM) (Venable et al., 2017).

Figure 1

Steps of SDSRM



Source: (Venable et al., 2017)

SDSRM methodology is inspired by Soft Systems Methodology (SSM). It has seven activities to solve a socio-technical problem.

1. The authors conducted a literature survey and internet search and found that no fashion design recommendation system can provide recommendations in Sinhala.
2. A survey conducted among Sinhala-speaking customers expressed the need for a fashion design recommendation mechanism in Sinhala. We also found that some fashion design recommendation systems support English-speaking communities. The fashion design recommendation generated in English must be translated into Sinhala.

3. For this project, we need a bilingual translation of Sinhala-English. A new system is also required to communicate with the existing recommendation systems and language translators.
4. The component-based Software engineering (CBSE) process is adopted to design and implement the general solution. We decided to reuse all available components, such as language translators and recommendation systems, and integrate them through a new system to solve our problem identified in Activity 1. This approach reduces the project duration drastically while maintaining the quality of the recommendations generated at a high level. We created a software model for the general requirement at this step.
5. The general design requirements are evaluated against the specific problem to assess compatibility and test the feasibility of the general solution. The problem is reframed regarding the general requirements and the imperative logic to articulate the design.

Table 1*Mapping SDSRM*

Specific Problem from Step 2	General Requirements from Step 4
<ol style="list-style-type: none"> 1. It is required to have a bilingual translation between Sinhala and English 2. It is required to interact with existing recommendation systems. 	<ol style="list-style-type: none"> 1. Used CBSE to identify components to satisfy the requirements elucidated in the Activity 2 2. Developed a software model using the components identified in the above activity.

6. Conducted a literature survey and Internet search to identify software components available in the market, facilitating the subsequent solution construction. Developed the system and conducted testing and evaluation.
7. Developed the system, implemented the identified components, and conducted thorough testing and evaluation to ensure functionality, usability, and performance.

Chatbot Development

Component-Based Software Engineering (CBSE): A Brief Overview

CBSE is a specialized branch of software engineering that focuses on constructing software systems using reusable, replaceable, and loosely coupled independent components (Crnkovic, 2001). Embracing the separation of concerns principle, CBSE divides the software development process into autonomous elements, each concentrating on a specific component or function of the system.

Components within CBSE are self-contained units in the software architecture, functioning independently and encapsulating distinct tasks. These components adhere to specific interfaces, enabling individual development, deployment, and maintenance. According to IEEE's "Guide to the Software Engineering Body of Knowledge," a software component is described as a "standalone, self-contained, small-sized, and easy-to-understand piece of code with well-defined boundaries" (Bourque, 2014).

This methodology reshapes the traditional waterfall-based development life cycle, which includes requirements, Design, Implementation, Test, Release, and Maintenance, into a streamlined CBSE life cycle: searching, choosing, adjusting, examining, implementing, and replacement. This transformation fosters a more adaptable and modular approach to software design, emphasizing reusability, maintainability, and scalability in constructing software systems.

Why CBSE in this research?

Component-Based Software Engineering (CBSE) offers several advantages that transcend the IT domain so that non-IT undergraduates can grasp the fundamental principles of efficient system development, fostering a more structured and collaborative approach to tackling complex projects, regardless of the specific field they are working in. Building a highly complex system like a chatbot within a year is a time-consuming process that involves years of expertise in areas such as data infrastructure, machine learning, natural language processing, speech recognition, and conversational interfaces.

The studies on software development methodologies have strongly recommended CBSE for several compelling reasons (Gulia & Palak, 2017). This concept suggests that developers can assemble systems by configuring and connecting reusable components from pre-existing packages or libraries instead of developing them from scratch.

Component-based software engineering (CBSE) offers several advantages, including,

1. Timesaving
2. Cost-effectiveness
3. Increased productivity
4. Quality improvement
5. Flexibility and scalability
6. Enhancing reliability

Component-Based Software Engineering Process

Component-based software engineering (CBSE) is a software development approach that supports developing software systems based on the composition of

reusable, standardized, and independent components. (Pressman, 2010; Sommerville, 2011)

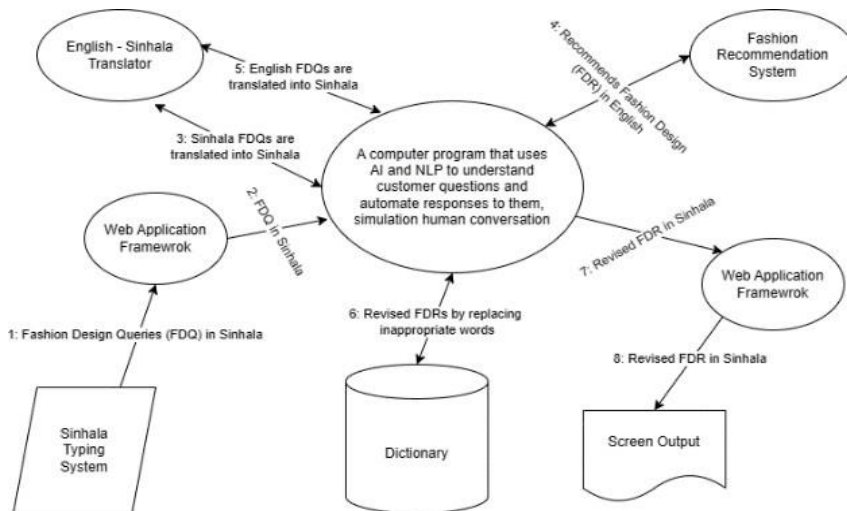
Usually, the following framework activities are included in the development with the reuse CBSE process.

1. Component Identification
2. Component Selection
3. Component Adaptation
4. Component Integration
5. Testing and Verification
6. Deployment and Maintenance

CBSE - Component Identification

Figure 2

Component Identification Diagram



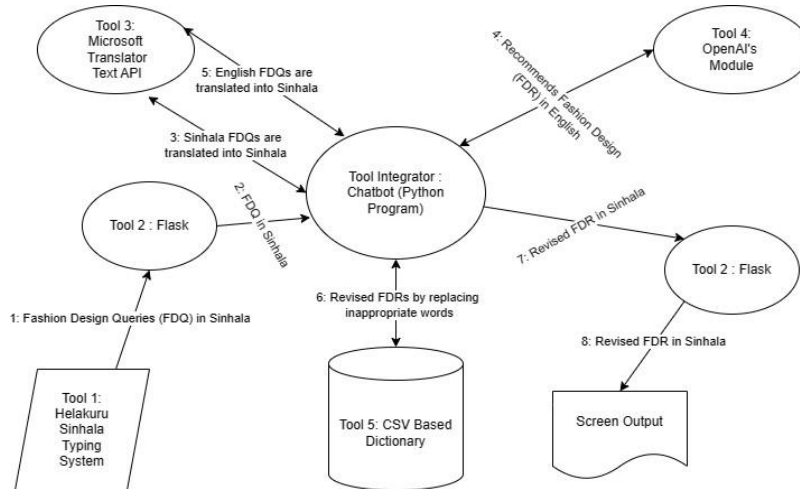
As shown in Figure 2, all the components are identified according to the fashion recommendation system's requirements. The diagram shows how data logically flows through the components. Therefore, the logical process is,

1. The user must use a Sinhala typing tool to type the response to the web UI in Sinhala.
2. Web UI passes user response to Chatbot.
3. The Chatbot passes the user's Sinhala response to the translator, who translates it into English and returns it to the chatbot.
4. The chatbot gives the English-translated user a response to the fashion recommendation system. The recommendation system gives the related recommendations to the chatbot.
5. The chatbot passes the English-style query to the translator, who translates it into Sinhala and passes it back to the chatbot.
6. Chatbot checks Sinhala translated fashion queries with Sinhala language CSV dictionary based on fashion domains and replaces wrongly translated words with correct words.
7. Chabot then delivers the revised Sinhala-style queries to the web UI.
8. Web UI displays Sinhala fashion queries to the user.

These processes can be repeated because the Chatbot is a conversational model. Users can chat with the Chatbot to get their fashion recommendations.

CBSE - Component Selection

Following the component identified in the first step of CBSE, the required components were selected to develop this Sinhala fashion recommendation chatbot.

Figure 3*Component Selection Diagram**Selecting a Programming Language*

Python was selected as the programming language for the development process. Python is an interpreted, high-level programming language suitable for various applications. Its design prioritizes code readability, most notably using significant whitespace. Python's syntax and object-oriented features are intended to help developers create clear, logical code that works well for both small scripts and large-scale projects (Siadati, n.d.). Python is also a popular programming language that has gained widespread adoption across various domains, including academia, research, and industry. Its simplicity, readability, and ease of use make it an ideal choice for non-IT undergraduates new to programming.

Additionally, Python's extensive ecosystem of libraries and packages offers a wealth of functionality, enabling users to tackle a wide range of tasks efficiently. Python's straightforward syntax and clear structure make it highly accessible for beginners, particularly non-IT undergraduates with limited coding experience. The language's design prioritizes readability, facilitating developers' understanding and

collaboration. Furthermore, Python boasts an active and supportive community that provides numerous resources, such as documentation, tutorials, and forums, catering to learners at all levels.

Selecting a Web framework

As a web framework, after following the chatbot's requirements, the Python Flask framework was selected among the other Python web frameworks such as Django, CherryPy, Pyramid, Bottle, and Tornado. Flask is a lightweight micro-framework for building web applications quickly. It provides only essential features, allowing developers to add functionality during implementation. As a WSGI application framework, Flask can serve as a backend or handle both backend and frontend tasks. The framework offers an interactive debugger, complete request object, endpoint routing system, and HTTP utilities (Salo, n.d.). Simply Flask allows developers to make web-based applications by combining Python with HTML, CSS, and JS.

One of Flask's key advantages is its status as a microframework, which means it does not require any additional tools or specific libraries, allowing for a more flexible and modular approach to development. This minimalist design philosophy ensures that developers can customize their projects according to their specific needs without being constrained by a rigid set of conventions or dependencies. Overall, Flask's combination of user-friendliness, flexibility, and adherence to industry standards has contributed to its widespread adoption among Python developers, making it a compelling choice for efficiently building dynamic and scalable web applications.

Selecting a Large Language Model

OpenAI's "GPT-3.5-turbo" model was selected as a fashion recommendation system. GPT-3.5 Turbo is a powerful language model created by OpenAI that builds on the GPT-3 series. It marks a substantial leap in natural language processing skills.

The model's lineage can be traced back to the Davinci architecture, which boasts 175 billion parameters (Ye et al., n.d.).

GPT-3.5 Turbo emerged as an optimization of text-davinci-003, specifically tailored for chat applications. It is the most capable model in the GPT-3.5 series, offering advanced performance at a lower computational cost than its predecessor. This balance of capability and efficiency makes GPT-3.5 Turbo a notable milestone in the evolution of large language models (Ye et al., n.d.).

The OpenAI GPT-3.5-turbo model is capable of prompting. This AI model is equipped with the capability of generating responses based on prompts. To construct a fashion recommendation system using this model, it is required to prompt it with a fashion dataset. Reasons to choose OpenAI modules,

- Only Minimum Coding Required.
- Customization and Personalization.
- Broad Knowledge Base.
- Natural Language Interaction.

The selection of the GPT-3.5 Turbo module over alternatives like GPT-3 or hypothetical versions such as GPT-4 for the fashion recommendation chatbot project is underpinned by its augmented capabilities tailored to natural language processing tasks. Compared to GPT-3, GPT-3.5 Turbo offers enhancements like a more extensive model size, refined training data, and improved language understanding, aligning closely with the project's requirements. Additionally, considering hypothetical options, the proven performance and practicality of GPT-3.5 Turbo render it a preferable choice over an unproven and potentially costlier GPT-4 model. This decision reflects an optimal balance of performance, relevance to project objectives, and practical considerations within the current landscape of AI technology.

Selecting a Language Translator

As a language translator for chatbot, Microsoft Translator Text API service was selected among the other language translator services, such as Google Translator, DeepL, Yandex, and IBM Watson, because Microsoft translator service provides higher quality translations than other services.

The Python CSV library was selected to develop a fashion domain-based dictionary. The necessity of a CSV-based vocabulary was raised due to the limitations of machine language translators, especially in a specialized domain like fashion.

CBSE - Component Adaptation

Adapting the OpenAI Module

OpenAI's "GPT-3.5-turbo" model has been prompted to use a fashion dataset to create the fashion recommendations system. For prompt testing, the OpenAI playground has been used. After achieving the desired functionality, the chatbot system was easily integrated using code generated from the playground.

Adapting Flask Web Framework

The chatbot's UI is a web-based user interface built using HTML, CSS, and JavaScript. HTML form elements receive user input and represent outputs. CSS styles the web UI, providing a better user experience. Relevant functionalities were added to the web UI with the support of JavaScript. The connection between the Chatbot program and the Web UI was implemented using Flask's "Request, Render Template, and Jsonify" functions.

Adapting Microsoft Language Translator

The relevant translation functions were created using the Microsoft Azure Python library's capabilities. Following the Azure documentation, after including all the

relevant translation functionalities, the defined function was securely stored as a component.

Developing CSV Based Dictionary

The CSV-based dictionary is essential for finding and swapping out "wrongly translated words" with their correct translations. The Python function 'DictReader,' which is part of the 'CSV' module, was used to read CSV files as dictionaries. Python regular expressions, which are essential to the restoration process, significantly enhances the implementation. A CSV-based dictionary enhances a chatbot's linguistic accuracy in fashion, ensuring more accurate and appropriate responses.

CBSE - Component Integration

Tool integrator: The chatbot serves as the integration tool to bring these components together.

Figure 4

Python Libraries

```
from flask import Flask, request, render_template, jsonify
from gptAPI import baseBot
from translator import BingTranslator
from translator import CSV_Dict
```

First, all required libraries and functions inside App.py are called.

Figure 5

Defining Home Route

```
app = Flask(__name__)

# Define home route
@app.route('/')
def home():
    return render_template('chatbot.html')
```

Then, basic web application routing and view processing were done using Flask, and a home () view function was created that renders the UI template 'Chatbot.html'.

Figure 6

Defining Data Endpoint

```
@app.route("/ask", methods=['POST'])
def ask():
    user_input = str(request.form['messageText'])
```

Then, the Flask route '/ask' was defined as an additional Flask path to request Chatbot responses. This route will integrate all the components. The first logic takes the user text input in Sinhala from a UI field and stores it in a variable called “user_input.”

Figure 7

Calling Sinhala to English Translator function

```
# To_English(Bing_Translator)
english_input=BingTranslator.Bing_Si_to_Eng(user_input)
prompt = english_input
```

After that, the user input is given to the language translation function “Bing_Si_to_Eng” to convert the Sinhala text to English. The results are stored in the English input variable.

Figure 8

Calling to GPT prompted module function

```
#Calling to BaseBot
bot_response = baseBot.generate_API_response(english_input)
```

“english_input” is then passed to the “generate_API_response” function, which interacts with the OpenAI’s API. The “bot_response” variable will save the English response of OpenAI’s module.

Figure 9*Calling to Sinhala to English Translator function*

```
# To_Sinhala(Bing_Translator)
Sinhala_output=BingTranslator.Bing_Eng_to_Si(bot_response)
```

"bot_response" is translated from English to Sinhala using the "Bing_Eng_to_Si" function. Sinhala texts are stored in the "sinhala_output" variable.

Figure 10*Calling to Sinhala to Sinhala Word Dictionary Function*

```
#Using_CSV_Translator - (Translator_r.py)
final_output=CSV.Dict.correct_words_detect(Sinhala_output)
```

The CSV dictionary is called in this step, and the variable value "Sinhala_output" is passed to the function parameter. The result is saved in the "final_output" variable.

Figure 11*Pass to Chatbot's Response to Web UI*

```
#Passing Final Output to WEB UI...
return jsonify({'status': 'OK', 'answer': final_output})
```

As the final step, using Flask's jsonify function returns the final response stored in the "final_output" variable to the web UI. Finally, the Web UI displays the Chatbot's response.

CBSE – Testing and Verification

The testing scenario is the "Style Preference Exploration." In this scenario, user queries and responses are as follows.

In Sinhala,

“මම සනී අන්ත නිවැසිවක සදහාසමනා අලුමක සසමින් සිටිමි. ඔබට හඬකර නමුත් සුවපහසු සෙයක් සයෙන්නා කළ හකි?”

English Translation,

“I am looking for a casual outfit for a weekend getaway. Can you suggest something stylish yet comfortable?”

The Chatbot gives the response as,

In Sinhala,

“අත්සනන්ම! විලසිතමය හා සුවපහසු සති අන්ත නිවැඩි ඇඳුමක් සඳහා මම ඉහළ ඉණ සහිත Jeans සහෝසඬිනිමි කලිසම් යුගලයක් ජරවහක බ්ලවුස් සහෝග්ඊෆික් ටී-ෂට්ට් එකක් සමඟ යුගල කර නිසෙව්ව කරමි. සමහර සුවපහසු ස්කිකට සහෝසසසරජ්ජු සමඟ සපනුම සමුණට කර ක්සරස්සබ්බි බඟයක් සහ අවි කණ්ණඬි සමඟ ජරසව්ව වන්ත්. සමම ඇඳුම ඔසබ්බි සති අන්තය උරම වික් සපනුමක් සහ සුවපහසුවක් ටෙසන්ත්තු ඇත.”

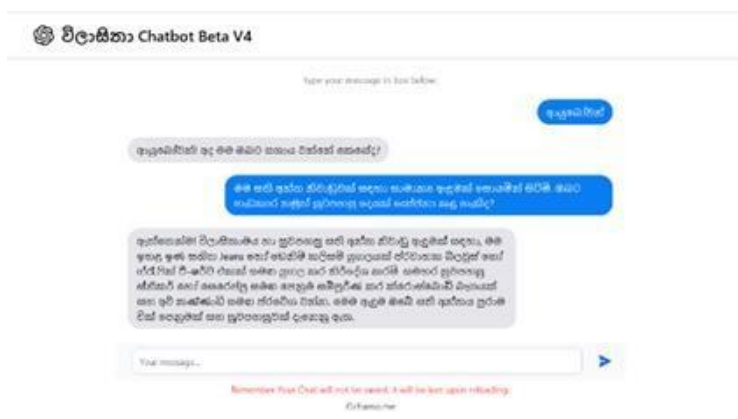
English Translation,

"For sure! For a stylish and comfortable weekend getaway outfit, I recommend a pair of high-waisted jeans or denim pants paired with a flowy blouse or graphic t-shirt. Complete the look with some comfortable sneakers or sandals and accessorize with a crossbody bag and sunglasses. This dress will keep you looking chic and feeling comfortable all weekend."

Figure 12

Chatbot Testing Scenario

CBSE -



Deployment and Maintenance

Deployment

The chatbot developed is deployed and hosted on a Python application cloud called “PythonAnywhere” (*Host, Run, and Code Python in the Cloud: PythonAnywhere*, n.d.). This cloud platform helps integrate development environments (IDEs) for easily deploying and hosting Python applications. It was hosted to provide users with scalability, high availability, and continuous access to the fashion chatbot.

Maintenance

Maintenance of a fashion chatbot involves several crucial aspects to ensure its effectiveness, relevance, and continuous improvement. These includes.

- Upgrade the fashion dataset.
- Improve the conversation ability.
- Update Sinhala fashion data dictionary.
- Upgrade OpenAI modules.

Challenges

Ambiguous User queries handling

This chatbot is created using OpenAI's GPT-3.5 module. Its primary purpose is to answer user queries related to fashion recommendations. If a user attempts to ask questions outside the scope of fashion-related topics, the chatbot is designed to recognize such queries as ambiguous or irrelevant. In such cases, the chatbot will politely remind the user that it is specifically designed to handle fashion-related inquiries and will kindly request the user to rephrase their question within fashion recommendations.

Fashion data set update strategies

As mentioned earlier, this chatbot was built by integrating various components. One of these components is the fashion dataset. Fashion is a domain that evolves daily, and numerous fashion variants exist worldwide. Consequently, it is challenging to upgrade the chatbot's fashion dataset instantly. A strategy has been developed to update the fashion dataset monthly by incorporating the latest global fashion trends to address this issue. The primary purpose of this dataset updating process is to ensure that the fashion chatbot remains up-to-date and relevant for users, providing them with the most current fashion recommendations and information.

Furthermore, the fashion industry is a dynamic and ever-changing landscape, with continually emerging new styles, trends, and designs. To maintain the chatbot's relevance and accuracy, it is crucial to refresh its knowledge base with the latest fashion data regularly. By adopting a monthly update schedule, the chatbot can stay abreast of the rapidly evolving fashion world, ensuring that its recommendations and responses reflect the most recent developments in the industry. This proactive approach to dataset maintenance enhances the chatbot's usefulness and fosters user trust and satisfaction, as they can rely on the chatbot to provide the most current and comprehensive fashion guidance.

Evaluation

A questionnaire was created to evaluate the fashion recommendation chatbot, and responses were collected from 20 independent participants.

Table 2*Chatbot Evaluation*

Questions	User Answers (As a Percentage)
1. Did the chatbot understand your initial request or question?	<ul style="list-style-type: none"> ● Yes : 100%. ● No: 0%.
2. How well did the chatbot recommend fashion items relevant to what you asked for?	<ul style="list-style-type: none"> ● Very relevant recommendations. : 70%. ● Somewhat relevant recommendations. : 30%. ● Not very relevant recommendations. : 0%.
3. Was the chatbot's Sinhala response fluent and easy to understand?	<ul style="list-style-type: none"> ● Very fluent and understandable : 40%. ● Somewhat fluent : 60%. ● Not very fluent or hard to understand : 0%.
4. Could you carry on a conversational dialogue with the chatbot?	<ul style="list-style-type: none"> ● Yes, conversation flowed well : 85%. ● Some back and forth but not very natural. :15%. ● No, responses were too limited for a conversation : 0%.
5. Did the chatbot provide recommendations specific to Sinhala fashion preferences?	<ul style="list-style-type: none"> ● Very specific for Sinhala fashion :65%. ● Somewhat tailored for Sinhala fashion : 35%. ● Not tailored at all : 0%.
6. Were you satisfied overall with the fashion recommendations from the chatbot?	<ul style="list-style-type: none"> ● Very satisfied : 65%. ● Somewhat satisfied : 35%. ● Not satisfied: 0%.

The majority of the 20 users reviewed the chatbot positively, indicating that it provided useful Sinhala fashion recommendations in response to natural language questions.

Conclusion

Significant of the study

Significance in the Fashion Industry

The fashion design recommendation chatbot represents a significant advancement in the fashion industry. By leveraging AI technology, it offers personalized style advice to consumers, potentially increasing customer satisfaction and sales. This tool can help bridge the gap between online shopping and the personalized experience of in-store stylists, making fashion more accessible to a broader audience. Additionally, it can assist designers by analyzing trends and consumer preferences, streamlining the design process, and reducing waste in production.

Adaptability to Other Domains

The chatbot's design uses component-based software engineering (CBSE), which makes it highly adaptable to other domains beyond fashion. This adaptability is significant because,

- It can be quickly modified for use in interior design, product recommendations, or even career advice.
- The cost and time for developing similar AI-powered recommendation systems in different industries can be significantly reduced.
- It demonstrates a model for creating flexible AI applications that can evolve with changing market needs or technological advancements.

Future Research

Future research directions stemming from this study could include:

- Explore the integration of visual recognition AI to provide recommendations based on user-uploaded images.
- Investigate the long-term impact of AI-powered fashion recommendations on consumer behavior and the fashion industry.
- Develop methods to ensure the chatbot's recommendations remain culturally sensitive and diverse.
- Study how to incorporate real-time fashion trend data to keep the chatbot's knowledge current.
- Examine ways to make the chatbot more interactive through augmented reality features for virtual try-ons.

Limitations

AI Expertise Gap

Building a complex chatbot requires deep AI knowledge, including machine learning and natural language processing. This poses a challenge for non-ICT undergraduates.

Library Selection

Finding an AI library that supports Sinhala language processing is crucial but challenging. Thorough research is needed to identify a suitable option.

Sinhala API Scarcity

Locating or developing APIs for Sinhala language processing and fashion domain knowledge is challenging due to limited resources for less common languages.

Conclusion

This research explores designing and developing a Sinhala fashion recommendation chatbot by developing a reusable chatbot module using the CBSE with a minimum coding knowledge suitable for non-ICT undergraduates. This study aimed to build a

reusable chatbot module by combining several components. It is a system that can identify integrated components separately, like a building block structure. If someone wants to create a chatbot based on another non-fashion domain, those developers can easily modify the required components of this Chatbot block separately.

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The Impact of Role Stress on Work-Life Balance Evidence From Sales Employees in The Tile and Sanitary Ware Industry in Sri Lanka

Harshani, M. D. R.¹ and Senevirathne D. M. W. H. K.²

In the modern workplace, work is an essential component of one's professional identity; however, striking a balance between work and non-work activities can be difficult. Since more workers realize the importance of what is now called "work-life balance," maintaining a healthy balance between one's professional and personal lives has come to the attention. However, work is an integral part of one's professional identity in the modern workplace. Work and family are two crucial aspects of an individual's life. Changes in the workplace and employee demographics have driven the attention of many researchers toward the line separating the work and family lives of employees. Maintaining a healthy balance between one's personal and professional lives has gained public attention as more workers recognize the significance of what is now called work-life balance. A few studies have been conducted to illustrate various aspects of role stress on work-life balance (WLB) concerning sales personnel in Sri Lanka's tile and sanitaryware industry. Therefore, the present study aims to investigate the relationship, concentrating on the influence of role stress on work-life balance. The study is quantitative in nature. Responses were obtained from 211 participants via a self-administered survey questionnaire. The multiple regression analysis was carried out utilizing SPSS 23.0 to verify the proposed relationships between the variables. Results showed that role stress (role overload, role ambiguity, and role conflict) significantly impacts the work-life balance of sales employees in the tiles and sanitary ware industry in Sri Lanka.

Keywords: *Role Conflict, Role stress, Work-Life Balance*

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Introduction

In the Today's Context, Work is an integral part of one's professional identity, but balancing it with the non-work activities can be challenging. The maintenance of balance between one's work and non-work domain has become a source of growing public concern in recent years, as more employees recognize the need for what is now commonly known as "work-life balance (Kumari & Kataria, 2022). Work and Family are two crucial aspects of an individual's life. Changes in the workplace and employee demographics have driven the attention of many researchers toward the line separating the work and family lives of employees. Managing work with family is a severe issue as it has decisive challenges for organizations, employees and researchers. There is a significant shift in the obligation of work and family life due to changes in political, social and economic values. Work-life balance is also a way to create a healthy and supportive work environment, which allows employees to have a balance between work and personal responsibility and thereby improve employee performance (Wiradendi & Christian, 2020). The dilemma for Employee competition for work demands has several detrimental effects on workers' work-life balance, including elevated stress, exhaustion from work, and strained relationships at work and with family (Ilayasankar, 2021).

According to Abby McCain (2023), 72% of workers believe work-life balance is a very important factor when choosing a job, and 57% of job seekers say a poor work-life balance is a deal breaker when they're considering a new job. In terms of work-life balance, 94% of service professionals in the U.S. spend over 50 hours working per week, while many of these people work on the weekends. 48% of Americans consider themselves to be workaholics, but 72% of people consider work-life balance when job-searching (Apollo Technical Engineered talent solutions, 2023).

In the industrialized world, occupational stress is becoming a more significant issue that is costly to both individual workers and companies globally. Because of the evolving nature of work, employees are facing never-before-seen demands, which

has raised concerns about how these changes may affect their general well-being. In 2022, Alexia and Katsounari (2022) and Hart et al. (1994) proposed the dynamic equilibrium theory of stress, which addresses certain issues that lead to occupational stress. It proposed that the dynamic equilibrium theory states that a wide range of factors, such as environmental and personality traits, coping mechanisms, good and bad experiences, and different measures of psychological well-being, contribute to stress.

From the analysis of the survey conducted by Md Awal Al Kabir and Rabbir Rashedin Tirno (2018), it was found that poor work-life balance leads to higher employee turnover and turnover intentions, and proper work-life balance of employees has a positive effect on the performance of the organizations.

According to Beehr (2014) an organizational stressor is any workplace stimulus variable that is causal, and a strain is a term used to describe an individual's adverse health or welfare reactions to stressors. These reactions can be either physiological or psychological. On the other hand, role demands, or work role stressors, refer to the demands that an individual faces because of the specific role that they hold within the company (Dionysia-Eleonora et al., 2011).

Roles frequently turn into sources of stress that result in unfavorable outcomes like emotional exhaustion, job satisfaction, organizational commitment, and—most importantly in our case—work-life balance. Work and family are two crucial aspects of an individual's life. As per the Role Theory, roles could equally well be causes of conflict, ambiguity, and overload (Nøstdal, 2022). Changes in the workplace and employee demographics have driven the attention of many researchers toward the line separating the work and family lives of employees. Managing work with family is a severe issue as it has decisive challenges for organizations, employees, and researchers.

According to the literature findings, most researchers have studied role stress and work-life balance independently or with variables like employee engagement, job

satisfaction, employee turnover, employee performance, etc. Among those few studies conducted related to the role of stress and work-life balance, Irawanto et al. (2021) conducted research on 'Measuring Satisfaction between Work-Life Balance and Work Stress during the COVID-19 Pandemic in Indonesia,' as well as studies by Omar, Mohd, and Ariffin (2015); Venugopal (2017); and Aruldoss, Kowalski, Travis, and Parayitam (2021). Another research examining work role stressors, job satisfaction, job stress, and turnover intention by (Dodanwala et al., 2022) focused on Role Stressors as the most influential factor in occupational stress in the Sri Lankan context. There is a lack of studies that have been carried out on role stress and work-life balance with special reference to the sales employees in the Tiles and Sanitary Ware Industry in Sri Lanka. The present study addresses the research question as follows,

What is the impact of Role Stress on the Employee work-life balance of Sales employees in Tiles and Sanitary Ware Industry Sri Lanka.

Literature Review

Work-Life Balance

A person's perception of their ability to effectively manage their work and personal commitments is known as work-life balance, or WLB. In order to attain psychological perfection and job satisfaction, work-life balance also refers to a flexible balance between one's personal and professional lives (Anthony, Prihanto, & Ringkar, 2023) As the times and generations change, work demands and anxieties grow in a society where there is a growing sense of self-conflict between work and life demands, which lowers quality of life (Prasetyaningtyas, Heryanto, Nurfauzi, & Tanjung, 2021). In its simplest form, work-life balance refers to the harmony between one's personal and professional lives and their interactions (Engman & Matilda, 2022). WLB is defined as "the extent to which an individual can adequately manage the multiple roles in their life, including work, family, and other major

responsibilities (Haar, 2013). Based on Zedeck's Spillover theory, the study hypothesized that high levels of observed job pressure stress and job threat stress would predict improved levels of work-life struggle and declined levels of work-life balance.

Work-life balance is crucial in today's business environment for achieving organizational goals (Gagnano, Simbula, & Miglioretti, 2020). Many businesses recognize the importance of work-life balance, which includes retaining key employees, lowering work-family conflict, lowering employee stress, raising job satisfaction, and improving work-life balance (Susanto, et al., 2022). Workplace cultures also appear to need to support and encourage work-life balance practices. Therefore, an employee's intention to stay with the company is aided by a strong and encouraging organizational culture (Arif & Farooqi, 2014). Additionally, workers who do not maintain a healthy work-life balance experience depression, strained relationships with family members, and conflict with peers (Saim, Rashid, & Noorsuriani, 2021)

According to numerous studies, the concept of a work-life balance originated in the 1970s and refers to how well a person balances the demands of their personal and professional lives (Abdirahman, Najeemdeen, Abidemi, & Ahmad., 2018) The idea originated when women started working and had trouble juggling the demands of their personal lives with their jobs, according to Dizaho, Sallen, and Abdullah (2017). Emile and Hunt (2009) reported that employers started addressing work-life balance issues in the workplace by offering additional benefits like childcare and maternity leave. Unfortunately, the majority of workers nowadays, irrespective of gender, are starting to place a higher value on and appreciation for a successful work-life balance, and they believe their employers have a big part to play in making sure this balance is reached (Wedgwood, 2022).

Numerous factors affecting work-life balance among employees in various industries, including health, hospitality, manufacturing, education, and IT, have

been the subject of prior research (Edeinat, 2022). Accordingly, a number of factors that have been researched by different authors and have an impact on work-life balance have been identified (Shrivastava, 2017). They went on to say that these factors could also be connected to an individual employee, their family, their job, or both. Nonetheless, Mazerolle and Goodman, 2013) carried out an investigation to examine the variables affecting work-life balance. Several factors, including family size, age of children, working hours, and social support level, influence the experience of work-family conflict and family-work conflict, as stated by Reddy, Veranda, Ahmed, and Siddaramu (2010) (Umma & Zahana, 2020).

In addition, (Poulose and Sudarsan, 2014) identified societal, organizational, individual, and other factors as WLB factors. In addition, Umma & Zahana (2020) found that the variables influencing employee work-life balance include individual characteristics like personality, well-being, and emotional intelligence; organizational characteristics like work schedules, work-life policies, and stress related to the job; and societal characteristics like childcare arrangements, family support, and social support, in addition to other variables like age, gender, and type of job.

Role Stress

According to Tharindu (2022) an organizational stressor is any workplace stimulus variable that is causal. On the other hand, a strain is a term used to describe an individual's aversive health or welfare reactions to stressors, which may be cognitive or physiological in nature. Role demands, another name for work role stressors, are the demands that an individual faces because of the specific role that they hold within the company.

According to Thompson (2001) role behavior is influenced by role expectations for appropriate behavior in that position, and role behavior is modified through an iterative process of role sending and receiving. Role theory also focuses on

expectations that are contradictory, unclear, or incompatible as a result of role dynamics in the workplace. Workers regularly come across conflicting or ambiguous information regarding role expectations. In some cases, this could result in role ambiguity and role conflict (Caroline & Gilbert, 2014).

Role Overload

According to Shah, et al., (2011) state that workload measures how demanding a job is. Workers experience stress at work as a result of it. It continued by saying that every worker appeared to be disclosing the issue with the workload in real life. Work overload, which can be either qualitative or quantitative, is defined as when there are more demands than resources (Elloy & Smith, , 2003). Quantitative overload results from too many tasks to complete, whereas qualitative overload results from a task being too difficult to complete. A workload is a demand or stressor associated with a job that consumes time and psychological resources. An increase in these demands means that more resources will either be needed or consumed by the sphere. Every employee seems to be revealing the issue of excessive workload in the real world these days. There are many stressors in each person's life and at work, which eventually have an impact on their performance and health. A shift in workload frequently results in a shift in employees' stress levels, which in turn has an impact on their productivity. Furthermore, although stress is generally discussed negatively, (Shah, et al., 2011)found that stress is not always bad in and of itself. When there is a chance for profit, it is an opportunity. The employees' workload presents an opportunity.

Role Ambiguity

Rizzo and colleagues (1970) defined role ambiguity as the behavioural requirements' clarity and the predictability of the response or outcome of an individual's behaviour. Role ambiguity occurs when an individual lacks sufficient information to reasonably

predict the consequences of their actions and when the set of behaviors expected for a role is unclear. (Jeanne, Shaari, & Kang, 2021) According to (Cengiz, Dube, Lindner, & Zentler-Munro, 2021) and (Schmidt, Michael, Redington, & Botker, 2014) role ambiguity or uncertainty is the result of ignorance or misunderstanding regarding the duties, responsibilities, and tasks attached to a position. Many factors could be causing the ambiguity (Cengiz, Dube, Lindner, & Zentler-Munro, 2021): (a) a job description that is not accurate; (b) unclear information about tasks and functions; and (c) poor communication about the duties and responsibilities that need to be carried out. Uncertain requests and expectations from coworkers and supervisors are also regarded as sources of uncertainty at work, according to (Cengiz, Dube, Lindner, & Zentler-Munro, 2021).

Role Conflict

The term "role conflict" describes the presence of competing demands within one role or between several roles (Shah, et al., 2011). Role conflict, according to Kreitner and Kinicki (2010), arises when different members of the role set expect different things of the focal person" or "others have inconsistent or conflicting expectations." When people encounter conflicting role expectations in the different social statuses they hold, role conflict arises (Yongkang et al, 2014). When people cannot agree on what is expected of them in a given role, conflict can also arise. Conversely, Cooper et al. (2001) described role conflict as a reflection of an individual's incompatible demands (within a single role or between multiple roles they occupy), which can cause adverse emotional reactions due to the perceived inability to be influenced by the job. In addition, Cooper et al. (2001) identified four types of role conflict: (i) When a manager or supervisor communicates mutually incompatible; (ii) When two or more individuals (supervisors, managers, coworkers, clients, etc.) communicate expectations that are incompatible; (iii) Person-role conflict: a situation in which a person feels that there is a discrepancy between their

expectations and values and those of the company or important individuals at work;

(iv) Inter-role conflict: this occurs when a person plays two or more roles, each of which may have different requirements or expectations.

Research Methods

This study used a quantitative research approach. Using a self-administrated survey questionnaire responses were gathered from 211 people. To test the hypothesized relationships between the variables, the multiple regression analysis was performed using SPSS 23.0 version. As the population was known, simple random sampling was used to select the sample. Also, a Mogan table was used to determine the sample size. Accordingly, the sample size was 205.

Conceptualization

Work-life balance is negatively impacted by workload, which leads to employees managing work-family conflict (Molino, Ingusci, Signore, & Amelia, 2020). This study is in line with another earlier study (Chiara et al., 2017) that found a high workload to be a significant predictor of the perception of an incompatibility between work and family roles. Workers said that their workload impacted their work-life balance.

H1: Role overload significantly impacts the work-life balance of Sales employees in the Tiles and Sanitary Ware Industry in Sri Lanka.

Some studies have observed a negative link between role ambiguity and work attitudes such as job satisfaction, organizational commitment, or intention to stay (Cengiz et al., 2021; Déry et al., 2018; Kadir et al., 2017; Schmidt et al., 2014; Sureda et al., 2018) and Some studies have observed a positive correlation between Role Ambiguity and work-life balance (Jeanne Ho, 2021)

H2: Role ambiguity significantly impacts the work-life balance of sales employees in the tiles and sanitary warfare industry in Sri Lanka.

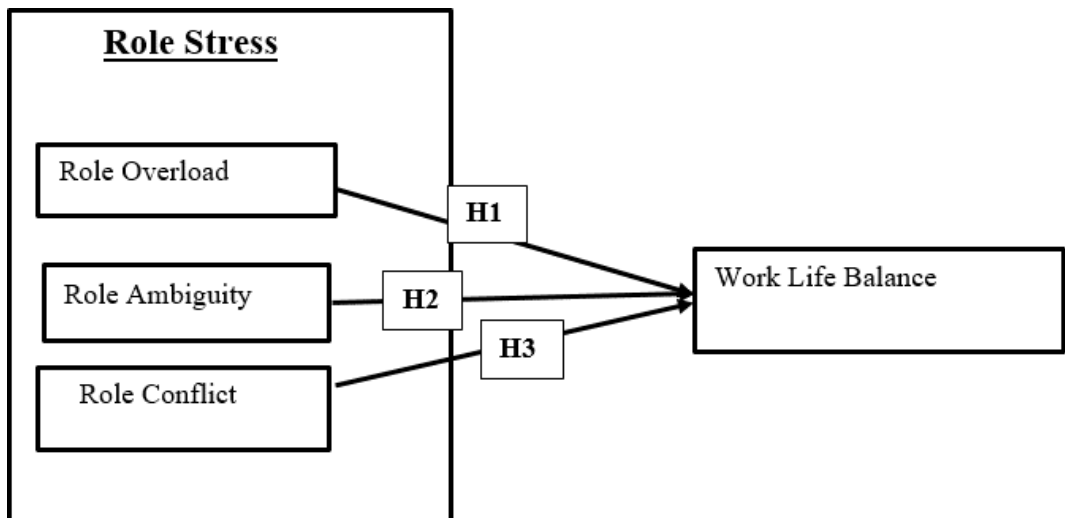
Prior research has indicated that role conflict can have an impact on professionals' work-life balance (Sirajunisa & Panchanatham, 2010; Razak et al., 2014; Omar et al., 2015). In previous literature findings, the positive impact of role conflict on work–life balance can be seen from different perspectives. While role conflict is generally considered a hindrance to work–life balance, some studies have highlighted certain positive effects; Role Conflict can lead individuals to manage their boundaries between work and personal life actively. Also, dealing with conflict can enhance certain skills that are curtailed for achieving work–life balance (Jeanne, Shaari, & Kang, 2021)

H3: Role conflict significantly impacts work – the work-life balance of Sales employees in the Tiles and Sanitary Ware Industry in Sri Lanka.

The conceptual framework depicted in figure 1 could be presented based on the hypothesized relationships explained above.

Figure 1

Conceptual Framework



Source: Author, 2023

Operationalization

Table 1

Operationalization Definitions of the Constructs

Construct	Operational Definition
Work-Life Balance	Work-life balance is the extent to which an individual can instantaneously adjust the emotional, behavioural and time demands of both paid work, family and personal obligations (Venugopal, 2017)
Role Overload	Role overload is termed as a condition whereby an employee faces excess work to do in a certain time (Venugopal, 2017).
Role Ambiguity	Role ambiguity occurs when the role expectations are unclear, and employees are Ambiguous about the task that they are assigned to perform (Venugopal, 2017)
Role Conflict	Role conflict occurs when an employee faces inconsistency or incompatibility in the demands and expectations of different parties that cannot be satisfied at the same time (Dodanwala, 2022)

Table 2

Operationalization Table

Dimensions	Indicators	Measurement Scale	Source
Work-Life Balance	Level of Work-Life Balance	Five-point Likert Scale	(Venugopal, 2017)
Role Overload	Level of Role overload	Five Point Likert Scale	(Venugopal, 2017)
Role Ambiguity	Level of Role Ambiguity	Five-point Likert Scale	(Venugopal, 2017)
Role Conflict	Level of Role Conflict	Five Point Likert Scale	(Dodanwala, 2022)

Source: Author, 2023

Analysis & Results

Reliability Statistics

For this purpose, Cronbach's Alpha test was performed. Table 3 shows the summary of reliability statistics for the independent variables (Role overload, Role Ambiguity, Role Conflict) and the dependent variable (Work – life balance)

Table 3

Cronbach's Alpha Statistics

Variables	Cronbach's Alpha	No of questions
Work Life Balance	0.728	05
Role Overload	0.797	05
Role Ambiguity	0.716	05
Role Conflict	0.858	05

Source: Analyzed Data

Validity Analysis

Content Validity

In this study, the researcher measured WLB using the 5 items from (venugopal, 2017) the most used 5-point Likert scale questionnaire for measuring WLB by different authors. In the questionnaire, the independent variable of role stressors was measured through three dimensions (Role Overload, Role Ambiguity, and Role Conflict) using 15 elements. Role overload and role ambiguity measurement scales were adopted (Venugopal, 2017), and Role Conflict measurement scale was adopted by (Dodanwala, 2022).

Construct Validity (KMO)

Validity refers to the extent to which it validates the set of questions that the researcher asked to measure the variables. In another way, it is examining the validity of the measuring instruments themselves (Sekaran & Bougie, 2010). It can be determined by applying different validity tests such as; content validity, criterion-related validity, and construct validity. This research tested construct validity.

Normality

To find whether the data set was graphically normally distributed, the researcher designed Q-Q plots and bell curves to test the normality of the data set. Q-Q plot, as used in statistics, is a scatterplot made by comparing two sets of quantiles (observed and expected). For normally distributed data, observed data are approximate to the expected data, that is, they are statistically equal (Mishra, 2019). If data is normally distributed, the circular dots that represent data points will be positioned approximately along the diagonal line in the Normal Q-Q Plot. According to the results the data values were very much closer to the diagonal line, it can be concluded that the data set was graphically normally distributed.

If the graph is approximately bell-shaped and symmetric about the mean, we can assume normally distributed data (Mishra, 2019). All the variables have a shape very similar to the "The probability distribution of a continuous variable is estimated by a histogram. Bell curve" shape and it can be identified data were approximately normally distributed.

Test of Linearity

Linearity is the presence of a straight-line relationship between two variables. A simple regression can estimate the relationship between dependent and independent variables if the relationships are linear in nature. It can be observed that a linear relationship exists between dependent and independent variables.

Homoscedasticity

When all of the independent variables' values in the relationship between the independent and dependent variables have the same error term, this is referred to as homoscedasticity. Homoscedasticity is broken when the error term's size varies among independent variable values. The term for it is "Heteroscedasticity." "Homoscedasticity can be checked by inspection of a plot of the standardized values against the standardized predicted values. The study represents the scatter plot for measuring homoscedasticity and it represents non- violation of the homoscedasticity assumption.

Multicollinearity

Table 6.2. illustrates that every independent variable has a tolerance value exceeding 0.1 and a VIF value below 10. Consequently, it can be inferred that there is no Multicollinearity, implying that there is no noteworthy correlation between the independent variables in the model.

Table 6

Multicollinearity

	Tolerance	VIF
Role Overload	.303	3.297
Role Ambiguity	.277	3.615
Role Conflict	.775	1.291

Source: Analyzed Data

Assessing the Impact

Multiple linear Regression analysis is a set of statistical processes for estimating the relationships among variables such as dependent variables and dimensions of Independent variables. It includes many methods for modeling and analyzing several types of variables when the purpose of the regression analysis is on the Impact on the dependent variable (work life balance) and dimensions of the Independent variable (Role overload, Role Ambiguity, and Role Conflict). Regression analysis is also used to predict which among the independent variables are related to the dependent variable and to explore the form of these relationships.

R Square and Adjusted R Square

R-square means the strength of the independent variable to measure the dependent variable. The higher the R-square is better for the model. Further Adjusted R-square attempts to yield a more honest value to estimate the R-square for the population. R is the square root of R-Square and is the correlation between the observed and predicted values of the dependent variable. R-square means the strength of independent variables (Role Overload, Role Ambiguity and Role Conflict) to measure the dependent variable (Work Life Balance). The higher the R-square is better for the model. R Square is greater than or equal to 0.4 it is called the line of best fit. The effect of individual factors on the dependent variable has been tested using the regression model. R Square for this study is 78.1. It means there is a higher R – Square for this model. The model summary was given

Analysis of variance (ANOVA)

ANOVA is a collection of statistical models, and their associated estimation procedure used to analyze the difference among group means in a sample. By using an ANOVA table, can be tested the significance value of variables that the researcher was considering. P-value was used to test it and if the P value less than or equal to

0.05, the variables are significant. On the other way the p- value was compared to the research alpha level (0.05) and, if smaller, it means that the independent variables reliably predict the dependent variable. If the p-value is greater than 0.05, it means that the group of independent variables does not show a statistically significant relationship or does not reliably predict the dependent variable., this model is significant under a 5% level of significance.

Coefficients

The regression coefficient describes how well the values fit the data. If the influence is positive, the sign for the related coefficient is also positive and if the influence is negative, the sign for the related coefficient is negative. The coefficient sign of Role Overload is negative. It means the influence of Role overload on Work Life Balance is negative. The Coefficient sign of Role Ambiguity is Positive. It means the influence of Role Ambiguity on work life Balance is positive. The coefficient sign of Role Conflict is positive. It means the influence of Role Conflict on Work Life Balance is positive.

Test of Hypothesis

Results of the Hypothesis Testing – Assessing the Impact

H1: Role Overload has a significant impact on the Work-Life Balance

According to the regression analysis, the p-value and beta values are 0.000 and – 0.216 respectively. Considering the p-value (0.000), it is lower than 0.05. Therefore, the alternative hypothesis is accepted. Role overload has a significant impact on work-life balance.

H2: Role Ambiguity has a significant impact on work-life balance.

In Hypothesis 2 (H2), the researcher proposed a significant impact of Role Ambiguity on Work - Life Balance. Supported by H2 the results show a significant

direct impact of Role Ambiguity on Work – Life Balance. Considering P – Value (0.000), it is lower than 0.05. Therefore, the alternative hypothesis is accepted.

H3: Role conflict has a significant impact on **work-life balance**.

In Hypothesis 3 (H3), the researcher proposed a significant impact of Role Conflict on Work - Life Balance. Supported by H3 the results show a significant direct impact of Role Conflict on Work – Life Balance. Considering P – Value (0.001), it is lower than 0.05. Therefore, the alternative hypothesis is accepted.

Discussion

The multiple regression model with all predictors generates $R^2 = 0.781$. This means that 78.1 of the variation of the dependent variable can be explained by independent variables. Meanwhile, other factors interpreted the remaining 21.9 of the dependent variable's variation. So, other additional variables are important that affect work-life balance that has not been considered in this study. Furthermore, Table 5 also shows that the study model was fit, and the significant values of all dimensions in the independent variable are less than 0.05 ($p < 0.05$). The results show that role overload, role Ambition, and role conflict have a significant impact on work-life balance.

As expected, work overload has a significant impact on work life balance (Monica et al., 2020), (Jichang et al., 2021), Role Ambiguity and Role conflict has a positive significant impact on the Work life balance. Pearson 's Correlation analysis is undertaken to measure the correlation or the strength of the relationship between all variables (Sekaran, 2003) . The strength of the relationship of the variables in this research is from moderate to weak, but in terms of significance, all the independent variables' relationship is significant to a dependent variable.

According to the correlation Analysis, there is a positive relationship or correlation between workload, Role Ambiguity, and role conflict with work-life balance. Some

studies have observed a negative link between role ambiguity and work attitudes such as job satisfaction, organizational commitment, or intention to stay (Cengiz et al., 2021; Déry et al., 2018; Kadir et al., 2017; Schmidt et al., 2014; Sureda et al., 2018) and Some studies have observed a positive correlation between Role Ambiguity and work life balance (Jeanne Ho, 2021)

In previous literature findings, the positive impact of role conflict on work – life balance can be seen from different perspectives. While role conflict is generally considered a hindrance to work – life balance, some studies have highlighted certain positive effects, Role Conflict can lead individuals to actively manage their boundaries between work and personal life. Also dealing with conflict can enhance certain skills that are curtailed for achieving work – life balance (Jeanne, Shaari, & Kang, 2021)

Prior research has indicated that role conflict can have an impact on professionals' work-life balance (Sirajunisa and Panchanatham, 2010; Razak et al., 2014; Omar et al., 2015). In previous literature findings, the positive impact of role conflict on work – life balance can be seen from different perspectives. While role conflict is generally considered a hindrance to work – life balance, some studies have highlighted certain positive effects, Role Conflict can lead individuals to actively manage their boundaries between work and personal life. Also dealing with conflict can enhance certain skills that are curtailed for achieving work–life balance (Jeanne, Shaari, & Kang, 2021)

According to the above-discussed literature findings, Role Stress can positively or negatively influence the Work Life Balance. According to the analyzed data, Role overload, Role Ambiguity, and Role Conflict significantly impact Work – Life Balance. Also, research findings indicate that Role Overload, Role Ambiguity

Conclusion

The major goals of the study were to provide answers to the following questions: How does role overload affect work-life balance? How does role ambiguity affect work-life balance? How does role conflict affect work-life balance? The population for this study is known to the researchers. As a result, the researcher uses the random sampling method to select 206 sales employees as the sample from the population in an effort to reach the maximum number of respondents. Structured questionnaires were used to gather primary data. Data analysis was done using statistical analysis packages (SPSS package, MS Excel package). The data collected from these questionnaires is analyzed using descriptive statistics, such as frequencies, measures of central tendency (Mean, Median, and Mode), and measures of dispersion (standard deviation).

The internal consistency of the research measurements was ascertained through the reliability analysis. The results of the reliability analysis showed that the work-life balance, role overload, role ambiguity, and role conflict all had alpha values higher than 0.7. This study's conclusion thus clarified why every measurement had a high level of internal consistency. According to the multiple regression Analysis, the p-value is higher than 0.05 ($p > 0.05$), for All Three Hypothesis. Therefore, Role overload, Role conflict, and Role Conflict have a significant impact on employee Work-Life Balance.

The results may not apply to all sales personnel in Sri Lanka's tile and Sanitaryware industries because this study used a basic random sampling method. The results might not hold true in environments with different cultural norms. Also, the effects of role conflict, role ambiguity, and role overload on work-life balance are the only aspects of this study that are examined. Some factors that might also affect the role of stress on work-life balance include personality traits and self-efficacy, but these were left out of the analysis. Cultural differences may also influence how work-family conflict is perceived. Using the same conceptual framework, a later study

might examine various populations within the tile and sanitary ware industry for different comparisons of the labor force. It is critical to recognize that additional factors, such as individual differences, job tenure, size of the organization, job satisfaction and commitment, and attitude variables, may also play a role in why people leave or remain in their positions. Lastly, additional research may examine the moderating impacts of demographic traits on those associations, such as gender and ethnic groupings. (Karatepe & Baddar, 2006) Discovered that, in the context of Sri Lanka, female employees have more issues with work-life balance than their male counterparts.

To gain a comprehensive understanding of workers across different industries, the study might find it helpful to conduct a qualitative analysis. Furthermore, the researcher proposes that the study can incorporate more moderate independent variable effects. Similarly, future researchers may consider conducting longitudinal studies to identify changes in the target group. In addition, future studies ought to obtain a sufficient sample size to ascertain the role of stress.

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Impact of Green Loans on Financial Performance: Evidence from Sri Lankan Licensed Commercial Banks

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To examine the impact of Green Loans on the Financial Performance, through examining the complex relationship between green credit and the financial performance of licensed commercial banks. This study includes ten private sector banks and two public sector banks for the period 2015 to 2022. Financial performance measured using Return on Assets (ROA) and Return on Equity (ROE). Regression analysis through two models for ROA and ROE were used for analyzing the acquired data and in addition normality test, hausman test and interdependency test were performed. As there are several articles on green banking concept and how its impact on financial and non-financial performances, this study investigates the relationship between green loans and financial performance, and the impact of green loans and financial performance. Although the previous literatures' results are inconclusive, this research study shows that there is a significant negative impact of Green Loans on the Financial Performance of the Licensed Commercial Banks in Sri Lanka. This research navigates the complex landscape of green loans and their impact on the financial performance of Sri Lankan banking sector, providing nuanced insights into both academic discourse and practical decision-making in the financial sector.

Keywords: *Green Loans, Return on Assets, Return on Equity, Non-Performing Loans, Sustainable Development, Green Banking Products*

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Introduction

In the banking sector, sustainability has become integral to day-to-day operations. Sustainability is not only the conservation of natural resources but also the utilization of social and economic resources to meet the needs of the present without compromising the ability of future generations to meet their own needs (Saxena, 2021). It extends beyond environmental issues and is characterized by a focus on social justice and economic development. Although sustainability is a relatively recent concept, it is based on historical movements rooted in social justice, conservatism, internationalism, and other ideologies. As we approach the end of the twentieth century, these ideas have gained considerable momentum, leading us to pursue ‘sustainable development’.

Green banking is one of the most trending concepts in today’s banking industry. Green banks are mission-driven institutions that use innovative financing to accelerate the transition to clean energy and fight climate change. Being mission-driven means green banks are more concerned with deploying clean energy than maximizing profits. Green banking initiatives are eco-friendly, online and mobile banking facilities that offer paperless banking services like special savings accounts, utility bill settlement, loan repayment, credit card balance, account balance enquiries, and discounted transaction statements instead of branch banks, E-statements, SMS bank alerts, electronic fund transfers etc. (Rahman, 2023).

Green loans, also known as sustainable or eco-friendly loans, are financial products designed to support environmentally friendly projects and initiatives. Banks and financial institutions usually offer these loans and are used to finance projects that positively impact the environment or promote sustainability. The main objective of green loans is to encourage and support the development of projects that contribute to environmental sustainability. These projects may include renewable energy installations (such as solar or wind farms), construction of energy-efficient buildings, waste management initiatives, sustainable agricultural practices, and

other environmentally friendly ventures. As green loans are financial products aimed at funding projects that support environmental sustainability, such as renewable energy initiatives, energy efficiency, and pollution prevention, they are closely connected to sustainability because they are specifically structured to support environmentally beneficial projects. These loans are used to fund initiatives that have a positive environmental impact, helping businesses and the government's transition towards more sustainable practices. Green loans often finance projects that involve renewable energy sources such as solar, wind, or hydroelectric power. By funding these projects, green loans help reduce reliance on fossil fuels, lower greenhouse gas emissions, and promote clean energy solutions. This directly contributes to global efforts to mitigate climate change. Green loans are aligned with broader sustainability frameworks like Environmental, Social, and Governance (ESG) criteria and the United Nations' Sustainable Development Goals (SDGs). By providing financial incentives for green projects, green loans encourage companies and governments to adopt strategies that promote long-term environmental stewardship and social responsibility. (ICMA, 2021).

There are a lot of articles on green banking concept and how its impact on financial and non-financial performances. Those articles focus on the green banking concept and its impacts, relationship between green loans and financial performance etc. When it comes to green banking products such as green loans, green accounts, green bonds, very few articles on can be found on those topics, but there are no articles about the relationship between green loans and financial performance. Sri Lanka, like many other countries, is moving towards sustainability in alignment with global trends. The Central Bank of Sri Lanka, along with other regulators, is promoting green finance initiatives, including green bonds and loans to build a reputation as responsible financial institutions, attracting eco-conscious customers and investors. Therefore, the problem statement is the Impact of green loans on financial performance: evidence from Sri Lankan commercial banks. To bridge the research gap, the current study focuses on examining impact between green loans on financial

performance of Sri Lankan licensed commercial banks in Sri Lanka.

This article explores the concept of green banking, which refers to a banking approach that emphasizes environmental responsibility and sustainability in its operations. It sheds light on the importance of incorporating sustainable practices into the financial sector and highlights the role of green credit as a key component of this paradigm. Green loans, as discussed in the article, are financial products specifically designed to finance environmentally friendly projects or initiatives such as renewable energy businesses, energy efficient infrastructure, and sustainable agriculture. Furthermore, the article explores the concept of sustainability in the context of green banking. Sustainability is the balanced balance between economic development, social progress and environmental conservation. The article provides a comprehensive understanding of the various dimensions of sustainability and how they intersect with green banking and green lending practices. In addition to explaining the green banking concept and sustainability, this paper also investigates the impact of green credit on firms' financial performance, particularly return on equity (ROE) and return on assets (ROA) of banks. Through empirical analysis and robust statistical methods, the paper investigates the relationship between banks' use of green credit and their financial performance. The findings presented in the paper provide valuable insights into the impact of green credit on banks' financial performance. This information is particularly relevant for financial institutions looking to integrate sustainable practices into their operations while simultaneously maintaining a strong financial position. By delving into these various topics, the article equips readers with a comprehensive understanding of the concept of green banking, the importance of green credit and the broader concept of sustainability. Additionally, it provides critical insight into how green credit affects banks' financial performance, particularly in terms of ROE and ROA. Such knowledge can serve as a valuable resource for researchers, policymakers and financial institutions, enabling them to make informed decisions and effect positive change for a more sustainable future.

This research paper is structured into five different sections, each of which contributes to a comprehensive understanding and analysis of the subject matter. The first section of the article consists of an introduction that serves as a basic framework to establish the context and purpose of the study. The second section of the article is devoted to the literature review. This section refers to an in-depth investigation of existing academic works, scholarly publications and relevant sources of information. Also, the third section of the article focuses on the research methodology employed in the study and the fourth section of the article includes the findings and discussion section where the results and findings obtained through the research methodology are presented and interpreted. Finally, the fifth and final section of the article is the conclusion. This chapter presents a brief summary of the main findings of the study.

Literature Review | Conceptualization & Hypotheses Development

Sustainability

Sustainability in the banking sector is the integration of environmental, social and governance (ESG) considerations into banks' core business operations, decision-making processes and risk management practices. This includes aligning financial industry activities with sustainable development goals, addressing environmental challenges, promoting social responsibility and ensuring good governance practices. Here are some key points about sustainability in the banking sector:

Environmental Responsibility is when banks can contribute to sustainability by financing and investing in environmentally friendly projects and businesses. This includes funding renewable energy projects, supporting energy efficiency initiatives, promoting sustainable agriculture and forestry, and financing green infrastructure. Banks can adopt environmentally responsible practices such as reducing their carbon footprint and managing waste and resource consumption (Shaumya, 2017).

Social Impact: Banks have the opportunity to support social progress and inclusive growth through their lending and investment decisions. This may include financing projects that address social challenges such as affordable housing, healthcare, education and community development. Banks can promote financial inclusion by providing access to banking services to underserved populations and by supporting microfinance initiatives.

Green banking concept

Green banking is about promoting environmentally friendly practices and reducing the carbon footprint of banking activities (Nizam, 2013). It is also known as ethical banking or sustainable banking. Green banking is a process implemented by banks to make the planet eco-friendly and safe for all life on Earth. A green bank considers all social and environmental/environmental factors in its normal banking operations (Krishore Kumar, 2021). Caring for Earth's environment/habitat/resources. Green banking includes the principles of sustainability, ethical investment, conservation and energy efficiency to protect the environment and natural resources.

Green banking, also known as sustainable banking or ethical banking, is a concept that promotes environmentally and socially responsible practices in the banking industry (Choudhury, Influence of Stakeholders in Developing Green Banking Products in Bangladesh. Influence of Stakeholders in Developing Green Banking Products in Bangladesh., 2013). It involves integrating environmental, social and governance (ESG) considerations into banks' core operations, strategies and decision-making processes. The main objective of green banking is to ensure that financial institutions operate sustainably and contribute to the transition towards a greener and more inclusive economy (Nazamul Hoque, 2019)

Green loans in the banking sector

Green loans in the banking sector are financial products designed to support and

finance environmentally friendly projects and initiatives. Banks and financial institutions offer these loans to individuals, businesses and organizations that aim to implement projects with positive environmental impacts (R.Suresh, 2020). Green loans fund renewable energy installations, energy-efficient upgrades, green building construction, sustainable agriculture initiatives, waste management projects and many other sustainability-focused projects.

A green loan is similar to a green bond that raises capital for green-worthy projects (R.Suresh, 2020). However, a green loan is usually based on a loan to a smaller and private operation rather than a bond. A green bond typically has a large volume, may have high transaction costs and may be held on an exchange or privately. Green debt and green bonds also follow different but consistent principles: the Green Debt Principles and the International Capital Markets Association (ICMA) Green Bond Principles (GBP), (Bank, 2021). Both instruments specify that 100% of the revenue should be used for green activities only.

Firms' financial performance

Financial performance measures the financial health of a company based on assets, liabilities, revenue, expenses, equity and profitability (Choubey, p. 2024). It is an in-depth analysis of the company's financial statements. Analysts examine a company's income statement, cash flow statement, balance sheet, and annual report. Financial performance refers to a company's ability to manage its finances. Based on the analysis, companies develop strategies to improve capital structure, increase revenue, improve cash flow and reduce costs.

The financial performance of the banking sector is usually measured using various key performance indicators (KPIs) and financial metrics (Osama Mohamed Ahmed Enad, 2022). Net Interest Margin (NIM) measures the difference between a bank's interest income and interest expense, expressed as a percentage of its interest-earning assets. It reflects the bank's ability to generate profits from its core lending

and investment activities. ROA is a profitability ratio that calculates a bank's net income as a percentage of its average total assets. It shows how effectively a bank is using its assets to generate profits. ROE measures a bank's profitability by comparing its net income to shareholders' equity. It shows the bank's ability to generate returns for its shareholders.

Return on Equity (ROE)

The return on equity (ROE) method measures the net profit a company generates based on each equity investment contributed by shareholders. Usually expressed as a percentage, the ROE measure can be useful for measuring the management team's capital allocation decisions and ability to create shareholder value (Gallo, 2016). Return on equity, or “ROE,” is a metric that depicts how profitable a company is after considering the contributions of its shareholders. “How much net profit does the company earn for each dollar shareholders invest?”. The ROE metric answers the question. Therefore, the ROE measures the percentage of invested capital converted into net income on a dollar basis, which helps show how efficiently the company is handling its given equity capital.

Return on Assets (ROA)

The return on assets (ROA) ratio is a metric used to assess how efficiently a company can generate profits with the assets it owns. It usually measures a company's net operating profit after tax as a percentage of annual income from all business operations and investments over a three-year period. ROA shows what happened with a company's historically acquired resources. It gives an idea of how efficient the management is in using its assets to generate earnings. Expressed as a percentage, a higher ROA indicates more efficient use of company resources (Gallo, 2016).

Non-Performing Loan (NPL)

A non-performing loan (NPL) is a loan where the borrower has failed to meet scheduled payments for a specified period of time, leading to a state of default. The critical element that defines non-performing status usually revolves around the failure of the borrower to pay principal or interest within the stipulated period. (saba & kouser, 2012) The specific elements that determine non-performance may vary depending on the specific terms set out in the loan agreement. Generally, the threshold for non-performing status is set at zero principal or interest payments during a specified period.

Development of Research Hypothesis

This study develops two research hypotheses to examine the impact of green loans on the financial performance of Sri Lankan Licensed commercial banks in Sri Lanka. Adopting environmental practices and principles such as the Equatorial Principles can lead to improved liquidity and profitability for banks. Applying green energy policies in banks has the potential to stimulate long-term profitability (Arulrajah, 2016). A longitudinal study carried out in 2020 which examined the impact of green loans on bank profitability over time, revealed a significant negative effect on financial performance metrics (Wang, 2020). Paying more attention to the environment can lead to higher quality products and services and ultimately less profit (Choudhury, 2013). The study examines the impact of green loans on bank profitability, finding a positive correlation between green lending activities and financial performance. (Smith, 2021) Green debt, in particular, has been found to improve financial performance indicators such as return on assets and net interest margin. The study which investigated the trade-off between sustainability and profitability in the context of green loans, demonstrating a significant negative impact on the financial performance of banks. (Wu, 2019). A study focused on the Sri Lankan banking sector between 2015 and 2022 showed that green banking

practices, including day-to-day operations, capital adequacy and liquidity, negatively affect a bank's profitability. Although an increased focus on green lending may adversely affect profitability, it is vital to empower banks to promote environmental issues with public and government support. The study identified several factors contributing to a bank's green performance (Gallo, 2016). These factors include bank size, reputation, age, profitability and investor response. These elements can act as catalysts to enhance a bank's green performance. Furthermore, another study on commercial banks in Bangladesh revealed that various profiles of bank employees, daily operations and green banking practices significantly and positively impact green finance. According to a research which investigated the relationship between environmental responsibility, as reflected in green loans, and financial performance in the banking sector, provides evidence of a significant negative impact on profitability (Liu, 2018). Focusing on developed economies, a research analyzes the relationship between green lending activities and bank profitability, revealing a significant negative impact on financial performance. (Park, 2021). Overall, the passage suggests that adopting green credit policies and engaging in green banking practices can have a positive impact on a bank's performance, including its profitability and financial indicators.

Accordingly, we hypothesize,

H1: There is a significant impact of green credit on the return on assets of Sri Lankan Licensed Commercial Banks (ROA)

H2: There is a significant impact of green credit on the return on equity of Sri Lankan Licensed Commercial Banks (ROE)

Research Methodology

This study follows a positivistic research philosophy, and the deductive approach was considered most suitable for this research. Using a deductive approach, the study begins with existing theories and hypotheses and then designs a research

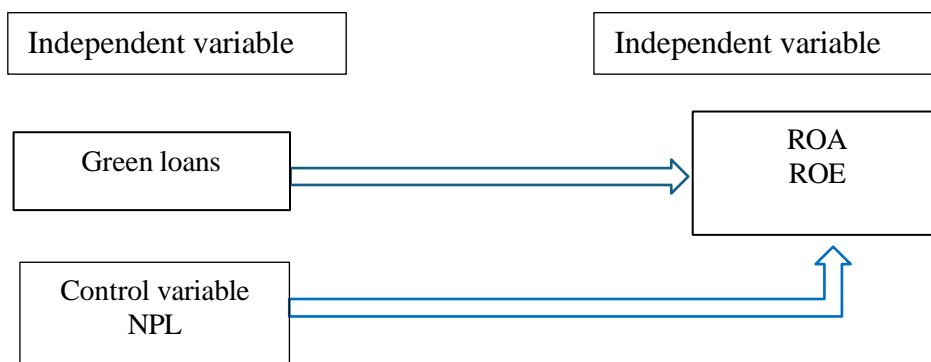
strategy to test these hypotheses.

The research approach used in this study is quantitative and this paper involved using secondary data obtained from annual reports and related articles. Researchers have relied on existing sources of information rather than collecting primary data. Quantitative data were obtained from the financial statements of ten private sector banks and two public sector banks were chosen from among those trading on the Colombo stock market and were categorized by the Global Industry Classification System (GICS) for the period 2015 to 2022. (Krejcie R. V & Morgan, 1970). The data analysis includes the regression analysis to investigate the impact between the dependent and independent variables. In addition, the Normality test, Hausman test and Cross Dependency tests are also performed to further strengthen the data analysis.

Conceptual framework

Figure 1

Conceptual framework



Source: (Xiaoyan Gao, Yiyang Guo, 2022)

Operationalization of the variables

Green loan which is an independent variable is measured using the total amount of green loans issuance by a bank and the Dependent variables such as ROA and ROE are measured using The return of assets $[(\text{Net Income} / \text{Average Total Assets}) * 100]$ and return of equity of a bank $[(\text{Net Income} / \text{Shareholders' Equity}) * 100]$. Non-performing loan, which is a controlling variable is measured using the Non-Performing Loans Ratio of a bank.

Findings and Discussion

Normality Test

In a normal test such as the Jarque-Bera test, the null hypothesis usually states that the data follow a normal distribution (Thadewald, 2007). The Jarque-Bera test statistic is then used to assess whether there is sufficient evidence to reject this null hypothesis. In this case, the Jarque-Bera test statistic for the Return on Equity (ROE) variable is reported as 7.5004. Now, interpretation involves comparing these test statistics to a critical value or, more commonly, examining the associated p-value. The p-value indicates the probability that a test statistic calculated assuming the null hypothesis is true is observed to be extreme or extreme. In the null hypothesis, if the p-value exceeds the chosen significance level (usually 0.05), the null hypothesis will not be rejected. So, the dataset follows a normal distribution.

Hausman test- ROE

This thesis analysis used Stata and conducted a Hausman test to decide between fixed effects and random effects models for modeling return on assets (ROA) in panel data (Pillai N, 2017). The Hausman test gave a p-value of 0.1849. Consistent with conventional statistical significance thresholds, this result led to acceptance of the null hypothesis and rejection of the alternative hypothesis.

H0= Random effect is appropriate

H1= fixed effect is appropriate

This decision to favor the random effects model was based on the statistical interpretation of the Hausman test. A high p value suggests no systematic difference between the two models. Consequently, since the p-value did not reach significance leading to rejection of the null hypothesis, the random effects model was considered more appropriate for the analysis.

Cross sectional Dependence

The p-value of 0.1249 obtained from the Pearson test indicates that there is insufficient evidence to reject the null hypothesis. The null hypothesis generally posits the absence of cross-sectional dependence between units in panel data with a p-value of 0.1249, which is higher than conventional significance levels such as 0.05, the researchers would fail to reject the null hypothesis This indicates that, based on the available data, there is insufficient statistical evidence to conclude that cross-sectional dependence exists between units within the same cross-section.

Table 01

ROE model testing results

Dependent variable: ROE				
Independent variables	Estimates (1)	Robust Standard errors (2)	T-values (3)	P- values (4)
GL	-8.550*	0.070	-2.78	0.005
NPL	-6.564*	0.129	-5.06	0.000
CONSTANT	0.155*	0.029	5.26	0.000
Estimation	Random Effect model			

No. of groups	12
No. of observations	96
P-value	0.000
R-square	0.4730

Source: Author compiled

Equation 01

$$\text{ROE}_{it} = 0.155 - 8.55\text{GL}_{it} - 6.564\text{NPL}_{it} \varepsilon_{it}$$

A p-value of 0.000 indicates a robust statistical significance in the relationship between green credit and non-performing credit with the independent variables in the regression model. In simpler terms, these combined independent variables significantly and meaningfully contribute to explaining the return on equity (ROE) for licensed commercial banks in Sri Lanka.

Consequently, the hypothesized model achieves a significance level of 1%, confirming the strength and validity of the proposed relationships in the regression analysis. This result underscores the meaningful impact of both green loans and non-performing loans in explaining differences in ROE among the surveyed banks.

The R-squared value of 0.4730 reveals that approximately 47.3% of the variation in equity returns among licensed commercial banks is explained by the independent variables incorporated in the regression model.

This observation suggests that the model exhibits a reasonably strong fit to the data, indicating that the selected independent variables effectively capture and explain a significant portion of the variation in ROE.

Table 02*ROA model testing results*

Dependent variable: ROA (Cluster applied)				
Independent variables	Estimates (1)	Robust Standard errors (2)	T-values (3)	P- values (4)
GL	-0.00172*	0.00093	-1.84	0.0006
NPL	-0.0028*	0.00165	-1.72	0.0086
CONSTANT	0.5201**	0.0213	2.44	0.015
Estimation	Random Effect model			
No. of groups	12			
No. of observations	96			
P-value	0.0006			
R-square	0.1709			

Equation 02

$$ROA_{it} = 0.5201 - 0.0017GL_{it} - 0.0028NPL_{it} \epsilon_{it}$$

A p-value of 0.000 for the coefficients associated with green loans and non-performing loans in the regression model highlights strong statistical significance. Simply put, these independent variables collectively have a significant and significant impact on the Return on Assets (ROA) for licensed commercial banks in Sri Lanka.

The hypothesized model achieves a significant significance of 1%, confirming the strength and validity of the relationships proposed in the regression analysis. This result highlights the significant effect of both green loans and non-performing loans in explaining the differences in ROA among the surveyed banks.

Considering the R squared value of 0.1709 for ROA, it suggests that approximately 17.09% of the variance in return on assets among licensed commercial banks is explained by the independent variables in the regression model. This indicates a moderate fit to the data while capturing the selected independent variables and playing a meaningful role in explaining a significant portion of the variation in ROA. The p-value of 0.0006 further strengthens the statistical significance of these independent variables, confirming their influence in explaining the observed changes in ROA.

Hypothesis 01 testing

H1: Specific green credit has a significant effect on bank's return on Equity (ROE).

Independent factor	Correlation coefficient	Statistic t	P
GL	-8.55	-1.86	0.000

The negative coefficient of -8.55 indicates that, on average, for a unit increase in specific green loans, banks' return on assets decreases by 8.55 units. A t value of -1.86 with a low p value of 0.000 provides strong evidence to reject the null hypothesis. This implies that specific green loans have a statistically significant effect on banks' return on Equity. The established statistical significance of the negative impact of specific green loans on return on assets (ROE) for the studied banks marks a critical milestone in understanding the complex relationship between sustainable finance initiatives and financial performance. This negative coefficient, illustrated by a significant decrease in ROE for each unit increase in green credit,

signals a potential trade-off that should be carefully considered.

The incorporation of low interest rates associated with green loans and the paperwork-intensive nature of the loan issuance process adds layers of complexity. It suggests that while green loans contribute to environmental objectives, they simultaneously affect banks' overall profitability and operational efficiency. The consumer utility sector further underscores the multiple implications, emphasizing the need for strategic decision-making to navigate the delicate balance between sustainability goals and financial health. By rejecting the null hypothesis, these findings illuminate an avenue for further investigation and discussion. Consideration of contextual factors such as market dynamics and regulatory landscapes is fundamental to a comprehensive understanding of the observed relationship.

Assessing short-term versus long-term implications and understanding the role of policies and regulations in shaping outcomes are critical components of strategic planning. This rejection prompts a nuanced exploration that asks stakeholders to delve into the complexities of sustainable finance, offering valuable insights that can inform not only banking practices but also broader discussions within the sustainable finance ecosystem.

Hypothesis 02 testing

H2: Specific green credit has a significant effect on bank's return on assets (ROA).

Independent factor	Correlation coefficient	Statistic t	P
GL	-0.0017	-1.84	0.0006

The negative correlation coefficient of -0.0017 indicates that there is a small but detectable inverse relationship between specific green credit (GL) and return on assets (ROA). In other words, as specific green credit levels increase, there is a

tendency for the return on assets to decrease slightly for the banks under consideration. The t-statistic of -1.84 calculates how many standard deviations the estimated coefficient is from zero. In this case, negative t-statistics suggest that the effect of specific green credit on return on assets is statistically significant. However, it is important to note that the magnitude of the t-statistic is relatively modest. The p-value associated with the t-statistic is a critical indicator of hypothesis testing. The p-value of 0.0006 is well below the common significance threshold of 0.05. This low p-value provides strong evidence against the null hypothesis, indicating that the observed negative correlation cannot be the result of chance. The result is therefore statistically significant and supports the alternative hypothesis that specific green debt has a significant effect on asset returns.

In summary, the data suggest that the negative correlation between specific green credit and return on assets is not merely coincidental and indicates a statistically significant relationship. Although the size of the effect may be relatively small, the evidence is strong enough to reject the notion that specific green credit does not have a significant effect on return on assets for the examined banks.

The hypothesis testing results are consistent with the findings in the related literature showing the significant impact of specific green loans on return on assets (ROA). (Choudhury, Influence of Stakeholders in Developing Green Banking Products in Bangladesh. Influence of Stakeholders in Developing Green Banking Products in Bangladesh, 2013) Shedding light on the importance of sustainable practices in the banking sector. The study emphasized the role of green initiatives in enhancing financial performance, which resonates with the negative correlation observed between specific green debt and ROA in the present analysis.

This supports the idea that incorporating environmentally friendly practices as captured by green credit can have a meaningful impact on a bank's financial results.

Furthermore, a study on the impact of the COVID-19 pandemic on the banking

sector in China (dong, 2021) and the United States provides insight into the evolving dynamics of the banking industry. Although not directly focused on green debt, it underscores the broader relevance of strategic decision-making in response to external shocks. The observed negative correlation between specific green credit and ROA can be seen as a strategic move by banks to address environmental considerations, aligning with broader trends in banking resilience highlighted in the literature.

Finally, the hypothesized results find a resonance in the existing literature emphasizing the importance of sustainable banking practices for financial performance. The cited studies provide context and support for the observed negative correlation, suggesting that banks that focus on specific green loans may experience a truly unique effect on their return on assets.

This discussion contributes to the broader narrative of the intersection of sustainability and financial outcomes in the banking sector.

Conclusion | Limitations & Future Research Directions

The study “Impact of Green Credit on Financial Performance: Evidence from Licensed Commercial Banks in Sri Lanka” provides a detailed analysis of the complex dynamics between green credit, moderate impact on financial performance (ROA/ROE) and default. Loans (NPL). In the investigation, hypothesis testing is used to examine the impact of green credit on return on assets (ROA) and return on equity (ROE). The final output showed a negative correlation coefficient between specific green credit and ROA, statistically significant which emphasizes the potential impact of green credit on financial performance. This aligns seamlessly with existing literature, as demonstrated by studies such as “Stakeholder Influence in Developing Green Banking Products in Bangladesh” by (Choudhury, 2013) and “The Impact of the COVID-19 Pandemic on the Banking Sector: Evidence from China and the United States.” by (dong, 2021)

The study's focus on licensed commercial banks in Sri Lanka limits the generalizability of the findings to other regions or global contexts. Differences in economic conditions, regulatory frameworks and consumer behavior across countries may affect the applicability of the results beyond the Sri Lankan banking sector and future research could explore the policy implications of promoting green credit, considering how government initiatives, regulatory frameworks, and incentives affect banks' sustainability practices and subsequent financial outcomes.

Finally, this paper unfolds as a detailed and nuanced exploration of the impact of green credit on the financial performance of licensed commercial banks in Sri Lanka. A combination of robust statistical analysis, alignment with existing literature, and strategic model selection increases the credibility of the findings. This research provides valuable insights to inform decision-making for policymakers, practitioners and researchers interested in sustainable banking practices. This journey through the analysis highlights the depth and breadth of the study, providing a nuanced understanding of the complex relationships within this evolving landscape.

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Assessment of Public Debt Sustainability Using Debt Dynamics Equation Approach: A Comparative Study of Sri Lanka, India and Pakistan

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The enduring feasibility of government debt is a widely discussed issue that significantly affects the formulation of public policies. It has a critical impact on the fiscal development of a country, and it is an essential feature of well-established macroeconomic policy. This research focused on assessing public debt sustainability by using the debt dynamics equation modified by Chandia based on the original work of Romer. This research examines the sustainability of public debt in Sri Lanka, India, and Pakistan, focusing on the factors influencing variations in debt levels from 1990 to 2020. The initial section of the study highlights the factors that contribute to changes in debt stock. According to the analysis, the difference between the interest rate and growth rate, adjusted for the public debt stock, had a substantial effect on changes in debt levels in Sri Lanka, India, and Pakistan. Furthermore, the disparity between the primary budget balance and changes in reserve money negatively affected debt levels in both India and Pakistan. A separate annual sustainability assessment of public debt is performed for each of the three countries. The findings of the analysis are grounded in two conditions of debt sustainability. The study reveals that the countries in question have faced unsustainable or marginally sustainable debt levels for an extended period. It emphasizes the need for fiscal and monetary policymakers to intervene in order to establish sustainable public debt levels within these nations.

Keywords: *Debt dynamics equation, Public debt, Public debt sustainability, South Asia*

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Introduction

Public debt sustainability is critical to economic management because it supports fiscal stability, market confidence, and policy flexibility. Governments must efficiently manage their debt to avoid excessive borrowing, which can raise interest rates, squeeze out private investment, and stifle economic progress. Maintaining sustainable debt levels boosts investor confidence and guarantees that governments can meet their financial obligations without resorting to harsh measures such as tax increases or budget reductions. Furthermore, unsustainable debt buildup can burden future generations, limit policy alternatives during times of crisis, and expose economies to foreign threats. Governments may protect fiscal health, promote economic stability, and ensure intergenerational equality by prioritizing public debt sustainability. In the contemporary economic system in South Asia, there are huge debt obligations due to increased government borrowings. Government borrowings need to smooth the consumption and investment functions of an economy. Many countries in the South Asian Association of Regional Corporation (SAARC) long ago faced a huge outstanding debt stock.

Table 1

Comparison of Debt to GDP in SAARC Countries

Year	Afg hani stan	Bangl adesh	Bhutan	India	Maldiv es	Nepal	Pakist an	Sri Lanka
1990	-	39.7%	48.2%	48.4%	45.5%	58.0%	78.8%	93.4%
2000	-	50.8%	47.0%	73.7%	57.8%	57.9%	74.9%	93.7%
2010	7.9%	34.1%	57.9%	67.5%	60.4%	34.0%	60.7%	81.9%
2020	7.4%	38.9%	120.7%	89.6%	146.1%	42.2%	87.6%	101%

Source: Compiled by the author

The public debt of eight SAARC countries as a percentage of GDP in the milestone four years is included in Table 1. India, Pakistan, and Sri Lanka faced a high debt-to-GDP ratio, and it gradually increased from 1990 to 2020 compared to other nations in the region. Afghanistan, Bangladesh, and Nepal reported comparatively low rates, and Bhutan and Maldives reported a high debt-to-GDP ratio in 2020. However, when it comes to 1990, 2000, and 2010, it is in mid-value. Therefore, the study encompasses the debt sustainability of Sri Lanka, India, and Pakistan, including assessing the determinants of change in the debt stock of those three nations.

“When debt ratios are beyond a certain level, financial crises become both more likely and more severe” (Reinhart and Rogoff, 2009, cited in Cecchetti et al., 2011). For example, Argentina, Brazil, the USA, and the Euro Zone nearly faced a financial crisis because of the indebtedness of their countries. “The 2009 global financial and economic crisis left a legacy of historically high levels of public debt in advanced economies, at a scale unseen during modern peacetime. Given the extreme severity of the crisis, coined by many as the great recession” (Burriel et al., 2020). “The broadest definition of public sector debt combines general government with public non-financial corporations, including the Central Bank” (Hakura, 2020). With huge, growing debt, the government has few options. There is a high possibility of facing a financial crisis. If the indebtedness continues to rise, investors will lose faith in the government’s capacity to return loans.

Investors would want higher interest rates, which would cause severe economic consequences. Debt creates the necessity of a large sum for debt servicing, implying fewer resources for public investment, slower growth, limited resource deployment, and further widening of the debt gap. “Debt sustainability is defined as a situation in which a borrower is expected to be able to continue servicing its debt without an unrealistically large correction to the balance of income and expenditure” (IMF,

2006, as cited in Islam & Biswas, 2005). Public debt sustainability is a significant issue in SAARC countries. Of the eight SAARC countries, Sri Lanka, India, and Pakistan reported high debt-to-GDP ratios from 1990 to 2020. Therefore, there is a timely need to assess the sustainability of public debt in these countries. This study aims to assess public debt sustainability and identify the determinants of change in public debt stock in Sri Lanka, India, and Pakistan, focusing on the period from 1990 to 2020. Recent economic events and data underscore the urgency of addressing public debt sustainability in these countries. The theoretical framework of this research is based on the debt dynamics equation proposed by Romer (2012) and modified by Chandia (2019), providing a robust model for analyzing public debt. This study contributes to the existing literature by providing new insights into public debt sustainability in Sri Lanka, India, and Pakistan and by demonstrating the applicability of the debt dynamics equation approach to these contexts. The research aims to investigate the determinants of public debt dynamics and assess the long-term sustainability of public debt in Sri Lanka, India, and Pakistan. Specifically, it addresses the following questions: What factors influence changes in the public debt stock in these countries? Is the current level of public debt sustainable in the context of each nation's economic conditions and fiscal policies?

Literature Review

“The broadest definition of public sector debt combines general government with public non-financial corporations, including the Central Bank” (Hakura, 2020). Public debt is the sum of domestic debt payable in domestic currency and public and publicly guaranteed external debt payable in foreign exchange (Chandia et al., 2019). A country's public debt is sustainable if the government can cover all its current and future payment commitments without requiring special financial help or going into default. (Hakura, 2020). International financial institutions typically

consider a country's debt sustainable if it can be serviced without disrupting development or restoring schedule. (Mahmood et al., 2014)

There are several approaches to measuring debt sustainability. All debt sustainability analysis (DSA) techniques must make assumptions regarding the future evolution of budget balances, GDP, interest rates, and other variables. The approaches to measuring debt sustainability are the IMF standardized approach, the debt-stabilizing primary balance approach, the value-at-risk stress test, and the debt dynamics equation approach. The IMF standardized approach claims this approach aims to provide a straightforward, clear, and standardized instrument that may be used in any country. The goal of the debt-stabilizing primary balance approach is to keep the debt stable at its current level or to move it to a more desirable level. Since it makes minimal assumptions, this strategy is simple, transparent, and easy to apply. Financial institutions have developed the value-at-risk approach to investigate portfolio risks. The debt dynamic equation discusses three components: interest rate growth rate differences, the impact of foreign exchange, and the primary budget deficit as an effect of change in the debt level. "The debt dynamic equation is necessary to monitor debt trends along with emerging domestic and external vulnerabilities and systemic risks that threaten debt sustainability" (Chandia et al., 2019). "A Debt Management Performance Assessment (DeMPA) was undertaken in August 2022 to update the latest 2015 assessment of debt management practices and identify areas for improvement." (World Bank, 2023) When looking at previous studies on this subject, almost all of them employed the standard threshold level to assess public debt sustainability. However, this study expects to use the debt dynamics equation approach. "Another possible advantage of the debt dynamic equation is that it explains important fiscal mechanisms at work" (Bohn, 1998, as cited in Chandia et al., 2019).

Khan et al. (2021) used empirical facts from selected Euro-area nations over the last 30 years to examine if the primary surplus relative to GDP is a positive function of public debt over GDP to assess whether debt policies are sustainable. According to the researchers, a favorable reaction guarantees a debt ratio sufficient for long-term sustainability if the government becomes a lender. According to this study, in the 1980s, the Netherlands faced a manageable public debt by implementing significant economic reforms. In contrast, although Germany and Portugal pursued sustainable policies, their debt ratios grew. Henning (2019) researched government policy in an explicit stochastic general equilibrium model to rethink the theoretical roots of the sustainability question about USA fiscal policy. He derived a government intertemporal constraint for stochastic, dynamic, efficient economy and risk-averse individuals. A crucial finding is that, with the intertemporal budget constraint and the transverse condition, the discounting of future public debt, taxes, and spending is primarily determined by the probability distribution of these elements across system states. Using the fiscal reaction function, Ejaz and Javid (2013) analyzed Pakistan's debt sustainability. They discovered that the primary surplus to GDP ratio and the lag debt to GDP ratio have a favorable association. After that, they extended the fiscal reaction function and estimated the coefficient for lag surplus to GDP. The result demonstrated that it is positive and marginally significant. Debt dynamics were also investigated. Revenue and expenditure response functions are modeled to examine the impacts of spending and revenue adjustment on debt, and the results support the intertemporal budget constraint by focusing on both revenue and expenditure; the government can help with fiscal changes.

Chandia et al. (2019) elaborated on Pakistan's and India's public debt sustainability from 1971 to 2017 using a debt dynamic equation for the long-term sustainability of the public debt. It used two components: interest rate-growth rate difference, difference of primary budget balance as a ratio of GDP, and changes in reserve money as a ratio of GDP. “The significance of the approach used in the current study

lies in the fact that in case of evaluation of countries' debt sustainability, it is quite necessary to monitor debt trends along with emerging domestic and external vulnerabilities and systemic risks that threaten debt sustainability” (Chandia et al., 2019). The study discovered that the interest rate-growth rate difference and the primary budget balance-reserve money ratio difference can influence a country's debt-to-GDP ratio variance. According to this study, in Pakistan and India, the growth rate of GDP, interest rate, primary budget balance, and reserve money all have a role in overall debt sustainability. The interest rate-growth rate difference positively impacted the rise of public debt rather than an adverse impact. On the other hand, the primary budget balance significantly benefits Pakistan's and India's increasing debt burdens.

Existing researchers cannot apply the debt dynamic equation to assess debt sustainability, especially regarding the interplay of factors such as primary budget balance, change in reserve money, interest rate, and growth rate. Not only that, but when it comes to existing literature, very few studies have been used to compare the sustainability of debt in Sri Lanka, India, and Pakistan. This study focuses on the sustainability of public debt in Sri Lanka, India, and Pakistan using the debt dynamic equation by highlighting factors like primary budget balance, change in reserve money, interest rate, and growth rate.

Methods

The first section of this study delves into the determinants of Change in debt stock in three specific countries: Sri Lanka, India, and Pakistan. The second section then proceeds to assess debt sustainability in these three countries. This analysis utilizes variables in the debt dynamics equation developed by Chandia (2019). Diagnostic analysis conducted for collected data, such as serial correlation test to check the out how independent and dependent variables are related, multicollinearity test, Breusch-Godfrey test to check the autocorrelation, Breusch-Pagan-Godfrey test to

check the heteroscedasticity, Jarque-Bera test is used to conduct normality test, Ramsey RESET test to check the stability diagnostic.

Theoretical Framework

Romer's Debt Dynamics Equation and Chandia et al.'s (2019) Framework are essential because they offer conceptual clarity, focus on fiscal sustainability, provide empirical applicability, and have significant policy relevance in analyzing public debt dynamics. Their combination of theoretical insights and empirical analysis makes them valuable tools for understanding and addressing the complexities of government debt management. Romer's Debt Dynamics Equation provides a clear and intuitive framework for understanding the relationship between government fiscal policy, debt accumulation, and economic variables. It is derived from the government budget constraint, which ensures that government spending is constrained by its initial wealth, tax receipts, and debt accumulation over time. This conceptual clarity makes it easier to analyze and interpret the factors driving changes in public debt levels. The debt dynamics equation proposed by Romer (2012) was used to examine public debt sustainability in this study. The debt dynamic equation was derived from the government budget constraint. "The government's budget constraint is analogous: the present value of its purchases of goods and services must be less than or equal to its initial wealth plus the present value of its tax receipts (net of transfer payments)" (Romer, 2012). The government budget constraint is described using the following equation, which is crucial for assessing the long-term viability of government debt levels. By considering variables such as real interest rates, GDP growth rates, and primary balances, these frameworks enable policymakers and economists to evaluate whether a country's debt trajectory is sustainable over time. This emphasis on sustainability is essential for avoiding (01) crises and maintaining economic stability.

$$\int_0^{\infty} e^{-Rt} G(t) dt \leq D(0) + \int_0^{\infty} e^{-Rt} T(t) dt$$

$$e^{-R(t)} T(t)dt$$

(01)

Where $G(t)$ is the government's actual purchases at time t , $T(t)$ is the government taxes at time t , and $D(0)$ is the initial real debt outstanding. $R(t)$ describes $\int_{T=0}^t r(T) dT$, where $r(T)$ means the real interest rate at time T . And the value of a unit of output at time t discounted back to time 0 is $e^{-R(t)}$. $D(0)$ represents debt rather than wealth.

“The simplest definition of the budget deficit is the rate of Change in the stock of debt. The rate of Change in the stock of real debt equals the difference between the government's purchases and revenue, plus the real interest on its debt” (Romer, 2012). That is,

$$D(t) = [G(t) - T(t)] + r(t)D(t) \quad (02)$$

When the price level deflates, rising inflation still raises the traditional deficit measure if the debt stock is favorable.

Empirical Framework

This study's empirical framework was developed based on the framework of Chandia et al. (2019), based on the theoretical insights into debt dynamics suggested by Romer (2012). This study analyzes the dynamics of the government's public debt. Regarding public debt payable in local currency, the domestic real interest rate, GDP growth, and primary balances are all relevant variables. This study offers a practical and empirically testable approach to analyzing public debt dynamics. By incorporating specific variables relevant to debt sustainability, such as domestic real interest rates and primary balances, this framework provides a basis for conducting empirical analysis and deriving policy implications. Its empirical applicability allows researchers to assess the determinants of debt accumulation and formulate

evidence-based policy recommendations.

“The debt-to-GDP ratio varies over time because of joint effects of certain macroeconomic variables, namely the interest rate, the exchange rate, budget deficit, and GDP growth”(Chandia et al., 2019). The investigation begins with the public sector’s budget identification, which can be presented as follows:

$$PD + iB = \Delta S + \Delta B \quad (03)$$

The following regression model has been developed to execute the empirical analysis.

$$\Delta b = (pd - s) + b(r - Y^{\wedge}) \quad (04)$$

Δb = Change in public debt stock

$(pd-s)$ = The primary budget balance change in reserve money differential

$b(r - Y^{\wedge})$ = The interest rate-growth rate differential adjusted to the public debt stock

The nature of public debt sustainability is determined by two conditions, according to Chandia et al. (2019). The first condition is that public debt is sustainable when the primary budget balance change in reserve money differential is greater than zero $[(pd-s)>0]$. The second condition is public debt is sustainable when the real interest rate is lower than the growth rate $(r < Y^{\wedge})$.

Findings of the Study

Analyzing determinants of change in debt

In case of Sri Lanka,

Table 2

Regression Output

Variable	Coefficient	Std. error	t-Statistic	Prob.
c	-2.641214	1.782343	-1.481878	0.1526
pd - s	11.00014	10.24473	1.073736	0.2946
02 nd Difference of b (r – Y [^])	0.899686	0.165656	5.431037	0.0000
R-squared			0.684406	
Adjusted R-squared			0.655715	
F-statistic			23.85489	
Prob(F-statistic)			0.0000	

Source: Compiled by the author

Based on the analysis, there is no statistically significant correlation between the difference in the primary budget balance and reserve money and the change in public debt stock. However, there is a statistically significant relationship between the difference in the adjusted interest rate-growth rate and the public debt stock, which affects changes in Sri Lanka's public debt stock.

$$\Delta b = 0.899686 b(r - Y^{\wedge}) \quad (05)$$

When the difference between the interest rate-growth rate and the public debt stock increases by 1%, the public debt stock increases by LKR 0.899686 billion, given that all other independent variables remain constant.

In the case of India,

Table 1

Regression Output

Variable	Coefficient	Std. error	t-Statistic	Prob.
c	88.30264	277.2267	0.318521	0.7526

02 nd Difference of pd - s	-998.0360	400.0422	-2.494826	0.0193
02 nd Difference of b (r – Y^)	0.312029	0.084524	3.691600	0.0010
R-squared			0.465889	
Adjusted R-squared			0.424803	
F-statistic			11.33950	
Prob(F-statistic)			0.000288	

Source: Compiled by the author

Based on the analysis, there is a significant correlation between the change in primary budget balance and the change in reserve money differential, which affects the change in the public debt stock. Additionally, the study shows a statistically significant relationship between the interest rate-growth rate differential adjusted to the public debt stock and the change in public debt stock in India.

$$\Delta b = -998.0360 (pd - s) + 0.312029 b (r - Y^{\wedge}) \quad (06)$$

When the primary budget balance change in reserve money differential is increased by one percent, the public debt stock decreases by Indian Rs. 998.04 billion, while other independent variables are constant. When the interest rate-growth rate differential adjusted to the public debt stock increases by one percent, the public debt stock increases by Indian Rs. 0.312029 billion, while other independent variables hold constant.

In the case of Pakistan,

Table 4

Regression Output

Variable	Coefficient	Std. error	t-Statistic	Prob.
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c	1081.782	392.0298	2.759438	0.0112
01 st difference of pd - s	-13764.39	8230.186	-1.672428	0.0080
b (r – Y [^])	1.166627	0.993921	1.173763	0.0425
R-squared			0.175212	
Adjusted R-squared			0.103491	
F-statistic			2.442977	
Prob(F-statistic)			0.009128	

Source: Compiled by the author

The analysis shows that in Pakistan, there is a statistically significant correlation between the change in the primary budget balance and the change in reserve money differential with the change in public debt stock. Moreover, it suggests a statistically significant relationship between the interest rate-growth rate differential adjusted to the public debt stock and the change in public debt stock..

$$\Delta b = -1.672428 (pd - s) + 1.173763 b (r - Y^{\wedge}) \quad (07)$$

When the primary budget balance change in reserve money differential is increased by one percent, public debt stock decreases by Rs.1.672428 billion, while other independent variables are constant. When the interest rate-growth rate differential adjusted to the public debt stock increase by one percent, public debt stock increased by Pakistani Rs. 1.173763 billion, while other independent variables held constant.

Assessment of public debt sustainability

In the case of Sri Lanka,

Table 5

Public Debt Sustainability Analysis in Sri Lanka

Year	Change in debt as a Percentage of GDP	(pd – s)	(r – Y[^])	Nature of (pd – s)	Nature of r – Y[^]	Nature of public debt
1990	0.0184	-0.027	Unavailable	(pd – s)<0	Unavailable	Unavailable
1991	-0.0301	-0.043	Unavailable	(pd – s)<0	Unavailable	Unavailable
1992	0.0145	-0.020	Unavailable	(pd – s)<0	Unavailable	Unavailable
1993	-0.0151	-0.031	Unavailable	(pd – s)<0	Unavailable	Unavailable
1994	-0.0010	-0.049	Unavailable	(pd – s)<0	Unavailable	Unavailable
1995	-0.0187	-0.043	Unavailable	(pd – s)<0	Unavailable	Unavailable
1996	-0.0720	-0.047	Unavailable	(pd – s)<0	Unavailable	Unavailable
1997	0.0485	-0.020	Unavailable	(pd – s)<0	Unavailable	Unavailable
1998	0.0408	-0.033	Unavailable	(pd – s)<0	Unavailable	Unavailable
1999	0.0179	-0.017	Unavailable	(pd – s)<0	Unavailable	Unavailable
2000	0.0610	-0.038	Unavailable	(pd – s)<0	Unavailable	Unavailable
2001	0.0230	-0.054	0.020	(pd – s)<0	r > Y [^]	Unsustainable
2002	0.0017	-0.053	0.007	(pd – s)<0	r > Y [^]	Unsustainable
2003	0.0006	-0.041	-0.045	(pd – s)<0	r < Y [^]	Weak form sustainability
2004	-0.1172	-0.053	-0.048	(pd – s)<0	r < Y [^]	Weak form sustainability
2005	-0.0273	-0.038	-0.059	(pd – s)<0	r < Y [^]	Weak form sustainability
2006	-0.0288	-0.038	-0.063	(pd – s)<0	r < Y [^]	Weak form sustainability
2007	-0.0363	-0.023	-0.042	(pd – s)<0	r < Y [^]	Weak form sustainability
2008	0.0469	-0.021	-0.038	(pd – s)<0	r < Y [^]	Weak form sustainability
2009	-0.0415	-0.044	0.058	(pd – s)<0	r > Y [^]	Unsustainable
2010	-0.0346	-0.030	-0.182	(pd – s)<0	r < Y [^]	Weak form sustainability
2011	0.0072	-0.022	-0.030	(pd – s)<0	r < Y [^]	Weak form sustainability
2012	-0.0085	-0.013	-0.069	(pd – s)<0	r < Y [^]	Weak form sustainability

2013	-0.0278	-0.008	0.025	(pd – s)<0	r > Y [^]	Unsustainable
2014	0.0050	-0.024	-0.001	(pd – s)<0	r < Y [^]	Weak form sustainability
2015	0.0296	-0.038	0.013	(pd – s)<0	r > Y [^]	Unsustainable
2016	-0.0110	-0.017	0.009	(pd – s)<0	r > Y [^]	Unsustainable
2017	0.0630	-0.006	0.004	(pd – s)<0	r > Y [^]	Unsustainable
2018	0.0260	0.005	0.041	(pd – s)>0	r > Y [^]	Weak form sustainability
2019	0.1420	-0.027	0.060	(pd – s)<0	r > Y [^]	Unsustainable
2020	0.0570	-0.048	0.104	(pd – s)<0	r > Y [^]	Unsustainable

Source: Compiled by the author

There was no indication of a sustainable debt level within Sri Lanka between 2001 and 2020. After 2013, the country has a lot of unsustainable debt levels. In the financial years 2001, 2002, 2009, 2013, 2015, 2016, 2017, 2019, and 2020, the present public debt of Sri Lanka is unsustainable. In other years, the country faced weak forms of sustainability according to the two conditions mentioned above. In 2001, Sri Lanka's public debt was unsustainable because of a substantial primary deficit 2001. It is LKR 57,915 million. In 2002, it also indicated unsustainable debt due to three reasons. The first issue was persistently substantial budget deficits resulting from diminishing revenues and rising spending. The second concern was the ever-increasing public debt and debt service obligations resulting from chronically high budget deficits and expensive deficit financing. The third was the state-owned enterprises' ongoing financial losses caused by ineffective business and financial management methods. (CBSL-Annual report -2001) In 2009 there is unsustainable debt reported. This is mainly because Sri Lanka was struck by the slowdown in local and foreign demand and the necessity of offering fiscal stimulus to counteract the effects of the global economic crisis.

Meanwhile, the government's recurrent expenditure surged dramatically due to the heightened security, urgent resettlement, rehabilitation, and reconstruction(RRR)

initiatives in the Northern and Eastern provinces and increasing interest payments. (CBSL -Annual report -2009) 2013, the Sri Lankan government could not meet its fiscal targets during the first half of the year. Expected government revenue decrease due to a decline in import-related taxes. Then, it impacted an unsustainable debt level in 2013. The conclusion of two crucial national elections in 2015 and the resulting change in the government's administrative apparatus, the inter-election period's uncertainty and the resulting slowdown in economic activity, as well as external sector-related problems, such as tightened international financial market conditions and a downturn in foreign inflows, all contribute to debt unsustainability(CBSL - Annual report -2015). In 2016, public debt became unsustainable due to the reduction in government revenue. When considering 2017, there is a positive primary surplus. Even though public debt becomes unsustainable due to the primary budget balance - the reserve money ratio is less than zero. It causes unsustainable debt in the respective year. In 2019, debt became unsustainable due to the reduction in revenue caused by considerable import restrictions on the import of motor vehicles. The economic activity has been low and aggravated due to the Easter Sunday attack. The expenditure side improves primarily due to subsidies, transfers, salaries, and wages(CBSL -Annual Report -2019). Due to the economic implications of the COVID-19 pandemic, public debt will become unsustainable in 2020, as demonstrated by a fall in government revenue and an increase in government recurrent expenditure, widening the budget deficit and raising the outstanding public debt.

“The existing literature suggested that if interest rate-growth rate differential comes up with the negative sign, it implies that the difference is not contributing towards debt accumulation or indebtedness” (Chandia et al., 2019). “The interest-growth difference does not affect the debt ratio because the interest rate, both nominal and real, have always been controlled and hence remained lower than the growth rate” (Bilquees Faiz, 2003). It is ensured by this study also. When the GDP growth rate

exceeds the real interest rate, it does not support debt becoming unsustainable. 2003 to 2008 and 2010 to 2012 mention that debt is not unsustainable. It is in a weak form of sustainability. In 2018, even though the genuine interest rate-growth rate differential is positive, the primary budget balance - change in reserve money differential is positive, creating a weak form of sustainability in debt. It shows a positive primary budget balance. It ensures that “primary budget surplus becomes compulsory for the maintenance of long-term sustainability of debt to GDP ratio” (Chandia et al., 2019).

In the case of India,

Table 6

Public Debt Sustainability Analysis in India

Year	Change in debt as a Percentage of GDP	(pd –s)	(r – Y[^])	Nature of (pd – s)	Nature of r – Y[^]	Nature of public debt
1990	Unavailable	Unavailable	-0.0023	Unavailabl e	r < Y [^]	Unavailable
1991	Unavailable	Unavailable	0.0252	Unavailabl e	r > Y [^]	Unavailable
1992	0.027657	Unavailable	0.0363	Unavailabl e	r > Y [^]	Unavailable
1993	0.02375	Unavailable	0.0101	Unavailabl e	r > Y [^]	Unavailable
1994	0.020625	Unavailable	-0.0236	Unavailabl e	r < Y [^]	Unavailable
1995	0.018555	Unavailable	-0.0174	Unavailabl e	r < Y [^]	Unavailable
1996	0.015151	-0.0975	0.0029	(pd – s) < 0	r > Y [^]	Unsustainable
1997	0.021695	-0.4196	0.0291	(pd – s) < 0	r > Y [^]	Unsustainable

1998	0.022181	-0.4396	-0.0108	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
1999	0.022913	-0.2445	0.0069	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2000	0.020183	-0.2650	0.0434	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2001	0.024234	-0.2376	0.0369	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2002	0.022224	-0.6082	0.0401	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2003	0.025604	-0.6087	-0.0059	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2004	0.024414	-0.4328	-0.0289	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2005	0.020592	-0.6168	-0.0444	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2006	0.020168	-0.8067	-0.0673	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2007	0.023612	-1.0529	-0.0412	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2008	0.020789	-0.3665	-0.0013	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2009	0.024258	-0.7664	-0.0369	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2010	0.022777	-0.8313	-0.1228	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2011	0.030777	-0.5521	-0.0528	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2012	0.023307	-0.3952	-0.0303	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2013	0.021593	-0.3564	-0.0253	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2014	0.018323	-0.3335	-0.0070	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2015	0.024384	-0.5843	-0.0044	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2016	0.021246	0.3632	-0.0207	$(pd - s) > 0$	$r < Y^{\wedge}$	Sustainable
2017	0.0243	-0.9775	-0.0147	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2018	0.022117	-0.5824	-0.0099	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable

2019	0.026341	-0.4207	0.0167	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2020	0.039328	-0.7033	0.1164	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable

Source: Compiled by the author

2016 was a milestone year in India since it had sustainable debt. While the economy grew by 8.3 percent, macroeconomic fundamentals improved, with low inflation and a small current account deficit. Moreover, India introduced a new tax rate called “Goods and Services Tax (GST)” in 2016. It increases the government revenue and strengthens the fiscal sector (RBI - Annual report -2016-17). It satisfied both conditions. “when the real growth rate exceeds the real interest rate, its beneficial effect in containing the process of debt accumulation is partly offset by the influence of the inflation rate, and vice versa”(Rangarajan & Srivastava, 2003). As the real interest rate was more significant than the GDP growth rate, and the primary budget balance-change in reserve money differential was negative, public debt became unsustainable in 1996, 1997, and 1999 to 2002. It was decided due to the negative primary budget balance change in reserve money differential and the favorable interest rate-growth rate difference. During 1999, government revenue decreased, and government expenditure increased remarkably. It increased India's primary deficit in 1999. It has a direct impact on the unsustainability of debt. In 2002, the Indian government had a shortfall in revenue collection. India showed unsustainable debt in 2019 and 2020. In 2019, the outbreak of COVID-19 started. It negatively impacts economic activities. Inadequacies in government revenues and disinvestment receipts caused the government's finances to deviate from its budgetary targets. That increases debt level. Indian rupees 17732.59 billion were added newly in 2019 to the total debt level. Public finances were harmed by a cyclical drop in revenues, exacerbated by COVID-19, while pandemic-related budgetary measures increased spending in fiscal year 2020 (RBI - Annual report - 2020-21). COVID-19 has highly impacted India. It reduces Indian strength on the

fiscal side and increases the debt level by 26165.029 billion Indian rupees. Therefore, it ensures the debt unsustainability.

2003 to 2015, 2017, and 2018 reported a weak form of sustainable debt in India. This happens due to the differences in the negative interest rate growth rate. “The role of the growth/interest rate difference has been to absorb the impact of the cumulated primary deficits from getting translated into accretion to the debt-GDP ratio” (Rangarajan & Srivastava, 2003) Reserve Bank of India mentioned that “In 2003-04, government finances improved slightly, owing to strong macroeconomic performance and a commitment to long term budget consolidation. The Centre’s major deficit indicators, including the gross fiscal deficit, revenue deficit, and primary deficit, were all lower than budgeted levels in the revised estimates and provisional accounts for 2003-04, owing to higher revenue realization and non-plan spending control” (RBI - Annual report -2003-04). This study suggests a weak form of sustainability in 2003 India’s public debt. The dissatisfactory monsoon and the unpredictable crude oil prices threatened the growth of the Indian economy in 2004, that impact on debt did not become sustainable. In 2005 and 2006, high GDP growth in India was recorded with the influence of high global growth. Even though the USA subprime mortgage crisis arose in 2007, India has experienced high growth. Then, their interest rate-growth rate difference is negative, and debt is not unsustainable. There was a sharp deterioration in global economic conditions due to the global financial crisis in 2008. It spread to India, and its growth rate deteriorated rapidly. However, India's adverse interest rate-growth rate difference causes it to maintain at least a weak form of sustainability in debt. India could recover their growth in the second half of the year 2009. Moreover, they could achieve one of the highest GDP growth rates in the world during that year. It was 8.5 percent.

The expansionary fiscal policy benefited economic growth by reducing the impact of slow private consumption and investment demand. It causes an adverse interest

growth rate difference. Even though there is a negative primary budget balance change in reserve money differential in India, it could maintain the weak form of sustainability. During the period 2010 to 2013, domestic weakness and global uncertainty posed the macroeconomy in danger, and it caused it not to maintain sustainable debt. However, it is in a weak form of sustainability. In 2014, the macroeconomic climate was defined by a slight increase in activity while maintaining internal and external stability against a gradual and uneven global recovery across regions. Therefore, the debt in that year became a weak form of sustainability. The economy moderated during the financial years 2015, 2017, and 2018. Therefore, the primary budget balance to GDP and the change in reserve money to GDP difference becomes negative. Therefore, the debt needs to be in a more potent form of sustainability. “The large primary budget deficit tends to increase debt ratio to such a high level that primary budget surplus becomes compulsory for the maintenance of long-term sustainability of debt to GDP ratio” (Chandia et al., 2019). That statement ensures the results of the analysis of India.

In the case of Pakistan,

Table 7

Public Debt Sustainability Analysis in Pakistan

Year	Change in debt as a Percentage of GDP	(pd –s)	(r – Y[^])	Nature of (pd – s)	Nature of r - Y[^]	Nature of public debt
1990	Unavailable	0.0000	-0.0460	Unavailable	r <Y [^]	Unavailable
1991	Unavailable	0.0000	-0.0510	Unavailable	r <Y [^]	Unavailable
1992	Unavailable	0.0000	-0.0760	Unavailable	r <Y [^]	Unavailable
1993	Unavailable	0.0000	-0.0210	Unavailable	r <Y [^]	Unavailable
1994	Unavailable	0.0000	-0.0440	Unavailable	r <Y [^]	Unavailable

1995	0.054903	0.0000	-0.0510	Unavailable	$r < Y^{\wedge}$	Unavailable
1996	0.105842	0.0000	-0.0660	Unavailable	$r < Y^{\wedge}$	Unavailable
1997	0.112897	-0.0570	-0.0170	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
1998	0.095576	-0.0270	-0.0350	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
1999	0.191491	0.0140	-0.0420	$(pd - s) > 0$	$r < Y^{\wedge}$	sustainable
2000	0.061824	-0.0030	-0.0390	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2001	0.110268	0.0050	-0.0200	$(pd - s) > 0$	$r < Y^{\wedge}$	sustainable
2002	-0.00702	0.0400	-0.0310	$(pd - s) > 0$	$r < Y^{\wedge}$	sustainable
2003	0.010618	0.0490	-0.0470	$(pd - s) > 0$	$r < Y^{\wedge}$	sustainable
2004	0.02338	0.0190	-0.0757	$(pd - s) > 0$	$r < Y^{\wedge}$	sustainable
2005	0.038521	-0.0140	-0.0786	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2006	0.037081	-0.0390	-0.0386	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2007	0.045547	-0.0490	-0.0131	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2008	0.119902	-0.0850	-0.0524	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2009	0.122673	-0.0570	-0.0548	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2010	0.086138	-0.1350	0.0028	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2011	0.09583	-0.0147	-0.0797	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2012	0.096528	-0.0321	0.0333	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2013	0.076574	-0.0255	0.0099	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2014	0.062016	-0.0230	-0.0008	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable
2015	0.050572	-0.0168	0.0171	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2016	0.078816	-0.0316	0.0372	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2017	0.054465	-0.0440	-0.0117	$(pd - s) < 0$	$r < Y^{\wedge}$	Weak form sustainable

2018	0.102358	-0.0398	0.0043	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2019	0.197891	-0.0646	0.0108	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable
2020	0.093863	-0.0446	0.0106	$(pd - s) < 0$	$r > Y^{\wedge}$	Unsustainable

Source: Compiled by the author

In 2001, the Pakistani government introduced fiscal reforms to improve tax compliance through documentation and transparency. “Other measures included a tax amnesty scheme, the extension of GST to services, fiscal transparency, measures to arrest the overrun of expenditures, and several other steps intended to enhance fiscal discipline and correct macroeconomic imbalances” (SBP-Annual report 2001-02). This decision caused public debt to become sustainable in that year and for consecutive years. Up to 2004, public debt became sustainable in Pakistan. 2005, there was an earthquake, and we had to spend more money on providing relief and rehabilitation facilities. It also had to continue for 2006.

In 2007, the direct and non-direct tax revenue increased. Therefore, public debt is only partially sustainable during the above period. Public debt was sustainable in a weak form in 2008 because revenue growth slowed while overall expenditures rose sharply. In 2009, due to the successful implementation of the macroeconomic stabilization program, public debt was sustainable in weak form. Since the slowing in revenue collection, persistent law and order pressure on public expenditure, and higher than anticipated subsidies, fiscal consolidation could not be in the financial year 2010. In 2011, public debt was sustainable in weak form due to administration restrictions on growth in its total expenditure. Substantial increases in expenditures, primarily due to debt servicing, subsidies, and development spending, contributed significantly to the budget deficit, reaching 8.5 percent of GDP in 2012. In 2013, a substantial portion of the budget deficit was caused by a large payment to resolve a circular debt that had not been budgeted for. Due to the above two reasons, public debt became unsustainable in 2012 and 2013. In the year 2014 the country faced a

weak form of sustainability. This was due to an increase in revenue and a decrease in expenditures in the previous two years. “The real interest rate-growth rate difference would push the Δb ratio up if the real interest rate exceeded the real output” (Bilquees Faiz, 2003). Then, 2015 and 2016 faced unsustainable debt since these years faced adverse interest rate-growth rate differences. “The increase in budget deficit has caused a sharp increase in internal and external borrowings” (Khan & Saeed, 2012). During that period, Pakistan’s primary balance also faced a deficit. In 2017, development expenditure increased primarily. “The budget deficit in the second half of the financial year 2018 climbed to nearly twice that in the first half of financial year, 2018, according to a half-yearly breakdown.” (SBP-Annual report 2017-18) In 2019, "The primary and revenue balances both deteriorated significantly, reflecting the government's growing debt burden and a decreasing capacity for critical development spending." (SBP-Annual report 2019-20)

COVID–19 outbreak badly impacted Pakistan, like all other countries. “Controlled spending and increased income growth resulted in a visible improvement in the budgetary position in the first eight months of financial year 2020, but the emergence of COVID–19 in the last four months of the year posed a problem. The outbreak’s response resulted in doubling the fiscal deficit in quarter four. Undoing the improvements of the previous three quarters.” (SBP-Annual report 2020-21) Above mentioned reasons caused public debt to become unsustainable during 2018, 2019, and 2020. That is explained by positive interest rate – -growth rate differential and harmful the primary budget balance-change in reserve money differential. “large budget deficits cause indebtedness by borrowings domestically and internationally and increase the burden on future generations” (Hakro, 2009, as cited in Khan & Saeed, 2012).

Discussion and Recommendation

This empirical study was mainly conducted to assess the public debt sustainability in the context of Sri Lanka, India, and Pakistan while determining the determinants of Change in public debt stock in these countries. Regarding the Sri Lankan context, the interest rate-growth rate differential adjusted to the public debt stock significantly positively impacts Change in public debt stock. When considering the primary budget balance, the change in reserve money differential has a positive, insignificant impact on the change in public debt stock in Sri Lanka. In the case of India and Pakistan, there is a significant negative impact from the primary budget balance change in reserve money differential on change in public debt stock. The interest rate-growth rate differential adjusted to the public debt stock significantly positively impacts the Change in public debt stock in India and Pakistan.

Finally examined the long-term sustainability of public debt in Sri Lanka, India, and Pakistan. Sri Lanka has not reported any year of sustainable public debt, and India reported sustainable debt in 2016. Pakistan also experienced sustainable public debt in 1999, 2001, 2002, 2003, and 2004.

This study contributes to policy implementation in Sri Lanka, India, and Pakistan. Governments need to maintain a sustainable fiscal policy by keeping budget deficits under control. This involves either reducing public spending, increasing revenues, or both. Running primary budget surpluses helps reduce the debt burden over time. Both monetary and fiscal policymakers have significant responsibility for formulating policies relating to the public debt of relevant countries. Any government tries to reduce the primary budget deficit by increasing revenue and decreasing expenditure. When increasing revenue it is better to impose direct taxes rather than indirect taxes. “Fiscal authorities need to increase the tax base by increasing direct taxes instead of imposing indirect taxes on poor people of the

country” (Chandia et al., 2019). The primary balance has to be maintained as a surplus, due to its need for the reduction in accumulation debt level in the three economies.

Increasing GDP causes a rise in the GDP growth rate, and it ultimately reduces the interest rate-growth rate differential. Governments have to implement efficient and effective policies in debt management and economic growth promotion. Moreover, we have to improve local and foreign direct investment. “An effective and viable monitoring system is put in place to ensure proper and systematic utilization of borrowed funds for the development projects” (Hameed & Quddus, 2020). In terms of policy recommendations, the study highlights the need for effective management of public debt in Sri Lanka, India, and Pakistan. Policymakers should consider the determinants of change in debt stock identified in this study when formulating debt management strategies. Furthermore, the findings underscore the importance of maintaining a positive primary budget balance change in reserve money differential and a lower real interest rate than the growth rate for public debt sustainability. In addition, it is necessary to reduce the increase in reserve money as it causes an inflationary impact on the economy. For that, political and economic reforms must focus on effective resource utilization.

The study mentioned some limitations, one of which was the potential constraints due to data availability. During the study period, there needed to be more data availability for some variables, which was a source of concern. This proved to be a great barrier to data collection. Additionally, the study's focus was limited to Sri Lanka, India, and Pakistan, and the empirical model used was simple. Future research could address these limitations by conducting longitudinal or comparative analyses, exploring the effects of specific fiscal policies, and investigating the impact of macroeconomic shocks on public debt dynamics. To enhance the robustness and generalizability of the findings, it would be beneficial to expand the

scope to include other countries or regions and incorporate more comprehensive datasets. Furthermore, exploring the role of political factors, institutional arrangements, and external influences on public debt dynamics could provide valuable insights for policymakers and researchers.

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Effectiveness of Different Value at Risk Models in Predicting Stock Prices during Covid-19: The Case of Colombo Stock Exchange

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This paper assesses the predictive capabilities (the performance and the reliability) of three widely used Value-at-Risk (VaR) models in forecasting stock values before and during a major economic disruption. Utilizing trading data from companies listed on the Colombo Stock Exchange in Sri Lanka, the research compares the performance of Parametric VaR, Historical Simulation VaR, and Monte Carlo VaR models across two distinct periods - the pre-Covid-19 era and the volatile pandemic market conditions. The analysis delves into how effectively these VaR methodologies capture and anticipate market volatilities and potential losses, offering valuable insights for financial risk management practices. The dataset is divided into three periods: pre-Covid-19 (01 February 2019 to 11 March 2020), during Covid-19 (11 March 2020 to 15 June 2021), with 270 observations for each period, and finally considering both periods. This split enables a balanced analysis of VaR model performance across different market conditions. By evaluating the model outputs across eight financial assets, including individual stocks, indices, and a diversified portfolio, the paper provides a comprehensive assessment of their strengths and limitations in turbulent market environments. The study's findings reveal that, based on backtesting, the Historical Simulation VaR model outperforms other models in predicting market risk. The Parametric VaR model shows moderate effectiveness, while the Monte Carlo VaR model proves to be the weakest in capturing market volatility. The findings shed light on enhancing the usability and applicability of VaR analysis during periods of extreme uncertainty, such as the Covid-19 pandemic. The paper aims to empower risk managers, investors, and financial professionals with data-driven strategies to mitigate risks and make more informed investment decisions, even in the face of unprecedented market conditions.

Keywords: *Covid-19 pandemic, Historical Simulation VaR, Monte Carlo VaR, Parametric VaR, Predictive Accuracy*

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Introduction

The Covid-19 pandemic has exerted a profound influence on the economies of both developed and developing economies (Bortz, Michelena & Toledo, 2020; Martin, Sánchez & Wilkinson, 2023; Wang, Zhao, Zhang, Zhang & Guo, 2023). Like many other countries, Sri Lanka enacted stringent international travel policies, including the imposition of quarantine measures. Additionally, the cancellation of numerous cultural festivals and sports events within the country limited economic activities within its borders. In Smith, J. A. (2021) evidence strongly suggests that the enduring repercussions of Covid-19 on the economy manifested in terms of increased business closures and elevated unemployment rates, further contributing to the temporary shutdown of the stock market. Understanding and managing risk during such turbulent times becomes paramount for investors and financial professionals.

The motivation behind this study stems from a personal investment experience in the Colombo Stock Exchange during the pandemic's peak. Despite hopes of capitalizing on the market's volatility, the unpredictable market dynamics led to a substantial financial loss on investment. This incident underscores the importance of practical risk management tools and strategies. From an investor's perspective, understanding the exact value of risk is crucial. If the factors leading to risk can be identified and understood, investment amounts can be adjusted, or better stocks can be targeted, potentially mitigating substantial losses. This is where Value-at-Risk (VaR) models, tools designed to predict potential losses, come into play. However, the real question is: How effective are these VaR models in predicting and managing risk during a crisis like Covid-19?

The paper is organized as follows: Section 2 outlines past literature on the VaR models used in predicting stocks under different circumstances in the world financial markets. Section 3 presents the VaR measurement models used in this paper and the

data. Section 4 discusses the results and examines the robustness of the results during crisis and post-crisis periods. Section 5 concludes the paper.

Literature Review

Value-at-Risk (VaR) models are widely used risk management tools, but their effectiveness in predicting and managing risk during crises like the Covid-19 pandemic has been called into question by several studies.

Aussenegg and Miazhyńska (2006) examined the uncertainty in Value-at-risk Estimates under Parametric and Non-parametric Modeling using historical simulation and Monte Carlo simulation. Degiannakis, Floros, and Livada (2012) used mostly widely accepted and simplified methods to calculate VaR including EWMA of RiskMetrics, Classic GARCH(1,1) model of conditional variance assuming a conditional normally distributed returns; and the asymmetric GARCH with skewed Student-t distributed standardized innovations. The results showed that the simplified ARCH framework provides satisfactory forecasts of VaR for both the pre-2008 period of the financial crisis and any period of high volatility of stock market returns. Roy (2011) estimated value at risk (VaR) using filtered historical simulation using data from the Indian capital market while Abad & Benito (2013) compared value at risk estimates using several VaR methods-historical simulation, Monte Carlo simulation, parametric methods and extreme value theory for estimation in stable and volatile periods using daily closing prices of major Spanish, French, German, UK, US Dow Jones Industrial Average, S&P 500, Japanese Nikkei 225 and Hong Kong Hang Seng (HSI) indexes. These are developed stock markets and only use one firm stock index data. Such model comparison lacks for a developing country context to ascertain the accuracy of the VaR models under a dynamic global financial environment often affected by external shocks.

Banihashemi & Navidi (2017) evaluated portfolio performance using the Mean-CVaR framework by comparing results between non-parametric methods value at risk in Mean-VaR analysis. Das & Rout (2020) used parametric value at risk (PVaR, normal distribution) and Student-t value at risk (TVaR) with Monte Carlo simulation by considering stock indices of five leading countries and compared the risk with other periods of crisis against the global financial crisis of 2007-2008 and stock market fluctuation in 1992. Shaik and Padmakumari (2022) employed three different VaR estimation models (normal, historical, and exponential weighted moving average) and eight backtesting models to analyze their performance across three periods: the overall period (2006–2021), the global financial crisis (2008–2009), and the Covid-19 period (2020–2021). The results indicated that the exponential weighted moving average model outperforms the other models for all six stock market indices during the overall and crisis periods. However, VaR models generally perform poorly during crisis periods like the Global Financial Crisis (GFC) and Covid-19 compared to the overall period, with the predictive accuracy being weaker during the Covid-19 era than during the GFC period.

Saputra et al. (2023) conducted Value at Risk analysis using the Historical Method and Monte Carlo Simulation in Banking and Mining Sector Companies and found that the VaR Monte Carlo simulation method can best describe each stock. Afzal et al. (2021) use dynamic conditional correlation (DCC) and generalize autoregressive conditional heteroscedasticity (GARCH) models on the daily stock return of Pakistan and Shanghai Stock Exchange to the actual behavior of stocks in dynamic markets. The study by Anderson & Mawhirter (2023) examined how banks' VaR models performed during the Covid-19 crisis using regulatory trading desk data. The results showed that the predictability from past backtesting exceptions (when actual losses exceeded the VaR estimate) increased during the pandemic relative to 2019, indicating that the models were incomplete in capturing risk during that turbulent period. Song, Sui, and Zhao (2023) based on the Shanghai Composite Index found

that VaR values calculated by more advanced models like the QR-SGED-EGARCH were superior to other models at different confidence levels during the Covid-19 crisis period. Müller & Righi (2024) used several multivariate models including HS (Historical Simulation), DCC-GARCH (Dynamic Conditional Correlation-Generalized Autoregressive Conditional Heteroskedasticity) with normal and Student's t distribution, GO-GARCH (Generalized Orthogonal-Generalized Autoregressive Conditional Heteroskedasticity), and copulas Vine (C-Vine, D-Vine, and R-Vine) to forecast and estimate the realized loss and cost.

Value-at-Risk (VaR) models are widely used risk management tools, but their effectiveness in predicting and managing risk during crises like the Covid-19 pandemic has been questioned by several studies. Researchers have evaluated the performance of various VaR models, including parametric, non-parametric, Monte Carlo simulations, ARCH/GARCH models, and combinations thereof, across different markets and time periods. While some models like exponential weighted moving average and advanced techniques like QR-SGED-EGARCH showed better performance during crises, VaR models generally struggled to accurately predict potential losses during events like the Global Financial Crisis and Covid-19 pandemic, which were characterized by high volatility and extreme market movements. Studies highlight the limitations of existing VaR models in capturing risk during turbulent times, suggesting the need for more sophisticated techniques, such as incorporating machine learning, artificial intelligence, or multivariate models, to improve risk predictions and management during crisis periods. Hence more advanced VaR modeling techniques and an understanding of their shortcomings during crises may be required for effective risk management by investors (Anderson & Mawhirter, 2023; Song, Sui & Zhao, 2023). This suggests that more sophisticated VaR models may be needed to better capture risk during extreme market conditions. While previous studies have extensively applied VaR models in developed markets, particularly during global financial crises like 2008,

there needs to be more research on their effectiveness in developing markets, such as Sri Lanka. Furthermore, there is a lack of focused analysis on how these models perform during unprecedented crises like the Covid-19 pandemic. Existing research often centers on global stock indices and fails to account for smaller economies' unique economic and market dynamics. Additionally, few studies have assessed the reliability and applicability of VaR models during a healthcare crisis, which has fundamentally different market impacts compared to traditional financial crises. This gap creates a need for research that explores VaR models' performance in a developing market and evaluates their usefulness during a pandemic-driven crisis. To fill this gap, this paper investigated the performance of the volatility in the financial returns of all seven significant financial assets of several stocks during the period of the Covid-19 pandemic by applying the three most effective VaR family models, known as Parametric VaR, Historical Simulation VaR & Monti-Carlo VaR.

Methods

Methodological Process and Data

Table 1

Stocks company codes and names

Company Code	Company Name
DIAL	DIALOG AXIATA PLC
DPL	DANKOTUWA PORCELAIN PLC
SLTL	SRI LANKA TELECOM PLC
EXPO	EXPOLANKA HOLDINGS PLC
TKYO	TOKYO CEMENT COMPANY (LANKA) PLC

Figure 1

Methodological process

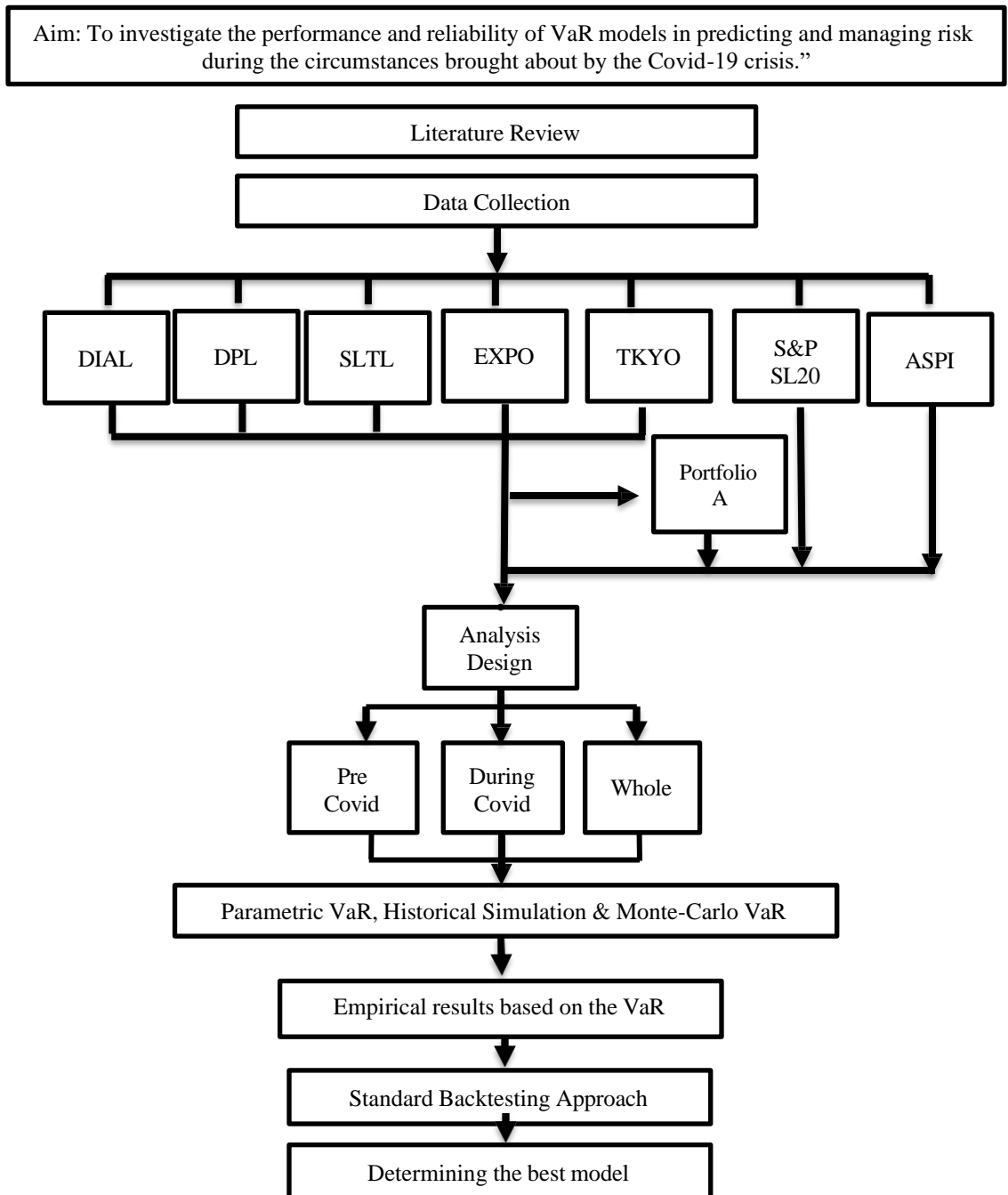


Figure 1 presents the methodological process adopted in this study. To achieve the main research objective, the study used eight financial assets (stock prices of 8 listed

companies) for the analysis purpose, i.e., equation five stocks (DIAL, DPL, SLTL, EXPO, and TKYO) and two indices (S&P SL20 and ASPI) were analyzed (see Table 1). Additionally, a portfolio was constructed using the five stocks, with each stock assigned a weight of 20% based on the following equation (1). The selected stocks in the portfolio were stocks with positive expected returns. Stocks with a positive expected return indicate that the stock is estimated to make a profit. The following calculation obtains the realized return. The composition of Portfolio-A is DIAL, DPL, SLTL, EXPO, TKYO.

$$R_p = \sum(w_i * r_i) \quad (1)$$

Stocks were selected under the constraint that they are traded daily in the market during the period to take their final real-time price. The dataset of daily closing prices for this study was downloaded from the database published at the Colombo Stock Exchange from 01 February 2019 to 15 June 2021, with a daily frequency for total observations of 540. The period featured Covid-19 as a ‘global pandemic’. Therefore, the study considered a dataset across three periods. Pre-Covid-19 Period, During Covid-19 Period and the Whole Period. Pre Covid-19 period considered in the analysis starts from 01 February 2019 to 11 March 2020 while the Covid-19 period begins from 11 March 2020 to 15 June 2021, with equal observations (270) in each period. The study used daily data as they are superior for short-term econometric modeling for forecasting. Daily data demonstrates a quicker reaction in the market by investors when compared to weekly and monthly data. The daily returns are calculated via Equation (2).

$$R_t = \ln(P_t/P_{t-1}) \quad (2)$$

Where R_t denotes returns of the markets at time t . P_t and P_{t-1} represent the current and previous day prices, respectively (Haseeb, 2023).

Parametric VaR model

The parametric VaR method is a risk assessment tool that estimates potential losses or gains a portfolio or single asset might experience over a specified time horizon with a given level of confidence. It uses historical data on returns, assuming that these returns are normally distributed. However, this approach has limitations, especially when financial markets exhibit non-normal behavior. To account for these limitations and provide a more comprehensive view of risk, risk managers and investors often complement parametric VaR with other risk assessment tools.

Step1: Calculate portfolio volatility

$$\sigma = \sqrt{w^T \Sigma w}$$

w – portfolio weight vector
 Σ - Covariance matrix

Step2: Calculate VaR

$$VaR = \text{portfolio value} \times \sigma \times \text{percentile} \quad (3)$$

Historical Simulation VaR

A method of calculating value-at-risk (VaR) that uses historical data to assess the impact of market moves on an asset. A current portfolio/Stock is subjected to historically recorded market movements; this is used to generate a distribution of returns on the portfolio (Likitracharoen and Pinmanee, 2021).

$$VaR_{t+1}^{1-\alpha} = Q^{\alpha}(\{ R_{it} \}_{t=1}^n) \quad (4)$$

where $VaR_{t+1}^{1-\alpha}$ = a value at risk at $1 - \alpha$ for time $t + 1$; And $Q^{\alpha}(\{ R_{it} \}_{t=1}^n)$ = a quantile at α of $\{ R_{it} \}_{t=1}^n$; $\{ R_{it} \}_{t=1}^n$ = a return asset i ; When the time equals to t between $t = 1$ to n .

The historical simulation VaR model uses unconditional data that focuses on the left tail and therefore the sharp of distributed return is not concerned.

Monti-Carlo Simulation VaR

The basic concept behind the Monte Carlo approach is to repeatedly run many simulations of a random process for a variable of interest (such as asset returns in finance) covering a wide range of possible scenarios.

$$dSt = \mu Std t + \sigma Std Wt \quad (5)$$

Data of 2000 Simulations were run for each asset individual. In summary, these three VaR methods use Confidence Levels and Time Horizons as critical inputs to estimate the potential losses in a portfolio or asset. When running Monti-Carlo stimulation to multiple assets, it is essential to normalize the distribution through Cholesky Decomposition. First, we illustrate how to perform Monte Carlo simulation on a single asset. Second, we look at Monte Carlo simulation for multiple assets that are correlated. Third, we discuss how to introduce asset correlation and finally, we outline how to use Cholesky Decomposition to generate correlated random variables for Monte Carlo simulation.

$$C = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \quad (6)$$

Given a symmetrical positive definite (invertible) correlation matrix, we can decompose the correlation matrix into its lower and upper triangular parts (Table 2). This is called Cholesky decomposition (Burgess 2022).

$$C = (LL^T) = \underbrace{\begin{pmatrix} 1 & 0 \\ \rho & \sqrt{1-\rho^2} \end{pmatrix}}_L \underbrace{\begin{pmatrix} 1 & \rho \\ 0 & \sqrt{1-\rho^2} \end{pmatrix}}_{L^T} = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \quad (7)$$

Table 2***Cholesky Matrix for the multiple assets***

0.04878	0	0	0	0
0.00905	0.42964	0	0	0
0.01050	0.10382	0.416375	0	0
0.01275	0.07915	0.051132	0.335886	0
0.01812	0.04589	0.05392	0.027352	0.415267

Findings of the Study**Descriptive Statistics**

Summary statistics of financial returns are represented in Table 3. During the pre-Covid-19 period, TKYO delivered the highest average return at 40.87%, while EXPO experienced a decline with the lowest mean return of -31.11%. Regarding volatility, DPL had the highest standard deviation at 42.97%. As the pandemic unfolded during Covid-19, EXPO surged to the forefront with an astonishing mean return of 249.86%. However, this reward came with risks, as EXPO also exhibited the highest volatility, with a standard deviation of 79.69%. The S&P SL20 index during this tumultuous period ranged from 1691 to 3514.

Figure 2 and Figure 3 show the price trends and return fluctuations of the financial assets. An extensive decline has been observed in the price of the S&P SL20 index, DIAL, SLTL and TKYO in March 2020. Additionally, the price of EXPO experienced a massive incline in January 2021. The returns graphs also show a high level of fluctuations at the beginning of the Covid-19 pandemic. DPL and EXPO show a high level of volatility during Covid-19, ranging from -0.211 to 0.19 and -0.182 to 0.201, respectively. Moreover, the presence of volatility clustering can be seen in the return graphs of all the financial markets.

Table 3***Summary Statistics for the selected financial assets***

Particulars	Stock					INDICES		Portfolio
	DIAL	DPL	SLTL	EXPO	TKYO	S&P SL20	ASPI	PF A
Period	Pre Covid-19							
Mean	6.94%	8.82%	19.65%	-31.11%	40.87%	-15.39%	-8.71%	9.03%
Standard Deviation	22.09%	42.97%	42.93%	34.91%	42.25%	15.02%	10.67%	21.56%
Maximum	13.5	8.4	33.8	6	53	3072	6215	
Minimum	8.7	4.8	20	3	20	2367	5122	
Count	270	270	270	270	270	270	270	
Period	During Covid-19							
Mean	20.44%	81.15%	28.43%	249.86%	79.27%	23.12%	35.43%	91.83%
Standard Deviation	25.23%	70.86%	34.94%	79.69%	51.72%	30.75%	23.45%	40.19%
Maximum	13.2	16.3	42.6	61.9	88.5	3514	8812	
Minimum	7.9	4.5	22	1.8	20	1691	4248	
Count	270	270	270	270	270	270	270	
Period	Whole Period							
Mean	14.11%	43.04%	19.75%	117.84%	59.59%	4.06%	13.93%	50.87%
Standard Deviation	23.83%	59.19%	38.37%	63.44%	47.51%	24.63%	18.59%	32.78%
Maximum	13.5	16.3	42.6	61.9	88.5	3514	8812	
Minimum	7.9	4.5	20	1.8	20	1691	4248	
Count	540	540	540	540	540	540	540	

The empirical results with respect to the different VaR models for the three selected periods (pre- and during the Covid-19 pandemic and the whole period) are illustrated in Table 4, Table 5 and Table 6, respectively. In this study, Portfolio A has given the initial investment as Rs. 100,000 and for other assets such as stocks and indices, their price has taken up to that date. Table 3 presents the Value at Risk (VaR) for various financial assets during the pre-Covid-19 period. The assets include DIAL, DPL, SLTL, EXPO, TKYO, S&P SL20, ASPI, and Portfolio A. The VaR values are calculated assuming three different confidence levels and time. Additionally, these

values are presented across three different VaR modeling techniques: Parametric, Historical stimulation, and Monte-Carlo Stimulation methods.

Figure 2

Price trends in the financial markets over the period of 01 February 2019 to 15 June 2021

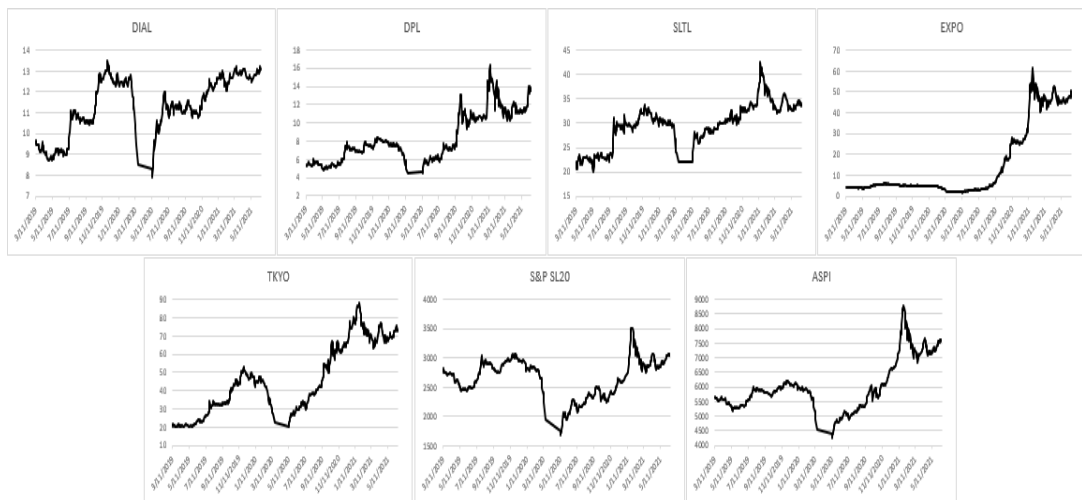


Figure 3

Returns fluctuations in the financial markets over the period of 01 February 2019 to 15 June 2021

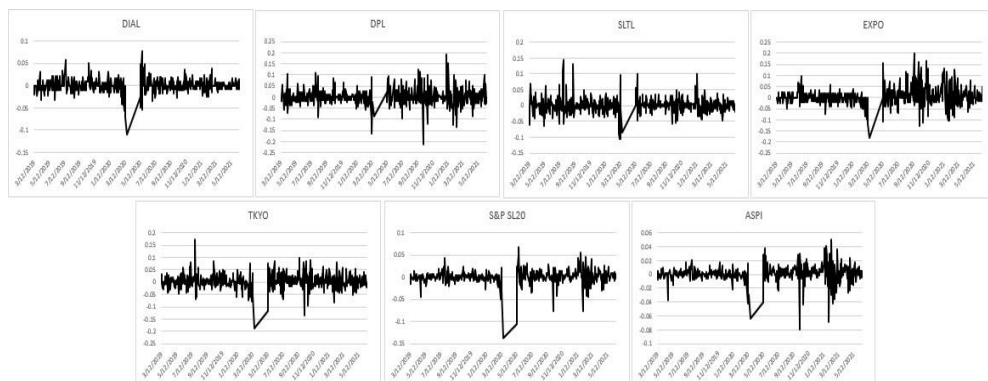


Table 4

Empirical results based on the VaR models in Pre Covid-19 Pandemic (01 February 2019 to 11 March 2020)

	Day	Parametric VaR			Historical Simulation VaR			Monti-Carlo VaR		
		90%	95%	99%	90%	95%	99%	90%	95%	99%
DIAL	1	(0.190)	(0.244)	(0.345)	(0.229)	(0.336)	(0.527)	(0.057)	(0.076)	(0.108)
	3	(0.329)	(0.422)	(0.597)	(0.396)	(0.581)	(0.913)	(0.099)	(0.131)	(0.188)
	7	(0.503)	(0.645)	(0.913)	(0.605)	(0.888)	(1.394)	(0.152)	(0.200)	(0.287)
DPL	1	(0.210)	(0.269)	(0.381)	(0.256)	(0.315)	(0.505)	(0.043)	(0.055)	(0.080)
	3	(0.363)	(0.466)	(0.659)	(0.444)	(0.546)	(0.875)	(0.075)	(0.095)	(0.138)
	7	(0.555)	(0.712)	(1.007)	(0.678)	(0.834)	(1.336)	(0.114)	(0.145)	(0.212)
SLTL	1	(0.952)	(1.221)	(1.727)	(1.083)	(1.442)	(2.583)	(0.447)	(0.560)	(0.775)
	3	(1.648)	(2.116)	(2.992)	(1.875)	(2.497)	(4.474)	(0.774)	(0.971)	(1.343)
	7	(2.518)	(3.232)	(4.571)	(2.865)	(3.815)	(6.834)	(1.183)	(1.483)	(2.051)
EXPO	1	(0.087)	(0.111)	(0.157)	(0.117)	(0.148)	(0.235)	(0.085)	(0.105)	(0.148)
	3	(0.150)	(0.193)	(0.272)	(0.202)	(0.257)	(0.407)	(0.147)	(0.182)	(0.256)
	7	(0.229)	(0.294)	(0.416)	(0.309)	(0.392)	(0.622)	(0.224)	(0.278)	(0.391)
TKYO	1	(1.070)	(1.373)	(1.942)	(1.258)	(1.605)	(2.591)	(0.999)	(1.305)	(1.881)
	3	(1.853)	(2.378)	(3.363)	(2.178)	(2.780)	(4.488)	(1.730)	(2.261)	(3.258)
	7	(2.830)	(3.632)	(5.137)	(3.328)	(4.247)	(6.856)	(2.642)	(3.454)	(4.976)
S&P SL20	1	(0.38)	(0.49)	(0.69)	(26.51)	(42.26)	(67.38)	(31.23)	(41.04)	(55.70)
	3	(0.66)	(0.84)	(1.20)	(45.91)	(73.19)	(116.70)	(54.09)	(71.08)	(96.48)
	7	(1.01)	(1.29)	(1.83)	(70.13)	(111.80)	(178.27)	(82.63)	(108.58)	(147.37)
ASPI	1	(46)	(59)	(83)	(43)	(63)	(90)	(38)	(48)	(68)
	3	(80)	(102)	(144)	(74)	(109)	(156)	(67)	(82)	(118)
	7	(122)	(156)	(221)	(113)	(166)	(238)	(102)	(126)	(180)
PF A	1	(1,784)	(2,289)	(3,238)	(1,777)	(2,604)	(4,374)	(352)	(461)	(647)
	3	(3,089)	(3,965)	(5,608)	(3,079)	(4,510)	(7,576)	(609)	(798)	(1,121)
	7	(4,719)	(6,056)	(8,566)	(4,703)	(6,890)	(11,572)	(930)	(1,219)	(1,712)

Note. Days and 90%, 95% and 99% refer to the time & confidence level of the VaR forecast. Results in Rupees value.

Table 4 represents the forecasted loss in rupee value compared to the final trading value of the dated period. Example DIAL day 1 predicted a loss of 0.0574 in Rupees using Monti Carlo VaR at a 90% confident level.

In Table 4, the lowest VaR value is -351.69 for the asset Portfolio A, determined using the Monti-Carlo VaR model at the 90% confidence level. Conversely, the

highest VaR value across the board is with a major significance when compared to other VaR is -2.58314 for the asset 'SLTL', derived from the Historical Simulation VaR model at the 99% confidence level. The difference between these values can be attributed to the inherent methodologies of the VaR models. The Monte-Carlo VaR, especially at a 90% confidence level, might be producing more conservative estimates due to its reliance on random sampling techniques.

Table 5

Empirical results based on the VaR models During Covid-19 Pandemic (11 March 2020 to 15 June 2021)

	Day	Parametric VaR			Historical Simulation VaR			Monti-Carlo VaR		
		90%	95%	99%	90%	95%	99%	90%	95%	99%
DIAL	1	(0.273)	(0.351)	(0.496)	(0.300)	(0.369)	(0.725)	(0.211)	(0.274)	(0.387)
	3	(0.474)	(0.608)	(0.860)	(0.520)	(0.638)	(1.255)	(0.365)	(0.474)	(0.670)
	7	(0.723)	(0.928)	(1.313)	(0.795)	(0.975)	(1.918)	(0.558)	(0.724)	(1.024)
DPL	1	(0.791)	(1.016)	(1.436)	(1.083)	(1.322)	(2.061)	(0.852)	(1.122)	(1.558)
	3	(1.371)	(1.759)	(2.488)	(1.876)	(2.289)	(3.570)	(1.476)	(1.943)	(2.699)
	7	(2.094)	(2.687)	(3.800)	(2.866)	(3.497)	(5.454)	(2.254)	(2.968)	(4.122)
SLTL	1	(0.968)	(1.243)	(1.758)	(0.950)	(1.438)	(2.270)	(0.720)	(0.946)	(1.321)
	3	(1.677)	(2.153)	(3.045)	(1.645)	(2.491)	(3.931)	(1.247)	(1.639)	(2.288)
	7	(2.562)	(3.288)	(4.651)	(2.513)	(3.805)	(6.005)	(1.905)	(2.503)	(3.495)
EXPO	1	(3.323)	(4.265)	(6.031)	(0.220)	(0.315)	(0.489)	(9.85)	(12.52)	(17.78)
	3	(5.755)	(7.386)	(10.447)	(0.380)	(0.546)	(0.848)	(17.05)	(21.68)	(30.80)
	7	(8.791)	(11.283)	(15.958)	(0.581)	(0.834)	(1.295)	(26.05)	(33.12)	(47.05)
TKYO	1	(3.089)	(3.965)	(5.608)	(1.474)	(2.009)	(3.523)	(1.925)	(2.417)	(3.621)
	3	(5.351)	(6.868)	(9.713)	(2.554)	(3.480)	(6.101)	(3.334)	(4.186)	(6.271)
	7	(8.174)	(10.491)	(14.837)	(3.901)	(5.316)	(9.320)	(5.093)	(6.394)	(9.579)
S&P SL20	1	(78)	(100)	(141)	(50)	(73)	(169)	(55)	(74)	(102)
	3	(134)	(173)	(244)	(87)	(127)	(292)	(95)	(127)	(177)
	7	(205)	(264)	(373)	(133)	(194)	(446)	(146)	(195)	(270)
ASPI	1	(148)	(189)	(268)	(100)	(150)	(278)	(149)	(198)	(269)
	3	(255)	(328)	(464)	(174)	(260)	(481)	(258)	(342)	(466)
	7	(390)	(501)	(708)	(265)	(397)	(735)	(394)	(523)	(712)
PF A	1	(3,325)	(4,267)	(6,035)	(3,489)	(5,095)	(7,956)	(1,565)	(2,185)	(3,218)
	3	(5,758)	(7,391)	(10,453)	(6,043)	(8,825)	(13,780)	(2,711)	(3,785)	(5,573)
	7	(8,796)	(11,290)	(15,967)	(9,230)	(13,480)	(21,049)	(4,141)	(5,781)	(8,513)

Note. Days and 90%, 95% and 99% refer to the time & confidence level of the VaR forecast. Results in Rupee values.

Table 5 represents the forecasted loss in rupee value compared to the final trading value of the dated period. Moreover, Table 3 refers to the empirical results of the different VaR models during the Covid-19 pandemic. During the "Covid-19" period, the Monte Carlo VaR method predicted the lowest potential loss among the three VaR models and the Historical Simulation VaR method indicated the highest potential loss. From the "Pre Covid-19" period to the "During Covid-19" period Parametric VaR values have increased (in magnitude), indicating a more significant potential loss during the pandemic. However, the value slightly decreased in the "Whole Covid-19" period (Table 6). This goes the same for Historical Simulation.

Table 6

Empirical results based on the VaR models in Whole Covid-19 Pandemic (01 February 2019 to 15 June 2021)

	Day	Parametric VaR			Historical Simulation VaR			Monti-Carlo VaR		
		90%	95%	99%	90%	95%	99%	90%	95%	99%
DIAL	1	(0.258)	(0.331)	(0.469)	(0.290)	(0.412)	(0.698)	(0.153)	(0.193)	(0.261)
	3	(0.447)	(0.574)	(0.812)	(0.503)	(0.714)	(1.209)	(0.265)	(0.334)	(0.453)
	7	(0.683)	(0.877)	(1.240)	(0.768)	(1.091)	(1.847)	(0.405)	(0.510)	(0.692)
DPL	1	(0.661)	(0.848)	(1.200)	(0.733)	(1.128)	(1.856)	(0.463)	(0.594)	(0.868)
	3	(1.145)	(1.470)	(2.078)	(1.270)	(1.953)	(3.215)	(0.802)	(1.028)	(1.503)
	7	(1.749)	(2.245)	(3.175)	(1.940)	(2.984)	(4.911)	(1.226)	(1.571)	(2.295)
SLTL	1	(1.063)	(1.365)	(1.930)	(1.287)	(1.822)	(3.362)	(0.515)	(0.688)	(0.983)
	3	(1.842)	(2.364)	(3.343)	(2.230)	(3.156)	(5.824)	(0.891)	(1.192)	(1.702)
	7	(2.813)	(3.611)	(5.107)	(3.406)	(4.820)	(8.896)	(1.362)	(1.821)	(2.600)
EXPO	1	(2.65)	(3.39)	(4.80)	(2.62)	(4.05)	(6.59)	(4.46)	(5.70)	(8.23)
	3	(4.58)	(5.88)	(8.32)	(4.54)	(7.02)	(11.42)	(7.72)	(9.87)	(14.25)
	7	(7.00)	(8.98)	(12.70)	(6.94)	(10.73)	(17.44)	(11.79)	(15.07)	(21.76)
TKYO	1	(2.84)	(3.64)	(5.15)	(3.15)	(4.40)	(8.16)	(3.22)	(4.23)	(6.14)
	3	(4.91)	(6.31)	(8.92)	(5.46)	(7.61)	(14.14)	(5.57)	(7.33)	(10.63)
	7	(7.51)	(9.64)	(13.63)	(8.34)	(11.63)	(21.60)	(8.51)	(11.20)	(16.24)
S&P SL20	1	(62.17)	(79.79)	(112.85)	(50.67)	(72.07)	(165.12)	(10)	(13)	(18)
	3	(107.68)	(138.20)	(195.46)	(87.76)	(124.82)	(286.00)	(18)	(22)	(30)
	7	(164.48)	(211.10)	(298.57)	(134.05)	(190.67)	(436.86)	(27)	(34)	(46)

ASPI	1	(117)	(150)	(212)	(101)	(161)	(301)	(84)	(108)	(163)
	3	(203)	(260)	(368)	(175)	(279)	(521)	(145)	(188)	(282)
	7	(309)	(397)	(562)	(267)	(426)	(797)	(222)	(287)	(431)
PF A	1	(2,712)	(2,289)	(3,238)	(2,693)	(4,124)	(7,524)	(777)	(1,064)	(1,692)
	3	(3,089)	(3,965)	(5,608)	(4,665)	(7,142)	(13,033)	(1,346)	(1,844)	(2,931)
	7	(4,719)	(6,056)	(8,566)	(7,126)	(10,910)	(19,908)	(2,055)	(2,816)	(4,477)

Note. Days and 90%, 95% and 99% refer to the time & confidence level of the VaR forecast.

The Monte Carlo VaR values increased across all periods, with the highest potential loss predicted during the "During Covid-19" period. In summary, all three VaR models reflected an increased potential for loss during the Covid-19 pandemic, with the Historical Simulation VaR model predicting the most significant potential loss. The effects of the pandemic were evident in the heightened risk assessments provided by these models, particularly during its peak.

After analyzing the results for the three different periods, it can be concluded that more than any single model is needed to model the risk of the selected financial assets. Each model provides different estimations for different periods. Therefore, analysis is carried out through graphs to understand which model gets the closest answer in the periods with the true value of the stocks and indices.

Upon obtaining the data, the forecasted loss values derived from Tables 2, 3, and 4 were analyzed. This process, termed "Loss Forecasting and Adjustment", involved subtracting the predicted loss values from the asset's original price. This subtraction yielded an adjusted forecasted price for the asset. Following this adjustment, a "Comparison with Actual Price" was conducted. To arrive at a definitive conclusion regarding the accuracy and reliability of the Value-at-Risk (VaR) models, two additional steps were meticulously executed: Loss Forecasting and Adjustment and Comparison with Actual Price. Figure 4 presents the Actual price fluctuation and the forecast prices over pre-Covid-19, Covid-19 and the total combined period. This phase involved a comparative assessment of the forecasted asset price against its

prevailing market price. This step was pivotal in determining the divergence between the predicted and actual prices, hence evaluating the precision of our forecasting model.

For the back-testing process, we utilize a one-day horizon with a 99% confidence level as a representative example (Table 7). In this context, if the actual price (e.g., 13.1) is equal to or exceeds the forecasted price (e.g., 12.63), it is not deemed a violation. This rationale stems from the understanding that the forecasted price incorporates the maximum potential loss as predicted by the VaR model. However, should the actual price fall below the forecasted price, it is identified as a violation, indicating that the loss has exceeded the model's prediction.

Figure 4

Actual price fluctuation and the forecast price of the 3 VaR model

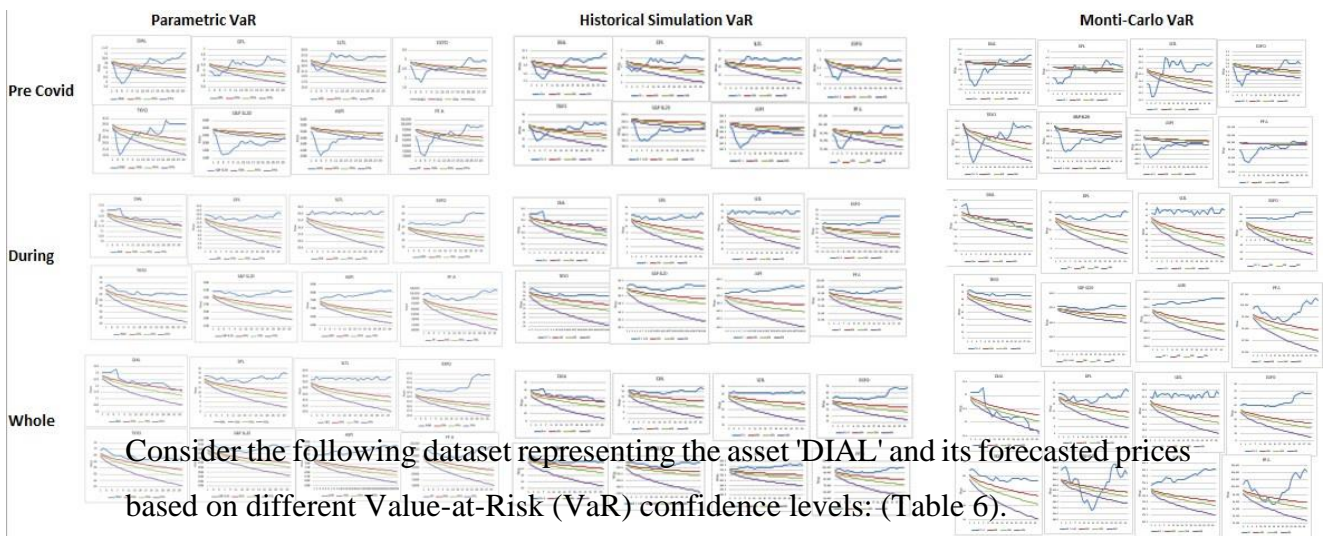


Table 6

For illustration, consider the following dataset for the asset 'DIAL':

		Actual Price	Forecast Loss		
	Trade Date	DIAL	90%	95%	99%
0	6/15/2021	13.1	13.10	13.10	13.10
1	6/16/2021	13.1	12.84	12.77	12.63
2	6/17/2021	13.1	12.73	12.63	12.44
3	6/18/2021	13.1	12.65	12.53	12.29
4	6/21/2021	13.1	12.58	12.44	12.16
5	6/22/2021	13.2	12.52	12.36	12.05
6	6/23/2021	13.3	12.47	12.29	11.95
7	6/25/2021	12.6	12.42	12.22	11.86

Table 7

Standard Back-Testing Approach. Number of Violations and Proportions

Sample size	Pre Covid						During covid						Whole						
	Parametric		Historic		Monte		Parametric		Historic		Monte		Parametric		Historic		Monte		
	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	Violation	Proportion	
30	90%	13	43.3%	11	36.7%	17	56.7%	3	10.0%	9	30.0%	16	53.3%	6	20.0%	0	0.0%	24	80.0%
	95%	12	40.0%	12	40.0%	16	53.3%	0	0.0%	0	0.0%	3	10.0%	0	0.0%	0	0.0%	23	76.7%
	99%	8	26.7%	8	26.7%	14	46.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5	16.7%
DIAL	90%	8	26.7%	8	26.7%	18	60.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	95%	8	26.7%	7	23.3%	17	56.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	99%	6	20.0%	5	16.7%	13	43.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
DPL	90%	6	20.0%	5	16.7%	7	23.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	95%	5	16.7%	5	16.7%	6	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	99%	5	16.7%	2	6.7%	6	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SLTL	90%	20	66.7%	15	50.0%	20	66.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	95%	16	53.3%	11	36.7%	16	53.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	99%	11	36.7%	6	20.0%	11	36.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
EXPO	90%	11	36.7%	9	30.0%	13	43.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	95%	10	33.3%	8	26.7%	10	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	99%	8	26.7%	5	16.7%	8	26.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TKYO	90%	30	100.0%	30	100.0%	30	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	12	40.0%
	95%	30	100.0%	30	100.0%	30	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	33.3%
	99%	28	93.3%	27	90.0%	28	93.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	8	26.7%
S&P SL20	90%	28	93.3%	29	96.7%	30	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	95%	23	76.7%	22	73.3%	28	93.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	99%	21	70.0%	19	63.3%	22	73.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
ASPI	90%	15	50.0%	16	53.3%	21	70.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9	30.0%
	95%	10	33.3%	9	30.0%	21	70.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5	16.7%
	99%	8	26.7%	8	26.7%	21	70.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
PF A	90%	13	43.3%	11	36.7%	17	56.7%	3	10.0%	9	30.0%	16	53.3%	6	20.0%	0	0.0%	24	80.0%
	95%	12	40.0%	12	40.0%	16	53.3%	0	0.0%	0	0.0%	3	10.0%	0	0.0%	0	0.0%	23	76.7%
	99%	8	26.7%	8	26.7%	14	46.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5	16.7%

A standard back-testing approach was implemented to determine the effectiveness of different Value-at-risk (VaR) models. This process involves comparing the actual

market prices to the forecasted prices generated by the VaR models. If the actual price falls below the forecasted price, it is identified as a violation, indicating that the loss has exceeded the model's prediction.

The results of our back-testing approach yielded some unexpected outcomes. As depicted in the accompanying graph, the number of violations in the pre-Covid period was surprisingly high, with 340, 307, and 423 violations for the three VaR models, respectively. This anomaly was traced back to the use of pre-Covid data in forecasting during the Covid-19 period, which did not account for the unprecedented market conditions introduced by the pandemic.

Despite these initial discrepancies, the study found that the Historical Simulation VaR model was the most effective in predicting market behavior during Covid-19. This model outperformed the others, exhibiting fewer violations and more accurate risk predictions. Following the Historical Simulation VaR model, the Parametric VaR model was the next most effective, while the Monte Carlo VaR model was the least effective in this context.

The results of this paper confirmed the findings of past research that VaR models' effectiveness can change during periods of market stress or volatility, and this aligns with the idea that model performance is time-dependent. A study on the Indian stock market similarly found that the accuracy of VaR models varied across different time periods, particularly when comparing pre-crisis and crisis periods (Bedi, Shankar, Agnihotri, & Kalra, 2018). Interestingly the results contradict the findings of Muneer Shaik and Lakshmi Padmakumari (2022) that the exponential weighted moving average (EWMA) VaR model performed better compared to normal distribution (N) and historical simulation (HS) estimation models. However, it is confirmed that these different performance of VaR models during Covid-19 are likely due more to the unusual and extreme market conditions rather than fundamental flaws in the

models themselves (Abboud, Anderson, Game, Iercosan, Inanoglu, and David Lynch, 2021).

Financial managers and investors should consider using the Historical Simulation VaR model for risk assessment, especially during periods of high market volatility like the Covid-19 pandemic. This model's ability to predict risk more accurately can enhance decision-making processes. While the Historical Simulation VaR model has proven effective in this study, financial managers must adopt a comprehensive approach. This involves using a combination of models to gain a more nuanced understanding of potential risks, as each model can offer unique insights. By understanding and applying these models, investors can make more informed decisions regarding portfolio adjustments, capital allocations, and risk mitigation strategies. This informed approach helps minimize potential losses and optimize returns during volatile market conditions, thereby enhancing overall financial stability and performance.

Discussion and Recommendation

The Covid-19 pandemic had a fatal influence on the financial markets and this crisis shook the volatility behavior of the financial returns. In this paper, we investigated the effectiveness of the Value-at-Risk model [Parametric VaR, Historical Simulation & Monte-Carlo VaR] in different scenarios during Covid-19. This paper empirically selected and tested the models for eight financial assets: DIAL, DPL, SLTL, EXPO, TKYO, S&P SL20, ASPI, and Portfolio A. The results indicated that the performance of the VaR models is dependent upon the time. The results also indicated that according to the standard backtesting approach, Historical Simulation VaR has performed better when compared to the other two models in pre Covid period. It is noteworthy that the data from the pre-Covid phase was used as a predictive basis for the early stages of the Covid-19 pandemic. Given the uncertain nature of the pandemic, markets were heightened with volatility and uncertainty.

Consequently, all three VaR models faced considerable challenges in accurately forecasting market trends during this rough phase. The inherent unpredictability of the market dynamics during the onset of Covid-19 rendered precise predictions exceedingly difficult for the models. Efficacy of Value-at-Risk during the Covid-19 period, the Parametric VaR model exhibited exemplary performance, standing out in its predictive accuracy. When coming to the Whole era from 01 February 2019 to 15 June 2021, the Historical Simulation VaR model emerged as superior, demonstrating unparalleled forecasting capabilities. Whereas the Monte-Carlo VaR model performed poorly with a significant deviation between its predictions and actual market outcomes. Overall Historical Simulation VaR model outperformed the others, exhibiting fewer violations and more accurate risk predictions. In conclusion, the study's findings highlight the critical role of appropriate model selection, dynamic data usage, diversified risk management, and informed decision-making in navigating the complexities of financial markets, particularly during periods of heightened uncertainty.

The paper used three VaR models - Parametric, Historical, and Monte Carlo methods to investigate the impact of Covid-19 on the financial market since these models are considered adequate for estimating volatility behavior regarding financial returns. However, it is very challenging to incorporate every aspect of market volatility regarding Covid-19; therefore, limiting our research study to a certain level was essential. This research can be further extended to model volatility in high-frequency data. Further studies can be conducted based on an alternative model, such as the Extreme Value Theory (EVT), Marginal VaR, Incremental VaR, and Component VaR model.

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Analysing the Impact of Voluntary Simplicity on Sustainable Fashion Clothing Purchase Intention among Young Consumers in Sri Lanka: Testing the Mediating Effects of Environmental Activism and Consumer Learning

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The developed world has shifted from primarily satisfying basic human needs to focusing on voluntary simplicity, a lifestyle that emphasizes intangible aspects like relationships, community, and personal growth. This approach reduces consumption and promotes environmental values, making individuals more aware of the consequences of their choices on the planet. The connection between past learning and feature-benefit associations allows consumers to prioritize aspects that are more relevant and merit greater attention during fresh learning. According to that, this research offers new insights into the impact of voluntary simplicity on sustainable fashion clothing purchase intention among young consumers in Sri Lanka: testing the mediating effects of environmental activism and consumer learning. In this study researcher use descriptive, quantitative research design with a deductive research approach and quota & judgment sampling methods has been used for the data collection. Overall findings revealed that Voluntary Simplicity positively affect Consumer Purchase Intention. This study introduces consumer learning as a novel mediating factor in the relationship between voluntary simplicity and sustainable fashion purchase intention, offering new insights into consumer behavior. As well as voluntary simplifiers fabricate a positive relationship on environmental activism and consumer learning. Further, the study revealed implications for Voluntary Simplicity in Sri Lanka through exploring Consumer Purchase Intention. Moreover, the study also suggests best practices for fashion industry parties in product offerings and other strategy development.

Key Words: Consumer Learning, Consumer Purchase Intention, Environmental Activism, Sustainable Fashion, Voluntary Simplicity

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Introduction

Sustainability is defined by the World Commission on Environment and Development (1987) as meeting present demands without harming future generations. However, the modern economy is primarily focused on expansion, leading to businesses developing new, improved items and selling as many as possible. Businesses must alter their priorities in the economy such that stability is prioritized over increasing growth if they are to become more sustainable (Crane, 2015).

The global economy's growth has led to the destruction of natural forests, species vulnerability, and overuse of resources, resulting in the fashion industry being a significant source of environmental harm (Wang, 2010). To address this, sustainable fashion has emerged as a movement that appreciates and supports the sustainability of the manufacturing process (Greco & De Cock, 2021; Grazzini, Acuti, & Aiello, 2021). Research on consumer behavior and production processes in the fashion industry has shown that sustainable fashion evaluates its negative impacts on social, economic, and environmental realms and works to provide solutions to reduce them (Lee et al., 2020).

The rising cost of living has significantly impacted consumer shopping behavior, shifting priorities from essential needs to sustainability (IBM, 2022). However, many struggle financially and struggle to prioritize sustainability, affecting their environmental consciousness (Mander, 2022).

The perception of individual purchase behavior and societal attitudes influences voluntary simplicity, leading to sustainable consumption. (Kraisornsuthasinee & Swier, 2018). Secondhand clothing consumption is a growing global trend, allowing consumers to buy great products for less money (Herjanto et al., 2016). Online discussions about used clothing are expected to grow by 23% in 2022. Consumers prioritize convenience over sustainability, but sustainability may not receive enough attention in discussions about purchases. In contrast, references to sustainability

have dropped, with customers valuing quick shopping opportunities and value goods that simplify their lives (Brandwatch, 2023).

Sri Lanka's fashion industry is a significant contributor to the country's economy and manufacturing sector, with the sector being the fastest growing in South Asia (EDB, 2023). It provides employment and foreign exchange, but contributes 10% of the world's carbon emissions, primarily from dyeing and finishing (The World Bank, 2019). To combat climate change, major clothing companies in Sri Lanka are converting their manufacturing processes to sustainable designs, reducing carbon and water footprints (EDB, 2020).

Sri Lankan manufacturers are leading the way in environmental sustainability in the clothing industry, reducing water and energy use by 70% and energy consumption by half through ethical practices (EDB, 2020). The Sri Lankan fashion market reached US\$441.20 million in 2023 and expected to reach US\$742.40 million of market volume and 7.32 million people by 2027 (Statista Market Forecast, 2023).

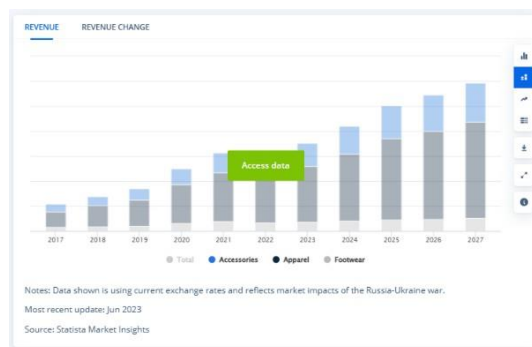


Figure 1

Fashion Market Revenue

Source: Statista Market Forecast, 2023

Influential local and foreign companies showcase upcoming designers and local designers, promoting sustainability and culture preservation. Sustainable fashion clothing brands like Lois London produce high-quality, modern, and elegant garments using eco-friendly fabrics (Colombo Fashion Week , 2023; Lois London ,

2023). These brands work to reduce their carbon footprint by purchasing carbon offsets and ensuring ethical working conditions (Absolute Basics, 2023; Nad, 2021; Nakota Tuwa, 2023). The young generation holds the highest market share in the fashion industry, attracting factors such as limitless freedom and financing availability. These brands are committed to preserving traditional crafts and materials, fostering a vibrant and sustainable industry (Colombage & Rathnayake, 2020).

Much of the developed world has moved beyond consumption's primary utilitarian function of satisfying basic human needs (Livingstone et al., 2013). The developed world is promoting environmentally friendly lifestyles, such as Patagonia's "Don't Buy This Jacket" campaign, which encourages thoughtful shopping and prevents overconsumption (Patagonia Inc, 2011).

Voluntary simplicity is a technique of life that is outwardly simple but inwardly rich, emphasizing being above possessing and emphasizing the more intangible parts of life such as relationships, community, and personal growth (Schor & Juliet, 2020). The researchers have presented different research studies and that have revealed the motivations, challenges, and benefits of choosing a simpler way of life (Barton, 1980; Osikomolu & Bocken, 2020; Reboucas & Soares, 2021). Environmental activism is a driving force behind people acting in an environmentally sustainable way (Tam & Chan, 2018). As a way to demonstrate their behavior, environmental activists use protests, petitions, lobbying, and fundraising campaigns to influence others' attitudes and behavior towards the environment (Fielding et al., 2008). Though fashion brands use misleading labeling, ambiguous sustainability claims, and dishonest marketing strategies to exaggerate their sustainability claims without taking any action (Freitas Netto et al., 2020). According to that, it is apparent why there is controversy regarding whether people ought to simply consume what they require for survival (Schellenberg & Bailis, 2014). It calls into question whether voluntary simplicity is feasible in today's consumerist and materialistic environment.

It is difficult to maintain a balance between basic needs and satisfaction without engaging in excessive consumerism.

The impact of consumer learning on voluntary simplicity adoption and sustainable clothing purchasing is limited, despite growing interest in sustainable fashion. Consumer learning is crucial for guiding customers towards voluntary simplicity, a practical path to sustainability (Elgin & Mitchell, 1977). The study however demonstrates that there is still more research to be done on the processes by which consumer learning affects the purposeful purchase of clothing that minimizes negative social and environmental effects as well as the voluntary adoption of simplicity. Moreover, there are more voluntary simplicity-related researches conducted with different areas (Hall, 2015; Shaw & Newholm, 2002; Barton, 1980; Haenfler, Johnson, & Jones, 2012; Shama & Wisenblit, Values of Voluntary Simplicity: Lifestyle and Motivation, 1984). Though there has been research done on the impact of current environmental activism on voluntary simplicity lifestyle and whether people actually try to voluntarily simplify, there is a dearth of studies in the accessible literature (Campos et al., 2022).

Previous empirical studies on voluntary simplicity were primarily undertaken in prosperous nations, with a few exceptions in countries that are underdeveloped. However, Asia is experiencing a surge in conspicuous consumption, corruption, and inequality (Kraisornsuthasinee & Swier, 2018). Consumers in developed countries are reasonably knowledgeable about the implications of modern industrial output on the environment and the consequences of their own consumption habits (Wang C. , 2010). As mentioned above, there is a theoretical gap as there are few studies done in this area. The newspaper article examines the problem of scarcity in Sri Lanka, highlighting economic, social, and environmental difficulties. It suggests voluntary simplicity can be a good response, but more systemic changes are needed to address the underlying causes and ensure all Sri Lankans have access to necessities (The Island, 2022). The fashion industry is one of the greatest to address in terms of

voluntary simplicity and environmental activism (Campos et al., 2022). Selyn is a fair-trade company from Sri Lanka that specializes in hand-loomed clothing and textiles. They encourage voluntary simplicity by providing classic, high-quality designs that value longevity and durability above rapid fashion trends (Kopertowski Design Limited, 2023). The Calamai Movement and Kantala are also examples of this (Shopify, 2023).

Furthermore, the researcher conducted an ethnography as a pilot study to gain insights from fashion industry consumers in Sri Lanka. The study focused on both male and female 15-44 age groups, mainly in the Western Province. This is due to the large number of fashion stores located in the area, which the young generation often visits with or without the intention of buying (Bandara et al., 2022). People take time to compare clothing, prices, search for offers, and analyze value for money before making purchases. Moreover, consumers use fitting rooms to evaluate clothing fit, look, and feel. And they often purchase clothes without their basic needs, keeping them in their wardrobe with the intention of wearing them later.

Though, no matter how many definitions were made about voluntary simplicity and environmental activism, conspicuous consumption and environmental damage have grown due to a lack of proper learning. Accordingly, it is very important to have consumers learn about voluntary simplicity. It can significantly affect customer purchase intentions.

Literature Review, Conceptualization & Hypotheses Development

Voluntary Simplicity

Voluntary simplicity, a spiritual practice exemplified by saints and sages like Buddha, Lao Tzu, Moses, and Mohammed, has been introduced as a philosophy by activist philosopher Richard B. Gregg (Gregg, 1936). It involves striking a balance between the inside and outside, aiming for abundance of life in spiritual terms, and living in harmony with the natural world. This approach emphasizes personal well-

being, meaningful connections, and living in harmony with the natural world, contrasting with the chaos of owning unnecessary possessions. Voluntary simplicity means making purposeful decisions to limit material consumption, emphasizing one's own well-being and meaningful connections, and living in harmony with the natural world (Rebouças & Soares, 2020; McDonald, Oates, Young, & Hwang, 2006; Elgin & Mitchell, 1977).

Later Elgin and Mitchell (1977) described voluntary simplicity as a social movement that promotes environmental awareness and prioritizes needs over wants. It encourages people to eliminate unnecessary possessions and consume consciously. However, choosing voluntary simplicity does not mean living in poverty or rejecting all benefits of science and technology (Kraisornsuthasinee & Swierczek, 2018; Liu & Wu, 2009). According to Alan Durning (1992), it involves realizing that consumption is enough to be liberated and satisfied, rather than living in poverty or becoming isolated. This approach helps address negative social and environmental impacts of overconsumption.

Environmental Activism

The history of environmental activism is lengthy and vibrant. Environmental activism means identification of nature correlates by participating in protests and rallies, contributing to charities, and signing petitions (Mackay, et al., 2021; Pepper, 1996). According to Campos (2022), a more radical and politicized environmental identity may support environmental activism. According to this perspective, people are more likely to support environmental concerns if they have a strong political knowledge and passionate connection to the environment.

The advocacy for environmental activism behavioral attribute can be important since it is demonstrated by sustainability-oriented people who are aware of the effects their activities have on society (Lee et al., 2019; Tam & Chan, 2018). These people, known as environmental activists, are mainly motivated by worries about nature and scarcity of natural resources. Environmental activism is a driving force behind

people acting in an environmentally responsible way (Ergen et al., 2014; Tam & Chan, 2018). Environmental activism can motivate individuals to adopt environmentally conscious behaviors through a sense of urgency and shared responsibility (Fielding et al., 2008). Environmental activism, in the opinion of the researchers mentioned above, is a multidimensional strategy for addressing and resolving environmental problems.

Consumer Purchase Intention of Sustainable Fashion Clothing

Sustainability, defined by the Brundtland World Commission on Environment and Development (United Nations, 1987) defined, refers to development that meets present needs without compromising future ones. The field of sustainable fashion gained attention in 2008, with seminal works by Fletcher (2008), Beard (2008), and Clark (2008). There is no universally accepted definition of sustainability, but it is often represented as reused and recycled fashion, green fashion, and ethical fashion in various research. (Henninger et al., 2017; Cervellon & Wernerfelt, 2012; Joergens, 2006).

Fast fashion is a harmful consumption model that harms the environment, social order, and economy by increasing waste, pollution, and worker exploitation (Lundblad & Davies, 2016). Sustainable fashion promotes ethical behavior throughout a garment's lifespan (Fibre2Fashion, 2014). Purchase intention, a measure of a consumer's propensity to make purchases, is a crucial factor in understanding the buying process. It is influenced by customer behavior, perceptions, and attitudes, and serves as a useful indicator of the buying process (Belch & Belch, 1998; Axelrod, 1968; Mirabi et al., 2015). However, it is essential to consider other factors that may affect a consumer's decision-making process, such as product satisfaction, brand loyalty, perceived value, and perceived quality. By understanding consumer behavior using attitude metrics, we can better understand the factors that influence their purchasing decisions (Mirabi et al., 2015).

Consumer Learning

Learning entails behavioral adjustments brought on by experience and the majority of human behavior is acquired over time through experience (Kotler, 2020). Every component of human behavior, including knowledge, language, skills, attitude, beliefs, and personality traits, is susceptible to learning experiences. Consumer learning has been identified and described by researchers in various ways (Brucks, 1985; Schahn & Holzer, 1990; Dodd, Laverie, Wilcox, & Duhan, 2005). Gregan-Paxton & John (1997) claims that exposure to outside information sources, such as advertising and product experience, helps most consumers to learn new knowledge. Consumers are exposed to fresh information, features, and advantages of various goods and services via being exposed to advertising messages.

Consumer learning refers to the process through which people gather the information and experience they need to make future relevant decisions about what to buy and consume (Hoyer et al., 2012; Schiffman & Kanuk, 2013). Consumer learning plays a critical role in determining consumer preferences, brand loyalty, and decision-making processes, as people constantly learn and update their knowledge. Furthermore, by highlighting consumer learning as a novel focus, this study explores how it mediates the relationship between voluntary simplicity and sustainable fashion purchasing, offering new insights into how informed decisions shape sustainable consumption behaviors among young consumers.

Voluntary Simplicity and Consumer Purchase Intention

According to numerous authors (Elgin & Mitchell, 1977; Shama, 1981; Etzioni, 2004), voluntary simplicity is a varied social movement made up of people who are opposing excessive consumption lifestyles and looking for alternatives that would involve less consumption but higher quality of life. The goal of voluntary simplicity is to focus on one's own well-being, sustainability, and meaningful experiences. Natural resources are scarce, which encourages opposition to consumerism. This viewpoint caused the idea of voluntary simplicity to be interpreted in the literature

on consumer behavior as a way of life in which the person begins to seek control and minimize consumption (Elgin & Mitchell, 1977). This scholar urges people to focus on simple, sustainable lives instead of pursuing material goods. Voluntary simplicity is occasionally viewed as a movement against materialism. The idea behind this is that whereas consumer culture emphasizes excess and the acquisition of commodities, simplicity ideology promotes principles that go against this (Jansiz, 2014). Voluntary simplicity seeks to prioritize wellbeing, meaningful connections, and harmony with nature.

H1: Voluntary simplicity positive relationship with purchase intention of sustainable fashion

Voluntary Simplicity, Environmental Activism and Consumer Purchase Intention

According to Elgin (2012), due to the alignment of their beliefs and actions with sustainability and minimizing environmental effect, people who practice voluntary simplicity tend to be more active in environmental activism. Individuals prioritize environmental values by reducing consumer consumption and adopting a simpler lifestyle.

Persons who practice voluntary simplicity are more likely to be actively involved in environmental issues. A correlation between voluntary simplicity and higher environmental concern was found (Alexander & Ussher, 2014). Individuals prioritize lowering their consumption, decreasing their ecological footprint, and adopting a more sustainable way of life by intentionally simplifying their lifestyle.

Environmental concerns are a common source of motivation for voluntary simplifiers, and they may take political action to protect their way of life and environment (Wu et al., 2013). According to this scholar, voluntary simplifiers want to build a more resilient and sustainable future by speaking up and taking part in environmental initiatives.

H2: Voluntary simplicity has a positive relationship with environmental activism

According to Stren (2000), environmental activism relates to personal behavior, is the active participation of individuals in groups and actions for the protection of the environment. Environmental activists take personal accountability for their actions, making deliberate decisions that support sustainable methods. Environmentally conscious consumer behavior has increased due to environmental trends driven by activist groups, demonstrating its strength through personal shopping and social movements (Ergen et al., 2014; Scott & Vigar-Ellis, 2014). Consumers are demonstrating the power of environmentally conscious consumer behavior by their own purchasing choices and involvement in social movements. According to Knopman (1999), people are more likely to contribute to solutions when they are aware of their personal role in issues related to environmental deterioration. More sustainable use and promotion of sustainable fashion products is a way to help with environmental problems.

H3: Environmental activism has a positive relationship with the purchase intention of sustainable fashion

The idea put forward here holds that voluntary simplicity must influence sustainable consumer behavior, either directly or indirectly via attitudes toward ecological responsibility and/or material simplicity (Druică et al., 2022). Voluntary simplicity is consciously choosing to reduce consumption and give sustainability priority, which is in line with the fundamentals of sustainable consumer behavior. Consumers who are involved in environmental activism are those who are not only conscious of ecological degradation but also recognize the role they may play in reversing it (Knopman et al., 1999). These individuals are considered obligated to go in the direction of sustainability because they are aware of how their day-to-day decisions and deeds affect the environment.

H4: Environmental activism mediates the relationship between voluntary simplicity and the purchase intention of sustainable fashion

Voluntary Simplicity, Consumer Learning and Consumer Purchase Intention

Although it may seem simpler to ignore responsibility in purchasing decisions and not question or alter consumption patterns, more and more consumers are becoming aware of the effects of their decisions and acting to voluntarily reduce consumption (Alexander & Ussher, 2012; Brown & Kasser, 2005; Etzioni, 2004; Elgin & Mitchell, 1977; Huneke, 2005). Consumers are acting to match their buying habits with their ideals as they become aware that their decisions can help to a more sustainable future. A shift in consumer thinking is seen in the rising trend of voluntary consumption reduction, where people are taking ownership of their decisions and actively contributing to the effort to create a more sustainable world.

Sustainable consumption is becoming increasingly popular, leading to a rise in scholarly interest in the relationship between voluntary simplicity and low consumption attitudes (Ballantine & Creery, 2010; Huneke, 2005; Markowitz & Bowerman, 2011; Peyer et al., 2017; Walther & Sandlin, 2011). Individuals are learning about the associations between the voluntary aspects of simplifying life—such as restricting material goods, looking for alternative lifestyles, and emphasizing quality over quantity—and attitudes that encourage lower consumption.

H5: Voluntary simplicity has a positive relationship with consumer learning

According to Cunha, et al., (2008), the connection between past learning and feature-benefit associations, which enables consumers to pick aspects that may be more relevant and, as a result, merit greater attention during fresh learning. Consumers can make informed decisions based on their knowledge and experience with a product or service. Informational and emotional assistance are both a part of social support. Building trust amongst consumers through information and knowledge exchange influences their purchasing intentions (Huang, Nambisan, & Uzuner, 2010).

Consumers' confidence and credibility in their decision-making might increase when they believe the information that others have offered. Consumers may receive useful

knowledge, learn about the characteristics and advantages of products, and make better purchase decisions through the exchange of information. Additionally, the emotional support offered by social networks may foster a sense of identity, security, and self-assurance, all of which can have a favorable effect on customers' purchase intentions. Customers are more inclined to trust their own judgment and make decisions that are in line with their requirements and wants when they feel emotionally supported. This knowledge would only affect a small portion of their clients though, given the proportion of individuals browsing the websites compared to those making purchases in stores (Harris, Roby, & Dibb, 2015). Regardless of the final conversion rate from online browsing to in-store purchases, consumer learning provides a useful method for people to gain the knowledge essential for making educated decisions and can greatly affect their purchase intentions.

H6: Consumer learning has a positive relationship with the purchase intention of sustainable fashion

Customers who adopt voluntary simplicity and sustainable fashion clothing consumption behaviors are more likely to stick with their efforts and feel more content, as mindfulness and awareness are seen as important ideas related to autonomy (Ryan et al., 2006). Consumer purchasing intention can be positively impacted by learning about environmental concerns and sustainable fashion (Bhardwaj & Fairhurst, 2010; Hasbullah, Sulaiman, & Mas'od, 2020). Increased information and awareness lead to better decisions and a stronger propensity to choose sustainable fashion items. Information helps customers recognize the importance of supporting sustainable products and making decisions consistent with their principles (McDonagh & Prothero, 2014).

According to Newton, et al. (2015) they contend that consumer information seeking and learning affect customers' intents to make sustainable purchases. People more likely to be interested in learning about sustainability and its effects on the fashion business. The intents of customers to make sustainable purchases are favorably

impacted by this improved awareness and knowledge. The study reveals that acquiring information and knowledge about sustainable fashion, highlighting voluntary simplicity, explains the beneficial effect of consumer learning on the relationship between voluntary simplicity and sustainable purchase intention. Despite an abundance of studies on sustainable consumption, the role of consumer learning as a mediator remains underexplored. By including consumer learning into the framework, this study fills the gap and makes a novel contribution to the literature.

H7: Consumer learning mediates the relationship between voluntary simplicity and the purchase intention of sustainable fashion

Research Methods

This study is conducted under quantitative study. Through that, allows the understanding of the relationship between the variables very accurately. As a result, it is thought to be the most capable of assisting in achieving the purpose of this study (Kilani & Kobziev, 2016).

The study objectives and the research questions fall into quantitative paradigm, the positivist philosophy is the one the researcher chooses for the study. Furthermore, the researcher plans to conduct a deductive approach to identify the relationship between variables. Researcher collects data from people by using survey systems to characterize, compare, or explain knowledge, attitudes, and behavior through papers, phone and online surveys (Phair & Warren , 2021). Furthermore, this study was conducted under the mono method. Researchers consider about the relationship between variables and according to that, the investigation type is correlational study (Saunders et al.,2009). This study uses cross sectional time horizon which employs one sample and data were gathered from a certain population sample, those data are anticipated to be gathered just once.

The consumption outlook for Sri Lanka 2022 reveals that clothing purchase behavior

in the western province is higher than other provinces (Census and Statistics, 2022). The current young population of Sri Lanka is 22,156 million (Census and Statistics, 2022). Among them, 2.356 million people aged 15-44 live in the Western Province (ZhujiWorld.com, 2023). In this study, 400 respondents who are engaging in fashion consumption within the age range 15-44 in western province Sri Lanka were selected as the sample size for the measurements. The sample size was determined as 400 through the Yamene's formula (Creswell, 2003). Researchers use non-probability sampling techniques called quota sampling and judgment sampling in the data collection process. Furthermore, all consumers who do fashion consumption in Sri Lanka were assumed by the researcher as a unit of analysis in this research unit.

The researcher had planned to carry out the data collection process through questionnaire and it contained 28 questions of multiple-choice questions, dichotomous (Yes/No) questions, scale type questions. The data collection instrument mainly consists of three sections. The first section mainly covers respondents' general opinion on sustainable fashion consumption and fashion behavior. The second section includes 05-point Likert scale questions mainly including Voluntary Simplicity, Environmental Activism, Sustainable Fashion Purchase Intention (Campos et al., 2022) and Consumer Learning (Evelyn, 2021). The third section covers the demographic profile of the respondents.

Initially the questionnaire was distributed among 21 respondents to eliminate potential problems. After subsequent adjustments, the final questionnaires were distributed among a sample size of 400 and 10 questionnaires with missing values and incorrect answers were removed. With that, the final sample total was 390 questionnaires.

The researcher used excel to record the respondents' answers and data analysis using descriptive and inferential methods through SPSS computer-based program. Under descriptive statistics, the researcher used summary statistics, graphs, and tables to describe a data set. By using inferential statistics, researcher got an idea of larger

populations by taking samples (Saunders et al., 2009; Anastasi & Urbina, 1997).

Findings and Discussion

According to the results, the study revealed that 36.9% of respondents were male and 63.1% female, aged 15-44, with 82.3% being single and 17.7% married. The majority worked in the private sector, with 65.1% earning below Rs. 50,000, and most purchases were made in Colombo district. Furthermore, the majority of respondents recently purchased fashion clothing, with 37.4% spending less than Rs. 5,000. Price was a significant influence, with 11.5% concerned about the environment and 6.9% about ethical considerations. Most frequently shopping from retail stores, 71.8% are concerned about fashion item recycling and re-usage, and 35.4% believe sustainable fashion is produced by companies adhering to environmental and social policy standards.

The study found a positive relationship between voluntary simplicity and sustainable fashion clothing purchase intention, with a strong Pearson Correlation value of 0.744. This relationship is significant under 0.000 significance level and 95% confidence level. The model summary explained 54.4% of observed variability in Sustainable Fashion Clothing Purchase Intention, indicating that voluntary simplicity impacts young consumers' sustainable fashion clothing purchase intention. This finding aligns with previous studies relating voluntary simplicity to more sustainable consumption, as voluntary simplifiers seek alternative methods of consuming, such as sustainable fashion (Etzioni, 2004; McDonald, Oates, Young, & Hwang, 2006; Druică, et al., 2022).

Furthermore, the researcher found a strong positive relationship between voluntary simplicity and environmental activism, with a Pearson Correlation value of 0.763. This relationship is significant under 0.000 significance level and 95% confidence level. The model summary explained 58.2% of observed variability in environmental activism, indicating that voluntary simplicity can explain 58.2% of

observed variability. Previous scholars suggest that those who choose voluntary simplicity actively participate in environmental advocacy, with voluntary simplifiers focusing on environmental protection (Tam & Chan, 2018; Peyer et al., 2017; Wu et al., 2013).

According to this empirical data, the study found a strong positive relationship between environmental activism and sustainable fashion clothing purchase intention, with a Pearson Correlation value of 0.764. This relationship is significant under 0.000 significance level and 95% confidence level. The model summary explained 58.4% of observed variability in Sustainable Fashion Clothing Purchase Intention, indicating that environmental activism can impact young consumers' sustainable fashion clothing purchase intention. Previous scholars also identified those who exhibit this behavioral characteristic—environmental activists—consume sustainable clothes. Environmental activists advocate for sustainable behavior, supporting organizations' claims and making conscious consumption decisions (Stern, 2000; Ergen et al., 2014; Demirel, 2021).

This study finds that environmental activism significantly impacts the relationship between voluntary simplicity and sustainable fashion clothing purchase intention among young consumers. The significant value of 0.000, less than 0.05, indicates that environmental activism significantly influences this relationship. The Sobel Test also confirms this, with the mediator variable (EA) and voluntary simplicity significantly explaining sustainable fashion clothing purchase intention. According to scholars, they imply that unpleasant emotions elevated by the potential for social judgment may restrict the collective or public activity of simplifiers, particularly environmental activism (Barnes & Lea-Greenwood, 2006; Crane, 2015; Fielding et al., 2008).

The study found a strong positive relationship between voluntary simplicity and consumer learning, with a Pearson Correlation value of 0.768. This relationship is significant under 0.000 significance level and 95% confidence level. The model

summary explained 58.9% of observed variability in consumer learning, indicating that voluntary simplicity impacts consumer learning. Scholars argue that consumers are aligning their buying habits with their ideals, learning that their decisions contribute to a more sustainable future. This shift in consumer thinking is reflected in the rising trend of voluntary consumption reduction (Alexander & Ussher, *The voluntary simplicity movement: A multi-national survey analysis in theoretical context*, 2012; Brown & Kasser, 2005; Etzioni, 2004; Elgin & Mitchell, 1977; Huneke, 2005).

Furthermore, the study found a strong positive relationship between consumer learning and sustainable fashion clothing purchase intention, with a Pearson Correlation value of 0.754. This relationship is significant under 0.000 significance level and 95% confidence level. The model summary explained 58.9% of observed variability in sustainable fashion clothing purchase intention, indicating that consumer learning impacts purchase intention. According to scholars, customers may improve their general well-being and contentment with their purchase decisions by intentionally selecting sustainable clothing options. Through consumer learning, people become more aware of and understand how their consumption decisions affect the environment, which increases their intention to purchase sustainable clothing (Ryan et al., 2006; Harris et al., 2015).

The study found that consumer learning significantly impacts the relationship between voluntary simplicity and sustainable fashion clothing purchase intention of young consumers. The significant value of 0.000, less than 0.05, indicates that learning about voluntary aspects of simplifying life, such as restricting material goods and focusing on quality over quantity, is associated with attitudes that encourage lower consumption. The Sobel Test also confirms this, with the P-value equal to zero, indicating that the mediator variable (CL) along with voluntary simplicity is significantly explaining sustainable fashion clothing purchase intention. Scholars have identified associations between voluntary aspects of

simplifying life and attitudes that encourage lower consumption (Ballantine & Creery, 2010; Huneke, 2005; Markowitz & Bowerman, 2011; Peyer et al.,2017; Walther & Sandlin, 2011).

According to that, these findings align closely with the objectives of this study, reinforcing the intended exploration of how consumer learning and environmental activism influence the relationship between voluntary simplicity and sustainable fashion clothing purchase intention.

Conclusion, Limitations & Future Research Directions

Sri Lanka's fashion industry is a significant contributor to the country's economy and a major manufacturing sector. As South Asia's fastest-growing destination, it showcases unique and vibrant clothing that inspires global fashion. The industry's growth has been consistent, generating employment and foreign exchange through the fashion wear and garment sector (EDB, 2023).

Voluntary simplicity, a technique emphasizing relationships, community, and personal growth, is also being promoted. Environmental activists engage in protests, petitions, lobbying, and fundraising campaigns to influence attitudes and behavior. However, fashion brands often exaggerate sustainability claims without providing evidence, raising concerns about factors that encourage sustainable fashion purchasing and whether voluntary simplicity is feasible in today's consumerist and materialistic environment.

This study conducted to examine the impact of voluntary simplicity on sustainable fashion clothing purchase intention among young consumers in Western Province Sri Lanka. The researcher has addressed the previous literature published by the scholars. And identified a few gaps in the studies and in order to those literatures, the researcher formulated hypothesis with justifications. After that the conceptual framework was developed considered voluntary simplicity as an independent variable, sustainable fashion clothing purchase intention considered as dependent

variable and environmental activism and consumer learning as mediator variables. According to the findings of this research, the researcher examined there is significant positive impact made by voluntary simplicity on sustainable fashion clothing purchase intention that accepted the H1. And after testing H2, the researcher explained there is significant positive impact made by voluntary simplicity on the environmental activism. Furthermore, this study tested the H3 and got the point that there is significant positive impact made by environmental activism on sustainable fashion clothing purchase intention. Then the researcher ensured that there is an impact of environmental activism on the relationship between voluntary simplicity and sustainable fashion clothing purchase intention after testing H4. And after testing H5, the researcher explained there is significant positive impact made by voluntary simplicity on the consumer learning. In addition, this study tested the H6 and got the point that there is significant positive impact made by consumer learning on sustainable fashion clothing purchase intention. Finally, this study provides empirical evidence that ensures there is an impact of consumer learning on the relationship between voluntary simplicity and sustainable fashion clothing purchase intention after testing H7. According to the findings of this study answered research questions one by one and it fulfilled the research objectives successfully.

Attitudes towards sustainability, perceptions of social pressures for sustainable consumption, and confidence in one's capacity to engage in sustainable purchasing behaviors are key factors in determining intentions when it comes to sustainable fashion clothing purchases (Ajzen, 1991). Environmental activism, which involves individuals engaging in activities promoting environmental sustainability, plays a crucial role in driving sustainable fashion clothing purchase intention among young consumers. It involves individuals engaging in activities promoting environmental sustainability, such as advocacy campaigns and eco-friendly brands (Zhang et al., 2019; McNeill & Venter, 2019). Consumer learning, which involves knowledge acquisition and information processing, plays a crucial role in shaping sustainable consumption behaviors. It influences voluntary simplicity and sustainable fashion purchase

intention, emphasizing the need for education and awareness-raising initiatives to promote sustainable consumption practices among young consumers (Bong Ko & Jin, 2017; Yazdanpanah & Forouzani, 2015).

In the practical field, the fashion brands should prioritize sustainable fashion lines that support voluntary simplicity and environmental consciousness, using eco-friendly materials, ethical production practices, and timeless designs that appeal to young consumers' preferences. They can also fund consumer education programs to raise awareness about the sector's negative impacts on society and the environment. Further, fashion brands can help young consumers make informed shopping decisions by being transparent about their sustainability initiatives and providing tools for learning about sustainable fashion practices. They can also use their influence to promote sustainable practices and support environmental action, collaborating with environmental groups, participating in sustainability initiatives, and spreading awareness about urgent environmental concerns. By implementing these suggestions, fashion businesses can cater to the changing tastes of younger consumers and advance the industry's shift towards greater social responsibility and sustainability.

This study is limited to the Sri Lankan fashion industry and the sustainable fashion apparel purchase intentions of Sri Lankan consumers residing in the Western Province (Colombo, Gampaha and Kalutara). Therefore, to generalize the results further investigations need to be done, present study only contains 390 of sample respondents, which is not sufficient to identify the accurate outcome therefore in order to get more accurate outcome the sample should include large number of respondents. In this study, the researcher focuses on identifying the impact of voluntary simplicity on consumer sustainable fashion clothing consumption by using environmental activism and consumer learning as mediating factors. But there are many more factors available that can impact on sustainable fashion purchase intention.

The researcher suggests future researchers to analyze different aspects as well as apply the same theoretical model focusing on another product or service category. Future researchers can conduct research related to this field in the future using both qualitative and quantitative research methods. The research and the information generated regarding voluntary simplicity is relatively new. Not a lot of research have been studied in this area. Although the primary focus of this study was on customers' purchase intention, there is still a need for more investigation in this area. The research emphasized the young consumers sample as the main sample for the investigation. Future researchers can explore the same research area using other specific samples. This can generate new findings that can be added to the existing knowledge. The concept and the study area can be applied to different industries and countries as there are unique characteristics such as behaviors, norms and patterns in different societies.

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Equipment Replacement: A Stochastic Approach Considering Financial and Failure Costs

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There are various motives to substitute productive equipment, with equipment degradation being one of the main factors. Equipment degradation involves the expenses of malfunctions that become costly over time, resulting in loss to the company. However, there is a scarcity of research that approaches the problem from a stochastic perspective. The incorporation of randomness in decision models signifies a progression in the quality of equipment replacement decisions. Thus, this research aims to analyze the advantages of the stochastic approach compared to the deterministic one, which is widely adopted. The results indicate that it is not advisable to generalize procedures that use a single sample size of failure data as a rule for equipment replacement decisions.

Keywords: *Equipment Replacement, Failure Costs, Financial Costs, Stochastic Financial Model*

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Introduction

Deciding when to replace equipment is a common problem for many companies, it is complex, as it involves many factors that are difficult to measure, and generally uses financial methods, such as NPV (Net Present Value) and EAUC (Equivalent Annual Uniform Costs). In operations management, deciding when to equipment replacement is a critical decision, as it involves large financial amounts and the decision is difficult to reverse (Hirschfeld, 2000; Rösiö & Bruch, 2017; Koschnick & Hartman, 2020). According to Degarmo (1973) and Yatsenko and Hritonenko (2022), a fundamental concept in this context is that the economic life of equipment corresponds to the time interval, generally in years, in which the EAUC of owning and operating the equipment asset reaches its minimum value.

There are several reasons to replace production equipment, one of the factors in particular is the deterioration of the equipment, which involves operational costs. In this regard, Hartman and Tan (2014) assess that when deciding to replace equipment, the operating and maintenance costs of current equipment and advances in equipment technology available on the market must be considered. Edokpia and Oparah (2013) also show the importance of maintenance in increasing reliability, and how it affects the decision of the equipment replacement.

Tambe and Kulkarni (2016) state that the factors used in the decision of the equipment replacement must be considered in an integrated manner and that the fact that the performance of equipment in production, when improved by the introduction of preventive maintenance, in excess results can be considered as unnecessary costs.

On the other hand, if the equipment is not well maintained, it can affect product quality, resulting in a large amount of rework and scrap to further increase non-quality costs and operational costs. Therefore, there is a close relationship between the maintenance of current equipment and the replacement of new equipment, as

carrying out maintenance over time becomes increasingly frequent and costly until the decision to replace it is made (Seidgar et al., 2015; Bensoussan et al., 2022).

Regarding equipment reliability and how this factor influences the replacement decision, Nodem (2011) presents an interesting perspective when investigating the integration of preventive and corrective maintenance policy with replacement for a machine subject to random failures. The intensity of failures and repairs increases with the greater number of failures. Nodem (2011) introduced a reduction factor into its model to reduce equipment repair times, if preventive maintenance is carried out before failures. The author modeled this problem using the system as a semi-Markov process that allowed the history of stochastic failures to be taken into account, thus adding a new dimension to the repair/replacement theory. The author shows that implementing this type of preventive maintenance increases the useful life of the machine and that the results obtained are particularly useful for industrial systems that suffer losses due to increased repair time.

Therefore, it is observed that the introduction of randomness in decision models represents an advance in the quality of decisions about equipment replacement. There are several who approach the subject in a deterministic way, such as Yoo and Sung (1985) who constructed an indicator to determine the replacement age of equipment, and Baskakova et al., (2008), who analyzed the influence of repair and replacement costs of production equipment through a mathematical model that considers the minimum and maximum cost limits established for different types of repairs. For the special case of geometric stochastic costs, the real options approach was extended to cost-minimizing asset replacement in Yatsenko and Hritonenko (2017). Kirstein and Visser (2017) develop risk modeling for heavy mobile equipment, aiming to determine optimal replacement ages, considering the randomness of failure. Bensoussan et al. (2022) study equipment maintenance and capital investment strategy, considering random equipment failures through a

stochastic method originating from an extension of Dynamic Programming. Yatsenko and Hritonenko (2022) developed stochastic algorithms based on real options and dynamic programming for medical imaging equipment using the EAUC method, but without considering the issue of variables related to failure and quality costs.

Nevertheless, Yeung et al. (2008) find that few studies integrate equipment quality and performance into the equipment replacement decision. Hartman and Tan (2014), and Bensoussan et al. (2022) also emphasize that although the topic has been studied for a long time, there is little guidance provided in the literature for cases in which cost information is insufficient, as well as a lack of useful guidance on the appropriate way to carry out replacement or optimization of the decision to replace. Another problem highlighted by the authors is that there is a lack of work that approaches the problem in a stochastic way, with deterministic models predominating. Yatsenko and Hritonenko (2022) further reinforce that equipment replacement methods with stochastic costs dependent on time and age remain an open theoretical question.

To contribute to minimizing the gaps presented previously, this article aims to propose a stochastic model for equipment replacement and analyze the advantages of the stochastic approach to the deterministic approach, which is widely used. For this analysis, a comparison was made between the approach of a deterministic method of minimum cost curves based on EAUC and the approach of a stochastic method of minimum cost curves based on EAUC, with theoretical data.

The article is divided into the following sections, in addition to this introduction: section 2 provides a summary of the theoretical framework, which supports the proposal; in section 3 the scientific procedure used is summarized; in section 4 the deterministic simulation is presented; in section 5, a stochastic approach is

developed in the decision to replace equipment based on failure costs; and in section 6 the conclusion of the study is presented.

Literature Review

Characterization of the problem of replacement equipment

Equipment replacement emerged with the work of Taylor (1923) and Hotelling (1925), who analyzed it from the perspective of equipment depreciation. Since then, several policies on equipment replacement have been proposed, such as Alchian (1952) who adopted the present value of cost as a decision method. Hartman and Tan (2014) propose three methods to solve the equipment replacement problem, the EAUC, Dynamic Programming, and extension of dynamic programming with a stochastic approach.

Thus, the method is EAUC, it assumes that technology does not change over an infinite horizon of time, and can also be referred to as stationary cost, in the sense that an asset is replaced with the purchase of a new, identical one, with the same cost (Grant et al., 1990; FAN et al., 2012; Hartman; Tan, 2014; Yatsenko & Hritonenko, 2022). The EAUC is given by:

$$EAUC_{(n)} = \left(\frac{r(1+r)^n}{(1+r)^n - 1} \right) \left(p + \left(\frac{s_n}{(1+r)^n} \right) + \sum_{i=1}^n \frac{o_i}{(1+r)^i} \right) \quad (1)$$

Where, $EAUC(n)$ represents the equivalent annual cost of equipment with a service life of N periods, r is the interest rate per period, p is the purchase price of a new equipment, s_n is the redemption value of an equipment of n -period age, and o_i is the cost of operation and maintenance throughout period i . Therefore, the economic life of an asset is represented by n , which results in the minimum limit of the EAUC (Fan *et al.*, 2012; Hartman; Tan, 2014; Yatsenko; Hritonenko, 2022).

The Dynamic Programming method is used to solve the problem of replacement technology. The first study on the topic was pioneered by Bellman (1957), in which the author introduced the concept of Dynamic Programming. Subsequently, a significant body of research has employed this approach (Hartman, 2004; Hartman & Murphy, 2006; Yatsenko & Hritonenko, 2017).

Subsequently, the stochastic method was developed from an extension of dynamic programming. This method is approached in a stochastic manner, considering that according to Koowattanatianchai and Charles (2015), Yatsenko and Hritonenko (2017), and Bensoussan et al. (2022), the traditional and deterministic approach, assumes that there is no uncertainty about the quantity of all sources of revenue and costs associated with the equipment. However, in stochastic processes, the revenues and costs of assets are assumed to move with the equipment. Still, optimal substitution decisions in stochastic problems depend on the decision maker's risk profile, which could be different for each company (Hartman & Tan, 2014; Yatsenko & Hritonenko, 2022).

Koowattanatianchai and Charles (2015), and Yatsenko and Hritonenko (2017), also consider that several model parameters, such as costs and technological processes, are uncertain in the real-world scenario and can invalidate the ideal solution with a deterministic approach. However, the solution to this problem often involves probability estimates, which, in situations where there is limited data, produce biased analyzes (Hartman; Tan, 2014). Therefore, the closed solution to the stochastic substitution problem is not available, as solving the dynamic formulation in such situations requires simulation techniques, which can be complex and are certainly difficult to apply (Lohmann, 1986; Yatsenko & Hritonenko, 2022).

Nevertheless, according to Hartman and Tan (2014), Yatsenko and Hritonenko (2017), Bensoussan et al. (2022), and Yatsenko and Hritonenko (2022), further

research is still needed that addresses forecast horizons capable of offering guidance regarding the amount of cost information needed. Furthermore, it is crucial to explore the interaction between replacement and utilization decisions, which requires different configurations of interactions between the decision-making process and traditional operational models.

Integration between the cost of non-quality and equipment replacement decision

Non-quality costs can be classified as inevitable and avoidable costs. The unavoidable costs are failure prevention costs and assessment costs, aimed at verifying compliance with specifications. Avoidable costs are considered internal failure costs and external failure costs. This "thinking" about avoidable costs of non-quality reinforces the importance of quality management for improving productivity by reducing operational costs (Tambe & Kulkarni, 2016; Duan et al., 2020). Regarding this, Crosby (1980), and Bensoussan et al. (2022), state that reducing the costs of non-quality is an opportunity to increase profit, and it is important to use this factor to understand and communicate the economic-financial value.

Therefore, it is known that the decision-making process to replace equipment includes failures that cannot be repaired or failures that can be repaired with major maintenance (Kirstein & Visser, 2017). To justify the variable that implies maintenance in a production environment, the Life Cycle Costing (LCC) analysis concept is introduced, involving reliability and maintenance.

Life Cycle Costing (LCC)

Life Cycle Costing (LCC) is a method that involves concepts about maintenance and economic aspects. It can be defined as a method for calculating the total cost of a system, from inception to disposal. The calculation of the total cost is the sum of

costs associated with all stages comprising the equipment's lifecycle, including purchase price, installation cost, operating costs, maintenance, upgrade costs, and the residual value or resale value at the end of ownership or its useful life (Artemenkov et al., 2023; Cheng et al., 2023; Mostafaei et al., 2023). To evaluate the LCC, four economic methods are used: NPV; the Benefit-Cost Ratio (BCR); the Internal Rate of Return (IRR), and the Payback Period (Elyamany & El-Nashar, 2016; Lotfi et al., 2023).

According to Gluch and Baumann (2004), AlJaber et al. (2023) Kokare et al. (2023), and Mecheter et al. (2023), among the costs related to LCC, acquisition costs, maintenance and operation costs, and ownership costs stand out. Acquisition costs are related to the investment required to acquire the equipment, while maintenance and operating costs cover all costs involved in maintenance activities throughout the equipment's life cycle and all costs for the equipment to keep running. This category includes costs to man hours, parts for maintenance and operation, materials, production downtime for maintenance, energy, administration, security, etc. Ownership costs, on the other hand, encompass all costs except for those related to operation and can be subdivided into three categories: acquisition, maintenance, and sale costs.

Method

Methodological Approach

Conceptually, the quantitative approach applied through modeling and simulation of a sample collected using computational techniques, had the purpose of simulating the functioning of a production system based on mathematical models, as defined by Chen et al. (2020). In this article, the effects of the Mean Time Between Failures (MTBF), used in LCC methods, were simulated and its financial effects were analyzed. The decision analysis will be carried out through the statistical distribution

of different scenarios, considering that the input variables behave according to a given probability distribution. In this case, we opted to use the negative exponential distribution for MTBF, that is, the number of failures in a given period occurs according to a Poisson distribution. This is the fact that modeling and simulation research aims to solve a real problem based on its structure and the behavior of its variables (Bertrand & Fransoo, 2002). What differentiates this article from classic proposals based on the mean is the use of extreme values such as the minimum equipment cost to seek an analysis closer to the reality of the industries.

Therefore, this study uses the quantitative approach and the simulation research method, in which the analyzed data comes from a theoretical illustrative case, referring to Ebeling (1997), section 17.6, on page 424.

Simulation

Simulation has the advantage of controlling input variables and manipulating them simultaneously. To achieve this, the dependent variable of the proposed stochastic model was the EAUC of the current equipment and the new equipment. For the development of the proposed model, the simulation was carried out with the Maple 13 software, using the stochastic numerical approach.

The variables that were observed and analyzed in the proposed stochastic model relating to the equipment are:

- Equipment age. Yoo and Sung (1985), Cassady et al. (1998), Tan and Hartman (2010), Koowattanatianchai and Charles (2015), Seidgar et al, (2015), Hartman (2004), Yatsenko and Hritonenko (2017), and Yatsenko and Hritonenko (2022) state that to analyze the replacement it is necessary to consider this variable, given that age is an important factor in the deterioration of equipment;

- Repair cost. Cassady et al. (1998), Edokpia and Oparah (2013), Felice and Petrillo (2013), Tambe and Kulkarni (2016), and Yatsenko and Hritonenko (2017) consider these costs relevant because excessive repair costs can adversely affect profitability until it becomes unviable;
- Failure rate (Mean Time Between Failures). Yoo and Sung (1985), Edokpia and Oparah (2013), Tambe and Kulkarni, (2016), and Bensoussan et al. (2022), assert that these costs are also significant as they impact the quality of the production system;
- Production per hour (production time). Hart and Cook (1995), Hartman (2004), Tan and Hartman (2010), Tambe and Kulkarni (2016), and Rösiö and Bruch (2017) state that it is essential to consider long-term productivity goals in equipment replacement decisions;
- Machine price (acquisition cost). Hart and Cook (1995), Tan and Hartman (2010), and Rösiö and Bruch (2017) consider this variable important for the financial feasibility of replacement;
- Internal failure cost (unit cost of scrap and rework). Yoo and Sung (1985), Tambe and Kulkarni (2016), and Bensoussan et al. (2022), emphasize the importance of considering failure costs as they impact equipment productivity.

Findings of the Study

Deterministic Approach

Based on the deterministic model proposed by Assis (2013), in which the Operational Expenditures (CapEx) and Capital Expenditures (OpEx) of the defender (current equipment) and the challenger (new or candidate equipment) were estimated by calculating the remaining life of the current equipment and life cycle

of new equipment. The estimate used by the author was the extrapolation of the number of failures from the history recorded in the registry. In this type of estimate, the predicted number of failures each year is multiplied by the mean cost of a failure (material + labour) and preventive maintenance costs are added by the adopted policy.

To apply the model, the author used theoretical data from Ebeling's (1997), which assumes that a welding robot has been operating for 5 years, and its estimated remaining lifespan is another 5 years. This robot, referred to as a defender, currently experiences a high failure rate. Each failure results in downtime, with a mean cost of €550 (opportunity costs due to lost production and repair costs, including materials and labor). Its current market value is €12,000, and its depreciation from this value is estimated at 20% per year.

A new robot (challenger) currently costs €40,000 and the depreciation of this value is also estimated at 20% per year. Its useful life is estimated at 10 years. The robot's mean working regimen is 8 hours per day and 240 days per year, and it is expected to maintain this schedule in the coming years. The robot's registration shows the occurrence of 30 failures since its acquisition until today (time of occurrence of the last failure). The accumulated operating times until each failure are found in Table 1. For a real update rate of 15% per year, one wants to know when it will be economically viable to replace the robot based on MTBF.

Table 1

Cumulative Times Until Each Failure (hours)

1,339	1,857	2,307	3,329	3,792
3,891	5,541	5,646	5,726	5,806
6,530	6,736	6,771	6,826	7,056
7,065	7,097	7,771	7,779	7,942
8,045	8,088	8,558	8,642	8,764
8,958	9,034	9,104	9,318	9,523

Source: Ebeling (1997).

To determine the economic life of the challenger and the timing of replacement of the defender, the uniform annual costs of the two alternatives “Maintain or replace the current robot” for each of the sub-alternatives are calculated: “Postpone the replacement for another 1, 2, 3, i years up to 5, in the case of the defender robot and 1, 2, 3, i years up to 10, in the case of the challenger robot.

Considering the time period represented by i in years, the equipment's *Market value* in Euros (€) to i years, the equipment's working hours represented by t in i years, $m(t)$ representing the equipment's working hours in i years, $m(t_i-t_{i-1})$ representing the current period i minus the previous period, maintenance cost in Euros symbolized by MC (€), maintenance cost in Euros updated for the i periods represented by MC updated (€), and the EAUC for the i period in Euros symbolized by $EAUC$ (€/year). Subsequently, the sub-alternatives are compared and conclusions are drawn. Thus, Table 2 shows the EAUC of the challenger robot, and Table 3 shows the EAUC values of the defender robot.

Table 2

EAUC of the Challenger Robot

Years (i)	Market value (€)	t (hours)	$m(t)$	$m(t_i-t_{i-1})$	MC (€)	MC updated (€)	EAUC (€/ano)
1	32,00	1,920	0.88285	1	550	478	14,550
2	25,60	3,840	4.06135	3	1,65	1,248	13,759
3	20,48	5,760	9.91685	6	3,30	2,170	13,328
4	16,38	7,680	18.68329	9	4,95	2,830	13,085
5	13,10	9,600	30.53666	12	6,60	3,281	12,974
6	10,48	11,520	45.62008	15	8,25	3,567	12,958
7	8,389	13,440	64.05512	18	9,90	3,722	13,014
8	6,711	15,360	85.94795	22	12,1	3,956	13,161
9	5,369	17,280	111.39322	25	13,7	3,909	13,336
10	4,295	19,200	140.47650	29	15,9	3,943	13,557

Source: Adapted from Assis (2013)

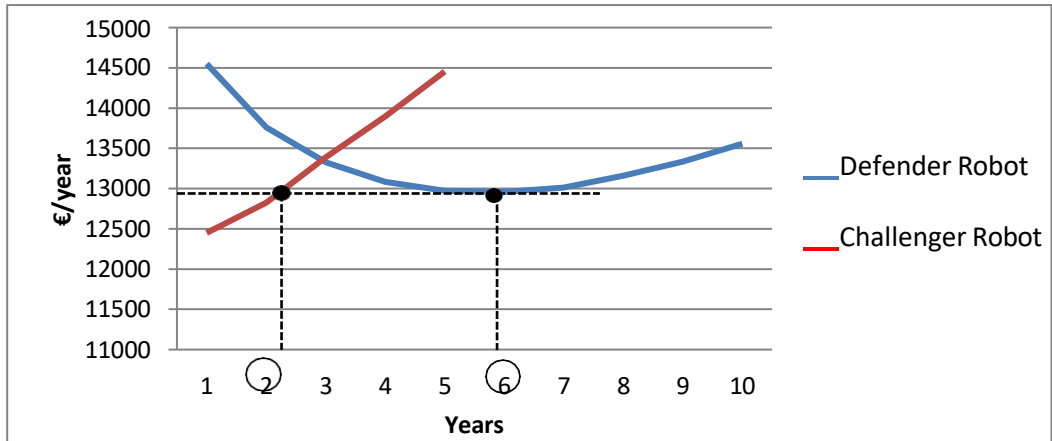
Table 3*EAUC of the Defender Robot*

Years (<i>i</i>)	Market value (€)	<i>t</i> (hours)	<i>m</i> (<i>t</i>)	<i>m</i> (<i>t-t_{i-1}</i>)	MC (€)	MC update d (€)	EAUC (€/ano)
1	9,600	11520	45.62008834	15	8,25	7,174	12,450
2	7,680	13440	64.05511691	18	9,90	7,486	12,827
3	6,144	15360	85.94795129	22	12,1	7,956	13,392
4	4,915	17280	111.3932233	25	13,7	7,862	13,894
5	3,932	19200	140.476505	29	15,9	7,930	14,454

Source: Adapted from Assis (2013)

In Table 2, it is observed that the EAUC will be minimal in the sixth year (economic life) at €12,958/year. The same procedure is applied to the defender robot, resulting in Table 3. The graphical representation of the EAUC for various alternatives is presented in Figure 1.

The analysis of the results was based on the minimum cost of the challenger equipment compared to the cost of the defender robot, showing that it will be more cost-effective to keep the defender robot for an additional 2 years and replace it in the third year (i.e., at the intersection point of the two cost curves). In that year, its EUAC was €12,827/year, lower than the minimum EAUC provided by the challenger robot at €12,958/year. After this acquisition, the equipment should be retained for 6 years and replaced in the sixth year. Furthermore, this calculation should be repeated whenever one or more cost factors or market value change.

Figure 1*Variation of EUAC with robot age**Source: Adapted from Assis (2013).***Results of the Stochastic Simulation Analysis**

To develop the proposed stochastic model, a numerical stochastic simulation approach was applied to the theoretical data from Ebeling (1997), assuming that the Mean Time Between Failures (MTBF) follows an Exponential distribution based on the times between failures, as shown in Table 4. In the proposed model, the times between failures are not independent, meaning the failure rate represented by $\rho(t)$ varies with time (t), where $m(t)$ represents the equipment's working hours in i years, considering $m(t) = a \cdot t^b$, and $ln(t)$ represents the inverse of the Exponential function for each time t found.

However, by assuming that the MTBF distribution is exponential, it is assumed that the failure rate is constant for each period and increases between periods (i), meaning that the MTBF decreases over time. However, the deterministic model being analyzed is based on an analysis of the equipment replacement moment that relies

on a mathematical expectation, in other words, on a mean result of the minimum cost.

Table 4

Calculation of the failure intensity function and MTBF at each failure moment

Períodos (<i>i</i>)	<i>t</i>	$\ln(t)$	$m(t)$	$r(t)$	MTBF
1	1,390	7.199678	0.399278	0.000657	1,523.15468
2	1,857	7.526718	0.820329	0.000973	1,028.16526
3	2,307	7.743703	1.322720	0.001262	792.17028
4	3,329	8.110427	2.965697	0.001961	509.83080
5	3,792	8.240649	3.950424	0.002294	435.97710
6	3,810	8.266421	4.181068	0.002366	422.68127
7	5,541	8.619930	9.105623	0.003618	276.38693
8	5,660	8.638703	9.489856	0.003701	270.22173
9	5,726	8.652772	9.788433	0.003764	265.69123
...
...
...
26	8,980	9.100302	26.220304	0.006444	155.17165
27	9,034	9.108751	26.712582	0.006510	153.60426
28	9,104	9.116469	27.170422	0.006571	152.18607
29	9,318	9.139703	28.596487	0.006757	147.99569
30	9,523	9.161465	30.000000	0.006936	144.17553

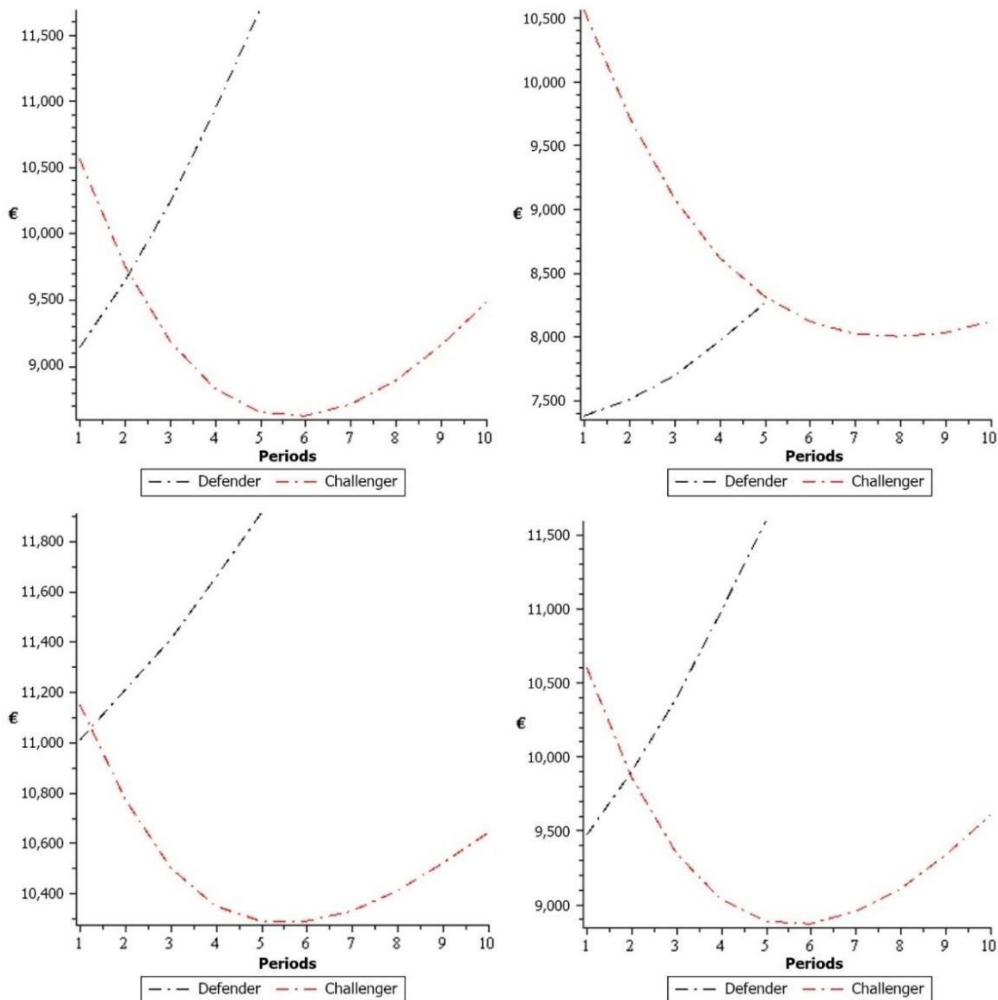
In the proposed stochastic model, the distribution of minimum and maximum costs of both the challenger and defender equipment was considered together, as depicted in Figure 2, represented by graphs related to these costs. Thus, based on the MTBF sample from Table 4, it is observed that in Figure 2, the intersection points of the cost curves varied in each graph.

It is also noticeable in Figure 2 that the generated graphs considered the random variation of MTBF. Consequently, the fixed failure rate for each period, as per an

exponential model with parameter $\gamma = \frac{1}{MTBF}$, results in varying equilibrium points between the costs of the defender and challenger equipment. However, in the deterministic model, the cost equilibrium point occurred in the third period (3), considering only a single sample and a failure rate that varies from equipment to equipment. Thus, the deterministic model's result is static and has limitations that require improvements that can be solved through the stochastic method.

Figure 2

Stochastic behavior of minimum costs



For this purpose, 1,000 simulations of the failure rate for similar equipment were conducted, and the equilibrium points were determined using different sample sizes: $n = [1, 2, 5, 10]$. Therefore, Table 5 shows the frequency of equilibrium points occurring in periods $T = [1, 2, 3, 4, 5]$.

Table 5

Frequency distribution of the equilibrium points for a simulation of 1000 cases

n	T	Frequency	Cumulative (F)	%	Cumulative (%)
	1	439	439	43.90	43.90
1	2	59	498	5.90	49.80
	3	55	553	5.50	55.30
	4	47	600	4.70	60.00
	5	400	1,000	40.00	100.00
2	1	551	551	55.10	55.10
	2	91	642	9.10	64.20
	3	65	707	6.50	70.70
	4	58	765	5.80	76.50
	5	235	1,000	23.50	100.00
5	1	716	716	71.60	71.60
	2	106	822	10.60	82.20
	3	53	875	5.30	87.50
	4	35	910	3.50	91.00
	5	90	1,000	9.00	100.00
10	1	845	845	84.50	84.50
	2	82	927	8.20	92.70
	3	41	968	4.10	96.80
	4	13	981	1.30	98.10
	5	19	1,000	1.90	100.00

Consequently, it is observed that the distribution of equilibrium points is asymmetrical, being truncated for a sample size of one ($n=1$). It is also noteworthy that the mean of the 1,000 simulations conducted for n sample sizes is close to the equilibrium point found in the deterministic model, represented by $T=3$. The simulation results indicate that the best decision is to replace the equipment in the

first period, after the fifth year of using the defender equipment, which differs from the recommendation of the deterministic method.

A Box Plot was also constructed after 1,000 simulations of the results for the equilibrium points, as illustrated in Figure 3 and Table 6.

Figure 3

Box plot of the stochastic behavior of the equilibrium point for different sample sizes in a thousand simulations

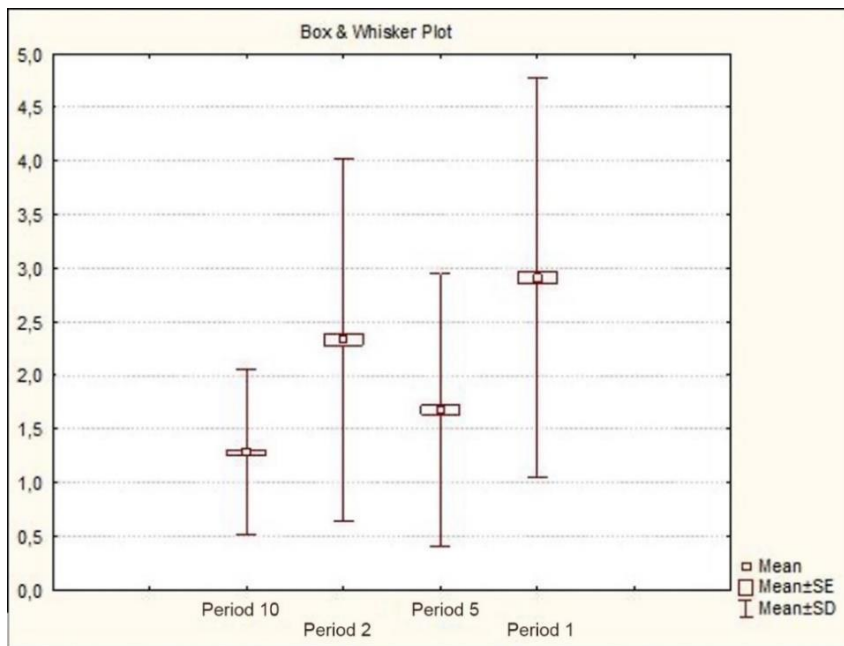


Table 6

Mean and standard deviation of thousand simulations with different sample sizes

Period	Mean	Std.Dev	Minimum	Maximum
10	1.28	0.77	1.00	5.00
2	2.34	1.69	1.00	5.00
5	1.68	1.27	1.00	5.00
1	2.91	1.86	1.00	5.00

In Figure 3 and Table 6, it can be observed that for $n=1$, referred to as Period 1, the mean equilibrium point is close to 3, which is significantly higher than the mean obtained for $n=10$, indicated as Period 10. Based on the results obtained, it is not advisable to generalize the deterministic method's procedure, as it considers only a single sample size as a decision rule. Therefore, the proposed stochastic model indicated that the best alternative is to replace the equipment in Period 1, rather than in Period 2 as suggested by the deterministic model.

Discussion and Recommendation

The use of a stochastic approach enables decision-makers to consider random variations when determining the appropriate moment to replace equipment. The results of the proposed model indicated that the equilibrium point between the cost of the challenger equipment and the defender equipment occurs in the first period in 84.5% of cases.

The deterministic model analyzes machine by machine, meaning the sample size is $n=1$, using only a single sample. On the other hand, the proposed stochastic model suggests incorporating all possible information about equipment failure rates into historical data, thereby increasing the sample size. This not only assists in more accurate decision-making but also allows for scenario analysis, considering equipment improvements.

The proposed stochastic model contributes to decision-making related to equipment replacement by considering the entire machine's life cycle and optimizing its utilization until the end of its productive life. Thus, the incorporation of life cycle considerations and the application of stochastic methods perform a crucial role in promoting sustainability, both from a financial and environmental perspective (Mecheter et al., 2023). This supports avoiding premature disposal of equipment

with remaining useful life, contributing to more responsible and effective resource management.

In conclusion, the results indicate that introducing a stochastic approach to equipment replacement decisions simultaneously increases data availability and optimizes the decision-making process. It is also concluded that it is not advisable to generalize a procedure that relies on a single sample size as a decision rule.

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Role of Artificial Intelligence in Human Resources Management

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In the contemporary business world remote working is something commonly observant nowadays. Remote working however has now limited the face-to-face interactions and greatly increased the adherence to online working as a comfortable way to work with. Consequently, technologies such as Artificial Intelligence has witnessed a boom in application in most of the management functions. Thus, efficient and fast work is something simple with Artificial Intelligence now. Considering about Human Resource Management solely, AI has radically transformed processes such as recruitment & selection, performance Management, Employee Engagement and T&D. The main intention of this study is to look at the role of AI in Human Resource Management and the opportunities and challenges that has been opened up with it. These results suggest that AI in the organizations plays a crucial role in supporting the HR department to automate recruitment, hiring, performance appraisal, T&D, employee engagement, retention, and reduce workload effectively to increase the efficiency of the workplace.

Keywords: *Artificial Intelligence, HR Functions, Human Resource Management, Opportunities & Challenges, Workplace Efficiency*

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Introduction

Human Resource Management (HRM) encompasses numerous aspects such as employee training, recruitment, employee relations, and organizational development (Armstrong, 2014). This introduction sets the basis for exploring the profound role played by technology and AI on the HR landscape, emphasizing the need for in-depth research in this area. The employees or staff are referred to as the human capital, who are the lifeblood and the most important resource in improving the assets in an organization (Wujarso, 2021). In the contemporary business world, technology has become ubiquitous, profoundly impacting various aspects of human life. The widespread use of intelligent systems has led to a heavy reliance on technology, significantly influencing the way people live and work. Therefore, it is crucial to stay informed and well known about technological advancements.

Artificial Intelligence (AI) plays an important role in the development and establishment of intelligent machines, paving paths to enabling them to match with human thinking and behavior. This technology is very faster and substantially changing the business landscape, with its ability for learning and problem solving. There are no any bounds or limits in integrating AI into any of the sectors or any industry is, which in turn offers opportunities to improve functions like recruitment, self-service transactions, payroll, access policies, and other procedures within human resources (HR).

AI take control of unique features, like quick processing of high-quality data, and the ability to make swift and precise decisions utilizing highly advanced algorithms. According to Daniel (2023), AI encloses techniques that allow computers to perform activities involving typical human reasoning. Furthermore, Athanasios & Valavanidis (2023) advocates for the development of AI capable of executing tasks that require human intelligence, promoting the concept of human-level artificial intelligence.

Many companies have now welcomed modern technology in various HR processes,

including performance appraisal, recruitment, and the implementation of cloud-based HR systems (Nyathani, 2021).

Research Objectives

1. To comprehensively explore the concept of Artificial Intelligence.

The initial research objective aims to deep dive into the multifaceted concept of artificial intelligence (AI) within the scope of human resource management (HRM). This involves studying about the underlying technologies, fundamental principles and applications of AI as they relate to HRM practices. The main aim is to gain a comprehensive understanding of AI, and how these technologies integrate with HRM processes. Additionally, this research objective also seeks to identify the historical development, theoretical foundations, and contemporary advancements in AI, providing a nuanced understanding of its relevance to HRM.

2. To understand the role of Artificial Intelligence in HRM functions.

This objective includes a comprehensive exploration of the specific roles and impact of AI in various HRM functions. It encompasses an in-depth analysis of how AI is transforming traditional HRM processes, comprising of talent acquisition, performance management, employee engagement, and Training and development. The aim also involves examining the ways in which AI-driven tools and algorithms are restructuring decision-making, automating routine tasks, and enabling data-driven insights within HRM functions. By elucidating the specific roles of AI in HRM, this research objective aims to offer a comprehensive understanding of the transformative potential of AI in optimizing HRM operations.

3. *To explore the prospects and benefits availed through Artificial Intelligence in HRM.*

This research objective seeks to identify and explore the myriad benefits as well as the opportunities presented by the integration of AI in HRM. It involves examining the potential benefits, efficiencies, and strategic advantages that AI offers in enhancing HRM practices. This exploration encompasses the identification of opportunities to leverage AI for talent identification, predictive analytics, personalized employee experiences, and strategic workforce planning. Furthermore, this objective involves assessing the potential for AI to drive innovation, improve decision-making, and create new avenues for value creation within HRM, thereby contributing to organizational effectiveness and competitive advantage.

4. *To Investigate the challenges offered by Artificial Intelligence in HRM.*

The final research objective entails a comprehensive study of the challenges posed by the adoption of AI in HRM. This involves an examination of ethical considerations, biases, privacy concerns, and potential disruptions that may arise from the integration of AI technologies in HRM. Additionally, the objective seeks to identify technical, organizational, and cultural challenges associated with AI adoption in HRM, including issues related to data security, change management, and human-AI collaboration. By studying these challenges, this research objective aims to provide insights into potential barriers and risks that organizations may encounter in their pursuit of AI-enabled HRM practices.

The integration of Artificial Intelligence (AI) in Human Resources Management (HRM) represents a transformative shift that has garnered increasing attention in recent years. However, despite the burgeoning interest, there remains a significant gap in the literature regarding the comprehensive understanding of AI's impact on various HR functions. This

study is essential as it aims to bridge these gaps by providing a thorough analysis of how AI technologies can enhance decision-making processes, optimize talent acquisition, and improve employee experiences. By examining both the potential benefits and challenges of AI implementation in HRM, this research will contribute to a deeper understanding of best practices and ethical considerations, ultimately guiding organizations in effectively leveraging AI to create a more adaptive and efficient workforce.

Literature Review

The literature on the role of artificial intelligence in Human Resources Management possesses a broad spectrum of themes and topics. Number of studies have inquired into the role of AI on talent acquisition, highlighting its potential to automate recurring tasks, analyze candidate data, and enhance the efficiency of recruitment processes. For instance, AI-enabled systems have been shown to effectively screen resumes, conduct initial candidate evaluations, and even engage in preliminary interviews, thereby reducing the time and effort needed for the initial stages of recruitment (Albassam,2023). Moreover, AI-driven tools and algorithms have been identified in the context of performance management, demonstrating their capacity to provide real-time feedback, identify patterns, and facilitate more accurate performance evaluations (Subhadarshini, 2024). These systems can analyze various data points to assess employee performance, recognize potential areas for improvement, and offer personalized development plans, thereby intensifying the effectiveness of performance management processes.

In addition, the role of AI in employee engagement and retention has been a subject of large-scale inquiry. Researchers have explored the use of AI-enabled systems to predict employee turnover, identify engagement drivers, and customize retention strategies. These AI-driven predictive models can analyze a wide array of factors, including employee sentiment, performance data, and external market trends, to identify individuals at risk of leaving the organization and recommend targeted interventions to improve retention.

Ethical considerations and potential biases inherent in AI applications within HR have also been a focal point of scholarly studies. Several studies have underscored the vitality of ensuring fairness, accountability, and transparency in AI-driven decision-making processes within HR. Ethical AI frameworks and guidelines have been proposed to address potential biases in algorithmic decision-making, safeguard employee privacy, and promote responsible use of AI technologies in HR settings. In the paper titled as "Artificial Intelligence in Human Resource Management," Zel et al., (2016) detail how AI changes HR functions such as recruitment, training, talent management, and retention. It provides insights in which AI and HR management meet in real time and its future impact on the HR workforce. Sousa, et al., (2020) states that the top business intelligence vendors are trying to add business intelligence and data analytics functionality to the Human Resource Management modules. The author emphasized the point of making HR a critical value-added department of the organization through the incorporation of business intelligence. Through the article "The Impact of Robotics, Artificial Intelligence on Business and Economics," finds adverse effects that robotics and AI might have on entities related to production, performance management, sales, strategic planning, customer relationship management, coaching, training and more (Dirican, 2015). Kazlauskaite et al., (2008) look back at the changes HR faced and propose the path to change HR for sustainable value using Artificial Intelligence. They regard the evolution of the role of HR from the "assistant nature" to a "strategic one". Further in the article "The Integration of Artificial Intelligence (AI) into Business Processes" highlights the transition from a distinct paradigm of information processing to a continuous paradigm that enables the response to the environmental requirements to be quicker and more reliable. Accordingly, Hlatshwayo, Mthokozisi (2023) conclude that under present-day business conditions, the utilization of artificial intelligence technologies is acceleratingly relevant in the decision-making processes of different functional departments as the HR.

Methods

This research methodology for a literature review on the "Role of Artificial Intelligence in Human Resources Management" is designed in a manner to facilitate a rigorous and systematic analysis of available scholarly literature, offering valuable insights into the multifaceted roles played by AI on HRM practices.

The Research Design of this research employs a comprehensive literature review methodology in order to systematically analyze and synthesize the prevailing scholarly works related to the role of artificial intelligence (AI) in human resources management (HRM). The primary research objective is to conduct an in-depth exploration and critical analysis of the multifaceted role of artificial intelligence in HRM, making clear its, challenges, and the opportunities.

Whilst, the data collection process involves systematic searches of scholarly databases, academic journals, conference proceedings, and reputable online platforms using specific keywords such as 'AI in HRM,' 'AI in Recruitment,' 'AI in performance management, ' AI in Training & Development' , AI in Employee Engagement', and 'AI in Employee Retention'. For that database's such as Scopus, Web of Science, PubMed, Google Scholar, and considerably leading academic publisher platforms were utilized to collect data from peer-reviewed articles, book chapters, and research papers in relation to the scope of AI in HRM.

Considering about the inclusion and Exclusion Criteria, the Inclusion criteria comprehends scholarly works published in the English language, peer-reviewed articles, and publications within a specified timeframe (2010-2024) focusing on AI's role in HRM to ensure relevance and accuracy. Only literature directly related to the role of AI in HRM, including its challenges, and opportunities, is included. Gray literature, and studies unrelated to the research topic are clearly excluded.

Subsequently, the Data Analysis and Synthesis was done by the collected literature through a rigorous thematic and content analysis to identify recurring themes, emerging trends, and divergent perspectives on the role of AI in HRM. Thematic analysis methods are employed to extract key insights, theoretical frameworks, and

empirical findings from the literature. The synthesized findings are organized thematically to provide a structured overview of the key dimensions of AI's role in HRM (George, 2023).

Findings of the Study

This study provides a comprehensive analysis of AI's transformative impact on HRM functions, including recruitment, performance management, employee engagement, and training and development. It offers new insights into the practical applications and benefits of AI, setting it apart from previous studies that primarily focus on theoretical aspects.

Recruitment & Selection

HR Professionals are responsible for the recruitment of talent for the organization, finding the right candidate from a pool of talents can be challenging. Screening resumes and shortlisting candidates is a task that can be difficult for HR executives. It's important to reach out to the right candidates quickly to avoid delays in operations. Providing a good candidate experience is essential as it increases the chances of the candidate accepting the offer (Sanyaolu & Atsaboghena, 2022). AI can help speed up the recruitment process by automating repetitive tasks and streamlining the hiring process (Saurabh, 2023). Chatbots can be used to engage visitors on the organization's websites and collect basic details and resumes from prospective candidates (Koivunen et al., 2022). According to Kumar (2023), Machine learning techniques can be used to interpret extensive amounts of data and identify patterns not previously recognized by the organization. AI technology can assist in checking resumes and identifying suitable candidates for a position. It can also help perform background checks on candidates' social media profiles, saving time and ensuring a fair recruiting process. Many businesses struggle to engage and re-engage prospects, but responding to candidates after applying for a position or interview is crucial. AI-powered software, like chatbots, Applicant Tracking

Systems (ATS), and Customer Relationship Management (CRM), can provide immediate answers to candidates' questions and keep them updated on their progress. By integrating AI into HRM, biased factors such as favoritism and nepotism are less likely to influence the recruitment and selection process for potential candidates (Sanyaolu & Atsaboghena, 2022). According to Wael (2023) a recruiter's viewpoint may be impacted by attributes such as ethnicity, language, gender, and even race during the hiring process. Biases are being eliminated by integrating algorithmic assessment platforms with automation and AI. The advantage of this approach is that if biases are identified after an evaluation, they can be modified to reduce or eliminate them.

Onboarding

Onboarding involves swiftly and smoothly integrating new hires into the organization's culture and policies (Jeske & Olson, 2021). This process is a significant aspect of human resource management (HRM). It not only showcases the company's culture but also defines and encourages it.

A successful integration process will help new hires feel more positive about the organization, be more engaged, and be more inclined to stay with the organization for a longer duration. However, these new hires require additional attention, and providing individual attention to each of them can be quite challenging. AI has the capability to automate the integration process, transforming it into a self-service experience, enabling new hires to easily interact with the workforce and management team, and helping to streamline manual and time-consuming tasks (Sanyaolu & Atsaboghena., 2022).

The initial stages of the integration process are crucial as this is where new hires form their perception of the organization. Intelligent chatbots also play a role in this process. AI-based chatbots can assist in gathering data, providing necessary information to new hires, organizing information, presenting required forms to fill out, collecting necessary documents from new hires, and offering online guidance

when needed. These chatbots can also aid in setting up new accounts for new hires and integrating them into the organization's system without requiring IT support (Tokarska & Dunham, 2024). According to Stefanic (2024), AI's automated integration process offers flexibility in terms of timing and location, allowing new hires to integrate into the system at their own pace. Furthermore, this reduces administrative tasks and leads to a quicker integration process. These chatbots can also gather feedback from new hires to improve their service and provide a more positive integration experience.

Training & Development

HR professionals must guarantee that employees possess the necessary skills and experience to meet both individual and organizational needs and goals through learning and development (Arulsamy,2023). Learning and development activities are crucial for dealing with changes, monitoring skills utilization, keeping learners engaged, cultivating soft skills, fostering leadership, imparting conflict management skills, and providing upskilling and reskilling opportunities (Pham,2023).

A well-equipped training facility is essential for any organization to have a competent and technically proficient workforce (Haan,2024). Employees should stay updated on the latest industry trends and advancements. According to Menaka (2023), HR departments now have the option to train and assess personnel using tools based on artificial intelligence. AI tools have made it possible to identify skill gaps and devise training plans tailored to meet the needs of individual staff members.

According to Tapalova et al. (2023) AI can assist in creating personalized learning paths for new employees based on their existing skills and matching them according to their interests. This will be particularly beneficial for large organizations, as it enables them to understand the base skills and interests of their employees and align them with learning paths and project requirements. This technology can also analyze employees' training metrics and identify those in need of further training, as well as the specific training they require. Implementing the right AI tools and technology

can enhance employees' learning experience and speed, ultimately leading to personal and professional growth and increased productivity. AI-based training programs ensure that every employee's needs are met by providing them with the necessary information at the right time.

Performance Management

Developing and setting a well-defined performance management framework is of utmost importance for any company. Such a solid performance management framework helps in tracking employees' job impact and the subsequent effectiveness of organizational training. By aligning employees' job performance with organizational goals and objectives, this framework facilitates with valuable support to the organization. The traditional performance management process involves time-consuming steps such as goal setting, self-evaluation, manager evaluation, discussion, and approval (Tardi et.al,2023).

AI can facilitate real-time monitoring of set objectives and give feedback on completed and pending tasks. Along with the integration of appraisal model into the system, performance management can involve gathering and analyzing data on employees' work performance. AI tools make it far easier to handle behavior and analyze individual performance. In cases of unmet objectives, AI can recommend ways to increase productivity and suggest rewards for achieving goals more quickly (Nyathani,2023).

AI technology can help minimize potential biases when comparing employee performance. This is achieved by establishing clear and detailed achievement standards, eliminating unilateral judgment of employees by leaders. According to Luhana et al. (2023) AI can also help steer any underperforming employees towards the required goals for improvement. Furthermore, it can provide insights into employees' potential and come up with predictions related to their future performance, which is important information for HR professionals in succession planning. These tools enable HR professionals in goal setting, monitoring teams and

individual performance, track developments and changes, and save time on operations, ultimately leading to optimal productivity and positive outcomes.

Employee Retention

Higher turnover rates are a serious issue, which can have a negative impact on the organization's efficiency (Suraihi,2021). When a member of the staff leaves the organization in a competitive environment, it can demotivate and reduce the productivity of the remaining team members in the organization. According to Divya (2023) Employee attrition also has an impact on the organization's revenue, leading to increased recruitment and training costs, as well as hindering organizational growth. Consequently, HRM is tasked with recruiting new staff to fill the manpower gap. According to Sanyaolu & Atsaboghena (2022) AI machine learning-based solutions can help HR professionals in predicting staff attrition rates and identifying employees who are more likely to leave, allowing for the planning of incentives to boost employee motivation. Analysis of historical data is used to recognize patterns, and all potential reasons for employee retention are taken into account in this prediction. AI can be used to monitor employee engagement, assess employee satisfaction, gather feedback, and promptly address it to ensure employee contentment and motivation in their work. By employing smooth onboarding processes using AI chatbots, promptly addressing employee feedback, ensuring that employees receive the necessary skills for their roles, and providing competitive compensation packages through AI-enabled solutions, employee attrition can be minimized.

Employee Engagement

Employee engagement and labor relations involve the collaboration between employers and employees to establish a just working environment (Smith et al.,2023). Certain organizations struggle to comprehend their workforce and their requirements effectively. Understanding the workforce is essential as it enables HR managers to efficiently address workplace conflicts. HR managers are responsible

for preventing and resolving issues within the organization, including abusive behavior such as conflicts, sexual harassment, disputes over annual leave, bullying, and other employee relations problems that can have a negative impact on the company. According to Selvaraj (2024) chatbot automation can aid in this area, as effective communication is crucial for employee engagement. This platform can encourage more interactive and open communication among employees, providing real-time feedback to both employees and HR professionals, regardless of whether it's positive or negative. Employees can freely express their emotions without the need for physical meetings or scheduled appointments. Organizations can now anticipate their employees' level of engagement using various AI-powered prediction methods. AI analytics models can be utilized to analyze a wide range of text formats, including emails, chatbot messages, memos, media comments, and more, to extract valuable insights for evaluating employee engagement. Current and future employee engagement levels can be predicted by analyzing extensive datasets and extracting crucial information. Natural language processing (NLP) technology can convert unstructured data from various sources into structured data for analysis (*NLP For unstructured Data Analysis*,2024). This technology is capable of performing sentiment analysis and topic analysis and can also interpret the sentiment behind an employee's written response in a survey. This capability aids in assessing overall employee satisfaction with the company's performance. AI-based technology streamlines the analysis of engagement surveys, enabling HR professionals to promptly identify employee needs and provide swift solutions.

Discussion and Recommendation

Human Resource Management focuses on principles, methods, and technologies that are used to improve the productivity of an organization. HR specialists achieve this through strategies and policies that increase the effectiveness of employees (Ammara, 2021). Nowadays, the human resource department has started turning digital and using means to optimize resources in the form of extensive data analysis,

artificial intelligence, and cloud computing Retno (2024). Artificial intelligence is one of the significant potential benefits for the HR world because it can help organizations accomplish goals in less time Priya (2021). With technological developments, organizations will need highly intellectual workers who can code machines to do work for them on their demand. According to Agarwal (2024) Artificial intelligence will help the workers balance their personal and professional lives properly and will help them complete the work on time increasing organizational efficiency and productivity.

Limitations

Considering about the limitations, one is that the reliance on secondary data, which may introduce biases due to the variability in data quality. Additionally, the study's focus on a specific timeframe (2010-2024) may limit the generalizability of the findings. Further the high implementation costs is another related limitation. Future research should incorporate primary data collection and consider a broader timeframe to enhance the robustness of the conclusions.

Prospects of AI

Artificial Intelligence (AI) has popped up as a powerful tool in minimizing discrimination and promoting fairness in HRM practices. By leveraging advanced algorithms and logic, AI offers a range of promising prospects that can revolutionize traditional HR processes and contribute organizations to achieve success.

Reducing Biases and Promoting Transparency

AI is being extensively used to minimize biases and promote transparency in the workplace. The framework enables organizations to reduce discrimination in resume selection by scanning job descriptions and recognize relevant qualifications and experience, thereby fostering an unbiased approach to evaluate candidates.

Enhancing Efficiency and HR Focus

AI-powered automation reduces monotonous tasks for employees, allowing the HR team to concentrate on higher-value work. By automating routine administrative functions, AI let HR professionals to pay attention on strategic initiatives such as talent development, employee engagement, and organizational culture enhancement.

Minimizing Errors and Enhancing Decision-Making

AI's reliance on algorithms and logic minimizes the probability of errors in outcomes, contributing to more accurate and reliable results. AI-based recruitment and selection applications facilitate the acquisition of talent and the discovery of the most suitable candidates for any available position, leading to more informed and data-driven decision-making.

Workflow Optimization and Error Reduction

AI maintains workflow among different functional departments. By streamlining processes and facilitating seamless communication, AI contributes to improved collaboration and reduced errors in HR and organizational operations.

Ethical and Unbiased Decision-Making

AI's algorithmic approach promotes ethical and unbiased decision-making in HRM processes. By standardizing procedures and anonymizing candidate data, AI applications facilitate to fair and transparent HR practices, fostering an inclusive and diverse work environment.

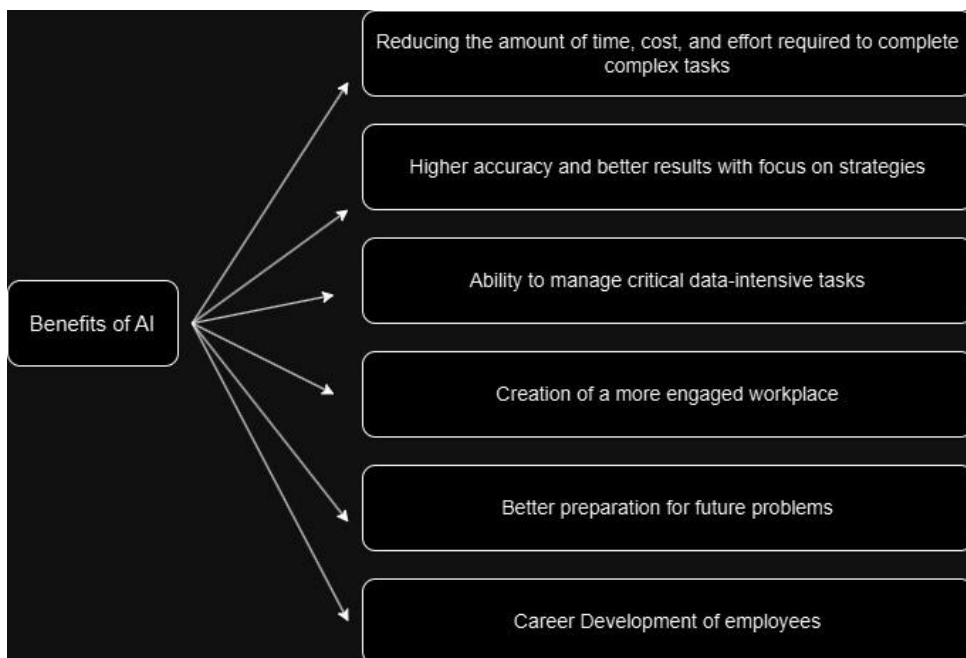
In gist, the prospects of AI in HRM are promising, offering opportunities to minimize biases, enhance efficiency, and optimize decision-making processes. By embracing AI technologies, organizations can streamline HR operations, promote fairness and transparency, and focus on strategic human capital management initiatives. However, it is very important for organizations to address ethical considerations, ensure AI literacy among HR professionals, and align AI initiatives with organizational values to maximize the potential benefits of AI in HRM.

Benefits of AI

Considering the benefits of AI, the time cost that has to be incurred, effort required for the completion of complex tasks has been reduced saving cost and time which are primarily important to organizations nowadays. Further the higher accuracy, better results, ability to manage critical data intensive tasks using artificial intelligence can be identified as benefits of AI. Increase in employee engagement, sound preparation to unexpected future scenarios, and higher levels of career progressions of employees are few other benefits of AI in HRM.

Figure 01

Benefits of AI



Source.(Author, 2024)

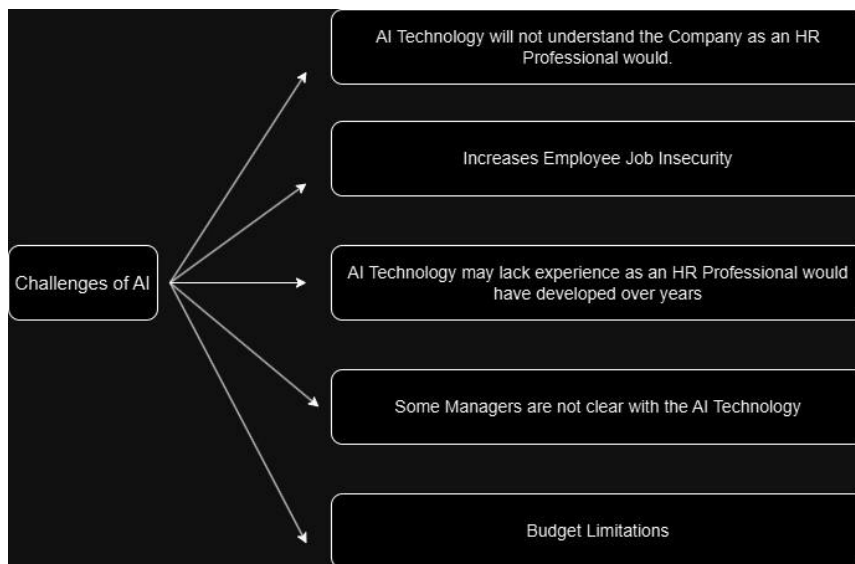
Challenges of AI

The entire world is now moving towards rapidly changing technologies in a very higher pace. At times organizations might choose incorrect paths in making themselves survive amidst the competition and sustain themselves in the business world. So proper implementation of AI Technology is highly important which would make organizations comparatively higher effective and efficient. Certain challenges that organizations do face when they adopt to AI Systems are as follows:

- Inability of the AI Technology to realize the company as a live, and active HR Professional could.
- Rise in job insecurity with the replacements done by AI Technology at the workplaces.
- Inability to gain the experience that an HR Professional gets sharpened up with years
- High implementation costs and resistance of workforce to accept technological advancements.

Figure 02

Challenges of AI



Source: (Author, 2024)

Conclusion

Artificial Intelligence (AI) has been making waves in various industries, and Human Resources (HR) is no exception. The integration of AI into HR functions has profound implications for HR teams, transforming them into more innovative and productive units. AI serves as a powerful tool that augments the capabilities of HR professionals. It empowers them by enriching their knowledge and skills. For instance, AI can analyze vast amounts of data to identify patterns and trends that would be impossible for humans to discern. This allows HR professionals to make more informed decisions about hiring, training, and managing employees. Moreover, AI enhances employee motivation and performance. It can automate routine tasks, freeing up employees to focus on more challenging and rewarding work. AI can also provide personalized training and development programs, which can boost employee engagement and productivity. However, it's crucial to understand that AI is not a decision-maker; it's a decision-support tool. AI can process and analyze data to generate insights and recommendations, but it doesn't make conclusions. The responsibility for making strategic or operational decisions still lies with HR managers. In some cases, AI might not provide the correct response or make the best decision. This is because AI algorithms are only as good as the data they're trained on. If the data is biased or incomplete, the AI's output will also be flawed. Therefore, HR managers should always have the ability to review and verify the algorithms and logic that underpin AI's recommendations. The time saved on repetitive HR tasks through AI automation allows managers to concentrate on more creative and strategic work. This work is crucial for driving organizational success. Success in an organization is achieved through the intelligent combination of people, processes, and technology. By freeing up time for strategic thinking, AI enables HR managers to contribute more effectively to this success. AI-empowered HR applications are not just analytical tools; they're also execution tools. They can analyze, diagnose, and predict, but they can also execute. For example, an AI-powered HR application could identify a skills gap in an organization, recommend

a training program to address the gap, and then implement the program. This makes AI a powerful resource for HR. However, companies must be careful when selecting AI solutions. The chosen solution should align with the organization's values and culture. AI will have a significant impact on employees, so it's essential to conduct a thorough assessment to ensure that the solution meets their needs and potential. In conclusion, the findings suggest that AI has significant potential to revolutionize HR by enhancing efficiency, strategic alignment, and employee-centric practices. However, limitations such as potential biases in AI algorithms and high implementation costs must be considered. Future research should focus on addressing these limitations to fully realize AI's benefits in HRM.

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The Impact of Green Training and Development on Green Organizational Citizenship Behavior: With the Mediating effect of Green Employee Attitudes at a Sri Lankan Apparel Sector Company

¹Dasanayaka S. W. S. and ²Pieiris M. D. P.

Today, worldwide organizations are prioritizing their impact on the environment and are taking initiatives to reduce environmental impact. Organizations are making huge investments to enhance their employees' green behaviors towards the environment. But employees are indicating less environmentally responsible behavior. This research aims to investigate how green training and development affect green organizational citizenship behavior, considering the mediating role of employee green attitudes at a selected apparel industry company in Sri Lanka. Apparel manufacturing sector is the key contributor to the Sri Lankan economy. Data was collected via an online questionnaire distributed to 108 executive-level and higher employees, selected through simple random sampling. The sample varied by gender, age, educational level, and years of service. Data analysis was performed using SPSS 25.0. The findings indicate that green training and development have a significant positive impact on both green organizational citizenship behavior and green employee attitudes. Additionally, green employee attitudes positively influence green organizational citizenship behavior. While those relationships are significant, they are not strongly correlated. Moreover, controlling green training and development, green employee attitudes have a significant direct impact on green organizational citizenship behavior. In order to analyze the mediating effect, the bootstrap test was utilized. Although green employee attitudes mediate the effect of green training and development on organizational citizenship behavior, this indirect effect is not significant. The relationships among green training and development, green citizenship behavior, and employee attitudes are also influenced by additional factors.

Keywords: *Green Training and Development, Green Employee Attitudes, Green Organizational Citizenship Behavior*

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Introduction

In Sri Lanka, the apparel manufacturing sector is the major contributor to the Sri Lankan economy. Sri Lankan apparel and ethical brands are aligned closely with a strong focus on sustainability by incorporating its entire production, supply chain and human resources as well with the initiative of “garments without guilty.

According to energy analysis by the Sri Lanka Sustainable Energy Institute, consumes about 14% of the total energy used by all industries. Additionally, industry and commerce provide approximately 60% of the electricity used in the country. Carbon dioxide represents the majority of greenhouse gasses associated with climate change and global warming. From 1960 to 2021, Sri Lanka's greenhouse gas emissions averaged 8810.48 KT and reached an all-time high of 25510. In 2019, it was 66 KT, and in 1960, it fell to 2258.87 KT. Between 1880 and 2013, the average of all the world's oceans showed an annual average increase of 0.06. However, since 1993, the average sea level has increased by 0.12 to 0.14 inches per year, nearly double the long-term trend. In Sri Lanka, Leading apparel manufacturers are focusing on green initiatives at every stage including reducing energy and water consumption.

Today organizations are becoming increasingly aware of the environment and are taking important steps to take sustainable measures. These measures include the use of energy-efficient technologies, waste reduction, supply chain optimization and the application of circular economy principles. At present, contemporary organizations are focusing on the importance of adopting environmental and green initiatives within the organization. This recognition has led to a trend where organizations are acknowledging the importance of environmentally responsible behaviors.

Problem Statement

Today, organizations are investing more resources in environmental training and development initiatives. While significant and huge investments are made in green training and development initiatives within the organizational context, there is a significant discrepancy between the employee knowledge and skills towards the environmental initiatives acquired by these programs and their actual adoption of organizational citizenship behavior towards the environment. On the other hand, employees are educated about the importance of greening, but their behaviors don't indicate environmentally responsible behavior. Therefore, it shows that simply offering training and development is not enough. It shows that it's a critical challenge for organizations when investing in environmental training and development practices. As well as this lack of green behavior led to direct environmental consequences such as increased pollution, resource consumption and carbon emissions.

Accordingly, the **research question**, 'What is the impact of green training and development on green organization citizenship behavior with the mediating effect of employee green attitudes?' could be raised.

Opatha et al. (2020) highlight significant empirical gaps in previous research regarding the relationship between green attitudes and various types of green behaviors, such as official, interpersonal, organizational citizenship, and personal behaviors. These gaps underscore the need for further investigation. Additionally, prior studies have not thoroughly explored green attitudes as a mediating factor in the relationship between HRM's green orientation and different forms of green behavior, as documented by Opatha et al. (2020). This gap exists both empirically and theoretically. In their research on the Sri Lankan tile industry, Opatha and Kottawatta (2020) found a positive and significant relationship between Green HRM and employees' green attitudes, emphasizing that green training exerts the strongest influence on green attitudes. However, their study did not specifically focus on green

training and development as the primary independent variable. Similarly, Yogendran and Priyashantha (2022) investigated the impact of Green HRM on employee green behavior with a focus on green attitudes at an IT company in Sri Lanka. They found a positive and significant effect of green attitudes on green behavior, highlighting that both green training and development and green attitudes directly influence green behavior. Nonetheless, their study did not specifically prioritize green training and development as the independent variable nor did it primarily address green organizational citizenship behavior as a key outcome variable.

Aoyagi-Usui et al. (2003) noted that existing research on environmentally friendly and green behavior among employees has predominantly focused on Western perspectives. However, environmental beliefs, values, and attitudes vary globally due to regulatory and cultural differences. Statistics from the World Bank indicate that the apparel industry is the largest labor-intensive manufacturing sector in South Asia. Despite this, there is limited research conducted within this industry and geographical context. While previous studies have demonstrated the influence of green training and development on changing employee green behaviors and attitudes, there remains a scarcity of research that specifically examines green training and development as an independent variable. Consequently, there are significant empirical gaps in the literature, with many researchers concentrating on exploring the relationship between Green HRM and employee green behaviors. Yet, there remains a notable absence of studies investigating the relationship between green training and development and various types of green behaviors, as well as employee green attitudes, particularly within the apparel industry and the South Asian context. This research aims to contribute to the evolving literature in this field by addressing these aforementioned empirical research gaps.

Therefore, the primary objective of this research study is to address this central problem by investigating how organizations can bridge the gap between green

training and development practices and employees' consistent exhibition of green organizational citizenship behavior effectively with the influence on green employee attitudes.

Objectives

The main goal of this research study is to explore how green training and development influences green organizational citizenship behavior, while considering the mediating role of green employee attitudes. This investigation specifically targets a prominent apparel manufacturing company located in Sri Lanka.

General Objectives:

- To examine the impact of green training and development on green organizational citizenship behavior.
- To study the relationship between the impact of green training and development on green employee attitudes.
- To explore the connection between the impact of green employee attitudes on green organizational citizenship behavior.
- To identify the role of green employee attitudes on influencing the relationship of green training and development on green organizational citizenship behavior.

Specific Objectives

- To conduct a systematic review of existing literature on Green Training and Development, Green organizational citizenship behavior, and Green Employee Attitudes aiming to identify existing research gaps for future research.

- To identify demographic differences among the employees in the Sri Lankan apparel industry.

Literature Review

Green Organizational Citizenship Behavior: Dependent Variable

As outlined by Opatha and Arulrajah (2014), Green HRM can be divided into four distinct categories, namely green competencies, green attitudes shown by employees, green behaviors in their actions, and the green outcomes and results achieved.

Green behavior is one of the most important human resource requirements and green behavior has three dimensions such as Green organizational citizenship behavior, Green interpersonal citizenship behavior and Green official behavior. Boiral (2009) defines that "Organizational Citizenship Behavior for the Environment " is based on organizational citizenship behavior. According to Robbins et al. (2010), Organizational Citizenship Behavior (OCB) encompasses discretionary actions that go beyond job requirements and are not formally rewarded by employers. Boiral and Paille (2012) similarly observe that OCB involves voluntary efforts that are not explicitly mandated by the job requirements. Opatha (2013) defines Green organizational citizenship behavior as the extent to employee involvement in positive activities that are intended to serve the organization to carry out green initiatives. These activities do not require official job necessities and mainly they are considered as voluntary green activities of employees.

Opatha (2019) defines green organizational citizenship behavior as the voluntary involvement of employees in activities aimed at supporting green goals and objectives. Employees willingly take on roles such as conservationist, preservationist, non-polluter, and maker. Additionally, Opatha and Kottawatta (2020) measured green organizational citizenship behavior using three specific

indicators such as conscientiousness, sportsmanship, and civic virtue out of the five dimensions of organizational citizenship behavior (OCB).

Studies by Lin et al. (2015) and Zhang et al. (2018) indicate that factors such as individual environmental awareness, leadership style, organizational environment, and external social environment significantly influence individuals' organizational citizenship behaviors for the environment (OCBE). In their research, Liu et al. (2019) examined the relationship between Green HRM, green organization identity (GOI), environmental values, and organizational citizenship behaviors for the environment (OCBEs) across three manufacturing enterprises in China. They found that Green HRM positively impacts OCBEs. Moreover, they discovered that green organization identity (GOI) mediates the relationship between Green HRM and OCBEs, while environmental values moderate the effect of Green HRM on organizational identity and OCBEs.

Green Training and Development: Independent Variable

Cook and Seith (1992) first proposed the concept of Green Training and Development, which focuses on providing environmental training across various organizational levels, from employees to managers. According to Garavan et al. (1995), training is described as a systematic and planned effort to enhance knowledge, skills, and attitudes through learning experiences, aimed at improving performance in specific activities. Thus, Jabbour et al. (2010) assert that green training in this context involves policies designed to equip employees with essential knowledge, practices, and attitudes necessary for environmental initiatives.

According to Aragon–Correa (1998) environmental training as the necessary tool to indicate the environmental performance of an organization. Furthermore, Cole et al. (2008) suggests that environmental training is deemed essential because it is equipping employees with the requisite skills to conceive and implement innovative environmental management initiatives. These initiatives, in turn, exert a positive

influence on the environmental performance of the organization. Wehrmeyer (1996) underscores the pivotal role of environmental training in effective implementation of environmental management within organizations.

Also, Opatha et al. (2015) suggests that environmental training plays a significant aspect to enhancing employees concerned toward the environment. According to North (1997), conducting seminars and workshops to create environmental awareness among employees to promote "environmental awareness" among the workforce is important to achieve environmental performance of an organization. This environmental training will lead to a change in the behavior and attitudes of both managerial and non-managerial level employees. Renwick et al. (2008) and Renwick et al. (2013) suggest innovative approaches such as training of employees to conduct green analysis at workplace, use of job rotation to groom future green managers and training in various aspects of environmental management initiatives such as recycling, safety, waste management and energy efficiency. According to Jackson and Seo (2010), Green training is widely recognized as an important organizational and human resource element, and Renwick et al. (2013) emphasize that green training is widely regarded as a crucial practice within Green Human Resource Management.

Ramus (2002) shows that HR processes such as learning and training related to the environmental aspect by creating a favorable green culture for the organization in which employees feel that employees were the part of the conversional outcomes, and these aspects contribute to achieving environmental goals. Furthermore, according to May and Flannery cited in Ajenthiny (2020) training and development are widely used Green HRM initiatives, to increase employee awareness of environmental impacts of their organization's processes. According to Jabbar and Abid (2014), even if employees are motivated towards organizational green performance, training would be needed to implement those policies.

Arulrajah et al. (2015) emphasize that an organization cannot achieve its environmental objectives without adequate environmental training. It is essential to underscore that the absence of comprehensive environmental training renders an organization incapable of attaining its environmental objectives as highlighted by Arulrajah et al. (2015). Scholarly discourse underscores that environmental training and education significantly augment employees' capabilities to make substantial contributions to environmental management endeavors, as posited by Ramus (2002) and further corroborated by Renwick et al. (2008). Jabbar and Abid (2014) have also advanced the notion that environmental training serves to elevate employees' motivation levels with respect to eco-initiatives and the environmental performance of the organization.

As articulated by Cole et al. (2008) Environmental training plays a pivotal role in enhancing employees' skills to initiate innovative environmental management initiatives. These initiatives, in turn, exert a positive influence on the environmental performance of the organization. It is essential to underscore that the absence of comprehensive environmental training renders an organization incapable of attaining its environmental objectives, as highlighted by Arulrajah et al. (2015). Thevanes and Arulrajah (2020) investigated the relationships between environmental training, environmental behavior of employee and environmental orientation of organization and with the mediating effect of environmental behavior of employee on the relationship among environmental training and environmental orientation of organization. The findings of this study indicate that environmental training programs have a positive impact on employees' green behavior.

Green Employee Attitudes: Mediating Variable

Environmental attitude is defined by Perlstring (1997) as learned tendencies that manifest as consistent behaviors that are either positive or negative toward the environment. Kempton et al. (1995) argue that green attitudes inspired by ethical and religious values, pragmatic and anthropocentric orientations and biocentric beliefs, All living organisms have the right to exist and survive. According to Milfont and Duckitt (2010) environmental attitudes are the mental propensity that people express when they evaluate responses to the environment, with favorably or unfavorably. "Green Human Resource Management: A Simplified Introduction" by Opatha (2013) provides an overview of the concept of Green Human Resource Management (GHRM). The concept of Green Attitude refers to an individual's beliefs, feelings, and behaviors related to environmental sustainability and eco-friendly practices. It encompasses three key aspects: cognitive, affective, and behavioral.

Hewapathirana et al. (2020) defines green attitudes as an individual who is supposed to be a green person, genuinely should believe in greening, exhibit a positive and engaged attitude towards greening and demonstrate a positive and serious behavioral alignment towards greening. As well as the individual's attitude should be complete cognitively, affectively, and behaviorally. According to Ojo et al. (2022) and Ojo and Fauzi (2020) states that environmental attitudes will contribute to better favorable outcomes for sustainability and environmental performance. Positive environmental attitudes are associated with environment responsible behavior and this support to achieve better results in environmental performance and sustainability. According to Priyashantha and Yogendran (2022) states GHRM affects green behaviors through employees' attitudes. The results indicate that the study's hypotheses were supported, showing that GHRM indeed impacts green behavior through employees' green attitudes. This suggests that GHRM influences employees' attitudes, leading to more eco-friendly behaviors.

Environmental training encourages the cultivation of proactive attitudes toward environmental concerns, as noted by Carter and Dresner (2001). Furthermore, scholarly research by Renwick et al. (2013), Opatha and Arulrajah (2014), Ahmad (2015), and Das and Singh (2016) underscores the positive impact of environmental training on enhancing environmental attitudes. According to Shaban (2019) Employee motivation for green application is greatly influenced by financial and non-financial incentives.

According to Pham et al. (2019), the use of green HR practices, such as green training, green rewards and green organizational culture, has a significant impact on the level of employees' commitment to environmental initiatives. Bashirun and Noranee (2020) conducted a study to explore the influence of environmental knowledge and attitude on employee green behavior in a private organization in Malaysia. But this study states that there is no relationship between environmental knowledge and environmental attitude on employee green behavior.

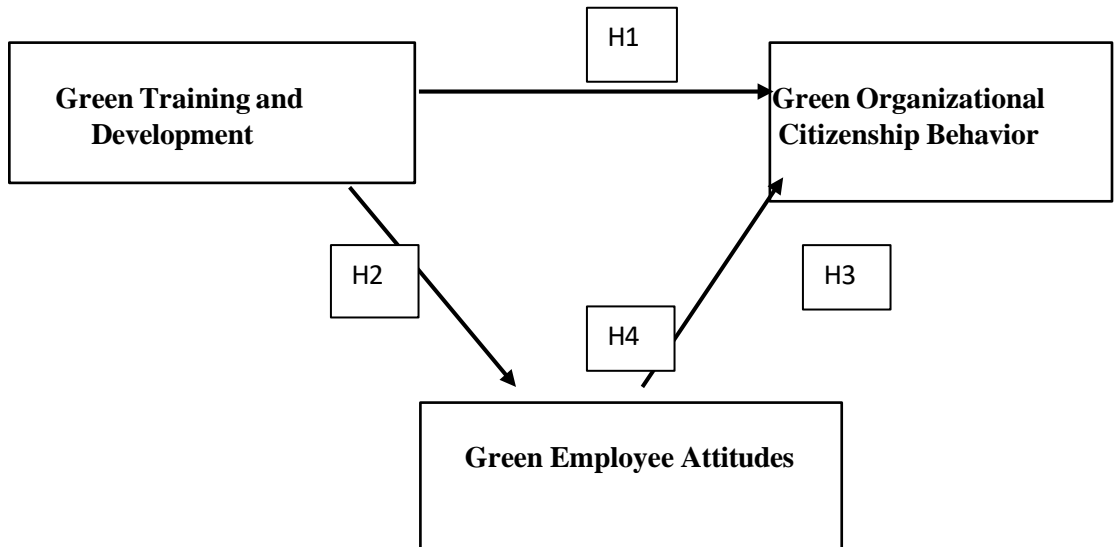
Research Design

This research is quantitative with minimal researcher interference. It uses an exploratory design and descriptive research to detail the characteristics of the employee group and the unit of analysis is individual.

Conceptual Framework

Figure 1

Conceptual Framework



Source: Author, 2023

Hypotheses of the Study

H1: There is a significant direct impact of green training and development on green organizational citizenship behavior.

H2: There is a significant direct impact of green training and development on green employee attitudes.

H3: There is a significant direct impact of green employee attitudes on green organizational citizenship behavior, controlling for green training and development.

H4: The indirect effect of green training and development on green organizational citizenship behavior through green employee attitudes is significant.

Selection of Population and Sample

The population comprised 150 executives and above level employees from a specific apparel sector company in Sri Lanka and the sample size for this study includes 108 executives and above level employees. This category encompasses Executives, Assistant Managers, Deputy Managers, and General Managers. The sample was determined using the Morgan table and the Ruskin model, which base sample size on statistical principles. Simple random sampling was employed to ensure unbiased selection.

Data Collection

This research utilized both primary and secondary data. Primary data were collected through a questionnaire, which was developed and then distributed to the target respondents as part of a structured survey. Secondary data were gathered from existing literature relevant to the study. The questionnaire, based on this literature, was personally administered by the researcher using a random sampling approach.

The questionnaire included demographic factors such as gender, age, educational level, and period of service in the current job. To measure green training and development, green employee attitudes, and green organizational citizenship behavior, a five-point Likert scale was used, with 1 indicating "strongly disagree" and 5 indicating "strongly agree."

Methodology to Analyze Data

This research was designed as a cross sectional research study with the quantitative research approach. According to Krejcie & Morgan table figures, 108 responses were collected from the whole sample by distributing a questionnaire survey and using a simple random sampling method. Furthermore, those primary data analyzed using SPSS version 25 and correlation and regression analyzes.

Reliability of the Measures

Table 1

Reliability Statistics

Variables	Cronbach's Alpha	No. of Items
Green Training and Development	.874	8
Green employee' attitudes	.648	6
Green organizational citizenship behavior	.628	10

Source: Analyzed data, 2023

Based on the Cronbach's alpha test, the reliability coefficient for Green Training and Development (GTD) is 0.874, which indicates a high level of internal consistency. This measurement was derived from 8 items. The Green Employee Attitudes (GEA) scale, measured with 6 items, has a Cronbach's alpha value of 0.648. Similarly, the Green Organizational Citizenship Behavior (GOCB) scale, assessed with 10 items, also has a Cronbach's alpha value of 0.648. Both values for GEA and GOCB are above the 0.6 threshold, signifying acceptable reliability.

Response Rate

Table 2

Response Rate

Delivered	Completed	Incomplete	Usable	Response rate
150	113	5	108	72%

According to analysis in the above-mentioned table, the response rate is 72%.

Sample Description

Table 3

Sample Composition

Gender	Male	61	56.5%
	Female	47	43.5%
Age	21 – 25 years	25	23.1%
	26 – 30 Years	42	38.9%
	31 – 35 Years	18	16.7%
	36 – 40 Years	11	10.2%
	41 Years and Above	12	11.1%
Educational Level	Professional qualifications	24	22.2%
	Degree	57	52.8%
	Post Graduate Diploma	10	9.3%
	Master' Degree	16	14.8%
Period of service year	Less than 1 Year	21	19.4%
	1 – 2 Years	23	21.3%
	3 – 4 Years	22	20.4%
	More than 4 Years	42	38.9%

Source: Analyzed data, 2023

In Sri Lanka where female representation in executive and above positions in the apparel sector remains lower. Therefore, those findings interpret the trend that male professionals occupy a higher percentage of executive and above positions represents a significant challenge in achieving gender diversity.

According to the age distribution analysis, a significant portion, consisting of 38.9% of the sample, falls within the 26 to 30 age category. This shows that the company consists of new energy and talent by recruiting young professionals. As well as 16.7% of respondents fall into the ages of 31 to 35 and this shows mid-career individuals of the company. The age group between age 21 to 25 employees shows 23.1% percentage, representing the second highest percentage but noteworthy representation of fresh and young blood employees. The multi-faceted age distribution represents the company's efforts to blend young bloods with experienced professionals in the Sri Lankan apparel industry.

The education distribution of executive and above employees in the Sri Lankan apparel sector is diverse, reflecting both academic and professional qualifications. The majority of employees hold a bachelor's degree and a significant number of employees having master's degrees or postgraduate diplomas indicates further attainment for advanced studies and continuous learning and skills development. This diverse educational background of executives and above employees in the Sri Lankan apparel sector indicates that they are well educated and their expertise contributes to the overall competitiveness of the apparel industry in Sri Lanka.

According to period of service years distribution of the respondents, there is a significant portion of employees has been in company for more than 4 years of period and indicating a significant stability of executive and above employees. Furthermore, there is a significant number of individuals with service periods less than 1 year and 1 – 2 years, but this also indicates a bit turnover ratio.

Descriptive Statistics

Tables 4

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GTD	108	2.38	5.00	4.0174	.53729
GEA	108	3.17	5.00	4.0972	.40578
GOCB	108	3.00	5.00	4.0630	.38925
Valid N (listwise)	108				

Source: Analyzed data, 2023

The above table shows the mean value of the GTD is 4.0174 while the value of standard deviations is 0.53729. Next, the mean value of the GEA is 4.0972 while the value of standard deviation is 0.40578. The mean value of the GOCB is 4.0630 while the value of standard deviation is 0.38925. It can be identified that the level of agreement of the respondents for each variable is high.

Correlation Analysis

Tables 5

Correlation Statistics

		GTD	GEA	GOCB
GTD	Pearson Correlation	1	.602**	.364**
	Sig. (2-tailed)		.000	.000
	N	108	108	108

GEA	Pearson Correlation	.602**	1	.368**
	Sig. (2-tailed)	.000		.000
	N	108	108	108
GOCB	Pearson Correlation	.364**	.368**	1
	Sig. (2-tailed)	.000	.000	
	N	108	108	108

Source: Analyzed data, 2023

The Pearson correlation coefficient for Green Training and Development (GTD) and Green Organizational Citizenship Behavior (GOCB) is 0.364, indicating a positive relationship. The significance value is 0.000, demonstrating that this relationship is statistically significant.

The Pearson correlation coefficient for GTD and Green Employee Attitudes (GEA) is 0.602, also indicating a positive relationship. The significance value is 0.000, showing a significant relationship.

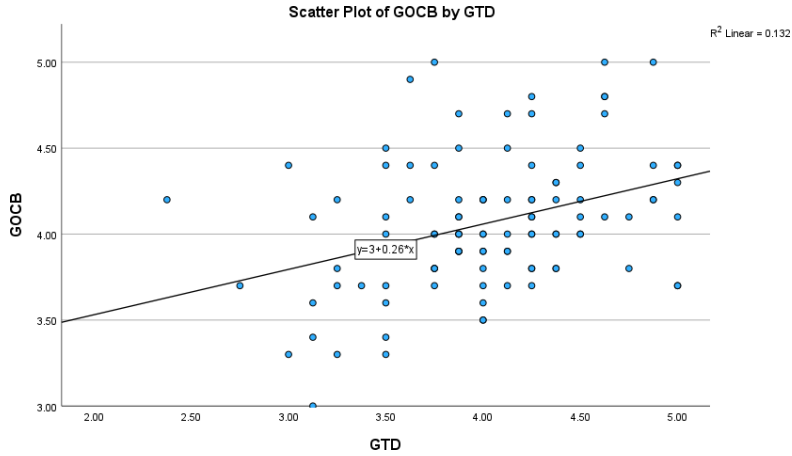
The Pearson correlation coefficient for GEA and GOCB is 0.368, indicating a positive relationship. The significance value is 0.000, which is less than 0.05, confirming that this relationship is statistically significant.

Regression Analysis

H01 - There is a significant direct impact of GTD on GOCB.

Figure 2

Scatter plot for GTD and GOCB



Source: Analyzed data, 2023

Linear curve in the scatter plot is derived as upward from left to right by showing the positive relationship among GTD and GOCB.

Table 6

Model of summary table for H2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig.F Change	
1	.364 ^a	.132	.124	.36426	.132	16.184	1	106	.000	1.809

a. Predictors: (Constant), GTD

b. b. Dependent Variable: GEA

Source: Analyzed data, 2023

According to the model summary table, the R-squared value is 0.132, indicating that Green Tra Development (GTD) can explain 13.2% of the variation in Green Organizational Citizenship (GOCB). The adjusted R-squared value is 0.124.

Table 7

Anova for H1

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.147	1	2.147	16.184	.000 ^b
	Residual	14.064	106	.133		
	Total	16.212	107			

a. Dependent Variable: GOCB

b. Predictors: (Constant), GTD

Source: Analyzed data, 2023

According to the provided table, the F value is 16.184, which is significant at the 0.000 level. This F value assesses the overall fit of the regression model for the data. These results suggest that the model does not have a strong fit with the data.

Table 8

Coefficients for H1

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.004	.266		11.308	.000
	GTD	.264	.066	.364	4.023	.000

a. Dependent Variable: GOCB

Source: Analyzed data, 2023

Based on the coefficient values in the above table, the regression equation of the GOCB can be constructed as follows;

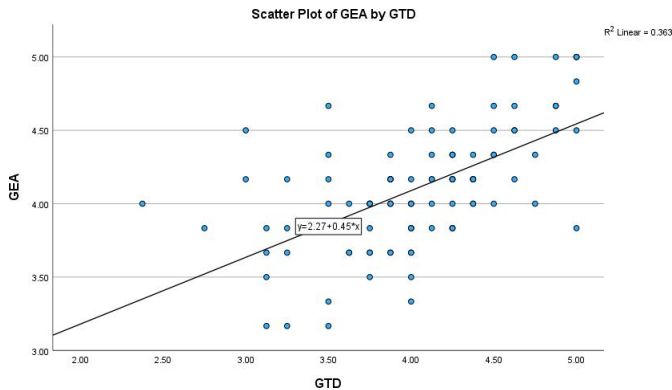
$$Y=3.004+0.264 \text{ GTD}$$

Considered in the analysis, GTD significantly impacts on GOCB (0.000, $p>0.05$). p-value (0.000) is less than 0.05, showing that the relationship between GTD and GOCB is statistically significant. When GTD increases from one-unit, GOCB will increase by 0.264. Therefore, H1 was supported.

Hypothesis 02 - There is a significant direct impact of GTD on GEA.

Figure 3

Scatter plot for GTD and GEA



Source: Analyzed data, 2023

According to the figure 3 Scatterplot, there is an approximate linear association between GTD and GEA, and a linear regression line / equation could be established. Linear curve in the scatter plot is derived as upward from left to right by showing the positive relationship among GTD and GEA.

Table 9

Simple Linear Regression Statistics for H2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	.602 ^a	.363	.357	.32549	.363	60.293	1	106	.000	2.039

a. Predictors: (Constant), GTD

b. Dependent Variable: GEA

Source: Analyzed data, 2023

According to the model summary table, R square value is 0.363 and it indicates that GTD ca 36.3% of variation in green employee attitude. It means there were several factors that influence employee attitude, not only GTD. The adjusted R Square value was 0.357.

Table 10

Anova for H2

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.388	1	6.388	60.293	.000 ^b
Residual	11.230	106	.106		
Total	17.618	107			

a. Dependent Variable: GEA

b. Predictors: (Constant), GTD

Source: Analyzed data, 2023

Based on the table, the F value is 60.293 and is significant at the 0.000 level. The F value evaluates whether the overall regression model appropriately fits the data. The results suggest that the model does not have a strong fit with the data.

Table 11

Coefficients for H2

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.270	.237		9.565	.000
	GTD	.455	.059	.602	7.765	.000

a. Dependent Variable: GEA

b. Predictors: (Constant), GTD

Source: Analyzed data, 2023

Based on the coefficient values in the above table, the regression equation can be constructed as follows;

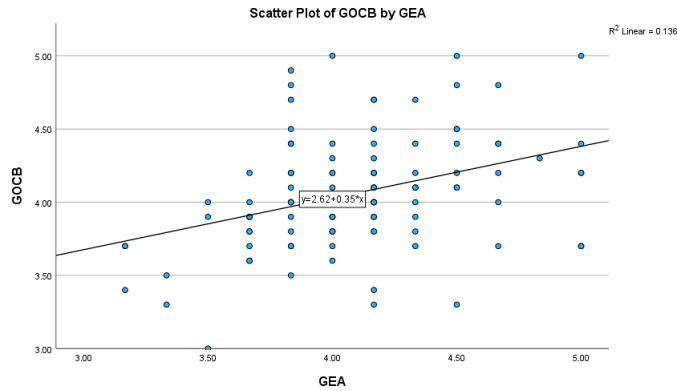
$$\text{GEA} = 2.270 + 0.455 \text{ GTD}$$

According to the above analysis, GTD significantly impacts GEA (0.000, $p > 0.05$). p-value (0.000) is less than 0.05, shows that the relationship between variables is statistically significant. When GTD increases from one-unit, GEA will increase by 0.455. This indicates a positive relationship between above two variables, as a result, H2 was supported.

Hypothesis 03: The significant direct impact of GTA on GOCB, controlling for GTD.

Figure 4:

Scatter plot for GEA and GOCB



Source: Analyzed data, 2023

According to Scatterplot, there is an approximate linear association between GEA and GOCB, and a linear regression line / equation could be established. Linear curve in the scatter plot is derived as upward from left to right by showing a positive relationship.

Table 12

Simple Linear Regression Statistics for H3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.368 ^a	.136	.127	.36361	.136	16.621	1	106	.000	1.669

a. Predictors: (Constant), GEA

b. Dependent Variable: GOCB

Source: Analyzed data, 2023

According to the model summary table, R square value is 0.136 and it indicates that green employee attitude can explain 13.6% of variation in GOCB. It means there were several factors that impact on GOCB, not only GEA. The adjusted R Square value was 0.127.

Table 13

Anova for H3

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.198	1	2.198	16.621	.000 ^b
	Residual	14.014	106	.132		
	Total	16.212	107			

a. Dependent Variable: GOCB

b. Predictors: (Constant), GEA

Source: Analyzed data, 2023

Based on the table, the F value is 16.621 and is significant at the 0.000 level. The F value assesses the adequacy of the overall regression model for the data. The results suggest that the model does not exhibit a strong fit with the data.

Table 14:

Coefficient statistics for H3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.616	.357		7.335	.000
	GEA	.353	.087	.368	4.077	.000

a. Dependent Variable: GOCB

Source: Analyzed data, 2023

Based on the coefficient values in the above table, the regression equation can be constructed as follows,

$$\text{GOCB} = 2.616 + 0.353 \text{ GEA}$$

According to the above analysis, green employee attitude significantly impacts on GOCB (0.000, $p > 0.05$) and shows that the relationship between GEA and GOCB is statistically significant. When GEA increases from one-unit, GOCB will increase by 0.353. This indicates a positive relationship between above two variables and as a result, H3 was supported.

Hypothesis 04: The indirect effect of green training and development on green organizational citizenship behavior through employee green attitudes is significant.

The bootstrap test results are as follows:

Y: GOCB

X: GTD

M: GEA

Sample Size: 108

Table 15

Total, direct and indirect effects of X on Y

Total effect of X on Y					
effect	se	t	p	LICI	ULCI
.2637	.0655	4.0230	.0001	.1337	.3936
Direct effect of X on Y					
effect	se	t	p	LICI	ULCI
.1617	.0808	2.0008	.0480	.0015	.3219
Indirect effect(s) of X on Y:					
GEA effect	Boot SE	Boot LICI	Boot ULCI		
.1020	.0581	-.0044	.2262		

Level of confidence for all confidence intervals in output: 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

Source: Analyzed data, 2023

The estimates show GTD's positive effect on green organizational citizenship behavior $B = 0.2637$, $p < 0.001$, CI (0.1337, 0.3936). The GTD directly positively affects GOCB. $B = 0.1617$, $p > 0.001$, CI (0.0015, 0.3219). It shows that with one unit increase in GTD there will be 0.1617 units of positive changes in the GOCB.

The estimates suggest that the indirect effect of green training and development on green organizational citizenship behavior (GOCB) through green employee attitudes (GEA) is 0.1020, with a p value greater than 0.001 and a confidence interval (CI) of -0.0044 to 0.2262. This indicates that GEA positively mediates the relationship between green training and development and GOCB. However, since the p value is

greater than 0.001, this effect is not statistically significant. Therefore, the hypothesis H4, which proposed that the indirect effect of green training and development on GOCB through GEA is not significant and H4 was not supported.

Table 16

Summary of Hypothesis Testing

Hypothesis	Supported/Not Supported
H1: There is a significant direct impact of GTD on GOCB.	Supported
H2: There is a significant direct impact of GTD on GEA.	Supported
H3: There is a significant direct impact of GEA on GOCB, controlling for GTD.	Supported
H4: The indirect effect of GTD on GOCB through GOCB is not significant.	Not Supported

Results

In this research study, the research objectives were achieved as follows:

The below-mentioned general objectives of this research study were achieved, based on the statistical data analyses.

- To examine the impact of green training and development on green organizational citizenship behavior.

The statistical analysis reveals a significant and positive relationship between green training and development (GTD) and green organizational citizenship behavior (GOCB).

- To study the relationship between the impact of green training and development on green employee attitudes.

Based on the data analysis, it was determined that there is a positive and significant relationship between green training and development (GTD) and green employee attitudes (GEA).

- To explore the connection between the impact of green employee attitudes on green organizational citizenship behavior.

Based on the statistical data analysis, it was identified that there exists a significant and positive relationship between green employee attitudes (GEA) and green organizational citizenship behavior (GOCB), while controlling for green training and development (GTD).

- To identify the role of green employee attitudes on influencing the relationship of green training and development on green organizational citizenship behavior.

The findings of this study indicate that the indirect effect of green training and development on green organizational citizenship behavior, mediated by green employee attitudes, is positive. However, this mediation effect is not statistically significant.

Following specific objectives have been achieved:

- To conduct a systematic review of existing literature on Green Training and Development, Green organizational citizenship behavior, and Green Employee Attitudes aiming to identify existing research gaps for future research.

In this research study, after a thorough review of relevant literature, identified gaps, inconsistencies, and areas lacking sufficient research in the

fields of green training and development, green organizational citizenship behavior, and green employee attitudes in the literature review.

- To identify demographic differences among the employees in the Sri Lankan apparel industry.

By collecting demographic data from selected sample, examined differences in characteristics such as gender, age, education level and period of service years. Male professionals occupy a higher percentage of executive and above positions represents a significant challenge in achieving gender diversity. The multi-faceted age distribution represents the company's efforts to blend young bloods with experienced professionals in the Sri Lankan apparel industry. Also, The education distribution of executive and above employees in the Sri Lankan apparel sector shows as diverse, reflecting both academic and professional qualifications. Educational levels are also good. This diverse educational background of executives and above employees in the Sri Lankan apparel sector indicates that they are well educated and their expertise contributes to the overall competitiveness of the apparel industry in Sri Lanka.

Findings and Discussion

Findings of this study are explained by the previous data analysis results that researcher generated by using the SPSS data analysis package. Discussions and findings are related to the literature review chapter and intended to provide possible justification for relationships between the variables of the conceptual framework. This current research study is based on the research objectives which are established with the beginning of this research study. Researcher main goal of this study was to assess the impact of green training and development on green organizational citizenship behavior through green employee' attitudes at selected apparel sector company in Sri Lanka. At present many contemporary organizations are

implementing training and development initiatives towards green and eco-friendly initiatives due to business impacts on the planet. But while companies are making huge investments on employee' green training and development program, their green behavior change is less. Therefore, the researcher has conducted thorough investigation about the existing literature related to green training and development, green employee' attitudes and green organizational citizenship behavior.

In their correlation analysis, Pham et al. (2018) discovered that green training has a significant positive impact on employees' voluntary green behavior in the Vietnamese hotel industry. Similarly, Thevanes and Arulrajah (2020) identified a significant positive relationship between environmental training and the environmental behavior of employees in the apparel sector in Batticaloa and Polonnaruwa, Sri Lanka. However, the current study found that while the relationship between green training and development (GTD) and green organizational citizenship behavior (GOCB) is significant, it is characterized by a weak correlation.

Zoogah (2011) noted that training and development initiatives can help maintain employees' environmental management knowledge, skills, and attitudes. Additionally, Opatha and Kottawatta (2020) found a positive and significant relationship between Green HRM and employees' green attitudes, with green training having the most substantial impact in the Sri Lankan tile industry. However, the current research reveals that while the impact of green training and development (GTD) on green employee attitudes (GEA) is also positive and significant, the correlation is weak. This suggests that other factors influence the relationship between these two variables.

The third hypothesis developed is that the impact of green employee attitudes (GEA) on green organizational citizenship behavior (GOCB), while controlling for green training and development (GTD), is significant and positive. Scherbaum et al. (2008) found that environmental attitudes significantly influence employee green

behaviors. Additionally, Murtagh et al. (2013) indicated that attitudes have a notable impact on energy-saving behavior. However, the results of the third hypothesis test in this study show that while GEA significantly and positively impacts GOCB, controlling for GTD, the correlation is weak. This suggests that other factors influence the relationship between these variables. The fourth hypothesis posited that the indirect effect of GTD on GOCB through GEA is significant. The findings reveal that green employee attitudes do positively mediate the relationship between GTD and GOCB, but this mediation effect is not significant.

Therefore, The findings of this research study showed that the green employee' attitudes positively mediating the indirect effect between green training and development and green organizational citizenship behavior is positive, but it is not significant in the selected research domain. Moreover, as a conclusion, according to demographic data, In Sri Lankan apparel sector there are a higher number of male executives and above employees. Female representation is low. As well as in Sri Lankan context, executive and above employees' educational levels are also at a good level. As well as the majority of executives and above employees are young blood.

Conclusion

The study identified a significant but weak positive relationship between green training and development (GTD) and green organizational citizenship behavior (GOCB). Additionally, it found a significant positive relationship between GTD and green employee attitudes (GEA), as well as between GEA and GOCB. The study also examined the indirect effect of GTD on GOCB through GEA. Furthermore, it addressed gaps in the existing literature on green training and development, gender diversity, and demographic differences in the Sri Lankan apparel manufacturing sector. This research enhances understanding of these relationships and provides insights into demographic characteristics.

Limitations

Few limitations identified in this research study. First implication is this is a cross sectional study and researcher collected data from sample at a single point in time. Therefore, when assessing the impact of green training and development on changing employee' green organizational citizenship behavior, need to assess for a considerable time period while examining the normal and control group of samples. Moreover, as a theoretical implication, this research study investigates the impact of green training and development on green organizational citizenship behavior with the mediating effect of green employee' attitudes. As well, need to address the moderating effect of green employee' attitudes and other factors affecting those variables. As well as need to analyze the other two types of green behaviors such as green interpersonal citizenship behavior and green official behavior as a dependent variable.

As a practical implication, it can be stated as this research study sample has taken as executive and above employees at an apparel manufacturing company and it's not covering the executive and below employee category. This is also a considerable limitation of this research study. Furthermore, this research study has been conducted in the apparel industry and can be conducted in different industries as well.

Research Gaps and Directions for Future Researchers

Numerous factors influence green employee attitudes and green organizational citizenship behavior. Hence, future research could explore the mediating and moderating roles of variables like green organization identity (GOI), environmental values, individual environmental awareness, leadership styles, organizational culture, external social influences, and employee motivation levels toward green initiatives. This exploration would enrich understanding of how green human

resource practices relate to various types of green behaviors, such as green organizational citizenship behavior, green interpersonal citizenship behavior, and green official behavior. Future studies might also delve into other aspects of green HR practices, such as green rewards management and green performance evaluation. As we advance into the technology era, there is a need to adapt green training and development programs to incorporate AI technologies, considering that future trainers and trainees may have AI-based educational experiences Weerasinghe, R. (2023).

Furthermore, future researchers should consider qualitative research methods to complement the findings of quantitative studies. Conducting such studies could enhance the effectiveness of green training and development initiatives by identifying specific factors that contribute to weaker correlations among variables.

Practical Implications for HR Professionals

This research aims to understand the effectiveness of environmental training programs in business organizations, focusing on employee behavior towards the environment. It can lead to enhanced green initiatives and reduced environmental impact. The findings can be used by managers and HR professionals to implement more effective training programs to reduce ecological footprints, promoting sustainability, and reducing energy and resource consumption.

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Impact of Virtual Learning Exposure on Students' Satisfaction during the Covid-19 Pandemic Epoch: A Study at Sri Lankan University

Manjula, S¹

The swift shift to virtual education due to the COVID-19 pandemic required a detailed assessment of students' satisfaction with this new learning environment. This study aims to examine the factors influencing students' satisfaction with online learning, focusing on how challenges of e-learning, learner motivation, and interaction affect their experience. Specifically, it investigates the extent to which these independent variables such as challenges of e-learning, learner motivation, and interaction impact students' satisfaction with online education during the COVID-19 pandemic, with a focus on the University of Jaffna in Sri Lanka. The study seeks to determine how these factors contribute to students' overall satisfaction with the transition to online learning. Using a convenience sampling, data gathered from 100 students at the University of Jaffna through a structured questionnaire. The data were then analyzed with SPSS version 25.0, utilizing Multiple Regression Modeling to evaluate the proposed hypotheses. This study highlights the strong correlation between learner motivation and student satisfaction in online education, especially during the COVID-19 pandemic. This study findings indicate a significant and positive relationship between student satisfaction and learner motivation, with learner motivation having the most substantial impact on satisfaction. Although e-learning challenges and interaction did not significantly influence satisfaction, this study has implications in practical, theoretical, and managerial areas. These results enhance comprehension of the factors influencing online learning satisfaction during exceptional global difficulties. Future research should expand to other universities and include perspectives from teachers and staffs to enhance generalizability.

Keywords: *Challenges of E-Learning, Interaction, Learner Motivation, Virtual Learning*

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Introduction

The unexpected emergence of the COVID-19 pandemic has affected nearly every sector, including higher education institutions around the globe (Adedoyin & Soykan, 2020). During the peak of the COVID-19 pandemic, numerous countries globally shifted to online instruction (Bokayev et al., 2021). In reaction to this emergency, academic institutions throughout the nation, supported by Sri Lanka's Ministry of Higher Education, chose to adopt an online teaching platform to lessen the impact (Gangahagedara, Karunarathna, Athukorala, Subasinghe & Ekanayake, 2021). Numerous organizations face diverse challenges due to major shifts, and one institution profoundly impacted by the COVID-19 pandemic is the university, crucial to higher education systems. Universities are crucial in the service sector, serving students at various educational stages who embody the future workforce potential (Indrawati & Kuncoro, 2021). In Sri Lanka, certain university students have little experience and limited exposure to online learning platforms for participating in educational activities (Hettiarachchi, Damayanthi, Heenkenda, Dissanayake, Ranagalage & Ananda, 2021). Online learning has become the main method of education, providing the only feasible solution to maintain continuous learning in a world that favors isolation over social interaction to curb the spread of COVID-19 (Bozkurt, 2020). The term 'virtual learning' is specifically employed in the educational realm to denote learning conducted through the internet and various media, including television, radio, and digital versatile discs (DVDs) (Arslan & Kaysi, 2013). In the current environment, the term 'virtual learning' may be unclear since it covers both real-time (Shamir-Inbal & Blau, 2021) (e.g., video conferencing, live chat, and instant messaging) and self-paced (e.g., web-based course materials) approaches to education. Tools like Zoom facilitate these interactions, allowing both lecturers and students to connect through web-based technologies. "Virtual learning" has emerged as the prevailing method in the "new normal" following the COVID-19 pandemic, facilitating continuous education for students without

disrupting their academic timelines (Buheji et al., 2020). Utilizing virtual learning is a practical approach to ensure, students can continue their studies amidst the challenges posed by the pandemic (Nartiningrum & Nugroho, 2020). COVID-19 arrived suddenly, catching many countries off guard with little to no preparation in place (Gupta & Loberg, 2021). During the COVID-19 era, the educational system has entered a phase often referred to as the "new normal," which signifies a shift following significant change (Sharma et al., 2022). Initially coined in business contexts, the term now describes situations that were once uncommon but have since become typical in various aspects of life (Eraut, 2004). The integration of virtual learning has served to complement traditional teaching methods. The sudden change from face-to-face teaching to fully online formats was triggered by the COVID-19 pandemic (Elshami et al., 2021). The term virtual learning has been in common usage since the 1990s (Corbeil & Corbeil, 2015). In current literature on higher education, terms like e-learning, virtual learning, and online learning are commonly utilized to depict various study methods adopted globally amid the COVID-19 pandemic (Alsop & Bencze, 2020). Yet, the rapid deployment of virtual learning during emergencies may not match the rigorous, well-planned online learning specifically developed for higher education (Achen, 2021). Hodges et al. propose that Emergency Remote Teaching (ERT) is a more accurate term to characterize the instructional approach adopted by many educational institutions during the COVID-19 pandemic. Previous research suggested that participants expressed higher satisfaction with in-person learning (McCutcheon, 2015). Shifting from traditional classroom teaching to online instruction presented many challenges and obstacles during its initial phases. This shift in the learning environment, coupled with the unfamiliarity of the new format, has impacted students' satisfaction with continuing their online learning journey (Atwa, 2022). There is no denying that the use of ICT applications empowered by internet technologies has emerged as a powerful tool contributing significantly to the swift evolution of electronic learning (Rosenberg,

2005). The abrupt onset of the COVID-19 pandemic and the subsequent shift to impromptu virtual learning undoubtedly had an immediate and substantial effect on student contentment (Rodriguez-Segura et al., 2020). Yet, the sudden and exclusive dependence on these digital tools during COVID-19 could potentially negatively impact students. This could be due to various obstacles that might impede many students' learning processes (Al-Kumaim, Alhazmi, Mohammed, Gazem, Shabbir, & Fazea, 2021). Several studies have evaluated student contentment with online learning post-COVID-19 (Sharma & Alvi, 2021). In this research, elements affecting students' satisfaction with online learning can be divided into three primary domains: difficulties of electronic learning, learner engagement, and interpersonal interaction. Each category encompasses distinct metrics to gauge levels of student contentment. This study also pinpointed several challenges linked to virtual learning in Sri Lanka. These issues encompassed problems like unreliable internet connections, the demanding aspects of online education, difficulties with digital assessments and exams, minimal interaction between faculty and students, inadequate video conferencing software quality, and restricted availability of devices. These challenges mirror common issues associated with online learning worldwide. There is a lack of studies addressing student satisfaction with online learning in the Sri Lankan University context. The research focused on undergraduate students at a Sri Lankan university and identified various difficulties associated with virtual education. The challenges of e-learning included problems like unstable internet connections, the rigorous demands of online learning, obstacles in administering online tests and exams, limited interaction between faculty and students, inadequate video conferencing software quality, and restricted availability of devices. Therefore, this study seeks to examine and clarify university students' viewpoints and attitudes toward the use of different emergency ICT online programs during the COVID-19 pandemic. Moreover, this study seeks to pinpoint the challenges and outcomes of adopting a complete e-learning approach during the

COVID-19 pandemic from the standpoint of students, especially when incorporating new e-learning technologies. This study investigated the elements that impact students' contentment with their experience of learning online.

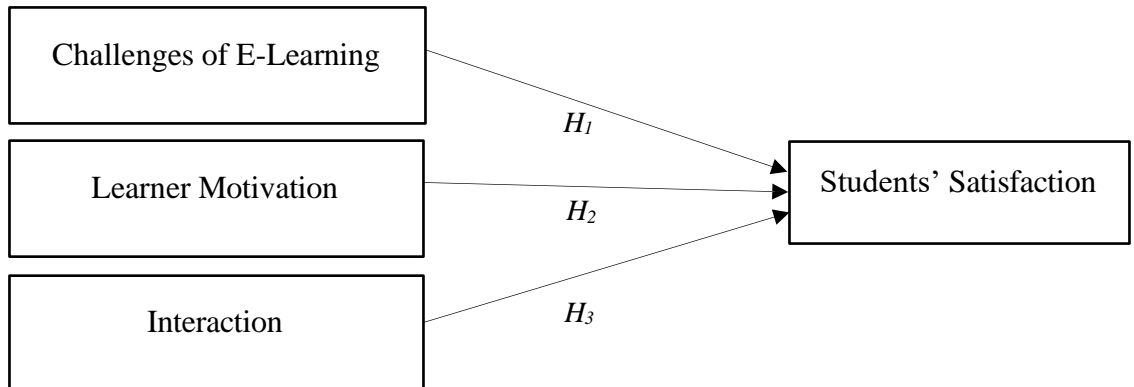
Problem Statement

Satisfaction with online education involves various aspects, such as communication, student participation in virtual discussions, flexibility, workload, technical assistance, teaching methods of instructors, and response mechanisms (Elshami et al., 2021). Several elements led to decreased student satisfaction during the COVID-19 pandemic, including limited interaction, difficulties in adapting to e-learning, inadequate communication infrastructure, internet connectivity issues, technical challenges, insufficient e-resources, low IT literacy, device handling problems, inadequate electronic equipment like laptops, lack of classmates' physical presence, lack of smartphone support, decreased motivation, unsupportive home environment, and heavy study/workload (Al-Kumaim, Mohammed, Gazem, Fazea, Alhazmi & Dakkak, 2021). While observing students during virtual learning sessions, it became apparent that they encountered numerous challenges. These included difficulties in staying motivated, as many found it challenging to perceive their home environment as a conducive space for learning, struggling to adopt the appropriate mindset. Moreover, issues with technology such as unreliable internet connections and device failures increased irritation and interrupted the progression of online learning sessions. Occasionally, the computer may unexpectedly shut down, and there are instances of spotty and weak internet connections. Additionally, having inadequate monitors can pose challenges in keeping up with virtual classmates and the learning environment. Most degree programs provide ample opportunities for social interaction among peers within their layouts. This may occur through virtual classroom activities or even designated "social lounges" created outside the digital classroom environment (Das, 2022). Moreover, some students may feel left behind,

as unlike in a traditional classroom where teachers can monitor and adjust their pace to accommodate those needing extra time, such individualized attention may be lacking in virtual settings. In an online learning environment, it's more challenging to gauge emotions. With virtual interactions, reading body language becomes harder, leading learners to stay silent or "put on a brave face," resulting in feelings of discouragement, frustration, and a sense of learning nothing by the end of the session. Moreover, the online platform often lacks many social aspects, contributing to a diminished sense of social connection compared to traditional methods (Das, 2022). There is no particular study conducted in Sri Lanka Jaffna University context. This study shows that students in the context of Jaffna University in Sri Lanka felt dissatisfied with their online learning experiences during the COVID-19 pandemic. Based on this research problem, the study utilized correlation and regression analysis to reveal answers to these framed research questions: What is the extent of the impact of e-learning challenges on students' satisfaction with their online learning? How does learner motivation influence students' satisfaction with online education? And to what degree does limited interaction affect students' satisfaction with online learning? Therefore, this study aimed to investigate the factors affecting students' satisfaction and to determine how much independent variables such as Challenges of E-Learning, Learner Motivation, and Interaction influence students' satisfaction with online learning during the COVID-19 pandemic, particularly in the context of Sri Lanka's Jaffna University. The study also seeks to analyze whether these independent variables (learner motivation, challenges of e-learning, and interaction) significantly impact on students' satisfaction with their new online learning experience.

Figure 1

Conceptual Model



Theoretical Background and Hypotheses Development

Student Satisfaction

Satisfaction entails the realization of desires, expectations, and needs, or the joy derived from one's experiences (Gnoth, 1994). Evaluating student satisfaction acts as an indicator of the effectiveness of education, whether the learning is conducted online or in-person (Johnson, 2000). Student satisfaction is a crucial element in higher education, and systematically examining this aspect can result in better student performance, advancements in online learning methods, and increased student retention in their academic endeavors (Naidu, 2006). Kotler and Clarke (1986) state that satisfaction is the desired outcome of any effort that fulfills an individual's preferences. Positive interactions between instructors and students enhance student satisfaction (Malik et al., 2010). Moreover, the student is vital in evaluating the effectiveness of online learning (Piccoli et al., 2001). Sanchez-Franco (2009) defines student satisfaction as the extent to which a student perceives that their needs, goals, and desires have been completely met. Yunusa and Umar (2021) categorize the various elements affecting student satisfaction in e-learning into four

dimensions: communication dynamics (e.g., interaction and information quality), e-learning environmental factors (e.g., course structure and content), organizational factors (e.g., technological support and service quality), and personality and situational factors (e.g., autonomy, self-efficacy, and motivation). Similarly, Zeng and Wang (2021) provide a comprehensive review of research on online learning during the COVID-19 pandemic, suggesting that in Emergency Remote Teaching, comparable factors can affect the level of student satisfaction. Various elements impact students' satisfaction with online learning during the COVID-19 pandemic. This research classifies the factors influencing student satisfaction into three categories: e-learning challenges, learner motivation, and interaction. In this research, student satisfaction is considered the outcome variable, while the factors studied include e-learning difficulties, learner motivation, and interaction. Accordingly, within these independent variables, numerous factors contribute to affecting the dependent variable. For instance, under the challenges of e-learning, factors encompass technology, internet access, family background, and available devices. For learner motivation, factors include ease of use, perceived usefulness, learner characteristics, faculty capacity, course content, course design, student learning skills, peer influence, and environmental factors. Within the interaction variable, factors consist of lecturer-student interaction, peer interaction, learner-content interaction, and access to e-resources.

Challenges of E-Learning

Amid the COVID-19 pandemic, students face various difficulties with online education in contrast to traditional in-person lectures (Serhan, 2020). Several obstacles emerge during virtual education, such as difficulties in attending lectures due to technical issues, challenges in maintaining concentration, insufficient proficiency in IT, limited chances for collaboration resulting in feelings of isolation, and a lack of opportunities to acquire practical skills essential for success in certain

subjects. A prevalent technical obstacle reported by students in various virtual learning settings is poor internet connectivity, impacting their capacity to regularly engage in live online learning sessions (Khalil, 2020). According to a study in Sri Lanka by Hayashi et al. (2020), the majority of students, 70%, cited unreliable internet access as a major obstacle in their online education. The learning environment also significantly impacts students' performance (Ames & Archer, 1988). Traditional classroom teaching has historically been regarded as an effective method for achieving educational goals (Ames & Archer, 1988). In contemporary times, online teaching has become a successful method for delivering lectures, utilizing web-based tools that have evolved into digital classrooms (Azlan et al., 2020). Recent studies show that both faculty members and students face various challenges while conducting online classes using virtual platforms (Simamora, 2020). The difficulties involve several technical problems, such as lack of familiarity with specific IT systems, limited internet connectivity, inadequate skills in managing online learning platforms to improve student involvement, interaction, and engagement. Furthermore, there is a need for improved assessment methods to accurately gauge online learning results, along with insufficient expertise in creating digital course materials or converting courses from face-to-face to virtual formats. Additional difficulties include cultural factors within academic institutions, minimal active participation from students in virtual classes, and learners facing social isolation or feelings of depression (Al-Kumaim, 2021). Usually, the education system in Sri Lanka consists of different elements including teachers, students, curricula, and numerous dedicated resources and supports carefully structured to guarantee a valuable learning journey. As a result, fully embracing virtual learning during the unforeseen situation of this COVID-19 era is not easy for anyone without encountering numerous issues and challenges (Yasmin et al., 2020). Students' virtual learning experiences are often hindered by software and hardware problems with

their devices. Moreover, some students lack sufficient internet access and proper devices, particularly those who rely on mobile phones for virtual learning. These challenges may be exacerbated by compatibility issues with essential software like Word, Excel, and PowerPoint, which are necessary for accessing online platforms and virtual learning resources. The consistent identification of inadequate or unsuitable devices for virtual learning highlights how the inability to fully access and benefit from online platforms can impact student satisfaction with virtual learning (Salas-Pilco et al., 2022).

The lack of adequate e-learning resources significantly impacts student satisfaction and poses a significant challenge for accessing the e-resources uploaded through online platforms (Millawithanachchi & Jayasundara, 2010). During in-person lectures, students find it easier to stay focused and attentive because of the direct presence of the instructor and their peers' physical attendance (Lehman & Conceição, 2010). For instance, in research conducted by Means and Neisler (2020) with American undergraduate students, 57% of respondents reported that their concentration during online sessions was lower or significantly lower than in traditional classroom settings. In a qualitative study by Yeung and Yau (2022) on online education among undergraduate students in Hong Kong universities, participants highlighted the difficulty of staying focused during sessions as a significant hurdle. Means and Neisler (2020) found that a majority of participants in their study at American universities felt that the level of academic rigor was lower in online learning settings. In virtual learning platforms, students often experience feelings of isolation and have fewer opportunities for collaboration with peers and lecturers (Wieser & Seeler, 2018). Huang et al. (2020) also point out that social isolation is a notable difficulty encountered by learners in online education. Virtual learning presents many obstacles and challenges, particularly amid the COVID-19 pandemic, that can greatly influence students' overall contentment with online education. Therefore, researcher hypothesize that:

Hypothesis 1: The Challenges of E-Learning negatively impact on students' satisfaction.

Learner motivation

Motivation is a crucial concept in understanding virtual learning, as it drives students to work towards achieving specific productive outcomes (Lin et al., 2017). In this regard, Motivation is crucial in enhancing students' satisfaction levels with e-learning on virtual platforms (Yilmaz, 2017). We can classify motivation into two categories: intrinsic motivation, which is driven by internal rewards, and inwardly directed self-motivation, which refers to the self-generated energy that guides an individual's behavior towards achieving specific objectives (McCombs, 2012). Therefore, self-directed learning, which includes thoughtful planning, monitoring, and adjusting one's thoughts, emotions, and behaviors in an iterative manner, becomes essential for achieving success in online education (Zimmerman & Schunk, 2011). Researchers have also found that self-motivation is a crucial variable for student satisfaction. Threlkeld and Brzoska (1994) describe maturity, strong motivation, and self-control as fundamental traits of online learners who achieve greater satisfaction and success. According to Rovai et al. (2007), existing literature commonly finds that factors linked to online education, such as the excitement of using new technology, decreased commuting to the learning site, curiosity, and a thirst for knowledge, can boost learner motivation. In a recent study conducted by Dhinigra et al. (2021), findings showed that despite facing numerous difficulties, a majority of medical students surveyed in India remained enthusiastic about receiving online education. Simultaneously, Oxford et al. (1993) identify it as the foremost determinant of student success in online education. Learner motivation significantly influences their engagement in online classes in the absence of instructors and peer (Conrad & Donaldson, 2011). It relates to how instructors approach pedagogy in virtual education. The lecturer's student-centered teaching style can encourage

students to consistently attend their virtual lectures. Yet, challenges such as unreliable internet connections and an unsupportive home learning environment can amplify learner discouragement (Hettiarachchi et al., 2021). Means and Neisler (2020) discovered that the primary issue frequently mentioned by their subjects was the struggle to sustain motivation throughout online sessions. 79% of participants recognized this as an issue. Self-driven motivation is pivotal in yielding favorable outcomes and improving performance and contentment in online education. Inadequate learner motivation in virtual learning can result in harmful consequences, such as an increased number of students giving up on virtual learning. Additionally, students may engage in passive procrastination, such as delaying tasks even when faced with negative consequences, leading to poor academic performance and dissatisfaction with virtual learning (Lucey, 2018). Therefore, researcher hypothesize that:

Hypothesis 2: Learner motivation positively impacts on students' satisfaction.

Interaction

Interaction plays a vital role in achieving fruitful results in e-learning and ensuring students' satisfaction on this virtual platform (Rajabalee & Santally, 2021). Social interaction with instructors or peers, along with access to e-resources, is essential for achieving the desired aspects of e-learning (Zozie, 2020). By fostering robust engagement and employing a consistent approach, e-learning can achieve effectiveness (Allen, 2016). The quality of the instructor, when lacking fanaticism, can negatively impact students' satisfaction (Gopal et al., 2021). The instructor's quality is a crucial factor that impacts student satisfaction and, consequently, the overall success of the educational process (Munteanu et al., 2010). According to Garrison and Shale (1990), education is essentially defined by interaction: "at its core, education involves an interaction between the instructor, the student, and the subject matter". Moreover, in virtual education, interaction entails the involvement

of students with the online platform employed by the course (Cacheiro-gonzalez et al., 2019). Interaction is crucial in traditional classroom settings, virtual learning environments, and any form of education (Shu & Gu, 2018). Numerous researchers have highlighted the substantial influence of online learning in improving quality and effectiveness (Zare et al., 2016). Williams et al. (2012) propose that interaction ought to be a core principle in the development of higher education curricula. As per Moore's (1989) renowned classification, interaction can be divided into three categories: learner-content interaction, learner-instructor interaction, and learner-learner interaction. Learner-content interaction refers to the emotional and cognitive connection that students establish with the e-resources, such as handouts and other study materials provided in the course curriculum. E-resources include assigned textbooks, designated course readings, lecture notes, audio-visual materials, and computer software (Laltnanmawii, 2011). In online education, particularly during the COVID-19 pandemic, higher education students usually interact with a variety of e-content, such as e-books, e-journals, simulations, presentations, animations, databases, websites, audio-video productions, discussion forums, and immersive content (Murithi, 2020). Bervell et al. (2019) indicate that among all types of interaction, student-content interaction is the most critical factor contributing to student satisfaction in online learning. According to Moore's (1989) framework, interaction between learners and instructors can maintain students' interest and boost their overall engagement in education. As examined by Zeng and Wang (2021), learner-instructor interaction plays a crucial role in determining student satisfaction in online education (Gan & Balakrishnan, 2018). Commonly, the literature indicates that enhanced student-lecturer interaction contributes significantly to student satisfaction. On the other hand, insufficient interaction between instructors and students can cause students to feel isolated from the academic community, leading to decreased satisfaction. The final type of interaction is lecturer-learner interaction, often referred to as peer interaction, which encompasses interactions among students

with or without the presence of the lecturer. Peer interaction influences students' engagement and interest in virtual learning. Additionally, Sher (2009) finds that interaction among learners significantly impacts student satisfaction. Based on this, researcher hypothesize that:

Hypothesis 3: Inadequate interaction (Lecturer-Student; Student-Student; Student-Content) leads to lack of students' satisfaction.

Methods

Data collection procedure and sample

The sample of this research comprises students from the Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka. This study focuses to explore the factors influencing satisfaction and analyze the impact of independent variables (challenges of e-learning, learner motivation, and interaction) on student satisfaction.

For data collection, this study employed self-administered questionnaires. Out of the 103 questionnaires distributed, a total of 100 questionnaires were returned and deemed usable, resulting in a response rate of 97%. Convenience sampling was used as the sampling method. Convenience sampling is a non-probability sampling technique where this study selects participants based on their availability, proximity, or ease of access rather than using a random or systematic method. Participants who are easy to reach or nearby at a location and can also select participants based on time constraints or limited resources. The goal is quick data collection rather than representative sampling, conduct a survey only with students visiting to University of Jaffna during a particular period. The main advantage of convenience sampling is the simplicity and speed of data collection, no need to seek out hard-to-reach participants. Prior permission was obtained from the relevant heads of the departments and dean of faculty to conduct data collection, and the questionnaires

were distributed along with a cover letter explaining the purpose of study. Participants were guaranteed anonymity and confidentiality of their responses. Among the 100 participants in this study, 77% were females. Here, most of the respondents (72%) are studying third year. In terms of age distribution, 69% were in the 23-24 years age group, while 20% fell between the ages of 21-22 and 11% are between 24-25. However, there are no respondents have above the year 25. In terms of districts, 46% of the respondents are from Jaffna district, and 4% of the respondents were from Chunnakam and Kaithady. Regarding the results, learner preferences for online learning (43%) of the respondents prefer the live sessions facilitating student-lecturer interaction and 35% prefer the recorded video lectures, also other 21% of respondents prefer the education via lecture notes and handouts for online learning. And only 1% of respondents prefer pre-recorded audio lectures.

Measures

Measurement levels clarify how values assigned by researchers relate to each other. Stevens (1946) categorized measurement into four levels: nominal, ordinal, interval, and ratio. Nominal level measurements are categorical. Ordinal measures indicate the rank order of cases. Interval measures have consistent distances between the values.

This study elaborates on the measurement scale and the scaling methods utilized in the survey. The questionnaire comprises three sections. Section A solicited personal details and demographic information from the participants and comprises questions about the demographic information of the participants. All the questions in this section are closed-ended. This section includes seven variables adopted from Tabiu (2016). Section B pertained to the elements influencing student satisfaction with online learning were assessed. Students' satisfaction itself was measured with eight items embrace from Khan, M. A. et al., (2021). Challenges of e-learning were assessed with five questions adopted from Means and Neisler (2020) and Richardson

et al., (2017), interaction was gauged with three items derived from Moore, S. F. (1989), and learner motivation was evaluated with five variables embrace from Means and Neisler (2020) and Pelikan et al. (2021). The satisfaction levels were measured using a seven-point Likert scale, ranging from “Strongly disagree” to “Strongly agree”.

Section C include one question designed to determine the learner preferences for online learning. The question provides four variables to gauge students' perceptions. The first option is live sessions that facilitate student-lecturer interaction. The second option is pre-recorded video lectures. The third option is pre-recorded audio lectures, and the last option is education via lecture notes and handouts. These options help identify which mode of virtual learning students prefer the most.

Findings of the Study

Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Satisfaction	100	1.38	5.00	3.7625	.73092
Challenges of e-learning	100	1.00	4.80	3.6360	.73930
Interaction	100	1.00	5.00	3.5933	.91573
Motivation	100	1.20	4.80	3.5380	.67192

Source: Descriptive analysis by SPSS

This table shows that the mean and standard deviation of each variable. Based on the data it would suggest that the satisfaction had a high mean value of 3.763 and a

standard deviation of 0.730. The mean value of challenges of e-learning is 3.636 and standard deviation is 0.739. Interaction had 3.593 mean score and high standard deviation 0.916. The mean value of motivation is 3.538 and standard deviation is 0.672.

Correlation analysis

Table 2

Results of Correlations

		Challenges e-learning	Interaction	Motivation
Satisfaction	Pearson Correlation	-.035	.044	.404**

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Correlation Analysis by SPSS

The table above shows the correlation between the variables. Learner motivation is positively and significantly correlated with satisfaction ($r = 0.404$, $p < 0.01$), indicating that higher motivation leads to greater student satisfaction. The challenges of e-learning are negatively correlated with satisfaction ($r = -0.035$), but this relationship is not statistically significant. Similarly, interaction is positively correlated with satisfaction ($r = 0.044$), though this correlation is also not significant.

Regression Analysis

Table 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.423 ^a	.179	.153	.67261

a. Predictors: (Constant), Motivation, Interaction, Challenges of e-learning

Source – Regression analysis by SPSS

The model summary in Table 3 indicates how well the independent variables motivation, interaction, and challenges of e-learning predict students' satisfaction with online learning. The R value of 0.423 shows a moderate correlation between the predictors and satisfaction. The R Square value of 0.179 means that approximately 17.9% of the variance in student satisfaction can be explained by the combined effect of motivation, interaction, and challenges of e-learning. The Adjusted R Square of 0.153 suggests that, after adjusting for the number of predictors, the model explains 15.3% of the variance. The standard error of the estimate (0.67261) indicates the average distance that the observed values fall from the regression line.

Table 4

ANOVA Chart

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.460	3	3.153	6.971	.000 ^b
	Residual	43.430	96	.452		
	Total	52.891	99			

a. Dependent Variable: Satisfaction

b. Predictors: (Constant, Motivation, Interaction, Challenges of e-learning)

Source: ANOVA test by SPSS

Table 5

Coefficients

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.441	.475		5.139	.000
	Challenges	-.137	.101	-.139	-1.357	.178
	Interaction	.052	.080	.065	.649	.518
	Motivation	.461	.102	.424	4.506	.000

a. Dependent Variable: Satisfaction

Source: Coefficients test by SPSS

To test the hypotheses that challenges of e-learning have negative impact on satisfaction, motivation has positive impact on satisfaction, inadequate interaction leads to lack of satisfaction employed multiple regression analysis. The prediction model was statistically significant, $F=6.971$, $P<0.05$, and accounted for approximately 18% variance of satisfaction ($R^2=0.179$). In other words, 18% variance of satisfaction is explained by the predictor variables taken into account. The 82% of the variance can be explained by other variables that have not been include in the model.

While motivation ($B=0.461$, $P<0.05$) has positive and significant impact on satisfaction. Interaction ($B=0.052$, $P<0.05$) has positive and not significant impact on satisfaction. Challenges of e-learning ($B = -0.137$, $P<0.05$) has negative and not significant impact on the satisfaction. This means that the students who have high motivation is more likely to get high level of satisfaction. The Challenges of e-learning and Interaction have no any significant impact on satisfaction. The coefficient values indicate that the Motivation has high impact on the satisfaction. When the Motivation is increased by one unit the satisfaction is increase by 0.461 units which implies that there is a positive relationship between learner motivation and students' satisfaction.

Discussion

This study aimed to identify and analyze the factors influencing students' satisfaction with virtual learning and to determine the impact of independent variables on this satisfaction. Regarding the hypotheses, H1 (challenges of e-learning, learning negatively impact satisfaction) was not supported ($\beta = -0.137$, not significant). H2 (learner motivation positively impacts satisfaction) was supported ($\beta = 0.461$, significant). H3 (inadequate interaction leads to lack of satisfaction) was not supported ($\beta = 0.052$, not significant). Overall, the predictor variables (challenges of

e-learning, interaction, and motivation) explained approximately 18% of the variance in satisfaction ($R^2=0.179$).

Theoretical Implications

This study enhances comprehension of how learner motivation correlates with satisfaction in online education, particularly amid the COVID-19 pandemic. It highlights that even typically self-reliant online learners may need additional support when forced to adopt virtual learning as the sole mode of education.

Practical Implications

The results suggest that simply transitioning from face-to-face to online learning does not ensure self-reliance and motivation among students. Lecturers need to provide ongoing guidance, encouragement, and training to help students manage their learning effectively. This involves considering student needs and preferences in the design of online teaching activities.

Managerial Implications

University faculties and departments should address the challenges students face in online learning by offering technical support and ensuring consistent engagement. Students need to be familiar with the technology and applications used for online education, and they should be encouraged to attend all sessions and complete assignments. This study helps identify factors affecting student satisfaction and provides insights for improving the online learning experience. Overall, this research contributes to understanding how to enhance student satisfaction with online learning and offers strategies for overcoming related challenges.

Limitations and Future Research Directions

This study was conducted exclusively on students from the University of Jaffna, limiting the scope for comparative analysis with other universities. Expanding the sample to include multiple universities could provide a broader perspective. Additionally, this research focused solely on student satisfaction; future studies could explore teacher satisfaction under similar conditions. Future research should also consider including perspectives from teachers, lecturers, and administrative staff to enhance the generalizability of the results. Interviews could be utilized to gather in-depth information on the factors influencing student satisfaction.

Conclusion

This study focusing on the determinants of students' satisfaction such as, challenges of e-learning, learner motivation and interaction. Multiple regression analysis revealed that learner motivation significantly impacts student satisfaction, aligning with existing literature. Among the three variables, learner motivation had the strongest positive influence on satisfaction, emphasizing the importance of self-regulated learning in online environments. Despite facing challenges such as poor Internet connectivity and less conducive home environments, students' motivation remained high, suggesting that motivated learners are more likely to be satisfied with online learning. However, the challenges of e-learning and inadequate interaction did not significantly impact student satisfaction, possibly due to the effective use of technology and sufficient resources provided by the university. This study also found that 43% of students preferred live sessions for better interaction with lecturers, highlighting the importance of student-lecturer engagement in online learning. This preference underscores the need for enhancing interactive elements in online education to boost student satisfaction. In a research article focusing on online education, the conclusion that learner motivation emerges as the most influential predictor of student satisfaction suggests that students who are more motivated tend

to be more satisfied with their online learning experience. This conclusion emphasizes the critical role motivation plays in determining how students perceive the quality, effectiveness, and overall enjoyment of online courses. The research likely indicates that when students are motivated, they engage more deeply, persist through challenges, and achieve better outcomes, all of which contribute to higher satisfaction levels.

The implication for educators and institutions is to design online learning environments that actively foster and support student motivation. This can be achieved through engaging content, interactive learning activities, clear goals, and support mechanisms that cater to student needs and preferences, ultimately enhancing their overall experience and satisfaction.

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Examining the Impact of Organizational Politics on Employee Commitment: The Moderating Role of Political Skills among Public Sector Employees in Sri Lanka.

Mayuran, L¹. Thasika, T² and Manjula, S³

This study assesses the importance of organizational politics in shaping employee commitment, emphasizing the complex interactions between perceived politics and individual characteristics. Specifically, we examined the moderating role of political skills in the relationship between perceived politics and employee commitment. The specific impact of political skills on employee commitment related to organizational politics is an unexplored area, particularly in Sri Lanka. Therefore, this research aims to bridge this gap by not only examining the negative relationship between organizational politics and employee commitment but also clarifying the moderating effect of political skills. The present study focuses on public sector employees in Sri Lanka. Out of 400 questionnaires distributed, a total of 211 questionnaires were returned and usable. We used a convenience sampling method to capture the complexity of this relationship. The study revealed a significant negative relationship between perceived politics and employee commitment. Furthermore, our findings highlight the significant role of political abilities as a moderator, demonstrating how individuals' confidence in their abilities moderates the effects of perceived politics on commitment. Therefore, political skills positively moderate the relationship between organizational politics and employee commitment. Our study underscores the importance of organizations recognizing and mitigating the adverse effects of organizational politics on employee commitment. Additionally, it emphasizes the importance of considering individual characteristics such as political skills to effectively understand and manage workplace dynamics. This research contributes to both theoretical advances and practical implications for organizational management and human resource practices.

Keywords: *Employee Commitment, Organizational Politics, Political Skills, Public Sector Employees, Sri Lanka.*

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Introduction

In the fast-paced and constantly changing modern business environment, cultivating a dedicated workforce is increasingly essential for achieving organizational success and long-term viability (Judijanto, 2023). Employee commitment refers to how devoted employees are to their organization's goals and values, and how much effort they're willing to put in (Barinua et al., 2022). It includes their emotional connection, loyalty, and feeling of belonging (Alagan & Shanker, 2022). Meyer and Allen's Three-Component Model breaks it down into three parts: Affective Commitment: This is about how emotionally attached, identified, and involved employees are with the organization. Continuance Commitment: This refers to how employees perceive the costs of leaving the organization. Normative Commitment: This relates to employees feeling obligated to stay with the organization (Meyer & Allen, 1991). An employee's commitment to their organization refers to their dedication, loyalty, and emotional connection to the company (Farrukh et al., 2020). Committed employees are persistent and willing to put in the effort to help the organization succeed (Murray et al., 2021). Research by Meyer and Allen (1991) has shown that low commitment can lead to decreased employee engagement, higher turnover rates, and poorer job performance.

Employee commitment, a crucial aspect of organizational success, has been shown to decline due to several factors (Mahmood Aziz et al., 2021). These factors include perceptions of inadequate managerial support, unclear career advancement opportunities, a lack of recognition for employee achievements, and a breakdown in trust in organizational leadership. This decline in commitment has become a focal point for research, with scholars aiming to identify the underlying reasons behind this phenomenon (Mowday et al., 1982). Low employee commitment is multifaceted and can stem from leadership issues, lack of growth opportunities, poor work environment, inadequate compensation, job insecurity, work-life imbalance, poor communication, and lack of recognition (Abebe & Assemie, 2023).

While research on commitment has proliferated in recent years, there remains a noticeable dearth of empirical studies, particularly in the context of Sri Lanka. Existing literature highlights the significance of antecedents, with organizational politics emerging as a notable factor influencing commitment levels. However, empirical investigations into the relationship between organizational politics and commitment, especially in Sri Lanka, are sparse. Political skills in the workplace, encompassing social astuteness, interpersonal influence, networking ability, and apparent sincerity, have been identified as a significant antecedent to employee commitment (Brouer et al., 2015). Employees who possess high political skills are adept at navigating complex organizational dynamics, building strong relationships, and effectively influencing others, which enhances their ability to achieve personal and organizational goals (Block, 2016). Empirical evidence suggests that politically skilled individuals experience higher job satisfaction, better job performance, and increased commitment to their organization. For instance, Ferris et al. (2007) found that political skills positively correlate with affective commitment, as employees with these skills can foster a supportive work environment and secure critical resources, thereby reinforcing their emotional attachment to the organization. Furthermore, politically skilled employees are more likely to perceive their work environment as fair and supportive, which further strengthens their commitment (Block, 2016). This research underscores the importance of political skills as a valuable asset for fostering a committed workforce.

A critical gap exists in the current understanding of how political skills influence employee commitment within the Sri Lankan context. COR Theory offers a valuable framework for exploring this relationship, but there is a dearth of empirical research examining this specific dynamic within Sri Lankan workplaces. While studies elsewhere (Cropanzano & Mitchell, 2005) have demonstrated the link between political skill and commitment through a social exchange lens, the cultural and institutional specificities of Sri Lanka necessitate dedicated research to understand

how these factors interact in this unique context. Understanding these dynamics is crucial for developing effective organizational practices that foster employee commitment in Sri Lanka. By investigating the relationship between political skills, social exchange, and employee commitment in Sri Lanka, this research has the potential to contribute valuable insights that can inform human resource practices and ultimately lead to a more positive and productive work environment for Sri Lankan employees.

Research suggests that political skill, the ability to navigate and influence workplace dynamics, is a key factor influencing employee commitment (Cropanzano & Mitchell, 2005). Political skill can shape how employees perceive organizational politics, but more importantly, it impacts the social exchange process within the organization (Blau, 1964). Social exchange theory posits that relationships are built on a mutual exchange of benefits and costs (Cropanzano & Mitchell, 2005). Politically skilled individuals are adept at understanding what others value and strategically offering those things in exchange for desired outcomes such as support or recognition which can ultimately lead to increased commitment (Kipnis, 1976). Despite this theoretical link, there is still a lack of empirical research directly examining the connection between political skills and commitment within the social exchange framework.

This article aims to address this empirical gap by examining the interplay between perceived organizational politics, political skills, and employee commitment in Sri Lanka. Specifically, it seeks to elucidate the moderating role of political skills in the relationship between perceived organizational politics and employee commitment. By shedding light on these dynamics, this research provides valuable insights for scholars and practitioners aiming to foster a more committed workforce in Sri Lankan organizations.

Therefore, this study contributes to the Conservation of Resources (COR) theory; by analyzing the impact of political skills on the relationship between employee

commitment and perceived organizational politics. The study also explains the moderating effect of political skills in the relationship between employee commitment and perceived organizational politics.

Findings from studies conducted in other countries may not be directly applicable to Sri Lanka due to cultural and institutional differences (Hofstede, 2001; House et al., 2004). This research can help identify how best to leverage political skills within the Sri Lankan workplace context to enhance social exchange and ultimately, employee commitment. Increased commitment can lead to a more engaged and productive workforce, benefiting both employees and organizations.

The specific moderating role of political skills on employee commitment in relation to organizational politics is an under-explored area, especially in Sri Lanka. Therefore, this research aims to bridge this gap by not only examining the negative relationship between perceived organizational politics and employee commitment but also elucidating the moderating effect of political skills, thereby providing a nuanced understanding of the dynamics at play in organizational politics and offering practical strategies for fostering a more positive work environment conducive to employee commitment and organizational success.

Problem Statement

In contemporary organizational settings, the negative impact of perceived organizational politics on employee commitment has become a significant concern due to its detrimental effects on employee morale, retention, and overall organizational performance. Research shows that perceived organizational politics often leads to reduced job satisfaction, increased turnover intentions, and lower organizational citizenship behaviors, ultimately resulting in diminished employee commitment (Byrne, 2005). Specifically, in the Sri Lankan public sector, where political influences are more prevalent, low employee commitment has emerged as a pressing issue.

While existing studies, such as those by Wanigasinghe et al. (2017), have explored the positive relationship between political skills and professional commitment in the Sri Lankan context, there remains a notable gap in research regarding the moderating role of political skills in mitigating the negative effects of perceived organizational politics on employee commitment. Moreover, research from other countries, including Kapoutsis et al. (2015) in Greece, Chen et al. (2013) in China, and Nurhayatia et al. (2017) in Indonesia, has suggested that political skills may act as a buffer against the harmful effects of organizational politics on employee commitment.

Despite these international findings, the specific moderating role of political skills in Sri Lanka remains underexplored. Addressing this gap is crucial, as evidence suggests that employees with high political skills may experience a less severe negative association between perceived organizational politics and their commitment to the organization. Therefore, understanding how political skills can moderate this relationship in the Sri Lankan public sector is essential to improving employee commitment, which is currently low and presents a critical challenge for the sector.

This study aims to investigate how political skills moderate the relationship between perceived organizational politics and employee commitment in the Sri Lankan public sector, providing both theoretical and practical insights into addressing this issue.

Theoretical Background and Hypotheses Development

Employee Commitment

Highly committed employees identify with the organization's goals, are willing to exert extra effort, and intend to stay with the company for the long term (Meyer et

al., 2004). High levels of employee commitment are crucial for organizations because they reflect a strong sense of identification with the organization's goals. This identification leads to several positive outcomes, such as increased effort, loyalty, and reduced turnover (Beloor et al., 2017). Biljana Dordevic (2004) highlighted that employee commitment is significant as it can be used to predict performance, absenteeism, and various other behaviors. According to Brown et al. (2011), high employee commitment to an organization enhances job satisfaction, job performance, overall productivity, and sales. Additionally, it reduces employee turnover, intention to leave, and absenteeism. Affective commitment signifies a deep sense of identification and voluntary dedication to the organization (Dávila & García, 2012).

Perceived Organizational Politics

Political behavior in the workplace refers to indirect or unofficial strategies employees use to influence others and advance their interests within the organization. These strategies can be constructive, such as building alliances and fostering collaboration, or destructive, like spreading rumors or manipulating situations for personal gain (Bartol & Martin, 2018). "The use of power, influence, and strategies to achieve personal or group goals that may not be aligned with the official goals of the organization" (Bartol & Martin, 2018). It highlights that these strategies can be both positive (building alliances) and negative (spreading rumors). In the workplace context, political behavior refers to, actions employees take to influence others and achieve their goals within the organization. These actions can be positive (e.g., building coalitions, networking) or negative (e.g., gossip, forming alliances to undermine others). A pervasive sense of political maneuvering within an organization can breed distrust among employees, leading to cynicism and ultimately eroding their commitment to the organization's goals (Cropanzano et al., 1997). A politically charged environment can be a breeding ground for stress and

frustration for employees. Feeling constantly on guard or pressured to play political games themselves can lead to a decline in motivation and commitment (Ferris & Kacmar, 1992). When promotions, resources, or recognition appear to be awarded based on political maneuvering rather than merit, employees can experience a deep sense of injustice. This can lead to decreased commitment and resentment toward the organization, potentially hindering productivity and fostering a negative work environment (Witt et al., 2000).

We examine the connection between how organizational politics are perceived and the level of commitment individuals have toward the organization, drawing upon the Conservation of Resources (COR) theory. According to the COR theory proposed by Hobfoll (2001), individuals are driven to obtain and safeguard their resources, encompassing elements like time, energy, and social support. When individuals perceive organizational politics, they perceive a threat to their current resources. Consequently, they may undergo stress and endeavor to safeguard their resources, potentially influencing their commitment to the organization (Eisenberger et al., 2001). Affective commitment pertains to the emotional bond an individual forms with an organization (Meyer & Allen, 1991), marked by sentiments of loyalty, identification, and a deep-seated aspiration to stay affiliated with the organization (Meyer & Allen, 1997). Aligned with the Conservation of Resources (COR) theory, individuals work towards accumulating and preserving diverse resources, among them emotional attachment to the organization, which manifests in their organizational commitment. Elevated levels of perceived organizational politics can negatively impact affective commitment, resulting in a decline in emotional attachment to the organization (Eisenberger et al., 2002). When individuals perceive political behaviors within the organization, they may undergo feelings of disillusionment, disengagement, and betrayal. These adverse emotions can diminish individuals' sense of identification and loyalty to the organization (Dulebohn et al., 2012). Additionally, normative commitment denotes a feeling of obligation and

moral responsibility to stay connected with the organization (Meyer & Allen, 1991). Individuals exhibiting high levels of normative commitment experience a profound sense of obligation towards the organization, feeling that they ought to remain with it because it aligns with their sense of moral duty. Their sense of moral obligation may stem from the benefits they've gained from the organization or a feeling of loyalty towards their colleagues or supervisors (Meyer & Parfyonova, 2010). When individuals perceive elevated levels of politics, it can undermine the fundamental pillars of normative commitment, such as fairness, trust, and reciprocity. Consequently, this could diminish individuals' feelings of moral obligation to remain affiliated with the organization. Building upon this premise, researchers proposes:

Hypothesis 1: There is a negative relationship between perceived organizational politics and employee commitment.

Perceived organizational politics and employee commitment, with political skills as a moderator.

Political skills

Political skill, considered a refined and contemporary social aptitude, wields significant influence in shaping job performance (Ferris et al., 2005; Semadar et al., 2006). Pioneering research by Pfeffer (1981) introduced the concept of "political skills" in the scientific literature. This research highlighted the importance of these skills for achieving success within an organization. Mintzberg (1983) suggested that political skills encompass a range of abilities used to influence others within an organization. These skills include persuasion, negotiation, and even manipulation. Ferris et al. (2005), showed political skills encompass four dimensions: social astuteness, interpersonal influence, networking abilities, and apparent sincerity. According to, Ahearn et al. (2004), political skills involve the ability to effectively understand others in the workplace and use that understanding to influence them to

act in ways that further personal and/or organizational goals. Political skill is an important social influence construct that has been linked to various intrapsychic, interpersonal, and intergroup outcomes (Munyon et al., 2015). Theoretically, political skill has its most significant impact as a form of social influence on interpersonal relationships (Perrewé et al., 2000). In particular, political skill is posited to affect objective measures of career success by functioning as an interpersonal social influence construct, enabling individuals to maneuver within their work environment to accomplish personal objectives (Semadar et al., 2006). Politically skilled individuals excel at constructing their personal reputations by conveying signals that cultivate positive perceptions among others. They achieve this through proactive networking endeavors and the strategic use of influence tactics tailored to specific situations. Leveraging their social acumen and adaptable interpersonal strategies, politically skilled individuals adeptly showcase their behavioral versatility to craft the desired image (e.g., Ferris et al., 2007). In a more focused context, it is posited that politically skilled individuals foster robust relationships with their immediate supervisors to attain the benefits linked with favorable personal reputations. Additionally, these politically adept individuals engage in citizenship behaviors that enhance the well-being of their colleagues, thereby signaling their eligibility for a positive personal reputation (Spence, 1974). Political skill has been demonstrated to impact task performance; however, recent research suggests that its influence on contextual performance, such as social interactions, can sometimes be even more pronounced than its effect on task performance (Bing et al., 2011; Munyon et al., 2015). Consequently, individuals may utilize political skill not only to advance their careers but also to foster positive interactions and relationships within the organization (Ferris et al., 2007). Individuals possessing strong political skills are more inclined to view themselves as capable of adeptly maneuvering through complex scenarios, such as managing organizational politics. They harbor a firm confidence in their capacity to manage

resources and surmount obstacles, even amidst perceived political dynamics within the organization (Ammeter et al., 2002). Consequently, individuals with high political skills may demonstrate resilience and proactive behavior in mitigating the adverse impacts of perceived politics on their organizational commitment (De Clercq & Belausteguigoitia, 2017). Conversely, individuals lacking in political skills may perceive themselves as less equipped to cope with or address perceived organizational politics. They might experience heightened feelings of resource threat and could find it challenging to sustain their organizational commitment amidst such obstacles (Ferris et al., 2013). Hence, it is anticipated that political skills will moderate the association between perceived organizational politics and organizational commitment by shaping individuals' perceptions of their capability to effectively navigate the influence of politics on their resources and levels of commitment (Ahmad-Mughal et al., 2017). In such cases, individuals with low political skills may find themselves at a disadvantage, as their limited ability to effectively navigate organizational politics could lead to increased feelings of frustration and helplessness. This, in turn, may fuel a cycle of disengagement and disconnection from the organization, further weakening their commitment (Cole, 2023). As a result, they may become more susceptible to turnover intentions or even voluntary turnover, ultimately impacting organizational performance and stability. Therefore, understanding the interplay between political skills, perceived organizational politics, and organizational commitment is crucial for organizations to foster a positive work environment and retain talented employees (Ferris & Kacmar, 1992).

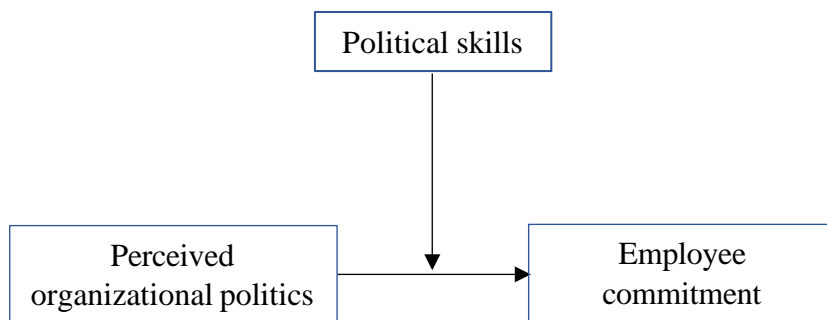
Indeed, political skills serve as a pivotal moderator in the intricate interrelationship between perceived organizational politics and organizational commitment. By shaping individuals' perceptions of their competence in navigating the complexities of political dynamics within the organization, political skills play a crucial role in determining how individuals respond to and cope with these challenges (Munyon et

al., 2015). Those with high political skills are better equipped to proactively manage and mitigate the negative effects of perceived politics on their commitment levels, whereas individuals lacking in political skills may struggle to effectively address these challenges, potentially leading to diminished organizational commitment. Thus, recognizing the significance of political skills as a moderator can inform organizational strategies aimed at fostering a supportive and resilient workforce capable of thriving in dynamic and politically charged environment. Building upon this premise, researchers proposes:

Hypothesis 2: Political skills moderate the relationship between perceived organizational politics and employee commitment. Employees with high political skills will experience a weaker negative association between perceived organizational politics and their commitment compared to employees with low political skills.

Figure 1

Conceptual Model



This research proposes a conceptual framework (Figure 1) that explores how political skill moderate the relationship between perceived organizational politics and employee commitment. The framework suggests that political skill can significantly weaken the negative impact of perceived organizational politics on commitment.

Methods

Data Collection Procedure and Sample

The research sample consists of employees from the public sector in Sri Lanka. Given the substantial influence of the public sector on the social, political, and economic development of the country, and the diverse range of occupations within Sri Lanka's public sector workforce, which includes administrative staff, healthcare workers, educators, and law enforcement personnel, comprehending the commitment levels of public sector employees holds paramount importance.

For data collection, this study utilized self-administered questionnaires for data collection. Out of the 400 questionnaires distributed, 211 were returned and deemed usable, resulting in a response rate of 52.69%. Convenience sampling was used as the sampling method. Convenience sampling is a widely used non-probability sampling method due to its ease of implementation, time efficiency, and cost-effectiveness. It allows researchers to quickly gather data from readily available participants, making it especially useful for studies with tight deadlines or limited resources. This method is ideal for exploratory research or pilot studies, where the goal is to gain preliminary insights or test hypotheses before conducting more rigorous research. Additionally, convenience sampling can be practical when accessing large populations in specific environments, such as universities or workplaces, and can minimize sampling errors when the population is relatively homogeneous. Despite its limitations in generalizability, it offers flexibility, allowing researchers to adjust their sample size or criteria during the study. For studies where time, budget, or accessibility are concerns, convenience sampling serves as an efficient and practical approach. Prior permission was obtained from the relevant heads of departments in public sector organizations to conduct data collection. The questionnaires were distributed along with a cover letter explaining the purpose of the study. Participants were assured of the anonymity and confidentiality of their responses.

Among the 211 participants in this study, 56% were male, and about 75% were married. Regarding age, 49% were between 30-39 years old, and 23% were 21-29 years old. In terms of education, 35% had a postgraduate degree, and 31% had completed a professional course. For work experience, 61% had been with their current organization for over 6 years, while the rest had been there for less than 6 years. In terms of job positions, 56% were executives, and 32% were managers.

Measures

Organizational Commitment

This study employed the 19-item measures developed by Meyer and Allen (1997) to assess the three components of organizational commitment: affective commitment, normative commitment, and continuance commitment. Participants were requested to indicate their level of agreement on a seven-point scale, ranging from "strongly disagree" to "strongly agree". The scale measuring affective commitment comprised a total of six items. A sample item for this scale is "This organization has a great deal of personal meaning to me". The coefficient alpha for this scale was 0.74. The normative commitment scale also consisted of six items. The sample item for this scale is "I would feel guilty if I left my organization now". The coefficient alpha for this scale was 0.77. The scale for measuring continuance commitment included a total of seven items. The sample item for this scale was "If I had not already put so much of myself into this organization, I might consider working elsewhere". The coefficient alpha for this scale was 0.74.

Perceived Organizational Politics

Organizational politics was measured with a six-item scale developed by Hochwarter et al. (2003). This scale assesses the extent to which individuals perceive various political behaviors or actions within their organizations. A sample item from

the scale is: “People spend too much time ingratiating themselves with those who can help them”.

Political Skills

Political skill was assessed with an 18-item scale developed by Ferris et al. (1999). Sample items include: "It is important that people believe I am sincere in what I say and do." The participants were asked to indicate their level of agreement on a seven-point scale, ranging from "strongly disagree" to "strongly agree". This scale, completed by the employees, assessed their ability to effectively understand others in the workplace and use this knowledge to influence others, thereby enhancing personal or organizational objectives. Previous research has demonstrated this instrument's reliability (Cronbach's $\alpha = 0.96$) and validity (Treadway et al., 2004).

Findings of the Study

Reliability Test

Table 1

Reliability Analysis

Variables	Cronbach's alpha value	No. of questions
Perceived organizational politics	0.717	9
Political Skills	0.614	6
Employee commitment	0.755	12

Source –Reliability analysis by SPSS

According to table 1 Cronbach's alpha values of all variables ranged from 0.717 to 0.755, it fulfills the relevant accepted of reliability. Generally, values should be

located in between 0.7-1.0. If the alpha values lie between that range, it concludes that the variables are reliable.

Correlation Analysis

Table 2

Two Tailed Correlation Analysis Table

		Perceived organizational politics	Political Skills	Employee commitment
Perceived organizational politics	Pearson correlation Sig.(2- tailed) N	1 211		
Political Skills	Pearson correlation Sig.(2- tailed) N	.543 .000 211	1 211	
Employee commitment	Pearson correlation Sig.(2- tailed) N	-.690 .000 211	.578 .000 211	1 211

Source – Correlation analysis by SPSS

According to the above table 2 the Pearson correlation value of perceived organizational politics and political skills is 0.543 and it implies that there is a positive relationship between perceived organizational politics and political skills.

According to the same table, the significant value is 0.000 (i.e. $P < 0.01$) hence both variables are significant at 0.01 the relationship between the variables are significant. Similarly, Pearson correlation value of Perceived organizational politics and Employee commitment is -0.690 and it implies that there is a Negative relationship between Perceived organizational politics and Employee commitment. According to the same table, the significant value is 0.000 (i.e. $P < 0.01$) hence both variables are significant at 0.01 the relationship between the variables are significant. Therefore, it can be statistically said that there is a significant and negative relationship between Perceived organizational politics and Employee Commitment.

Regression Analysis

Table 3

Regression Analysis (Model Summary Table)

Model	R	R square	Adjusted square	R	Std. error of the estimate
1	.750 ^a	.693	.688		.1612

a. Predictors: (constant), Perceived organizational politics
 Political skills

b. Dependent variable: Employee commitment

Source – Regression analysis by SPSS

We performed hierarchical multiple regression analysis to test hypotheses. In this work experience a control variable was entered in step 1, predictor variables perceived organizational politics was entered in step 2, and political skills was entered in step 3. The interaction terms for ‘Perceived organizational politics and Political skill’ were entered in step 4. The scores for organizational politics and political skills (Aiken & West, 1991). The interaction terms were obtained by

multiplying the centered scores (see Table 2). The moderating test was performed in Process 4.0 SPSS. There was a significant interaction found between organizational politics and political skills and employee commitment ($r=0.693$, $p=0.000$). It was found that the participants who reported higher political skills have a positive impact on organizational politics. Therefore, political skills positively moderate the relationship between organizational politics and employee commitment. This is significant because the significant value 0.000 is less than 0.05 ($p < 0.05$) that we obtain from the significant F change.

Discussion

The current study's findings contribute to the growing body of literature on organizational behavior by highlighting the moderating role of political skills in the relationship between organizational politics and employee commitment. Hierarchical multiple regression analysis provided strong evidence supporting our hypotheses, particularly regarding interaction effects. Consistent with previous research, our study confirms that perceived organizational politics negatively affects employee commitment. Our findings from Step 2 of the regression analysis confirm this, demonstrating that higher levels of organizational politics are associated with lower levels of employee commitment.

The significant moderating role of political skills identified in Step 4 of the regression analysis sheds light on an important interpersonal resource that can buffer the adverse effects of organizational politics. Political skills, defined as the ability to understand and influence others for personal or organizational gain, have been shown to improve individuals' ability to navigate complex social environments and manage organizational challenges. Our results indicate a significant interaction effect ($r=0.693$, $p=0.000$), suggesting that employees with high political skills are better equipped to maintain commitment levels even in politically charged environments.

The interaction effect highlights the important role political skills play in how employees perceive and respond to organizational politics. Employees with high political skills may feel more confident in their ability to influence outcomes, turning political challenges into opportunities rather than viewing them as barriers to their commitment.

By fostering political skills among employees through targeted training and development programs, organizations can mitigate the negative effects of perceived organizational politics on employee commitment. Interventions aimed at improving political skills may include interpersonal communication workshops, negotiation training, and mentoring programs that help employees enhance their ability to navigate organizational dynamics. Additionally, promoting an open, transparent organizational culture may reduce negative perceptions associated with politics and further strengthen the positive effects of political skills.

In conclusion, this study underscores the importance of political skills as a moderating factor in the relationship between perceived organizational politics and employee commitment. Our findings suggest that enhancing political skills can serve as a valuable strategy for organizations to maintain high levels of employee commitment in the face of political challenges. Future research should examine additional moderating and mediating variables that may further elucidate these complex relationships. Organizations should continuously develop and implement strategies that empower employees to effectively manage organizational politics and maintain their commitment.

Theoretical Contributions

Recognizing political skills as a moderator in the relationship between perceived organizational politics and employee commitment enriches the current research. This underscores the significance of examining how individual variables can moderate the influence of organizational factors on employee decisions.

The exploration of political skills as a moderating variable in the relationship between organizational politics and employee commitment offers substantial theoretical contributions. Traditionally, organizational politics have been viewed negatively, often associated with reduced employee commitment. However, introducing political skills into this dynamic suggests that individual differences can significantly alter these outcomes. Employees equipped with high political skills may not only withstand the adverse effects of organizational politics but also utilize these dynamics to their advantage, leading to enhanced commitment.

Practical Contributions

The practical implications of these findings are significant for organizational management. From a practical standpoint, acknowledging the moderating role of political skills offers actionable insights for organizations aiming to bolster employee commitment in environments perceived as politically charged. Organizations should develop and implement training programs that enhance employees' political skills. Training that focuses on self-awareness, social astuteness, networking abilities, and interpersonal influence can empower employees to manage organizational politics more effectively. Leaders and managers should be trained to recognize and address organizational politics constructively. By fostering a work environment that values transparency and open communication, leaders can support employees in developing political skills. Effective leadership in managing politics can create a supportive atmosphere that enhances employee commitment, even among those who are highly politically skilled. Human resource policies should be designed to promote fairness, equity, and transparency. Clear decision-making processes and equitable treatment can reduce the perception of politics, thereby enhancing overall commitment. Additionally, HR policies could include assessments of political skills during recruitment and development processes, ensuring that employees are both politically savvy and

committed. Cultivating an organizational culture that acknowledges and values political skills can lead to a more engaged and committed workforce. Encouraging open dialogue about organizational politics and providing platforms for employees to develop and share their political skills can foster a more resilient and adaptive organizational environment.

By integrating political skills into the analysis of organizational politics and employee commitment, organizations can develop more nuanced and effective strategies for fostering a committed workforce. The theoretical insights call for a reexamination of traditional views on organizational politics, while practical applications emphasize the importance of targeted training, effective leadership, and supportive HR policies. This approach not only enriches theoretical frameworks but also offers concrete steps for organizations to enhance employee commitment in the face of organizational politics.

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The Impact of the Quality of Grievance Handling on Job Satisfaction among Middle-Level Employees in ABC (Pvt) Ltd

Dilakshi, G. P. P.¹ and Devadas, U. M.²

The Sri Lankan apparel industry is deeply committed to ensure the satisfaction level of its employees. Accordingly, the main purpose of this study is to see whether there is an impact of the quality of grievance handling on job satisfaction among middle-level employees at ABC (Pvt) Ltd. According to the literature, the research on the impact of quality of grievance handling on job satisfaction among middle-level employees in the apparel sector in Sri Lanka is skeletal. This study was conducted to determine the level of quality of grievance handling, the level of job satisfaction, and the impact of quality of grievance handling on job satisfaction among middle-level employees at ABC (Pvt) Ltd. Questionnaires were distributed among 59 selected respondents to collect data. The sample was drawn from its population using a simple, probabilistic random sampling technique. The Statistical Package for Social Sciences was used to analyze descriptive statistics, regression and correlation analysis. Accordingly, the analysis identified a significant positive relationship between the quality of grievance handling and job satisfaction among middle-level employees at ABC (Pvt) Ltd. The findings showed that dimensions of quality of grievance handling, such as timeliness, structure of grievance handling, justice and collaborative participation of managers and trade unions, also have a positive and significant impact on the job satisfaction of middle-level employees. Researcher is recommended by improving of commitment of all stakeholders and by implementing simple, transparent, timely manner grievance handling structure can easily enhance the quality of grievance handling in any organization.

Keywords: *Collaborative Participation, Job Satisfaction, Justice, Quality of Grievance Handling, Structure of Grievance Handling, Timeliness*

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Introduction

The apparel sector is vital to any country's economy. (Embuldeniya, 2018) discovered a positive relationship between the apparel industry and the economy of Sri Lanka. Sri Lanka's apparel industry began to expand rapidly following the country's open economic policy in 1977 (Industry capability report Sri Lankan apparel sector, 2022). Due to trade-friendly environment factors, more foreign investment came into Sri Lanka after the implementation of a free financial plan. Due to its open economic policy and Multi-Fiber Arrangements (MFA), Sri Lanka has become a more appealing country for the apparel industry (Dheerasinghe, 2009).

In this study we can identify dependent variable as a job satisfaction and independent variable as a quality of grievance handling. Increasing no of employee grievances is the one of most critical factors that cause to decreasing level of job satisfaction among the employees in this industry. Other than that, in this study we can identify major four dimensions under quality of grievance handling procedure. Most of the organizations do not pay sufficient attention to the issues that relevant to the grievance management. The impact of poor grievance management is difficult to understand, but it has a significant impact on organizational productivity and performance. It is important to note that dissatisfaction and demotivation have a direct effect on productivity. The severity of industrial problems is greatly influenced by managers' approaches and attitudes toward the effective handling of employee grievances. (Gomathi, 2014).

The below table shows annual turnover ratios in last three years in ABC (Pvt) Ltd.

Table 1*Annual Turnover Ratio ABC (Pvt) Ltd*

Year	Annual Turnover rate of middle level employees
2022	6%
2021	5%
2020	3%

Source – Internal Records of ABC (Pvt) Ltd

When an employee raises a workplace grievance, we have to take them very seriously. Because whether we do not take our employees 'grievances as a valid thing, then employees can be dissatisfied with the management also it could be having a negative effect on them. That menace employees' morale, productivity level as well as satisfaction level might have dropped as well as employee turnover ratio of the organization can be increased. A negative perception of a company can led to job dissatisfaction and an increase in turnover. When the work environment lacks flexibility or a source of amusement for the employees, dissatisfaction can arise, resulting in turnover (Kaye & Jordan-Evans, 1999). Accordingly, this table is indicated turnover ratios has increased in those years.

The following table shows the average no of reported grievances in ABC (Pvt) Ltd.

Table 2*The Average Number of Reported Grievances ABC (Pvt) Ltd*

Year	Monthly Grievances	Annually Grievances
2022	6	29
2021	4	20
2020	4	16

Source – Internal Records of ABC (Pvt) Ltd

This is indicated by the increased general grievances of ABC (Pvt) Ltd. Despite the nature of the grievance, an upward trend is noted in here. It is noteworthy to mention the radical rise of these numbers in 2022.

According to literature some researchers have conducted to see whether there is relationship between grievance handling procedure and job satisfaction. Grievance handling procedure and employee satisfaction: a study of Indian organizations (Priyanka, 2021), Measuring workers' satisfaction with grievance-handling procedure: study of a power distribution major in India (Goel, G. ,2014), The impact of grievances handling procedure on job satisfaction: a study of lower level managers in a selected private bank, Sri Lanka (Tharuka,2020) and Workers' Satisfaction with Grievance-Handling Procedure: A Study on the Selected Garment Factories in Bangladesh(Aktar. S. & Alam., M. M. 2021) are some research studies relevant to grievance handling procedure and job satisfaction. But according to the literature, the research on the impact of the quality of grievance handling on job satisfaction among middle level employees in the apparel sector in Sri Lanka is Skeletal. Therefore, it can be identified as a performance gap of this study. The purpose of this study is to examine the connection between the quality of grievance handling procedure and employee satisfaction in the apparel sector in Sri Lanka.

Objectives of the Research Study

- 01) To determine the level of the quality of grievance handling in ABC (Pvt) Ltd.
- 02) To determine the level of job satisfaction among middle level employees in ABC (Pvt) Ltd.
- 03) To determine the impact of quality of grievance handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.

According to third research objective the following research objectives are derived.

- To determine the impact of timeliness of current grievances handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.
- To determine the impact of structure of the current grievances handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.
- To determine the impact of justice assured by current grievances handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.
- To determine the impact of collaborative participation assured by current grievances handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.

Literature Review

According to the research, the independent variable is quality of grievance handling, the dependent variable is job satisfaction, and the independent variable consists of four dimensions as, timeliness, structure of the grievance handling procedure, justice and collaborative participation. When considering a workplace, it is likely to have employee's complaints and issues arise from time to time. Therefore, it is really important that organizations have an effective grievance handling mechanism to redress such issues raised by the employees.

One of the most commonly cited definitions of job satisfaction is that provided by Spector, who believes that job satisfaction has to do with how individuals feel about their job and its different aspects. It has to do with the degree to which people like or dislike their jobs. As a result, job satisfaction and dissatisfaction can easily appear in every given work setting. Job satisfaction is a combination of positive and negative feelings that employees have about their jobs. Meanwhile, when a worker gets employed with in a business, he brings with him the needs, desires, and experiences that indicate the expectations that he has rejected. Job satisfaction measures the extent to which expectations are and comparison to actual awards. Job

satisfaction is strongly related to an individual's behavior within the workplace (Davis et al, 1985).

Theories of Job Satisfaction

Theories of job satisfaction and theories of human motivation share many similarities. Maslow's needs hierarchy theory and Herzberg's motivator-hygiene theory are two of the most commonly used theories in this field.

Hierarchy of Needs

Maslow's hierarchy of needs describes basic human needs in which physical or extrinsic needs are the foundation or must be met first, and psychological needs are at the top of the pyramid, building on physical needs (Ghatak & Singh, 2019; Maslow, 1943).

Motivator-Hygiene Theory

Extrinsic and intrinsic factors influence an employee's relationship with the job, workplace, coworkers, and supervisors (Herzberg, 1987; Ryan & Deci, 2017; Weiss et al., 1967). Various authors have defined the term "grievances" in various ways. Opatha (2009) cited evidence from the author listed below, where Grievance is defined. Any discontent or dissatisfaction, whether expressed or not, valid or invalid, arising out of anything connected with the company that an employee, believes, or even feels is unfair, unjust, or inequitable (Tripathi, 1992).

Dimensions of Grievance Handling Procedure

Timeliness

The term "Timeliness" is used by the researcher to describe the time it takes to resolve the grievance. One of the most important principles of effective grievance management is responding to employee concerns in a timely manner. The time spent

making the decision focuses on dealing with employee complaints in a timely manner while also ensuring that decisions are made on time. (Buchanan and Boswell, 2008).

Structure of the Grievance Handling Procedure

The formality and simplicity of the grievance handling procedure are two parameters studied in the structure of a grievance handling procedure.

We could be identified one of indicator as a formality of the grievance handling procedure. There is a substantial body of literature on formal versus informal grievance procedures. The presence and use of a grievance procedure allows employees to express themselves in a formal manner (Peterson and Lewin, 2000). According to Opatha (2009), one of the characteristics of an effective grievance handling procedure is formality.

Also, simplicity of the procedure is also very much important indicator that could be find under structure of the grievance handling procedure. A good grievance procedure should be straightforward and free from the jargon because if we add some technical word that can be difficult to understand for the average employees in the company.

Justice

Employees have always been concerned about workplace justice and fairness. 'The concepts of justice and fairness appear central to our understanding of the impact of changing employment relationships. (Alexander et al., 1995). Formal employee grievance procedures and programs are symbols of workplace justice in the organization, but there is no guarantee that aggrieved employees will receive fair resolutions to their grievances (Selznick, 1996).

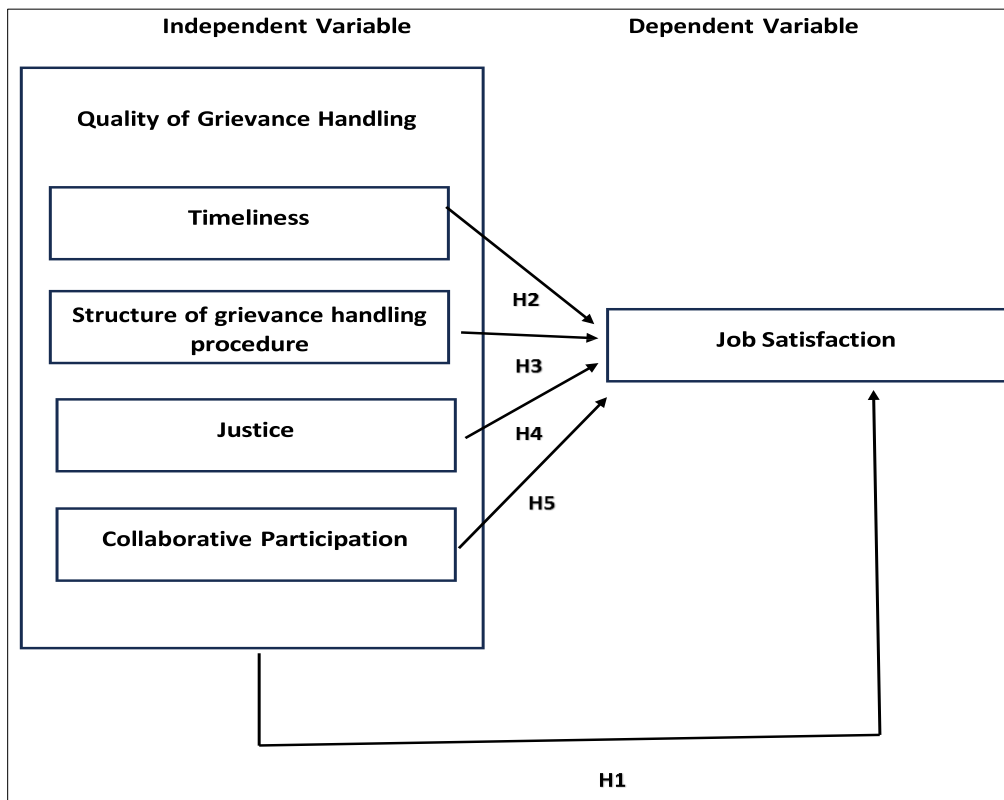
Collaborative Participation

According to Tripathi (1992), an acceptable grievance handling procedure must ensure adequate trade union participation, and managers must be capable of exercising reasonable authority. Meyer (1994) predicted that as the management-union relationship evolved, grievance handling would become more efficient. As a result of the literature review, two stakeholders who support grievance handling procedures as parameters have been identified: trade unions and management. According to that here we can identify collaborative participation as an indicator.

Conceptualization & Hypotheses Development

Figure 1

Conceptual Framework



Source: Developed by researcher, 2023

Accordingly, based on these four-dimension model, researcher developed the following hypotheses:

H1 - There is significant impact of the quality of grievance handling on job satisfaction among middle-level employees in ABC (Pvt) Ltd.

According to the literature Geetika (2014) found there was a positive and significant relationship between grievance handling procedure and job satisfaction. Other than that, according to Tharuka (2020), the grievances handling procedure had a positive and significant impact on job satisfaction. The study's findings revealed that the grievances handling procedure had a positive as well as significant impact on the job satisfaction of lower-level managers at the selected private bank. Further Priyanka (2021) highlighted there was a positive effect of grievance handling procedures on employee satisfaction.

H2 - There is significant impact of timeliness of grievances handling on job satisfaction among middle-level employees in ABC (Pvt) Ltd.

According to literature (White, 1989; Tripathi, 1992 as cited in Opatha, 2009), a time limit should be set and strictly adhered to at each level in order to expedite the resolution of a grievance. Time limits are one of the characteristics that a good grievance handling procedure must have, according to (Opatha, 2009). According to Opatha (1994), the mere existence of a grievance settlement procedure does not guarantee the successful handling of employee grievances, and he proposes that such a procedure be characterized by speedy settlement. One of the four established characteristics of an effective grievance-handling procedure has been identified as promptness (Adikaram and Rupasiri 2008).

H3 - There is significant impact of structure of grievances handling on job satisfaction among middle-level employees in ABC (Pvt) Ltd.

According to literature Polster (2011), non-union employers have increasingly adopted formal grievance procedures over the last fifty years to minimize liability and ensure employee productivity; such formal procedures allow employees to challenge a company decision or policy. Lewin and Peterson (1988) discovered a positive relationship between grievance procedure structure and grievance rates. As a result of the preceding argument, the third hypothesis is certified by the literature.

H4 - There is significant impact of justice of grievance handling on job satisfaction among middle-level employees in ABC (Pvt) Ltd.

The majority of the literature on the outcome of a grievance handling procedure focuses on justice. The provision for appeal is another aspect of the outcome in such a procedure. According to Peterson and Lewin (2000: 402), "a grievance system that employees perceive to be procedurally just or fair is likely to be used and regarded as effective." This suggests that when employees perceive the system's procedures to be fair and just, they are more likely to perceive the outcomes to be fair, even when the outcomes are not in their favor (Nurse and Devonish 2007).

H5 - There is significant impact of collaborative participation of grievance handling on job satisfaction among middle-level employees in ABC (Pvt) Ltd.

According to Tripathi (1992), an acceptable grievance handling procedure must ensure adequate trade union participation, and managers must be capable of exercising reasonable authority. Meyer (1994) predicted that as the management-union relationship evolved, grievance handling would become more efficient and effective. As a result of the literature review, two stakeholders who support grievance handling procedures as parameters have been identified: trade unions and management.

Research Methods

The study is focusing on positivistic research paradigm and the reasoning approach is deduction. The reasoning approach has selected as deduction based on the researcher's aim to address a contextual gap according to the available literature. Further, the required primary data have been collected via survey. Therefore, the study is a cross-sectional study. This study is a descriptive research design that involves obtaining information concerning the current phenomena. This study has used a quantitative research design. According to this research study the population of this study is 70 middle level employees like department heads of the ABC (Pvt) Ltd (Department of Finance, IT, HR, Engineering, Supply chain and marketing) and Executives of departments in the ABC (Pvt) Ltd.

The sample size is determined by the required level of precision and confidence in predicting population parameters, as well as the population's variability (Sekaran, 2003). According to Morgan table selected sample size of this study is 59. The Sample were selected the using the probability sampling technique. Under probability sampling technique, Simple random sampling is the technique that which researcher uses to collect data. Simple random sampling can be defined as every element in the population has a known and equal chance of being selected as a subject. It is an unrestricted probability sampling design (Sekaran, 2003). Therefore, we can identify the Simple random sample is a randomly selected subset of a population. In this method every member of the population has equal chance of being selected.

Primary data are used to study this research study and it was obtained from the standard structured questionnaire. The questionnaire develops through the Google form. Likert scale questions are especially included in this Google questionnaire with the purpose of respondent's easiness to provide answers. The study used self-admired questionnaire to collect the data and respondents indicated the extent to

which they disagree or agree with each statement using 5 points of Likert Scale. The independent variable of the research model was quality of grievance heading of ABC (Pvt) Ltd which was measured by an instrument consisting of 23 statements developed by (Melchade, V., 2013). The dependent variable of the research model was job satisfaction of middle level employees in ABC (Pvt) Ltd which was measured by an instrument consisting of 10 statements developed by Macdonald and MacIntyre (1997). The validity of the questionnaire has already tested by the developers of the questionnaire. Reliability of questions has tested by using Cronobach's Alpha value.

Findings of the Study

Here, in analyzing the demographic profiles of the sample, the main objective of the researcher is to identify the demographic characteristics of the sample. According to the data collected from the middle level employees in ABC (Pvt) Ltd who responded to the survey, the demographic profiles can be presented as follows.

Table 3

Sample Composition

Variable	Category	No	%
Gender	Male	38	64%
	Female	21	36%
Marital Status	Single	6	10%
	Married	53	90%
Age Category	20-30 Years	10	17%
	31-45 Years	27	46%
	More than 45 Years	22	37%
Work Experience	Less than 3 years	-	-
	3-6 Years	9	15%

Variable	Category	No	%
	7-10 Years	26	44%
	11-14 Years	24	41%
	More than 14 years	-	-

Source: Analyzed data,2023

Table 4

Validity Statistics

Variable	KMO Coefficient	Bartlett's Test [Chi-Square]	Sig.
Quality of grievance handling	0.819	914.972	.000
Job Satisfaction	0.836	376.842	.000

Source: Analyzed data,2023

The Kaiser-Meyer-Olkin (KMO) measure should be greater than 0.70 and is inadequate if less than 0.70 and is inadequate if less than 0.50. The KMO test tells us whether or not enough items are predicted by each factor. According to table 2 quality of grievance handling has 0.819 KMO value and Job satisfaction has 0.836 KMO Value. So that is good. Other than that, the Bartlett test should be significant. So, the significant value should be less than 0.05. this means the variables are correlated highly enough to provide a reasonable basis for factor analysis as in this case. So according to this table 2 there is a less than 0.5 significance value to each variable. So that is also good value.

Table 5*Reliability Statistics*

Variable	Dimension	No of Items	Cronbach alpha
Quality of grievance handling (Cronbach alpha = 0.942)	Timeliness	03	0.757
	Structure of grievance handling procedure	08	0.852
	Justice	06	0.893
	Collaborative Participation	06	0.891
Job Satisfaction (Cronbach alpha = 0.913)		10	0.913

Source: Analyzed data, 2023

According to the above table, Quality of grievances' α value was 0.942. So, it has a better internal consistency. Timeliness has a better reliability because it's α value was 0.757. Structure of grievance handling procedure α value was 0.852 and it has a better internal consistency. Also, Justice has a better reliability because it's α value was 0.893 and Collaborative participation has a better reliability because it's α value was 0.891. Other than that Job satisfaction has better reliability because it's α value was 0.913.

As depicted in table 3, Cronbach alpha of internal consistency coefficients of dimensions of independent variable as well as dependent variable are greater than 0.7 indicating that multi-item measurement scales are reliable enough and no bias.

Data Analysis Related to Research Objectives

Objective 01 - To determine the level of the quality of grievance handling in ABC

(Pvt) Ltd.

Table 6

Descriptive Statistics of Quality of Grievance Handling

Descriptive Statistics	Quality of grievance handling	Timeliness	Structure of grievance handling procedure	Justice	Collaborative Participation
Mean	4.2115	4.1977	4.2500	4.2797	4.0989
Standard Deviation	0.46115	0.56092	0.48468	0.55142	0.584.5
Max	5.00	5.00	5.00	5.00	5.00
Min	3.52	3.00	3.25	3.33	2.67
Range	1.48	2.00	1.75	1.67	2.33
Variance	0.213	0.315	0.235	0.304	0.341
Skewness	0.433	-0.066	0.290	0.220	0.180
Kurtosis	-1.200	-0.0833	-0.920	-1.501	-0.683

Source: Analyzed data,2023

The mean and the standard deviation are two basic descriptive statistics measurements extensively employed in social science research. If the standard deviation falls between -2 and +2, the construct's variability is said to be acceptable for statistical analysis. The results of the descriptive analysis were given in table 4. According to the descriptive statistics table, this descriptive statistics data is approximately normally distributed because Skewness and Kurtosis value is very close to the -0.5 and 0.5.

First objective of the study is to determine the level of the quality of grievance handling in ABC (Pvt) Ltd. For those descriptive statistics of the data set were used. The study used self-admired questionnaire to collect the data and respondents indicated the extent to which they disagree or agree with each statement using 5 points of Likert Scale. The number 1 to 5 corresponds to the scale were, 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree. Under quality of grievance handling, researcher has identified four dimensions. According to the mean value of the timeliness it can be concluded that most of the respondents have valued timeliness as agree. According to the descriptive statistics of the Structure of grievance handling procedure mean value is 4.25 and minimum value is 3.25 and maximum value is 5. According to the mean value of the Structure of grievance handling procedure it can be concluded that most of the respondents have valued Structure of grievance handling procedure as agree. Therefore, it can be concluded that the Structure of grievance handling procedure is very strong. According to the descriptive statistics of the justice mean value is 4.27 and minimum value is 3.33 and maximum value is 5. According to the mean value of the justice it can be concluded that most of the respondents have valued justice as agree. Therefore, it can be concluded that the justice is very strong. As a final dimension of the quality of grievance handling procedure according to the descriptive statistics of the collaborative participation mean value is 4.21 and minimum value is 3.52 and maximum value is 5. According to the mean value of the collaborative participation

it can be concluded that most of the respondents have valued collaborative participation as agree.

According to the descriptive statistics of the quality of grievance handling mean value is 4.10 and minimum value is 2.67 and maximum value is 5. According to the mean value of the quality of grievance handling it can be concluded that most of the respondents have valued quality of grievance handling as agree. Therefore, it can be concluded that the level of the quality of grievance in ABC (Pvt) Ltd is very strong. Accordingly, first research objective has been achieved.

Objective 02 - To determine the level of job satisfaction among middle level employees in ABC (Pvt) Ltd.

Table 7

Descriptive Statistics of Job Satisfaction

Descriptive Statistics	Job Satisfaction
Mean value	4.3983
Standard Deviation	0.59148
Max	5.00
Min	3.40
Range	1.30
Variance	0.242
Skewness	0.157
Kurtosis	-0.537

Source: Analyzed data, 2023

According to the descriptive statistics of the job satisfaction mean value is 4.39 and minimum value is 3.40 and maximum value is 5. According to the mean value of the job satisfaction it can be concluded that most of the respondents have valued job satisfaction as agree. Finally, it can be concluded that ABC (Pvt) Ltd organization's job satisfaction at a very strong position.

Objective 03- To determine the impact of quality of grievance handling on job satisfaction among middle level employees in ABC (Pvt) Ltd.

Table 8

Correlation Analysis

	Pearson Correlation Coefficient	Sig. (2 –tailed) test
Quality of grievance handling procedure	0.766	0.000
Timeliness	0.358	0.000
Structure of grievance handling procedure	0.694	0.000
Justice	0.734	0.000
Collaborative Participation	0.684	0.000

Source: Analyzed data,2023

Here the researcher used 2 tailed Pearson correlation test. The reason for that is from this study the researcher finds a significant impact of quality of grievance handling procedure on employee job satisfaction. According to the findings of the study, the significance of quality of grievance handling is 0.000 which is less than 0.05 (p-value) and the Pearson correlation value is reported as 0.766. So, the relationship is statistically significant. Therefore, it can be concluded that the relationship between

job satisfaction and quality of grievance handling of ABC (Pvt) Ltd is shown as a strong positive relationship. Therefore, according to the results of the correlation test, hypothesis one is not rejected. Accordingly, a specific objective 3 is achieved. According to the research study researcher finds a significant impact of timeliness on employee job satisfaction. According to the findings of the study, the significance of timeliness is 0.005 which is less than 0.05 (p-value) and the Pearson correlation value is reported as 0.358. So, the relationship is statistically significant. Therefore, it can be concluded that the relationship between job satisfaction and timeliness of ABC (Pvt) Ltd is shown as a moderate positive relationship. Because the Pearson correlation value is very much close to the 0.4. Therefore, according to the results of the correlation test, hypothesis two is not rejected. Accordingly, under third objective 1st sub objective is achieved.

According to the findings of the study, the significance of the structure of grievance handling procedure is 0.000 which is less than 0.05 (p-value) and the Pearson correlation value is reported as 0.694. So, the relationship is statistically significant. Therefore, it can be concluded that the relationship between job satisfaction and structure of grievance handling procedure of ABC (Pvt) Ltd is shown as a strong positive relationship. Therefore, according to the results of the correlation test, hypothesis three is not rejected. Accordingly, under third objective 2nd sub objective is achieved.

Researcher finds a significant impact of justice on employee job satisfaction. According to the findings of the study, the significance of justice is 0.000 which is less than 0.05 (p-value) and the Pearson correlation value is reported as 0.734. So, the relationship is statistically significant. Therefore, it can be concluded that the relationship between job satisfaction and justice of ABC (Pvt) Ltd is shown as a strong positive relationship. Therefore, according to the results of the correlation test, hypothesis four is not rejected. Accordingly, under third objective 3rd sub objective is achieved.

Here the research study researcher finds a significant impact of collaborative participation on employee job satisfaction. According to the findings of the study, the significance of collaborative participation is 0.000 which is less than 0.05 (p-value) and the Pearson correlation value is reported as 0.684. So, the relationship is statistically significant. Therefore, it can be concluded that the relationship between job satisfaction and collaborative participation of ABC (Pvt) Ltd is shown as a strong positive relationship. Therefore, according to the results of the correlation test, hypothesis five is not rejected. Accordingly, under third objective 4th sub objective is achieved.

Table 9*Regression Statistics*

Description	Quality of grievance handling procedure	Timeliness	Structure of grievance handling procedure	Justice	Collaborative Participation
R	0.797	0.358	0.694	0.734	0.684
R Square	0.636	0.128	0.482	0.539	0.468
Adjusted R Square	0.609	0.113	0.472	0.531	0.459
Standard Error	0.30747	0.46296	0.35697	0.33645	0.36150
F	23.549	8.364	52.943	66.760	50.206
β	-	0.319	0.704	0.655	0.576
Sig.	0.000	0.005	0.000	0.000	0.000

Source: Analyzed data,2023

According to the multiple regression analysis depicts in table 7, the four dimensions of the independent variable in the conceptual framework have a combined effect of 60% (as Adjusted R Square = 0.609) on the determination of the dependent variable; job satisfaction. Adjusted R square value of 0.609 mean that the independent variables explain 60% of the variability of the dependent variable, job satisfaction. Therefore, the analysis is identified there is a significant positive impact of quality of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) ltd.

The significance value of the timeliness is reported as the values less than the p-value. ($P < 0.05$). On the other hand, the beta value of the timeliness is identified as 0.319, as per the findings of the beta coefficient analysis when quality of timeliness is increased by 1, job satisfaction will increase by 0.319. Therefore, the analysis is identified there is a significant positive impact of timeliness on job satisfaction among middle level employees in ABC (Pvt) ltd. Therefore, according to the results of the regression analysis, hypothesis two is not rejected. Accordingly, under third objective 1st sub objective is achieved.

The significance value of the structure of grievance handling procedure is reported as the values less than the p-value. ($P < 0.05$). On the other hand, the beta value of the structure of the grievance handling procedure is identified as 0.704, as per the findings of the beta coefficient analysis when quality of structure of grievance handling procedure is increased by 1, job satisfaction will increase by 0.704. Therefore, the analysis is identified there is a significant positive impact of structure of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) ltd. Therefore, according to the results of the regression analysis, hypothesis three is not rejected. Accordingly, under third objective 2nd sub objective is achieved.

The significance value of the justice is reported as the values less than the p-value. ($P < 0.05$). On the other hand, the beta value of the justice is identified as 0.655, as

per the findings of the beta coefficient analysis when justice is increased by 1, job satisfaction will increase by 0.655. According to the results of the regression analysis, hypothesis four is not rejected. Accordingly, under the third objective 3rd sub objective is achieved.

The significant value of collaborative participation is reported as the values less than the p-value. ($P < 0.05$). On the other hand, the beta value of the collaborative participation identified as 0.576, as per the findings of the beta coefficient analysis when collaborative participation is increased by 1, job satisfaction will increase by 0.576. Therefore, according to the results of the regression analysis, hypothesis five is not rejected. Accordingly, under third objective 4th sub objective is achieved.

Discussion and Recommendation

This section describes the summary of the main findings. This study has focused on the impact of the quality of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) Ltd. Then, this has referred to the previous detailed literature and discussion with academicians and industrial experts. The findings showed that dimensions of quality of grievance handling have a positive and significant impact on the job satisfaction of middle level employees. The population of the study is 70 employees in the ABC (Pvt) Ltd of Sri Lanka apparel industry. Therefore, out of the total 70 middle level employees 59 employees selected for the research study. As quantitative research study a standard questionnaire was used to gather primary data and Statistical Package for Social Sciences was used to analyze descriptive statistics, inferential statistics, regression, and correlation analysis. According to the findings of the study, overall impact between quality of grievance handling and job satisfaction that there is a significant positive relationship between quality of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) Ltd. In addition to that researcher found significant impact between four dimensions of the independent

variable and job satisfaction. Accordingly, those impact can be concluded as there is a significant positive impact of timeliness on job satisfaction, significant positive impact of structure of grievances handling on job satisfaction, there is a significant positive impact of justice on job satisfaction and finally there is a significant positive impact of collaborative participation on job satisfaction among middle level employees in ABC (Pvt) Ltd. Other than that researcher found there is a high level of job satisfaction among middle level employees and also level of quality of grievance handling procedure also high among middle level employees in ABC (Pvt) Ltd.

Conclusion

The current study is to determine the impact of the quality of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) Ltd. To achieve the study's goals the researcher developed hypotheses based on the literature. Under the correlation analysis and regression analysis, the researcher analyze that the research hypothesis was accepted. Having considered the findings reported in the current study concludes that there is a moderate positive correlation is found between timeliness and job satisfaction, and a strong positive correlation is found between structure of grievance handling procedure and job satisfaction. Also, a strong positive correlation is found between justice and job satisfaction as well as collaborative participation and job satisfaction. According to findings this study summarized that the job satisfaction of middle level employees in the ABC (Pvt) Ltd is very high because the level of the quality of grievance is high. Ultimately, a conclusion can be drawn using the analysis that there is a significant positive impact of the quality of grievance handling procedure on job satisfaction among middle level employees in ABC (Pvt) Ltd.

Implication of the Research

According to this research study very much important policy makers as well as management to create a competitive advantage by making and facilitating strong grievance handling procedure and good strategies in the organizations. Other than that, this research provides good understanding to managers and other workers to utilize the grievance handling practices efficiently and effectively in their organization. And also, this study will generate valuable support to managers to create good working environment. This study aims to investigate the impact of grievance handling procedure on job satisfaction of middle level employees in selected apparel company in Gampaha district. As a result, this study focuses on filling the gap in the current research literature by assessing the impact of the quality of grievance handling on job satisfaction of middle level employees in selected apparel company in Gampaha district.

Recommendations

The suggestions and recommendations could be developed based on the statistical analysis of the current research. Commitment of all stakeholders is very much important to maintain quality of grievance handling process. In order to make the grievance procedure effective, all the employees, specifically managers and trade unions, should be the actively involved in the process. For that company top management can provide training to human resource department staff and other relevant staff on grievance resolution techniques, conflict resolution skills as well as communication skills. Further implanting open communication culture is very much important because such kind of communication channels encourage employees to raise their voice without fear. Then easily top management can identify what are the weaknesses of the quality of grievance handling in the company. Moreover, by implementing simple, transparent and timely manner grievance handling structure can easily enhance the quality of grievance handling. Maintaining good quality of

the grievance handling process, which is an essential part of cultivating good employee relations and running a fair, successful and productive workplace.

Limitations

This study was limited to investigate the impact of dimensions of quality of grievances handling on job satisfaction of among middle level employees in ABC (Pvt) Ltd. But these are not only the dimensions reflects the effectiveness of the quality of grievances handling procedure which affects the job satisfaction of employees in the apparel industry in Sri Lanka. Another limitation of this study was that it covered only one apparel company located in Gampaha district in Sri Lanka.

Future Research Directions

This research study is based on mainly apparel industry, but future research can be selected another field in business world such as banking sector, education institute, hospital, insurance, manufacturing etc., and public sector organizations. Furthermore, the current research is a quantitative study, and data were collected through a standard questionnaire in online mode. Hence, the researcher suggests that future researchers do a qualitative study by gathering data from the interview method. The study may be beneficial to do a qualitative analysis to get a depth insight into employees in various sectors. If the interviewing method was used to gather the information it would bring the opportunity to get more comprehensive responses.

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The Potential Impact of AI-Driven Personalization on Tourist Satisfaction and Retention in Sri Lanka

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This study explores the impact of Artificial Intelligence (AI) on enhancing personalized travel experiences in Sri Lanka's tourism sector. Employing a qualitative research approach, data was collected through in-depth interviews with 18 tourists and focus groups with 21 tourism service providers. The study applies the Technology Acceptance Model (TAM), Diffusion of Innovations Theory (DOI), and Service-Dominant Logic (SDL) to analyze perceptions, adoption challenges, and potential benefits of AI technologies. Key findings indicate that while AI tools like chatbots and personalized recommendations can significantly enhance customer service and operational efficiency, their adoption is hindered by technical issues, high costs, and resistance to change. This research was conducted to provide strategic insights that can help stakeholders in the tourism sector make informed decisions about AI adoption. To address these barriers, the study recommends comprehensive training programs, robust technical infrastructure, customization to local contexts, effective communication strategies, and collaboration between stakeholders. The implications suggest that leveraging AI can enhance Sri Lanka's tourism competitiveness and promote sustainable practices. Future research should focus on the long-term impacts of AI-driven tourism on local communities and the role of government support in facilitating AI adoption.

Keywords: *AI adoption, Artificial Intelligence, customer service, operational efficiency, personalized travel, Sri Lanka, sustainable tourism, tourism, tourist experience,*

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Introduction

Tourism is a critical pillar of Sri Lanka's economy, contributing significantly to GDP, employment, and foreign exchange earnings (Weerathunga et al, 2020). Known for its stunning landscapes, rich cultural heritage, and biodiversity, Sri Lanka attracts millions of tourists annually. However, the tourism sector faces numerous challenges, including competition from other destinations, the need for sustainable practices, and the demand for enhanced visitor experiences (Buultjens et al, 2017). In this context, leveraging advanced technologies, particularly Artificial Intelligence (AI), emerges as a strategic imperative to enhance the competitiveness and attractiveness of Sri Lanka's tourism offerings.

Sri Lanka's tourism industry has seen substantial growth over the past decades, with notable peaks and troughs influenced by global and local events (Weerathunga et al, 2020). The sector is diverse, encompassing heritage sites, wildlife safaris, beach resorts, and adventure tourism. Despite this diversity, the industry struggles with several issues, including seasonal fluctuations, environmental degradation, and the need for infrastructure development (Buultjens et al, 2017). Additionally, the COVID-19 pandemic has profoundly impacted the tourism sector, highlighting the need for resilience and innovation in recovery strategies (Sivanandamoorthy, 2021). The integration of AI into Sri Lanka's tourism sector presents both opportunities and challenges. One of the primary issues is the technological infrastructure (Bulchand-Gidumal, 2022). Sri Lanka faces challenges in terms of digital infrastructure, which is crucial for deploying AI technologies (Hummel et al, 2024). This includes reliable internet connectivity, data storage solutions, and access to advanced computational resources (Arachchi et al, 2022). Without these, the implementation of AI solutions remains a significant hurdle (Arachchi et al, 2022). Another critical concern is data privacy and security. Implementing AI solutions requires extensive data collection and processing, raising concerns about data privacy and security. There is a need for robust regulatory frameworks to protect tourists' data and ensure the ethical use of

AI (Bulchand-Gidumal, 2022). Additionally, the adoption of AI technologies necessitates a workforce skilled in AI and data science. Sri Lanka faces a shortage of such skilled professionals, which hampers the effective implementation of AI-driven solutions (Bulchand-Gidumal, 2022).

Economic constraints further complicate the adoption of AI in the tourism sector (Çeltek and Ilhan, 2020). Many small and medium enterprises (SMEs) may find the cost of adopting AI technologies prohibitive. Financial constraints and limited access to capital can slow down the adoption of AI (Çeltek and Ilhan, 2020). The high initial investment required for AI infrastructure, coupled with the ongoing costs of maintenance and updates, can be daunting for these businesses. Moreover, the acceptance of AI technologies by both tourists and service providers is critical (Çeltek and Ilhan, 2020). Cultural resistance to technological changes can pose a significant barrier to AI integration in the tourism sector. Ensuring that both stakeholders are comfortable and proficient in using AI tools is essential for their successful implementation (Çeltek and Ilhan, 2020).

AI technologies have the potential to transform the tourism sector by enhancing personalized travel experiences (Bulchand-Gidumal, 2022). One of the most significant benefits is the enhancement of customer service. AI-driven chatbots and virtual assistants can provide real-time support to tourists, answering queries, and offering personalized recommendations. This not only enhances customer satisfaction but also engages tourists more effectively, leading to a more enriching travel experience (Bulchand-Gidumal, 2022). Personalized marketing is another area where AI can make a significant impact. AI can analyze vast amounts of data to offer personalized marketing strategies, ensuring that promotional efforts are targeted and effective. This can significantly improve tourist retention and loyalty by offering them services and experiences tailored to their preferences and behaviors (Doborjeh et al, 2022).

Operational efficiency in the tourism sector can also be significantly improved

through AI (Bulchand-Gidumal, 2022). AI can streamline operations, from managing bookings and logistics to optimizing resource use. For instance, AI can predict peak times and manage bookings accordingly, ensuring that resources are used efficiently (Bulchand-Gidumal, 2022). This leads to cost savings and improved service delivery, which are crucial for maintaining a competitive edge in the tourism market. Additionally, AI can contribute to sustainable tourism practices (Çeltek and İlhan, 2020). By optimizing energy use, managing waste, and monitoring environmental impacts, AI can help tourism operators implement more sustainable practices (Çeltek and İlhan, 2020). This aligns with the global trends towards more sustainable and responsible tourism, which are increasingly important to today's environmentally conscious travelers (Çeltek and İlhan, 2020).

Aims and objectives

The research aims to explore tourists' perceptions regarding the role of AI in augmenting their travel experiences in Sri Lanka. Specifically, the study focuses on the following objectives:

1. To identify AI applications suitable for integration into the tourism sector to deliver personalized services.
2. To examine the challenges and opportunities faced by tourism service providers in implementing AI-based solutions.
3. To understand the impact of AI-driven personalization on tourist satisfaction and retention in Sri Lanka.

Through these objectives, the research seeks to provide valuable insights into AI-enabled tourism experiences, contributing to the advancement of technological adoption in Sri Lanka's tourism sector.

This research is crucial for several reasons. Firstly, it provides strategic insights that can help tourism stakeholders in Sri Lanka make informed decisions about technology adoption and implementation. Understanding how AI can enhance

personalized travel experiences allows for better planning and integration of these technologies into existing systems. Secondly, the findings of this research can inform policy recommendations for the Sri Lankan government and tourism bodies. This is particularly important in areas related to digital infrastructure development, data privacy regulations, and skills training programs. By addressing these areas, policymakers can create an environment that supports the successful adoption of AI technologies.

Implementing AI-driven solutions can give Sri Lanka a competitive edge in the global tourism market (Çeltek and Ilhan, 2020). Enhanced personalization and operational efficiency can attract more tourists and increase their satisfaction, leading to higher retention rates and positive word-of-mouth promotion (Çeltek and Ilhan, 2020). Tourists who have personalized and seamless experiences are more likely to return and recommend Sri Lanka to others. AI technologies can also play a pivotal role in promoting sustainable tourism practices in Sri Lanka (Çeltek and Ilhan, 2020). By optimizing resource use and minimizing environmental impacts, AI can help balance economic growth with environmental conservation. This not only preserves Sri Lanka's natural beauty for future generations but also attracts tourists who are increasingly seeking eco-friendly travel options.

The innovation potential highlighted by this research is also significant. By showcasing successful AI applications and identifying best practices, this study can encourage tourism businesses to innovate and adopt new technologies (Bulchand-Gidumal, 2022). This is particularly important for staying competitive in an industry that is rapidly evolving with technological advancements.

Literature review

Tourism plays a vital role in Sri Lanka's economy, contributing significantly to employment and GDP. As the industry evolves, the integration of Artificial Intelligence (AI) has become increasingly important in enhancing personalized

travel experiences. AI's capabilities in data analysis, customer service, and predictive modeling are transforming how tourists interact with destinations and services. This literature review aims to explore the historical context, recent advancements, applications, challenges, and future directions of AI in tourism, with a specific focus on Sri Lanka. The review will also critically analyze theoretical frameworks relevant to understanding AI adoption in tourism.

The early applications of AI in tourism began with basic data processing and management systems, which evolved into more sophisticated tools like expert systems and recommendation engines (Çeltek and İlhan, 2020). Milestones in AI development relevant to tourism include the advent of machine learning algorithms, natural language processing (NLP), and the integration of AI with mobile technologies. These innovations have enabled more accurate predictions, personalized recommendations, and enhanced customer interactions, contributing to a more seamless and customized travel experience (Li and Zhang, 2022).

Recent technological advancements in AI, such as deep learning, real-time data analytics, and advanced NLP, have further revolutionized the tourism sector (Li and Zhang, 2022). These innovations have enabled more accurate predictions, personalized recommendations, and enhanced customer interactions, contributing to a more seamless and customized travel experience. (Li and Zhang, 2022). AI-driven customer service has seen widespread adoption in the form of chatbots and virtual assistants (Stroumpoulis et al, 2022). These technologies provide 24/7 customer support, handling inquiries, booking services, and offering travel advice. Case studies from global companies like Expedia and Skyscanner illustrate successful implementations where AI has significantly improved customer satisfaction and operational efficiency (Gretzel et al., 2015).

AI enhances personalized marketing by analyzing customer data to offer tailored recommendations and promotions. This targeted approach not only boosts marketing efficiency but also increases consumer engagement and satisfaction. Studies have

shown that personalized offers significantly impact consumer behavior, leading to higher conversion rates and customer loyalty (Tussyadiah et al., 2017). Smart tourism destinations utilize AI to optimize resource management, enhance tourist experiences, and promote sustainability. Components of smart destinations include IoT devices, data analytics, and AI-driven decision support systems. AI's role in sustainability is evident in energy management, waste reduction, and the preservation of natural resources. Examples include smart city initiatives in Barcelona and Amsterdam, where AI contributes to sustainable tourism practices (Boes et al., 2016).

The extensive use of AI in tourism raises significant concerns about data privacy and security. Issues related to the collection, storage, and use of personal data are prevalent. Mitigation strategies include robust data protection policies, encryption, and transparent data handling practices to ensure consumer trust and compliance with regulations like General Data Protection Regulation (GDPR) (Chaudhuri, 2016). AI algorithms can perpetuate biases present in training data, leading to unfair treatment of certain groups. Ensuring algorithmic fairness involves rigorous testing, diverse data sets, and continuous monitoring to detect and correct biases. Inclusive AI design and stakeholder engagement are crucial to achieving fairness (Kaplan & Haenlein, 2019).

AI's impact on employment in tourism includes both job displacement and the creation of new roles. Automation of routine tasks can lead to job losses, necessitating workforce reskilling programs. Strategies for reskilling include training in digital literacy, AI management, and service-oriented roles to equip workers for the evolving job market (Huang & Rust, 2018). Global examples of AI in tourism demonstrate diverse applications and impacts. Comparative studies of AI implementations in countries like Japan, the United States, and the United Kingdom highlight differences in adoption rates, technological integration, and outcomes. These studies provide valuable insights into best practices and common challenges

faced in leveraging AI for tourism (Gretzel et al., 2020).

In Sri Lanka, existing research on AI in tourism is limited but growing (Arachchi et al., 2022). Studies focus on opportunities such as enhancing tourist experiences through personalized services and challenges like infrastructure limitations and digital literacy. Sri Lanka's unique cultural and economic context presents both opportunities and challenges for AI adoption in tourism (Fernando et al., 2020). Emerging trends in AI for tourism include predictive analytics, real-time personalization, and immersive technologies like augmented reality (AR) and virtual reality (VR). These trends promise to further personalize travel experiences and enhance decision-making processes. Predictive analytics, for instance, can forecast tourist behavior and preferences, allowing for more proactive service delivery (Buhalis & Amaranggana, 2015).

Despite significant advancements, several research gaps remain. Areas needing further exploration include the impact of AI on small and medium-sized enterprises (SMEs) in tourism, regional variations in AI adoption, and the long-term effects of AI-driven tourism on local communities (Isono and Prilliadi, 2023). Addressing these gaps will provide a more comprehensive understanding of AI's role in the tourism sector (Sigala, 2018). The Technology Acceptance Model (TAM) provides a framework for understanding how users accept and use technology. Key constructs include perceived usefulness (PU) and perceived ease of use (PEOU). In tourism, PU reflects how AI applications enhance the travel experience, such as through personalized recommendations or efficient customer service. PEOU pertains to the simplicity and intuitiveness of AI tools, which is crucial for widespread adoption among tourists and service providers.

In the tourism context, TAM can be adapted to assess user satisfaction and acceptance levels of AI technologies. Studies indicate that both PU and PEOU significantly influence the acceptance of AI tools in tourism, highlighting the importance of user-friendly designs and clear benefits (Kim et al., 2008). Diffusion

of Innovations Theory (DOI) explains how new ideas and technologies spread within a social system. In tourism, innovations include AI technologies such as chatbots, recommendation systems, and virtual assistants. Effective dissemination of information about AI tools is crucial for their adoption. This involves leveraging various channels like social media, tourism websites, and word-of-mouth. The cultural and social context of Sri Lanka's tourism sector influences the adoption of AI. Understanding local norms, values, and practices is essential for successful implementation (Rogers, 2003).

DOI can be applied to examine how AI innovations are adopted in the tourism industry. Factors such as relative advantage, compatibility, and observability influence the rate of adoption. Research suggests that stakeholder engagement and tailored communication strategies enhance the adoption of AI technologies (Karahanna et al., 1999). Service-Dominant Logic (SDL) emphasizes value co-creation and the role of service processes. In tourism, AI enables tourists and service providers to jointly create value through enhanced experiences and personalized services. AI applications facilitate ongoing interactions, contributing to continuous service improvement and customer satisfaction.

SDL is relevant to understanding how AI transforms service delivery in tourism. It underscores the importance of collaborative value creation and the dynamic nature of service interactions. Research highlights the potential of AI to enhance co-creation processes and deliver more meaningful and personalized travel experiences (Zsarnoczky, 2017) This literature review has explored the historical context, recent advancements, applications, challenges, and future directions of AI in tourism. Key findings include the significant impact of AI on personalized travel experiences, the importance of addressing ethical considerations, and the need for further research in specific areas.

Theoretically, this review highlights the relevance of frameworks like TAM, DOI, and SDL in understanding AI adoption in tourism. Practically, it provides insights

for stakeholders in Sri Lanka to leverage AI for enhancing tourist experiences, addressing challenges, and promoting sustainable tourism practices.

Methods

This study employs a qualitative research approach to explore the impact of AI on personalized travel experiences in Sri Lanka. The research methodology involves the development of an interview guide based on theoretical frameworks such as the Technology Acceptance Model (TAM), Diffusion of Innovations Theory (DOI), and Service-Dominant Logic (SDL). The data collection period spanned from March 2023 to September 2023.

The research population includes two main groups: tourists who have experienced AI-based services in Sri Lanka and tourism service providers who have implemented or interacted with AI technologies. The tourists were selected from popular destinations in Sri Lanka, namely Arugambay, Ella, Galle, Kandy, the Cultural Triangle, Yala, and Nuwara Eliya. These locations were chosen due to their prominence in the tourism sector and their adoption of AI technologies in various services.

A purposive sampling method was used to select 18 tourists for in-depth interviews. Purposive sampling is suitable for this study as it allows the researcher to select participants who have specific experiences with AI-based tourism services. This method ensures that the selected tourists have firsthand experience with AI technologies, such as AI chatbots, personalized recommendations, and smart itinerary planning, which is crucial for obtaining relevant and detailed insights.

For the focus groups, 21 tourism service providers were selected using a stratified sampling method. Stratified sampling ensures that different subgroups within the population are adequately represented. In this study, the subgroups are defined by the type of service providers (hotel managers, tour operators, and travel agencies) and their locations (Arugambay, Ella, Galle, Kandy, the Cultural Triangle, Yala, and

Nuwara Eliya). Each destination had three representatives from each type of service provider, ensuring a comprehensive representation of perspectives across different regions and service types. This method allows for a detailed understanding of the experiences and expectations of service providers regarding AI implementation in tourism.

The data collection involved two primary methods: in-depth interviews and focus groups. The interviews with tourists were conducted using a semi-structured interview guide developed based on the theoretical frameworks. The interview guide included questions designed to explore tourists' perceptions of the usefulness and ease of use of AI technologies (TAM), their experiences with the adoption and diffusion of these innovations (DOI), and their views on value co-creation and service interactions facilitated by AI (SDL). The semi-structured format allowed for flexibility, enabling participants to provide rich, detailed responses while ensuring that the key themes relevant to the theoretical frameworks were covered.

The focus groups with tourism service providers were organized to gather insights on their experiences and expectations of using AI in tourism. The focus groups were structured to facilitate discussions around the benefits, challenges, and future potential of AI in enhancing service delivery and customer experiences. The discussions were guided by questions derived from the theoretical frameworks, focusing on aspects such as the perceived advantages and challenges of AI adoption, communication channels used for disseminating information about AI tools, and the role of AI in co-creating value with customers.

The qualitative data collected from interviews and focus groups were analyzed using thematic analysis. This method involves identifying, analyzing, and reporting patterns (themes) within the data. The data analysis process included several steps: familiarization, coding, theme development, reviewing themes, and defining and naming themes. The first step involved transcribing the interviews and focus group discussions, followed by repeated reading to become familiar with the data. Initial

codes were generated by systematically working through the data and identifying significant features related to the research questions and theoretical frameworks. The codes were then grouped into potential themes, which were reviewed and refined to ensure they accurately represented the data and addressed the research objectives. The themes were reviewed in relation to the coded extracts and the entire dataset to ensure coherence and consistency. The final themes were defined and named, providing a clear understanding of each theme and its relevance to the research questions.

Findings of the Study

Analysis and Findings from Tourism Service Providers

To explore how AI technologies can be utilized to create personalized travel experiences for tourists in Sri Lanka, and to understand the perceptions and expectations of both tourists and tourism service providers regarding AI-enhanced services this interview guide was used. The responses were analyzed to understand the lack of current AI technology usage due to various challenges, despite recognizing its potential benefits.

Table 1

Interview Evidence for Technology Acceptance Model (TAM)

Question	Summary of Responses	Example Quotes
Perceived Usefulness	AI applications like chatbots and recommendation systems are recognized for their potential to enhance customer service by providing quick responses and personalized suggestions. However, these tools are not widely used at the moment.	"We see the potential in AI chatbots to reduce staff workload, but we haven't implemented them yet." (Hotel Manager- Galle, Personal Communication. March 13, 2023)
Perceived Ease of Use	Staff and tourists find the idea of AI tools appealing, but actual use is limited due to perceived complexity and lack of	"Our staff needs more training to effectively use AI tools." - (Tour operator Kandy, Personal Communication.

	familiarity. Training programs are considered essential for future adoption.	March 19, 2023)
Challenges	Challenges include technical issues, high costs, resistance to change, and the need for continuous training and updates.	"Implementing AI tools is expensive and requires constant updates and training." - (Travel Agency Nuwara Eliya, Personal Communication. March 26, 2023)

Table 2*Interview Evidence for Diffusion of Innovations Theory (DOI)*

Question	Summary of Responses	Example Quotes
Innovation	There is an interest in integrating AI technologies such as chatbots, personalized recommendations, and smart itinerary planning. Decisions to adopt these tools are still under consideration, mainly due to cost and technical challenges.	"We are interested in AI for personalized recommendations, but haven't adopted it yet." (Hotel Manager- Ella, Personal Communication. March 7, 2023)
Communication Channels	Information about AI tools is mainly communicated through industry conferences and webinars. Effective communication channels are still being evaluated.	"We learn about AI tools through industry events, but haven't started using them." (Tour operator Arugambay, Personal Communication. May 17, 2023)
Social System	The cultural and social context influences AI adoption, with a preference for personal interactions over AI. Efforts are being made to understand and address these cultural barriers.	"In Sri Lanka, there's a strong preference for personal interaction, which affects AI adoption." (Travel Agency Cultural Triangle, Personal Communication. June 2, 2023)

Table 3*Interview Evidence for Service-Dominant Logic (SDL)*

Question	Summary of Responses	Example Quotes
Value Co-creation	While AI tools are seen as valuable for creating personalized travel experiences, actual collaboration with tourists through these tools is minimal. The potential for future co-creation is recognized.	"We see the potential for AI in creating personalized experiences, but haven't implemented it yet." - (Hotel Manager- Yala, Personal Communication. July 15, 2023)
Service as Process	AI applications could facilitate ongoing service interactions and improvements, but their current use is limited. There is interest in future adoption to enhance customer satisfaction.	"AI could help us improve interactions, but we need to overcome several challenges first." - (Tour operator Galle, Personal Communication. July 17, 2023)

Table 4*Interview Evidence for General Questions*

Question	Summary of Responses	Example Quotes
Challenges	Major challenges include technical issues, high costs, resistance to change, and ensuring data privacy. These factors have prevented widespread AI adoption.	"High costs and technical challenges are major barriers to AI implementation." (Travel Agency Kandy, Personal Communication. August 2, 2023)
Opportunities	Opportunities include the potential for enhanced personalization, improved efficiency, and innovative services. Service providers recognize the transformative potential of AI despite current challenges.	"AI has the potential to significantly enhance our services once we overcome the challenges." (Hotel Manager- Ella, Personal Communication. March 8, 2023)
AI-driven Personalization	AI-driven personalization is expected to positively impact tourist satisfaction and retention in the future.	"We believe AI personalization will improve satisfaction, but we're not there yet."

	Current implementation is limited but promising.	(Tour operator Arugambay, Personal Communication. May 18, 2023)
Future AI Developments	Desired developments include more user-friendly AI, improved integration with existing systems, and enhanced data security. These advancements are seen as necessary for future adoption.	"We need more user-friendly AI and better integration with our systems." (Hotel Manager- Nuwara Eliya, Personal Communication. May 7, 2023)

The study delves into the perceptions and attitudes of tourism service providers in Sri Lanka regarding the adoption of Artificial Intelligence (AI) technologies across various dimensions. One key aspect examined is the perceived usefulness of AI applications. While a notable majority of respondents (57%) acknowledged the potential benefits of AI, it is noteworthy that these technologies are not currently in use. A significant portion of respondents (33%) provided hypothetical examples of how AI tools could enhance services, indicating a level of awareness and interest in their potential utility.

Moreover, the perceived ease of use emerged as another crucial consideration. Nearly half of the respondents (48%) highlighted the potential ease of use of AI applications, albeit with a substantial portion (38%) acknowledging the need for training. However, the implementation of AI faces considerable challenges, with a significant majority (71%) identifying barriers that currently prevent its adoption. These challenges encompass various factors such as technical issues, high costs, and resistance to change.

The study also explores perspectives on innovation in AI technologies. A majority of respondents (62%) expressed interest in various AI technologies, indicating a willingness to explore their potential applications. However, a notable proportion (43%) is considering adoption but faces barriers in doing so, suggesting a gap between interest and implementation.

Communication channels and social systems play pivotal roles in shaping attitudes towards AI adoption. The reliance on industry conferences and webinars for information (52%) underscores the importance of effective communication methods in disseminating knowledge about AI technologies. Moreover, cultural influences and barriers are significant factors affecting AI adoption, as indicated by the acknowledgment of cultural influences (67%) and encountered cultural barriers (48%).

Value co-creation through collaboration via AI is recognized by a portion of respondents (38%), although examples of such collaboration are currently minimal. Similarly, while there is recognition of the potential for AI to facilitate ongoing service interactions (48%) and drive continuous improvement (43%), actual implementation remains limited.

The study concludes that despite the recognized benefits of AI in enhancing personalized travel experiences and improving customer satisfaction, tourism service providers in Sri Lanka face significant barriers to adoption. Technical issues, resistance to change, and data privacy concerns are among the primary challenges hindering widespread implementation. Nevertheless, there is optimism regarding future AI developments, with stakeholders eagerly anticipating advancements that can overcome these barriers and facilitate broader adoption in the tourism industry.

Analysis and Findings from Tourists

This interview guide was used to explore how AI technologies can be utilized to create personalized travel experiences for tourists in Sri Lanka, and to understand the perceptions and expectations of both tourists and tourism service providers regarding AI-enhanced services. The focus was on understanding their experiences in Sri Lanka, particularly in comparison to other countries like Vietnam, India, Thailand, Indonesia, and Maldives. The responses were analyzed to identify the challenges and potential improvements for AI-based tourism services in Sri Lanka.

Table 5*Interview evidence for Technology Acceptance Model (TAM)*

Question	Summary of Responses	Example Quotes
Perceived Usefulness	AI applications like chatbots and recommendation systems are seen as enhancing the travel experience by providing quick and personalized assistance. However, many tourists found these tools less effective in Sri Lanka compared to other countries.	"AI chatbots were helpful for quick responses, but they were not as effective as in Thailand or Indonesia." (Tourist- Germany, Personal Communication. August 16, 2023)
Specific Examples	Specific examples include using chatbots for booking assistance and recommendation systems for finding local attractions. These tools were particularly useful in planning daily activities.	"The recommendation system helped us find great restaurants, but it wasn't as comprehensive as in Vietnam." (Tourist- USA, Personal Communication. August 16, 2023)
Perceived Ease of Use	Tourists generally found AI technologies easy to use, but the user experience in Sri Lanka was often less smooth compared to other countries. Technical issues and lack of local adaptation were common challenges	"In Sri Lanka, the AI tools were sometimes slow and didn't always understand local nuances." (Tourist- UK, Personal Communication. August 16, 2023)
Challenging Tool	Some tourists found AI chatbots and virtual assistants challenging to use due to technical glitches and limited functionality.	"The AI chatbot frequently misunderstood my queries, which was frustrating." (Tourist- Australia, Personal Communication. August 16, 2023)

Table 6*Interview evidence for Diffusion of Innovations Theory (DOI)*

Question	Summary of Responses	Example Quotes
Innovation	Tourists used various AI technologies such as chatbots, personalized recommendations, and smart itinerary planning during their trips. The adoption of these tools was influenced by previous positive experiences in other countries.	"I used AI for itinerary planning, but it was not as efficient as in the Maldives." (Tourist- Canada, Personal Communication. August 11, 2023)
Learning About AI Tools	Tourists learned about AI tools through travel websites, social media, and word-of-mouth from fellow travelers.	"I first heard about AI travel tools on a travel blog and decided to try them out." (Tourist- France, Personal Communication. August 21, 2023)
Communication Channels	Information about AI tools was communicated through various channels, with travel websites and social media being the most effective. Hotel staff also played a role in informing tourists about available AI services.	"Travel websites and social media were my main sources of information about AI tools." (Tourist- Israel, Personal Communication. August 23, 2023)
Effective Channels	Social media and travel blogs were found to be the most effective channels for informing tourists about AI services.	"Social media posts about AI travel tools caught my attention and made me want to try them." (Tourist- Japan, Personal Communication. August 30, 2023)

Table 7*Interview evidence for Service-Dominant Logic (SDL)*

Question	Summary of Responses	Example Quotes
Value Co-creation	AI enhanced tourists' ability to create personalized travel experiences by offering tailored recommendations and real-time assistance. Collaboration with service providers through AI tools was limited but recognized as having potential.	"AI recommendations helped me personalize my travel itinerary, but I didn't interact much with service providers through AI." (Tourist- Italy, Personal Communication. August 26, 2023)
Collaboration Examples	Examples of collaboration include using AI for booking activities and receiving personalized travel tips. However, the extent of collaboration was less compared to experiences in other countries.	"In Sri Lanka, AI helped me book activities, but it wasn't as interactive as in India." (Tourist- Brazil, Personal Communication. August 27, 2023)
Service as Process	Ongoing interactions with AI applications included using chatbots for customer service and recommendation systems for daily planning. These tools facilitated continuous improvement and satisfaction to some extent.	AI tools provided ongoing assistance, but the experience wasn't as seamless as in other countries." (Tourist- South Korea, Personal Communication. August 27, 2023)
Continuous Improvement	Continuous service improvement through AI was noted, but the level of satisfaction was lower compared to other countries.	AI tools helped improve my experience, but there's room for improvement in Sri Lanka." (Tourist- Russia, Personal Communication. August 30, 2023)

Table 8*Interview evidence for General Questions*

Question	Summary of Responses	Example Quotes
Challenges	Challenges included technical issues, lack of local adaptation, and limited functionality of AI tools. These factors made it difficult to fully utilize AI technologies in Sri Lanka.	"Technical glitches and limited local knowledge made AI tools less useful in Sri Lanka." (Tourist- UK, Personal Communication. May 11, 2023)
Improvements Suggested	Suggestions for improvement include enhancing the technical reliability of AI tools, better local adaptation, and providing more comprehensive and accurate information.	"AI tools need to be more reliable and better adapted to local contexts." (Tourist-Germany, Personal Communication. May 18, 2023)
Overall Satisfaction	Overall satisfaction with AI-enhanced services in Sri Lanka was moderate. Tourists appreciated the potential benefits but found the implementation lacking compared to other countries.	"I was moderately satisfied with AI services in Sri Lanka, but they have a long way to go." (Tourist-France, Personal Communication. May 19, 2023)
Recommendation	Many tourists would recommend AI-based tourism services to others, with the caveat that improvements are needed. The potential benefits are recognized, but the current experience is not as high as in other countries.	"I would recommend AI services, but they need to improve to match the standards of other countries." (Tourist-Australia, Personal Communication. May 21, 2023)

The investigation into tourists' perceptions and experiences with AI technologies in Sri Lanka sheds light on several critical aspects influencing the adoption and effectiveness of AI-driven services. Notably, the perceived usefulness of AI applications among respondents highlights a mixed sentiment, with a majority (56%) acknowledging their utility but expressing dissatisfaction with their effectiveness compared to other countries. Specific examples provided by respondents underscore

the potential of AI tools to enhance services, albeit with room for improvement to meet international standards.

Concerns regarding the ease of use of AI tools are prevalent among respondents, with half (50%) finding them easy to use but encountering technical issues specific to Sri Lanka. Additionally, the identification of certain AI tools as challenging due to technical glitches suggests a need for enhanced usability and reliability to optimize user experience.

Innovation in AI technologies emerges as a significant theme, with a majority of respondents (67%) reporting the use of various AI technologies during their trips. However, there is a notable reliance on travel websites and social media (61%) for learning about AI tools, indicating the importance of effective communication channels in disseminating information to tourists.

Cultural influences and barriers play a significant role in shaping the adoption of AI technologies, with half of the respondents (50%) acknowledging the impact of cultural context on their usage. Similarly, a substantial portion (39%) encountered cultural barriers when using AI services, emphasizing the need for culturally sensitive AI solutions.

Despite challenges, respondents recognize the potential for value co-creation through AI (56%), although examples provided are limited, indicating untapped potential for collaboration and innovation. Ongoing interactions with AI applications (50%) and perceived continuous improvement (44%) highlight the evolving nature of AI-driven services in Sri Lanka.

However, technical issues (67%), lack of local adaptation (56%), and limited functionality pose significant challenges to AI implementation. Respondents also express the desire for enhanced personalization (61%) and more innovative AI services (50%), suggesting opportunities for improvement in meeting tourist expectations.

Tourists heavily reliant on AI technologies perceive current AI services in Sri Lanka as challenging compared to experiences in other countries. Addressing technical issues, enhancing local adaptation, and improving functionality are crucial steps to bridge this gap and fully realize the benefits of AI-based tourism services in Sri Lanka. Future developments should focus on enhancing reliability, usability, and information dissemination to align with international standards and meet the evolving needs of tourists.

Thematic Analysis

To conduct a thematic analysis of the interview responses from both tourism service providers and tourists, key themes that emerged from the data were identified. These themes were grouped based on the Technology Acceptance Model (TAM), Diffusion of Innovations Theory (DOI), Service-Dominant Logic (SDL), and general questions. The responses were coded, and recurring patterns were identified.

Table 9

Thematic Analysis of Responses (Including Codes and Categories)

Theme	Description	Codes	Category
Perceived Usefulness	Recognition of AI's potential benefits for enhancing services, despite current low usage.	"Potential benefits," "Enhancing services," "Low usage"	Perceived Benefits
Perceived Ease of Use	Challenges in ease of use due to technical issues and lack of training.	"Technical challenges," "Complexity," "Training needs"	Ease of Use Challenges
Challenges	Technical issues, high costs, resistance to change, and data	"High costs," "Resistance to change," "Technical	Adoption Barriers

	privacy concerns.	problems," "Data privacy"	
Innovation	Interest in AI technologies but facing barriers in adoption due to cost and technical issues.	"Interest in innovation," "Cost barriers," "Technological hurdles"	Barriers to AI Adoption
Communication Channels	Reliance on industry conferences, social media, and travel websites for AI information.	"Learning from conferences," "Social media," "Travel websites"	Information Sources
Social System	Cultural influences and barriers affecting AI adoption.	"Cultural resistance," "Preference for personal interactions"	Cultural and Social Barriers
Value Co-creation	Potential for personalized travel experiences through AI, but with limited current examples.	"Potential for co-creation," "Few examples," "Personalized experiences"	Collaborative Value Creation
Service as Process	Recognition of AI's potential to facilitate ongoing interactions and service improvements.	"Service improvement," "Ongoing interactions," "Future potential"	Continuous Service Improvements
Opportunities	Enhanced personalization, improved efficiency, and innovative services seen as future benefits.	"Future potential," "Improved efficiency," "Personalization potential"	Future Benefits of AI Adoption
Satisfaction	Moderate satisfaction with current AI services,	"Moderate satisfaction," "Room for improvement,"	Current Satisfaction Levels

	recognizing the need for improvements.	the for	"Less effective than other countries"	
Recommendation	Willingness to recommend AI services, with an emphasis on needed improvements.	to AI	"Recommend with improvements," "Potential but not fully realized"	AI Service Recommendations

The thematic analysis provides a comprehensive overview of the perceptions and experiences surrounding AI technologies in the Sri Lankan tourism sector, as observed from the viewpoints of both service providers and tourists.

There is a consensus among both groups regarding the potential benefits of AI applications such as chatbots and recommendation systems. However, the actual adoption of these technologies is hindered by various challenges, including technical issues, high costs, and resistance to change. Service providers recognize the potential of AI tools to reduce workload and enhance customer experiences, but they face barriers in implementation, such as the need for training and the preference for personal interactions inherent in the cultural context. Similarly, tourists appreciate the convenience offered by AI tools but express dissatisfaction with their effectiveness compared to experiences in other countries.

Furthermore, the thematic analysis underscores the importance of effective communication channels for disseminating information about AI technologies. Both service providers and tourists rely on industry events, social media, and travel websites to learn about AI tools, highlighting the need for comprehensive and accessible information dissemination strategies.

Despite the challenges, there is optimism regarding the future potential of AI in the Sri Lankan tourism sector. Both service providers and tourists envision AI contributing to enhanced personalization, efficiency, and innovation in service delivery. However, to realize this vision, significant improvements in technical

reliability, local adaptation, and user training are necessary.

Discussion and Recommendation

This study aimed to explore how AI technologies can be utilized to create personalized travel experiences for tourists in Sri Lanka, and to understand the perceptions and expectations of both tourists and tourism service providers regarding AI-enhanced services. The findings from interviews with 21 tourism service providers and 18 tourists reveal critical insights into the current use, challenges, and potential of AI technologies in the Sri Lankan tourism sector.

Technology Acceptance Model (TAM)

The TAM framework helped elucidate the perceived usefulness and ease of use of AI technologies. A significant portion of service providers (57%) recognized the potential benefits of AI applications like chatbots and recommendation systems. However, the actual use of these tools is currently limited due to various challenges. Both service providers and tourists reported that AI tools could enhance customer service and provide personalized suggestions. For instance, a hotel manager from Galle noted, "We see the potential in AI chatbots to reduce staff workload, but we haven't implemented them yet." Similarly, tourists acknowledged the utility of AI applications but found them less effective in Sri Lanka compared to other countries. A tourist from Germany remarked, "AI chatbots were helpful for quick responses, but they were not as effective as in Thailand or Indonesia."

Perceived ease of use emerged as another critical factor. Approximately 48% of service providers and 50% of tourists found AI technologies appealing but challenging to use due to technical issues and lack of training. For instance, a tour operator from Kandy highlighted the need for more training, stating, "Our staff needs more training to effectively use AI tools." Tourists also reported similar experiences, with a tourist from the UK noting, "In Sri Lanka, the AI tools were sometimes slow and didn't always understand local nuances."

Diffusion of Innovations Theory (DOI)

The DOI theory provided insights into the innovation adoption process among service providers and tourists. There is evident interest in integrating AI technologies such as chatbots, personalized recommendations, and smart itinerary planning. However, actual adoption is hindered by cost and technical challenges, as indicated by 62% of service providers and 67% of tourists. A hotel manager from Ella expressed this interest, stating, "We are interested in AI for personalized recommendations, but haven't adopted it yet."

Effective communication channels are crucial for disseminating information about AI tools. Both service providers (52%) and tourists (61%) rely on industry conferences, social media, and travel websites for information. A tourist from Israel noted, "Travel websites and social media were my main sources of information about AI tools." This highlights the need for comprehensive and accessible information dissemination strategies to facilitate AI adoption.

The social system also plays a significant role in shaping AI adoption. Cultural influences and barriers were noted by 67% of service providers and 50% of tourists. For instance, a travel agency from the Cultural Triangle mentioned, "In Sri Lanka, there's a strong preference for personal interaction, which affects AI adoption." Tourists also acknowledged cultural impacts on their use of AI technologies, as a tourist from Japan stated, "The cultural context influenced my use of AI technologies."

Service-Dominant Logic (SDL)

SDL emphasizes value co-creation and service as a process. AI technologies have the potential to enhance personalized travel experiences and facilitate ongoing service interactions. However, current collaboration with tourists through AI tools is minimal, as recognized by 38% of service providers and 56% of tourists. A hotel manager from Yala mentioned, "We see the potential for AI in creating personalized

experiences, but haven't implemented it yet." Similarly, tourists reported limited interaction with service providers through AI, as a tourist from Italy noted, "AI recommendations helped me personalize my travel itinerary, but I didn't interact much with service providers through AI."

AI tools can facilitate continuous service improvement and satisfaction, although the current level of satisfaction is moderate. A tourist from South Korea stated, "AI tools provided ongoing assistance, but the experience wasn't as seamless as in other countries."

General Questions

The study identified several challenges hindering the widespread adoption of AI technologies in Sri Lanka. Both service providers (71%) and tourists (67%) reported technical issues, high costs, resistance to change, and data privacy concerns as significant barriers. A travel agency from Kandy highlighted these challenges, stating, "High costs and technical challenges are major barriers to AI implementation." Tourists echoed similar sentiments, with a tourist from the UK noting, "Technical glitches and limited local knowledge made AI tools less useful in Sri Lanka."

Despite these challenges, there is optimism regarding the future potential of AI in the Sri Lankan tourism sector. Both service providers (71%) and tourists (61%) recognize the potential for enhanced personalization, improved efficiency, and innovative services. A hotel manager from Ella mentioned, "AI has the potential to significantly enhance our services once we overcome the challenges."

Recommendations

Based on the study's findings, the following recommendations are proposed to enhance the adoption and effectiveness of AI technologies in the Sri Lankan tourism sector.

1. Provide comprehensive training programs for staff to improve their familiarity and competence with AI tools. This will help overcome the perceived complexity and ease the adoption process.
2. Address technical issues by investing in robust AI systems that are reliable and capable of handling local nuances. This includes improving the speed and accuracy of AI applications like chatbots and virtual assistants.
3. Customize AI technologies to better understand and cater to the local context and cultural preferences. This will help mitigate resistance to change and enhance the user experience.
4. Utilize multiple communication channels such as industry conferences, social media, and travel websites to disseminate information about AI tools. Ensure that the information is comprehensive and accessible to both service providers and tourists.
5. Encourage collaboration between service providers and tourists through AI tools to co-create personalized travel experiences. This can be achieved by integrating AI tools that facilitate real-time interaction and feedback.
6. Address data privacy concerns by implementing robust data protection measures. This will build trust among users and encourage the adoption of AI technologies.
7. Foster a culture of continuous improvement and innovation by regularly updating and refining AI tools based on user feedback. This will enhance customer satisfaction and keep pace with technological advancements.
8. Seek support from government and industry stakeholders to subsidize the costs associated with implementing AI technologies. This can help mitigate the financial barriers to adoption.

By implementing these recommendations, the Sri Lankan tourism sector can leverage AI technologies to create more personalized and satisfying travel

experiences for tourists, ultimately enhancing the overall competitiveness of the industry.

Conclusion

The integration of Artificial Intelligence (AI) into Sri Lanka's tourism sector holds significant potential to transform and elevate the industry's offerings. This study has highlighted the critical role AI can play in personalizing travel experiences, enhancing customer service, and improving operational efficiency. By addressing the current challenges—such as technological infrastructure, data privacy concerns, and the need for skilled professionals—Sri Lanka can effectively harness AI's capabilities.

Training and development are paramount to overcoming perceived complexities associated with AI tools. Enhancing technical reliability and adapting AI technologies to local contexts can mitigate resistance and improve user experiences. Effective communication strategies, robust data protection measures, and fostering collaboration for value co-creation are also essential steps in promoting AI adoption.

Furthermore, continuous improvement and innovation, supported by government and industry stakeholders, will be crucial in sustaining AI advancements. These efforts will not only enhance the personalization and efficiency of tourism services but also contribute to sustainable tourism practices by optimizing resource use and minimizing environmental impacts.

The insights gained from this study underscore the importance of AI in creating competitive advantages for Sri Lanka's tourism sector. Enhanced personalization and operational efficiency can lead to higher tourist satisfaction and retention, driving positive word-of-mouth promotion. Moreover, AI's role in promoting sustainable tourism aligns with the growing demand for eco-friendly travel options, preserving Sri Lanka's natural beauty for future generations.

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Factors Influencing the Migration Intention of Sri Lankan Apparel Industry Executives

De Silva, H. W.¹ and Devadas, U. M.²

The apparel industries in Sri Lanka are the largest exporters of high-quality apparel products to global brands. With global recognition, migration opportunities have increased, and recently, there has been an increase in the migration tendency of Sri Lankan professionals involved in the apparel industry. However, there is a lack of research on factors influencing migration intentions in the Sri Lankan context. Therefore, this study investigates the factors influencing Sri Lankan apparel industry executives' migration intentions, analyzes their level of intention, and determines the impact of these influencing factors on Sri Lankan apparel industry executives. A study using positivist philosophy and deductive methods was conducted on 248 executive employees in the Sri Lankan apparel sector. The study utilized an individual-level survey-based questionnaire method, analyzed using descriptive statistics, reliability, normality analysis, and multiple regression to test hypotheses. The study found a significant positive relationship between push and pull factors of migration intention and the migration intentions of Sri Lankan apparel industry executives. The findings suggest that policies should be developed to retain the skilled workforce in the industry, reducing migration tendencies. These policies should include micro and macro policies related to improving working conditions and involvement in political and economic issues.

Keywords: *Apparel Industry, Migration Intention, Pull Factors, Push Factors, Sri Lanka*

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Introduction

Background of the Study

The study investigates factors influencing Sri Lankan apparel industry executives' migration intentions, emphasizing the need for understanding these motivations in a globalized and economic era, and aims to offer actionable insights for policymakers and industry stakeholders.

The apparel industry in Sri Lanka has been a substantial contributor to the country's economic expansion since the 1950s (Lanka, 2021), with garments accounting for 52% of exports by 2002. The industry employs around 1 million people and employs 15% of Sri Lanka's workforce. However, challenges such as economic turmoil and political instability have hindered growth, with the value-added of manufacturing operations decreasing by 12.6% in 2022. The apparel sub-sector production had a remarkable growth of 25.9% in 2021 post-pandemic but only showed 5.3% annual growth in 2022 (Central Bank of Sri Lanka, 2023).

The apparel industry in Sri Lanka is a labor-intensive sector with a significant workforce, but faces challenges such as employee turnover (MGS & KAN, 2020). Despite rapid expansion, the industry employs over 330,000 people, supporting over 1.2 million people and accounting for 5% of all jobs in the country. Over 8% of managerial and executive positions remain unfilled due to a lack of qualified candidates. The industry experiences an annual labor turnover of around 60% per plant (Kelegama, 2005; Dheerasinghe, 2009; Liyanage & Galhena, 2014; Welmilla, 2020).

Also, this migration can be identified as a significant factor affecting the turnover of executive level workers in the apparel industry. Accordingly, Dheerasinghe (2009) says that the issue of executive employee turnover in Sri Lankan apparel industries is a growing one. Furthermore, in addition to talented professionals, executives and senior staff in the apparel industry migrating for better opportunities, more than 30% of employees in the SME sector are said to be leaving their positions (Apparel SMEs

in Grave Crisis, n.d.). As well as, Weerasooriya (2021) mention that Sri Lanka is struggling with a lack of skilled professionals in a variety of industries, including tourism, manufacturing, business process outsourcing, apparel, health, and jewelry. According to Wijesinghe (2018), employee turnover has become a critical issue in the apparel industry and he has concluded that it adversely affects the performance of the industry. According to the findings of this study, it is concluded that organizational politics, migration, job satisfaction, organizational commitment, training and development are influencing factors.

When considering ABC Company, a major apparel manufacturer in Sri Lanka, it appears that migration can be identified as a significant factor affecting the turnover of executive level employees. Migration is the main reason that affected more than 50% of the company's annual turnover in the last two years (Table 1.1).

In 2021, 48 executives departed due to migration, accounting for 61.5% of total turnover. In 2022, 88 executives left their positions, with 66 being migration-related, accounting for 75%. Due to this, increased turnover has led to urgent recruitment efforts to fill vacant positions, and this has impacted the company's recruitment costs. As it takes at least 2 months to fill an executive level position, the company needs to start hiring urgently to ensure a smooth transition and continuity of leadership. As a result, ABC has made emergency recruitments of at least 20 in 2021 and 30 in 2022. Due to such urgent recruitment, the company's recruitment cost has increased. The urgent recruitment process involves various costs including advertising, recruitment agency fees, interview costs, and onboarding costs. Due to such urgent recruitment, the company has to bear the cost of Rs.20,000 in addition to one person. Also, 35% of ongoing projects were delayed due to sudden turnover of executives. Therefore, high turnover caused by migration is a serious problem for the company (Internal records of company ABC).

Table 1

ABC Company's Migration-Related Executive Turnover

Year	2021			2022		
Category	<i>Executive Turnover</i>	<i>Migration-Related Turnover</i>	<i>Migration Turnover Percentage</i>	<i>Executive Turnover</i>	<i>Migration-Related Turnover</i>	<i>Migration Turnover Percentage</i>
Month						
<i>January</i>	4	-	-	6	5	83.3%
<i>February</i>	5	4	80%	7	6	85.7%
<i>March</i>	6	4	66.6%	8	3	37.5%
<i>April</i>	6	5	83.3%	9	6	66.6%
<i>May</i>	4	-	-	6	5	83.3%
<i>June</i>	5	2	40%	5	5	100%
<i>July</i>	6	3	50%	2	1	50%
<i>August</i>	10	8	80%	6	3	50%
<i>September</i>	6	4	66.6%	9	7	77.7%
<i>October</i>	8	8	100%	10	7	70%
<i>November</i>	9	7	77.7%	8	8	100%
<i>December</i>	9	3	33.3%	12	10	83.3%
Annual	78	48	61.5%	88	66	75%

Source: Internal records of company ABC

So, since ABC is a major company in the apparel industry, we can assume that the percentage of turnover related to migration in executive positions is a problem affecting the entire apparel industry in Sri Lanka. Because of that situation, this

should be studied quickly and solutions should be proposed. Therefore, that this study needs to be formally studied to understand the migration intentions of Sri Lankan apparel industry executives and the factors affecting their migration intentions.

Statement of Problem

The apparel industry plays a crucial role in Sri Lanka's economy. But today, the Sri Lankan apparel industry has seen a lot of disintegration. Several reasons have mainly affected it. However, the increase in turnover due to the migration of executive employees can be cited as the main reason that affected it. These executive employees can be known as the main stakeholders who make decisions in an organization.

According to the literature of a study done in 2009, it can be seen that the turnover increases due to the migration of executive workers in the apparel industry. He said that more than 30% of skilled professionals, executives and senior staff in the apparel industry are leaving their positions (Dheerasinghe, 2009).

Also, one of the major organizations in Sri Lanka's apparel industry, ABC Company, has a major problem with executive turnover. According to Company ABC, the main reason for the increase in corporate turnover is the migration of company executives. Turnover due to migration will be 61.5% in 2021 and 75% in 2022. Considering that, turnover has increased due to migration by 14% in 2022 compared to 2021. Also, more than 50% of the executive employees currently working in the organization had the intention to migrate. Due to this situation, ABC had to face serious problems such as increased recruitment costs, urgent recruitment, and delays in ongoing projects (Internal records of company ABC). And also, this problem will be one of the main factors that can affect the entire apparel industry. This issue has significantly affected the entire apparel industry, resulting in a 14.9% decline in apparel exports in the country according to statistics released by the Central Bank of Sri Lanka (Samaya, 2023).

And also, this study has been done in several countries of the world. According to

Tung (2022), factors influencing the migration behavior of workers in garment enterprises in Vietnam have been identified and evaluated. Furthermore, Sohad et al. (2023), identified factors that determine migration intentions in factories in Bangladesh.

But at present there are few literature summaries of the migration/migration intention of executive workers in the apparel industry in Sri Lanka and other countries. According to the above facts, it seems that there is a gap in the past literature summaries. This has become a very important problem that needs to be addressed present. Therefore, research problem of this study is "Factors Influencing the Migration Intention of Sri Lankan Apparel Industry Executives".

Research Questions

1. What is the level of migration intention of Sri Lankan apparel industry executives?
2. What factors are affecting migration intention of Sri Lankan apparel industry executives?
3. What is the impact of influencing factors on the migration intention of Sri Lankan apparel industry executives?
 - 3.1. What is the impact of political push factors on the migration intention of Sri Lankan apparel industry executives?
 - 3.2. What is the impact of economic push factors on the migration intention of Sri Lankan apparel industry executives?
 - 3.3. What is the impact of social / psychological push factors on the migration intention of Sri Lankan apparel industry executives?
 - 3.4. What is the impact of political pull factors on the migration intention of Sri Lankan apparel industry executives?
 - 3.5. What is the impact of economic pull factors on the migration intention of Sri Lankan apparel industry executives?

3.6. What is the impact of social / psychological pull factors on the migration intention of Sri Lankan apparel industry executives?

Objectives of the Study

1. To determine the level of migration intention of Sri Lankan apparel industry executives
2. To determine the factors are influencing migration intention of Sri Lankan apparel industry executives
3. To determine the impact of influencing factors on the migration intention of Sri Lankan apparel industry executives

Significance of the Study

The apparel industry's globalization has increased mobility, prompting interest in factors influencing executives' migration intentions. Sri Lanka serves as a case study, providing practical insights and contributing to academic discourse on global workforce migration trends.

The Sri Lankan apparel industry is crucial for export earnings and employment, with executives' skills influencing global competitiveness. Understanding migration intentions can inform strategies for talent retention and attraction, enhancing industry growth and sustainability. This study provides actionable insights for stakeholders, policymakers, and human resource professionals, enhancing strategic management of human capital within the Sri Lankan apparel industry.

This study explores international migration, executive decision-making, and human capital management in the apparel industry. It enriches theories on career mobility and global talent management. The research provides a nuanced exploration of socio-cultural and economic factors in Sri Lanka, offering insights applicable to similar industries. Understanding migration intentions is crucial for the apparel industry in Sri Lanka's rapidly changing global market.

Literature Review

Definitions of Migration Intention

Migration also describes the process through which non-natives visit a nation to reside there. The act of moving within or outside of a country is referred to as migration (Vafeas & Hendricks, 2017). All those who move to establish themselves temporarily or permanently in the host country are included in the term "migrants," which refers to everyone who does so. Migration presupposes the movement of displaced individuals, refugees, and the general populace (Vafeas, 2013). According to Sazila, Abdullah, Mohamed, Khadri, Abdullah, Mat, & Rahman (2018), intention is the attitude toward the consequences of one's behavior.

The intent of migrants to depart from their home countries is one of the variables in the study of migration. According to Carling (2017), an individual's intention to migrate may be defined as their desire, contemplation, inclination, plan, or preparedness to move independent of their actual activities. According to Sabti and Ramalu (2021), the desire to immigrate is a trustworthy predictor of people's long-term hopes for their future.

In the present study, the term "migration intention" describes the desire of an individual or group to relocate, usually from one country or region to another. Intention to migrate is defined as their desire, plans and preparations to migrate. Migration wish (or desire): Ideally, if you had the opportunity, would you like to move permanently to another country, or would you prefer to continue living in this country. Migration plan: Are you planning to move permanently to another country in the next 12 months, or not. Migration preparation: Have you done any preparation for this move (Migali, S., & Scipioni, M., 2019).

Factors Influencing the Migration Intention

Global, national, regional, and local population changes have always been significantly influenced by migration. People decide to migrate to another area or nation for a variety of reasons. The pull and push model of migration is the most

widely recognized conceptualization of understanding international migration (Richmond, 1993). According to Lee's Migration Theory and Ravenstein's Migration Theory, push and pull factors can be stated as the main factors that influence migration intention. Push factors are circumstances or conditions in one's home country that compel individuals or families to leave and seek opportunities elsewhere. A pull factor refers to the conditions of a certain area, country, or location that attract people to migrate there from other areas. Also, push factors and pull factors can be divided into political, economic and social/psychological factors (Lee, 1966b; Ravenstein, 1885b).

It describes migration as a function of supply-push factors that force migrants out of their home countries and demand- pull factors that draw them to industrialized nations (Mazzarol & Soutar, 2002b). While scholars have identified a number of PUSM and PULM, they can be broadly classified into the following categories: economic factors, which include labor market conditions and job market opportunities (Zimmermann, 2005); preservation factors, which include psychological and psychical security (Tartakovsky & Schwartz, 2011); social factors, which include language and culture, social networks, and security (Naidoo, 2007); political factors, which include migration and visa policies (González et al., 2010); and growth/opportunities factors, which include chances to live a higher quality of life and (Borozan & Bojanić, 2012).

The underlying causes of Bangladesh's brain drain include a lack of opportunities for research and advanced education, challenges in sustaining a level of living, political unrest, discrimination, and general insecurity. Furthermore, Bangladeshis are drawn to other nations by extrinsic reasons including rich scientific and cultural traditions, intellectual freedom, professional development opportunities, and attractive economic opportunities (Abdullah, A. M., & Hossain, M., 2014).

It is discovered that political unrest and economic hardships in the mother country are the primary causes of African migration. A smaller percentage of African migrants have also been motivated by the belief that South Africa offers lucrative

commercial prospects. It also implies that the immigrant is drawn to become an entrepreneur by discrimination and the difficulties in obtaining employment in their new country (Khosa & Kalitanyi, 2015).

According to a study conducted on Bangladesh, India, Pakistan, and Sri Lanka, issues including a lack of jobs, job favoritism, low pay, an unpleasant working environment, poverty, social unrest, civil conflict, dire economic conditions, and harassment based on one's religion or political beliefs are driving workers out of their nation. However, they are being drawn to other nations by things like employment opportunities, a need for labor, better healthcare and education, a welcoming workplace, higher pay, higher living standards, and the ability to practice their religion and politics freely (Azam, 2015).

In his studies, Iredale has put forth ideas and typologies on the movement of professionals. According to the "Human capital theory," people should look for work and compensation packages that are more in line with their formal education and training. According to the "Neo-Marxist macro level approach," gender, race, and class have an influence on migratory decisions. According to the "Structuration approach," both public and private entities have the authority to define work requirements and provide job possibilities, which has an effect on migration (Iredale, 2011).

According to a recent study, the majority of domestic workers who moved from Vietnam to Taiwan did so in order to achieve financial objectives such debt repayment, assisting with their spouses' or children's education, and providing additional financial assistance for their families (Phuong & Venkatesh, 2015). It is discovered that the country's dropping wage rate, unemployment, and inflation all have a beneficial impact on migration out of Pakistan. Remittance inflows from host nations also had a significant role in driving up migration rates (Ahmad et al., 2016). Chowdhury carried out a study to provide an explanation for the empirical finding that, while skilled labor is more likely to migrate from developing nations that are relatively equal, unskilled labor is more likely to migrate from developing nations

that are relatively unequal. The findings are only considered legitimate in cases when starting a business is less expensive than going to school, and wealth is distributed according to the Pareto principle (Chowdhury & Wheeler, 2008).

Weerasinghe & Kumar have demonstrated that, in addition to subjective norms, perceived behavioral control, and resource facilitation condition being less relevant in predicting intention and actual behavior, self-efficacy and attitudes were also significant predictors (Weerasinghe & Kumar, 2015).

Shrestha has looked at the variables that affect reverse migration. The two parts of reverse migration are the following: the first is the movement of individuals from a developed to a developing nation, and the second is the movement of migrants from the developed to the developing nation. According to the research, the factors that draw traditional migrants include employment and good pay, education and training, exposure and experience, safety and security, modern facilities, the future of children, treatment that is devoid of discrimination, and family welfare back home. Conversely, lower living expenses, identity and status, getting back to nature, values, social participation and happiness, care and service, adventure and challenge, investment and great profits are what draw people to migrate in reverse (Shrestha, 2011).

Table 2

Push Factors Influencing Migration Intention

<i>Factors</i>	<i>Reference</i>	<i>Country</i>
<ul style="list-style-type: none"> • Scarcity of jobs • Favoritism in jobs • Low wage • Unfavorable working environment • Poverty • Civil conflicts • Social unrest • Political and religious harassment 	Azam, 2015	Bangladesh, India, Pakistan and Sri Lanka

<ul style="list-style-type: none"> • Unfavorable political conditions 	Zaidi, 2014	Not specific
<ul style="list-style-type: none"> • Repaying the debt • Facilitate the education of children • Provide monetary support for family 	Phuong, 2015	Vietnam
<ul style="list-style-type: none"> • Insufficient opportunity for higher study • Political turmoil • Discrimination and insecurity 	Abdullah & Hossain, 2014	Bangladesh
<ul style="list-style-type: none"> • Lack of good education for children • Treats of violence • Poor intellectual stimulation • Limited career structures 	Kumari, 2017	Sri Lanka
<ul style="list-style-type: none"> • Inflation • Unemployment • Declining wage rate 	Ahmad et al., 2018	Pakistan
<ul style="list-style-type: none"> • Political instability • Economic reasons 	Khosa, 2015	African countries

Table 3

Pull Factors Influencing Migration Intention

<i>Factors</i>	<i>Reference</i>	<i>Country</i>
<ul style="list-style-type: none"> • Opportunity for career development • Intellectual liberty • Lucrative economic prospects • Presence of enriched, scientific and cultural tradition 	Abdullah & Hossain, 2014	Bangladesh
<ul style="list-style-type: none"> • Job security • Working conditions • Economic considerations 	Simplice, 2015	Africa

<ul style="list-style-type: none"> • Political considerations • Physical security 		
<ul style="list-style-type: none"> • Attractions for jobs • Labor demand • Improved education, health facilities • Friendly working environment • Better wages • Improved standards of living • Political and religious freedom 	Azam, 2015	Bangladesh, India, Pakistan and Sri Lanka
<ul style="list-style-type: none"> • Improved standard of living • Improved quality of life • Opportunities for higher education • Better pay • Accessibility to modern technology 	Zaidi, 2014	Not specific
<ul style="list-style-type: none"> • Employment & high salary • Openness to innovation • Safety and security 	Shrestha, 2011	Not specific

Hypotheses Development

The intent of the migration was stated to have an effect on the migrants' home nation in both different impacts. Lee argues that every location has a mix of push and pull aspects. Push variables have a tendency to drive people away, whilst pull aspects serve to draw people in or keep them there. Apart from these, there are other forces that are fundamentally indifferent to humans and stay neutral. While the majority of the local population is impacted by some of these variables, others often have differing effects. Any area's migration is ultimately the outcome of these variables working together (Lee, 1966a).

Some researchers contend that the push element outweighs the pull factor because

they believe that issues, not attractions, are the primary drivers of population movement. Conversely, proponents of the pull factors, who place higher weight on them, highlight high rates of investment in regions that provide more chances for employment and business ventures as well as a more alluring way of life. Researchers belonging to a third group contend that there is a strong relationship between the push and pull forces, with people who are pushed towards migration also being drawn by the hope of greater opportunities abroad (Kainth, 2010).

According to Oltman and Renshon (2017) analysis, the primary forces influencing migration include socio-political, economic, and ecological considerations. One of the main reasons why people migrate from impoverished countries to rich ones is the economic gap between developed and underdeveloped nations. However, economic factors in wealthy nations, such as the demand for labor, also draw migrants who are looking for better job possibilities.

Azam asserts that remittances from migrant workers and a nation's economic development are positively correlated, notwithstanding the grave worry over brain drain (Azam, 2015). The main advantage of migration for the region is remittances, however the diaspora of South Asians has also contributed to the region's growth (Dhar & Samanta, 2014). Skandarajah (2002) asserts, based on an analysis of Sri Lanka, that migration raises living conditions, promotes human development, lowers unemployment, and encourages constructive investments. Zaidi and colleagues have also recognized the remittances as a benefit to the migrant's nation of origin. Additionally, it demonstrates how immigrants may support national development by imparting their research expertise, knowledge, and experience to native citizens through formal training sessions, seminars, and cooperative research projects. However, the notions offered in this study work are not well supported by the available data (Zaidi, Ahmed & Aslam, 2014).

According to Abdullah and Hossain, the brain drain is a major problem for Bangladesh's growth. The primary professions in Bangladesh that contribute to the country's widespread brain drain include academia, medicine, engineering, and

agricultural research. The primary drawbacks of brain drain in Bangladesh include the dearth of academics in the nation, mismanagement of public funds, erosion of trust in the healthcare industry, and scarcity of domestic talent (Abdullah & Hossain, 2014). Similarly, migration of health professionals was shown to be a declining influence in Africa's health industry (Simplice, 2015). It has been shown that one of the most detrimental effects of migration for Jamaica is brain drain (Parkins, 2010). Nejad and Young (2016) looked into how migrants choose themselves based on the caliber of the institutions. These were predicated on disparities in politics and economy. The study discovered that potential migrants have a strong pull to economic freedoms. The paper also mentioned how advancements in property rights and legal systems strongly pull potential migrants. Ramirez and Valiuniene (2013) deduced that one of the main reasons behind migration is the availability of greater welfare benefits, which supports the necessity of a functional social structure. From a different angle, Charsley and Shaw (2006) discussed how family members' encouragement to rejoin with migrating relatives has been mentioned as a primary motivator for migration.

According to Dail (1988), societal variables influence people's decisions to immigrate to other nations. Social issues including poverty, a lack of job opportunities, access to education, and housing frequently push migrants from developing nations like South America to relocate to developed nations like the US. According to Carbajal and De Miguel Calvo (2021), the human desire for a higher standard of living is the foundation for the social causes pushing migration. Social considerations, such the demand for improved education for themselves and their children, are what push migrants. Graduate programs in the US, for example, draw young immigrants from all over the world (justiceforimmigrants.org 2017). There are several political variables that contribute to the global surge in migration. Political events including economic stagnation, civil conflicts, and political revolutions, according to Chandler and Tsai (2001), frequently push people to relocate to areas with safe political environments (Hadj Abdou 2020). Migration

decisions to other nations are influenced in part by safety concerns. People's decisions for moving are regularly influenced by persecution they face because of their beliefs.

Furthermore, according to Sabti (2020b), political push factors were found to have a positive impact on migration intention among professionals. According to Kumari (2017), in a selected sample of 250 IT professionals found that all push and pull political, economic and social / psychological factors have a positive impact on migration intention of IT professionals in Sri Lanka. And also, according to Sabti and Ramalu (2021b), economic factors of the home country were found to have a significant impact on the migration intention of useful professionals in decision-making for hospital management. According to the Muhammad et al. (2021), according to business students of public sector universities in Peshawar, push factors have a positive impact on business sector migration intention. According to Assfaw and Minaye (2022e), the study revealed that psycho-social factors have a positive impact on the intention to migrate to South Wolo, Ethiopia. According to Urbański (2022), the research shows that pull factors have a positive impact on migration between Poland and Romania. Also, among them, there are literatures with opposite results. If they are, according to De Haas (2021), found all pull and push factors had a negative impact on migration intention.

Six hypotheses are formulated to cover above six facts of this study.

H1: There is a significant impact of political push factors on the migration intention of Sri Lankan apparel industry executives

H2: There is a significant impact of economic push factors on the migration intention of Sri Lankan apparel industry executives

H3: There is a significant impact of social/psychological push factors on the migration intention of Sri Lankan apparel industry executives

H4: There is a significant impact of political pull factors on the migration intention of Sri Lankan apparel industry executives

H5: There is a significant impact of economic pull factors on the migration intention

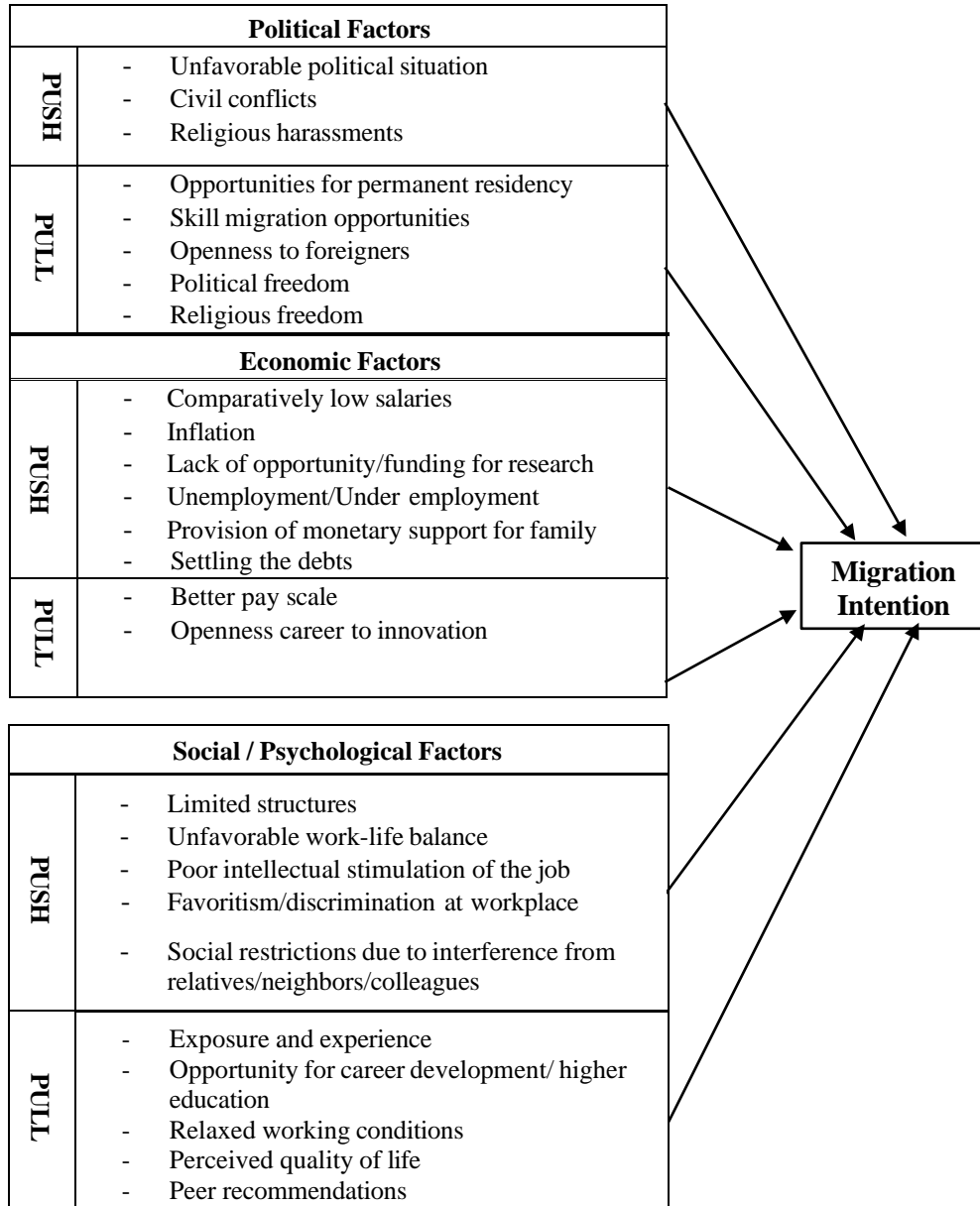
of Sri Lankan apparel industry executives

H6: There is a significant impact of social/psychological pull factors on the migration intention of Sri Lankan apparel industry executives

Conceptual Framework of the Study

Figure 1

Conceptual Framework



Source: Kumari (2017)

Methods

Research Paradigm

The study uses a post positivistic research paradigm and deduction reasoning to address a contextual gap in literature. Analysis was conducted at the individual level. This exploratory study is cross-sectional and conducted as an exploratory study, as this area has been previously studied by other researchers. The study aims to fill a contextual gap in available literature.

Research Design

This study is a quantitative field study using primary data from executive employees of apparel manufacturing companies in Sri Lanka. The data was collected through online questionnaires in English, designed based on standard measurement scales. The sample consisted of 248 executive grade employees from ABC Company, a major apparel company in Sri Lanka. The data was analyzed using SPSS, employing correlation and regression, with minimal researcher interference.

Population

A population is a group of people or items with characteristics one wants to understand. In this study, the population consists of 698 executive grade employees of ABC Company, a major company in the Sri Lankan apparel industry.

Sample

A sample is a small group of representative units from a population used for accurate determinations. It saves time and money, reduces workload, and provides known results with mathematical accuracy. Krejcie and Morgan (1970) suggest that for a population between 650-700, a sample size of 248 is necessary. In this study, the sample size is 248 respondents from the executive employees of the apparel industry in Sri Lanka.

Sampling Technique

This study employs the Probability Sampling Technique (Simple Random Sampling) to select a sample from a large population based on probability theory. The key requirement is that everyone in the population is known and has an equal chance of being selected. The sample consisted of executive employees of a leading apparel company in Sri Lanka, ensuring that every member of the population has an equal chance of being selected.

Data Collecting Method

The researcher collected primary and secondary data for a study on migration intention among executive employees of ABC Company. Primary data was collected through a questionnaire consisting of three sections. The questionnaires were anchored on a five-point Likert scale, ranging from strongly agree to strongly disagree. Secondary data was collected through various methods, including the organization's website and company records. The study aimed to understand the factors influencing migration intention.

Data Analysis

The researcher will ensure all questions are filled out and any incomplete forms are returned. After data editing, the data and data sheet will be coded using an appropriate system. Data were analyzed using Statistical Package for Social Science (SPSS) which included statistical test such as descriptive statistics, reliability and normality analysis. Also, regression was used test the hypotheses.

Findings of the Study

Response Rate

The study measured migration intention among executive employees of ABC Apparel Company by collecting 248 questionnaires from 260 distributed through social media and among employees, with a 95.38% response rate.

Table 4

The Responsive Rate of the Study

Description	Value	Percentage
Total number of questionnaires distributed	260	100%
Total number of responses received	248	95.38%
Incomplete responses	12	4.62%

Source-: Survey Data, 2023

Demographic Variable Analysis

Data was collected based on demographic characteristics such as gender, age, marital status, education level, designation, income level, and years of work in Sri Lanka.

Table 5

Demographic Profile of the Respondents

Variable	Categories	Frequency	Valid Percent
Gender	Female	183	73.8
	Male	65	26.2
Age	Below 25	98	39.5
	25-30 Years	134	54.0
	30 - 35 Years	16	6.5
Marital Status	Married	160	64.5
	Unmarried	88	35.5
Level of Education	Diploma/ Higher Diploma	33	13.3
	Bachelor's Degree	198	79.8
	Master's Degree	17	6.9
Monthly Income	50,000 - 100,000 LKR	162	65.3
	100,000 - 200,000 LKR	86	34.7

Designation	Executive	192	77.4
	Senior Executive	56	22.6
Years of work in Sri Lanka	1-2 Years	22	8.9
	3-4 Years	162	65.3
	5 Years	25	10.1
	More than 5 Years	39	15.7

Source-: Survey Data, 2023

Analyzing the Level of Migration Intention in the Sri Lankan Apparel Industry Executives

The answers to the first research question, “What is the level of migration intention of Sri Lankan apparel industry executives?” are analyzed below. The first question in the questionnaire for executives of the apparel sector was specifically designed to get the answer to this research question.

Table 6

Level of Migration Intention

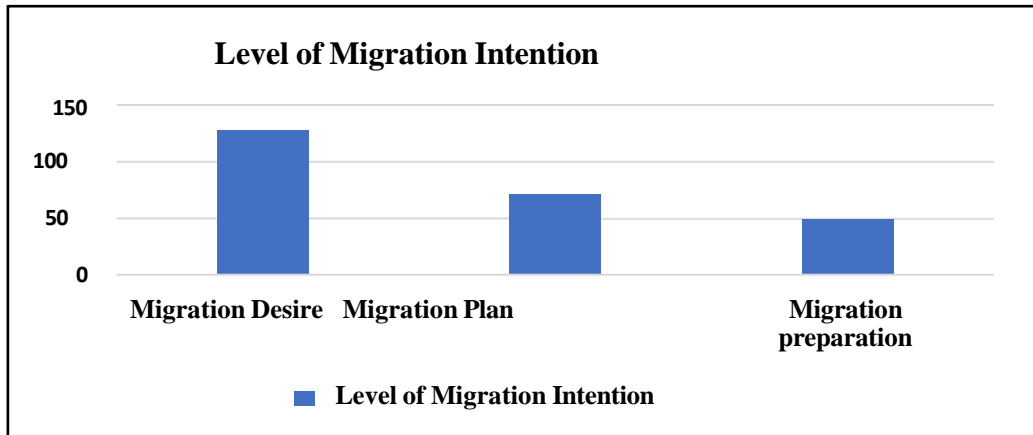
Level of migration intention	Frequency	Valid Percent
Migration Desire	128	51.6
Migration Plan	71	28.6
Migration Preparation	49	19.8

Source-: Survey Data, 2023

When looking at the intentions to migrate to different countries, the researcher observed that willingness to migrate is consistently higher than planning and preparation. According to the above graph, 128 executives desire to migrate, and 71 executives have a migration plan. Out of the 242, only 49 respondents were prepared the migrate into another country.

Figure 2

Level of Migration Intention



Source:- Survey Data, 2023

While the intention to migrate is a general indication of a desire to move, the other two questions, planning and preparing to migrate, reveal more specific intentions and arrangements people can make before actually leaving.

In other words, the question of intention to migrate can be based on various factors and to identify those factors, the second research question is analyzed as follows.

Analysis of the Factors of Migration Intention of the Sri Lankan Apparel Industry Executives

Descriptive Statistics

The researcher can use descriptive statistics to gain a good understanding of how respondents responded to the questionnaire items and the relevance of the questions and measurements they used (Sekaran, 2003). The mean and standard deviation were used by the researcher to define the variables in order to understand their current level.

Table 7

Descriptive Statistic

	N	Minimum	Maximum	Mean	Std. Deviation
Political Push	248	1	5	3.16	1.536
Economic Push	248	1	5	3.24	1.452
Social Psychological Push	248	1	5	3.12	1.395
Political Pull	248	1	5	3.14	1.423
Economic Pull	248	1	5	3.19	1.386
Social Psychological Pull	248	1	5	3.07	1.291
Migration Intention	248	1	5	3.23	1.514

Source:- Survey Data, 2023

The study reveals a moderate level of migration intention among executives in the apparel sector of Sri Lanka, with a mean value of 3.23. Moreover, the standard deviation of 1.514 implies that the variable deviated within the range of 1.514. The independent variables of political push and pull factors have a mean value of 3.16 and 3.14, respectively, indicating a moderate level of effect on migration intention. Economic push and pull factors also have a moderate level of effect, with an overall mean value of 3.24 with a 3.19. Social psychological push and pull factors also have a mean value of 3.12 and 3.07.

Test of Reliability

Considering the insights they provided, Cronbach ‘s coefficient alpha value of less than 0.60 is considered to be poor and within the range of 0.70 is acceptable and more than 0.80 is excellent. When considering the overall Cronbach’s alpha value of this study has recorded 0.962 which is an excellent level. Table 8, shows the Cronbach’s alpha values of variables gained by the researcher through running the SPSS.

Table 8

Cronbach's Alpha Value of Variable

Variable	Cronbach's Alpha	N of Items
Political Push	.898	3
Economic Push	.948	6
Social Psychological Push	.888	5
Political Pull	.880	5
Economic Pull	.883	2
Social Psychological Pull	.939	5
Migration Intention (Y)	.876	3

Source-: Survey Data, 2023

Validity Analysis

According to Kaiser as cited in Field (2009), KMO and Bartlett's Test results must be greater than 0.5 to confirm the validity. Furthermore, if KMO and Bartlett's Test results fall between 0.5 and 0.7, they are considered average; 0.7–0.8, good; 0.8–0.9, fantastic; and more than 0.9, excellent.

According to Table 9 below, all the items were reliable and there are three variables' values of KMO and Bartlett between 0.8 and 0.9, and two variables also between 0.7 and 0.8 and other two variables are between 0.5 and 0.7. Therefore, scales of all variables were validated. Furthermore, the KMO and Bartlett's values of economic push factors, political pull factors, and social psychological pull factors are between 0.8 and 0.9 indicating that the variables are great. And also, KMO and Bartlett's values of political push factors, social psychological push factors, and migration intention between 0.7 and 0.8 indicate that variables are good.

Table 9

Validity Test

Variable	KMO and Bartlett's Test values	P value
Political Push	.746	0.000
Economic Push	.894	0.000
Social Psychological Push	.782	0.000
Political Pull	.831	0.000
Economic Pull	.500	0.000
Social Psychological Pull	.890	0.000
Migration Intention (Y)	.686	0.000

Source: Survey Data, 2023

Multicollinearity Test

This test is conducted in two stages using an intercorrelation matrix and tolerance values and the variance inflation factor (VIF). The researcher proposed two hypotheses: H0 (no multicollinearity issue) and H1 (There is no multicollinearity issue). Use an intercorrelation matrix to compare the Pearson correlation coefficients of each independent variable. If the Pearson coefficient of inter-correlation between independent variables is strong, that is, 0.9 or higher, there is high risk of multicollinearity. There is less chance for multicollinearity if the Pearson coefficient is small (below 0.9 or around 0).

According to the below table 10, the Pearson correlation coefficient values from the inter- correlation matrix are less than 0.9, indicating that all the independent variables (PPUSH, PPULL, EPUSH, EPULL, SPUSH, SPULL) are not multicollinear. Therefore, it can accept the null hypothesis.

Table 10

Correlation Matrix

		<i>PPUSH</i>	<i>PPULL</i>	<i>EPUSH</i>	<i>EPULL</i>	<i>SPUSH</i>	<i>SPULL</i>
<i>PPUSH</i>	Pearson Correlation	1	.838^{**}	.720 ^{**}	.729 ^{**}	.735 ^{**}	.652 ^{**}
	Sig. (2-tailed)		.000	.000	.000	.000	.000
<i>PPULL</i>	Pearson Correlation	.838^{**}	1	.706^{**}	.734 ^{**}	.708 ^{**}	.672 ^{**}
	Sig. (2-tailed)	.000		.000	.000	.000	.000
<i>EPUSH</i>	Pearson Correlation	.720 ^{**}	.706^{**}	1	.834^{**}	.852 ^{**}	.704 ^{**}
	Sig. (2-tailed)	.000	.000		.000	.000	.000
<i>EPULL</i>	Pearson Correlation	.729 ^{**}	.734 ^{**}	.834^{**}	1	.811^{**}	.717 ^{**}
	Sig. (2-tailed)	.000	.000	.000		.000	.000
<i>SPUSH</i>	Pearson Correlation	.735 ^{**}	.708 ^{**}	.852 ^{**}	.811^{**}	1	.662^{**}
	Sig. (2-tailed)	.000	.000	.000	.000		.000
<i>SPULL</i>	Pearson Correlation	.652 ^{**}	.672 ^{**}	.704 ^{**}	.717 ^{**}	.662^{**}	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

****. Correlation is significant at the 0.01 level (2-tailed).

Source: Survey Data, 2023

Tolerance value and variance inflation factor (VIF)

To verify the multicollinearity test, tolerance values and a VIF for each variable are required. A significant probability of multicollinearity is observed when tolerance values are less than 0.2 and VIF values are larger than 5. Conversely, multicollinearity decreases with tolerance values higher and VIF values lower.

The table 11 below results show that the independent variables (PPUSH, PPULL, EPUSH, EPULL, SPUSH, SPULL) are not multicollinear, indicating that the null hypothesis (H0 - There is no multicollinearity issue) can be accepted, and multiple regression can be conducted due to these findings.

Table 11

Tolerance Value and Variance Inflation Factor

	Collinearity Statistics	
	Tolerance	VIF
Political Push	.252	3.971
Economic Push	.204	4.908
Social Psychological Push	.226	4.428
Political Pull	.256	3.907
Economic Pull	.230	4.344
Social Psychological Pull	.418	2.391

Source: Survey Data, 2023

Analysis of the Impact of Influencing Factors on MI

Adjusted R Square (R2)

Table 12

Model Summary Table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.902 ^a	.814	.809	.661	2.066

Source: Survey Data, 2023

R-value represents the correlation between the dependent and independent variables. The R-value is .902 which is greater than .5 which indicates that the relationship between migration intention and all factors affecting it is very strong. R-square shows the total variation for the dependent variable that could be explained by the independent variables. A value of .814 greater than 0.5 indicates that the model is effective enough to determine the relationship. The Durbin-Watson value is 2.066 and it can be concluded that it is free from the problem of autocorrelation based on the thumb rule stating that it should be between 1.5 and 2.5.

Analysis of Variance (ANOVA)

Table 13

ANOVA Table

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	460.522	6	76.754	175.538	.000 ^b
	Residual	105.377	241	.437		
	Total	565.899	247			

Source-: Survey Data, 2023

P-value/ Sig value: Generally, 95% confidence interval or 5% level of the significance level is chosen for the study. The Sig value should be less than 0.05. In the above table, it is .000. Therefore, the result is significant. These results estimate that as the p-value of the ANOVA table is below the acceptable significance level, thus there is a possibility of rejecting the null hypothesis in further analysis.

Discussion and Recommendation

Discussion

This research aims to identify the factors influencing Sri Lankan apparel industry executives' migration intentions and evaluate their relationship with these factors. This study posits a significant correlation between migration intention and political push factors in the Sri Lankan apparel industry. Political push factors include unfavorable political situations, civil conflicts, and religious harassment, while political pull factors include opportunities for permanent residency, skill migration, openness to foreigners, and political freedom (Sabri & Ramalu, 2020; Al-Tamimi, 2006). This finding aligns with previous research indicating that political instability strongly influences migration and brain drain movements. Thus, H1 and H4 are accepted as significant associations.

The study suggests a significant relationship between migration intention and

economic push factors in Sri Lankan apparel industry executives. Economic conditions like unemployment, inflation, low wages, and debt servicing problems can push migrants out of their home countries, while destinations offering higher wages and innovation are often pulled in. Simpson's (2020) findings confirm this positive relationship, confirming the existence of a significant positive relationship between economic push and pull factors. With the consistency of the above findings, H2 and H5 were accepted with confirming the significant positive relationship.

Research on cross-border migration reveals that social/psychological factors play a significant role in migration intention. Push factors include limited career structures, unfavorable work-life balance, poor intellectual stimulation, and workplace discrimination (Urbanski, 2022). Pull factors include exposure, career development opportunities, relaxed working conditions, perceived quality of life, and peer recommendations. The findings related to the acceptance of H3 and H6, with confirming the positive relationship between these factors and migration intention.

Conclusion

This study investigates the factors influencing the migration intention of Sri Lankan apparel industry executives. It aims to determine the level of migration intention, the factors affecting it, and the impact of these factors. The study uses literature to categorize migration intention into push and pull factors. A sample of 248 Sri Lankan apparel industry executives was collected to gather data on these factors. Random sampling was used to reach potential qualitative survey respondents. The research aims to understand the influence of these factors on the migration intentions of Sri Lankan apparel industry executives.

According to this study, the first question was to find out the level of migration intention. The level of intention to migrate to different countries is observed along three aspects: willingness, planning, and readiness to migrate. Willingness to migrate is consistently higher than planning and preparation. According to table 4, 128 executives desire to migrate, and 71 executives have a migration plan. Out of the 242, only 49 respondents were prepared to migrate into another country. Our

findings are consistent with the aspiration-capability gap described by De Haas (2011) and Carling (2002). A significant number of executives express willingness to migrate and willingness to migrate is higher than planning and preparation.

Furthermore, the second question was what factors influence the migration intention of Sri Lankan apparel industry executives. Descriptive statistics and other statistics found that political, economic and social/psychological factors influence the migration intention of Sri Lankan apparel industry executives. Political concerns also resonate with Haas (2010), who notes that restrictive or unstable political environments compel skilled professionals to seek opportunities in more stable and predictable countries. This finding supports Cohen and Sirkeci (2011), who highlights that economic disparities between countries drive migration, especially among professionals seeking better financial stability. Social and psychological factors play a significant role in migration intentions, reflecting insights from Carling (2002), who emphasizes the role of social networks and perceived quality of life in migration decisions.

And also, the third question was what is the impact of influencing factors on the migration intention of Sri Lankan apparel industry executives. According to statistics, push and pull (political, economic, and social) factors have a significant positive impact on the migration intention of Sri Lankan apparel industry executives. This finding is consistent with the research of Haas (2010), who found that political instability and adverse government conditions significantly drive migration. Cohen and Sirkeci (2011) further support this by noting that individuals are often pushed to migrate due to unfavorable economic conditions at home, which is reflected in the significant positive impact of economic factors observed in our study. Furthermore, Carling (2002) argues that social networks and the desire to join family members abroad significantly influence migration decisions.

Limitations

Limitations that may arise in relation to this study are:

1. Focuses on Sri Lankan apparel industry executives from one company and region.
2. Inability to reach mass audience to collect data.
3. Focuses only on most important variables influencing migration intentions.
4. Findings may be specific to the apparel industry, not applicable to other industries.

Recommendations

The following recommendations should be considered in relation to this study. Policies need to be developed to retain the skilled workforce in the apparel sector to work in the home country, which will reduce the level of migration trends of apparel executives in Sri Lanka. And, comparative analysis with executives from different sectors or geographical areas can provide a comprehensive understanding of migration variables. Furthermore, Government incentives or support programs for companies implementing employee retention strategies can be beneficial. And also, international best practices for retaining personnel can be used to create practical solutions tailored to the Sri Lankan environment.

Future Work

Future research may leverage these findings to learn more about the factors influencing the migration intentions of Sri Lankan apparel industry executives.

1. Examine executives in the Sri Lankan apparel industry's intentions to migrate in comparison to executives in other industries in Sri Lanka or executives in related industries in different countries.
2. Conduct a more detailed investigation into specific factors that significantly influence migration intentions.

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Analysis of Public Satisfaction of Service Quality in Gampaha Municipal Council.

Pramuditha, S.¹, Karunarathne, L.² and Indumini, A.³

Local governments in Sri Lanka represent the lowest tier of the administrative structure, where clients hold clear expectations of efficiency and effectiveness. This study aims to apply the SERVQUAL model to measure public satisfaction with service quality in the Gampaha Municipality. The research involved a sample of 100 and used purposive sampling technique to select service users from various departments within the Gampaha Municipality. A self-administered, Likert-scaled questionnaire was developed to separately measure the variables. The study's findings indicate a significant relationship between all the measured variables and public satisfaction. This research is particularly notable as it addresses a gap in existing literature; no previous studies have investigated the service quality of local government in Gampaha Municipality using the SERVQUAL model. The implications of this study are significant for local governments and policymakers. Future research could expand on this study by exploring other service quality dimensions within the SERVQUAL model and applying similar methodologies to other local government agencies.

Keywords: *Municipal council, Public satisfaction, SERVQUAL model, Service quality.*

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Introduction

Providing superior service can be identified as one of the main factors affecting the long-term success of the service industry. Service quality is considered to be the evaluation of the excellence and superiority of the service (Shahin & Dabestani, 2010). The attitudes and emotions experienced during the consumption process affect the loyalty of the customer who consumes the service (Ishaq, 2012). Due to pressures and expectations from society that local governments deliver their services to the standard of quality expected by the public, efficiency and effectiveness become the main focus of government in many countries.

Compared to the private sector, clients may find dissatisfaction with the quality of service in the public sector. The opportunity also helps to identify the strengths and weaknesses of the service quality of the local government in order to better understand and satisfy the needs of the beneficiaries. Quality of service and satisfaction of service beneficiaries are important concepts that local authorities need to understand in order to maintain efficiency and effectiveness (Piyasunthornsakul et al., 2022). The objective of this study is analyze the satisfaction level of users on service quality of Gampaha municipal council.

In Sri Lanka, as in Thailand, there is a pressing need to evaluate service quality and public satisfaction within the government sector. While public sector objectives differ from those of commercial enterprises, enhancing service quality and public trust remains essential. Despite efforts, dissatisfaction with local government services is prevalent, and the specific factors contributing to this dissatisfaction are not well understood.

This study aims to address this gap by assessing public satisfaction and identifying the components affecting service quality in the public sector. Utilizing the SERVQUAL model, the research will pinpoint areas for improvement to enhance service delivery and increase public satisfaction. This study is important for various stakeholders, especially local government officials, administrators and policy makers at regional and national levels. By comprehensively understanding public

perceptions of municipal services, decision makers can pinpoint areas for improvement that lead to significant improvements in service quality.

Literature Review

Concept of public service

The quality of public services places an emphasis on both the service itself and the method used to plan or provide it. It can list speed, accuracy, convenience, and justice as determinants of the level of public service. The public good should take precedence above servicing one's private wants, and administrators should concentrate more on doing so (Tumiwa et al., 2018). Overall, public institutions show a failure to deliver services to the potential market. But the public sector cannot be removed from the whole process and the public sector is important to regulate production and finance while maintaining the efficiency of the market (Suwandi & Warokka, 2013; Akroush et al., 2015). According to the Spicker (2009), public service is a reflection of community independence and striving to provide good service to enhance the welfare of the community. Public services have four main characteristics. They exist for policy purposes, provide public services, are redistributed, and provide reliable service.

This article explores the essential characteristics of public services, emphasizing their role as a trust, providers of public services, with policy-related goals and a redistributive function. Additionally, it highlights the dynamic nature of society, necessitating public services to innovate and adapt to societal changes. The post-World War II era witnessed three methods of public sector innovation, establishing connections between innovation and the improvement of public services. The government's responsiveness to diverse public needs is crucial for meeting evolving public expectations (Spicker, 2009).

Local authority system in Sri Lanka

In this study, the services provided by local authorities in Sri Lanka are examined. Local governments, which operate at the lowest level of the administrative structure, are responsible for delivering a range of essential services within specific geographic areas to meet public needs. These services include local administration, health and hygiene promotion, public transportation, and utility services (Gov.lk, 2023).

The 13th Amendment to the 1987 Constitution devolved local administration to Provincial Councils, giving them oversight of local government entities while the federal government retained control over the foundation, organization, and national policies of local governments. The local government system in Sri Lanka comprises three primary governing bodies: Municipal Councils, Urban Councils, and Pradeshiya Sabhas. Sri Lanka has 24 Municipal Councils, which serve as the primary legislative bodies for the largest cities. These councils, led by elected mayors and members, oversee a variety of services, including clean water provision, public health, utility services, road maintenance, and the upkeep of public amenities such as playgrounds, libraries, and community centers. Municipal Councils operate under the Local Government Elections Ordinance, with members elected through a proportional representation method (Gov.lk, 2023).

Urban Councils, governed by the Urban Council Ordinance No. 61 of 1939, are established in areas with urbanized characteristics. The Minister, through a gazette order, designates these areas as cities, defining their administrative boundaries. Urban Councils provide services similar to those of Municipal Councils, focusing on public utilities, health services, and infrastructure maintenance (Gov.lk, 2023). This study underscores the critical role of local governments in Sri Lanka in promoting public welfare and providing essential services, highlighting the impact of decentralization on local administration and service delivery.

Service quality

Many international researchers have studied the topic because raising the standard of public services is one of the most important objectives in enhancing public administration globally. Whether or not the community receives the necessary and desired services is how service delivery success is determined. Since the government is the principal public servant, it has a moral duty to keep raising the standard of care. The public service encompasses all acts taken by public sector organizations that are supported by tax dollars and pertain to the provision of goods or services to all societal levels (Akroush et al., 2015). Customer expectation serves as a basis for evaluating service quality because quality is high when performance exceeds expectation and quality is low when performance does not meet their expectation (Akroush et al., 2015). As per Parasuraman et al. (1985), 10 criteria used to evaluate service quality are identified; Credibility, Approach, Competence, Communication, Courtesy, Credibility, Security, Responsiveness, Tactfulness and Understanding of the Customer. He suggested that when service quality is high, it leads to increased customer satisfaction.

SERVQUEL Model

A multifaceted research tool called SERVQUAL was created by Parasuraman et al. (1985). SERVQUAL measures customer satisfaction in five parameters that represent the quality of the service. The paper further indicated that "the gap model is the most reliable and valuable contribution to the service literature". There are five components in SERVQUEL model. They are, Tangibility: The tangible assets, machinery, appearance, and communication materials, Reliability: the capacity to deliver the promised service consistently, on time, and in a trustworthy way, Responsiveness: the desire to address issues swiftly, deal effectively with customer complaints, and be able to both help and meet the demands of customers,

Assurance: the knowledge and courtesy of employees and their ability to convey trust and confidence, Empathy: the provision of caring, individualized attention to customers (Parasuraman et al., 1988). They reported further that, regardless of the service being studied, reliability was the most important dimension, followed by responsiveness, assurance and empathy. The intangibles were of least concern to service customers. The degree of service quality and its impact on customers' satisfaction with divisional secretariats' customer service, however, is not a field of study that has been finished in Sri Lanka. Since its conception, SERVQUAL has been extensively applied in simulation studies in a range of industrial, business, and non-profit contexts to evaluate the quality-of-service delivery in terms of what clients anticipate and what they actually get. However, there is a gap in the literature concerning the assessment of service quality in Sri Lankan Municipal Council Local Authorities. The study proposes to address this gap by applying Parasuraman's SERVQUAL model to evaluate service quality in this specific context, drawing on the extensive use of the model in various sectors globally.

SERVQUAL instruments

Tangibility

Tangibility in services refers to the physical elements impacting customer interactions, such as location and appearance. It's a non-human factor distinct from human-related aspects like assurance and empathy. Research highlights the significant influence of tangible proof, including building appearance and tools, on customer satisfaction. In the retail banking industry in Bangladesh, empathy has the strongest positive correlation with consumer satisfaction, while tangibility has the least impact. "Tangibles" encompass external aspects like buildings, office spaces, and communication tools, contributing to customer satisfaction. A well-managed infrastructure, with modern technology and furnishings, can capture customer

attention and enhance overall satisfaction (Hennayake & Hennayake, 2017), (Dewi & Riani, 2017).

Reliability

Reliability in service provision centers on the customer's perception of receiving promised services in a consistent, trustworthy, and timely manner. It involves the ability to consistently deliver services as committed, reflecting the company's commitment and integrity. Marketers are urged to offer reliable products or services without compromising their quality. Honesty in addressing issues and honoring commitments is crucial to prevent customer dissatisfaction. Timely delivery and adherence to promises, such as guarantees, are emphasized for maintaining trust. Overall, reliability is foundational for a company's reputation and customer satisfaction (Tumiwa et al., 2018).

Responsiveness

The importance of service provider responsiveness is emphasized in the literature, with a focus on timely and accurate assistance to customers' needs and requests. Responsiveness plays a vital role in determining product quality, communication standards, and customer satisfaction. Swift and precise responsiveness contributes to increased consumer satisfaction, loyalty, and trust, ultimately impacting the organization's profitability and product delivery. The commitment of staff members to fulfilling client needs and ensuring quick service is crucial, emphasizing the significance of maintaining customer-centric practices at all levels of the organization (Tumiwa et al., 2018), (Rajapaksha, 2021).

Assurance

Assurance, defined as the workforce's ability to instill confidence and trust through knowledge and courtesy, is found to have a significant positive correlation with

customer satisfaction. Greater assurance strength, encompassing staff knowledge, skills, courtesy, and credibility, leads to higher levels of customer satisfaction. In competitive environments, the presence of knowledgeable and skilled staff becomes crucial for building and maintaining customer trust (Tumiwa et al., 2018).

Empathy

Empathy, defined as an organization's consideration and thoughtfulness toward its clients, is found to have a strong positive correlation with customer satisfaction. Higher satisfaction is a result of increased empathy, as demonstrated in various studies. The Urban Transformation Centre's service quality and public satisfaction were notably improved through empathy. Empathy, encompassing effective communication, individual consideration, and understanding of customer needs, fosters customer focus and builds trust. Time management skills are crucial for prompt customer service, emphasizing the importance of quick response and personalized interactions to enhance customer relationships (Tumiwa et al., 2018), (Kumar, 2020).

Public satisfaction

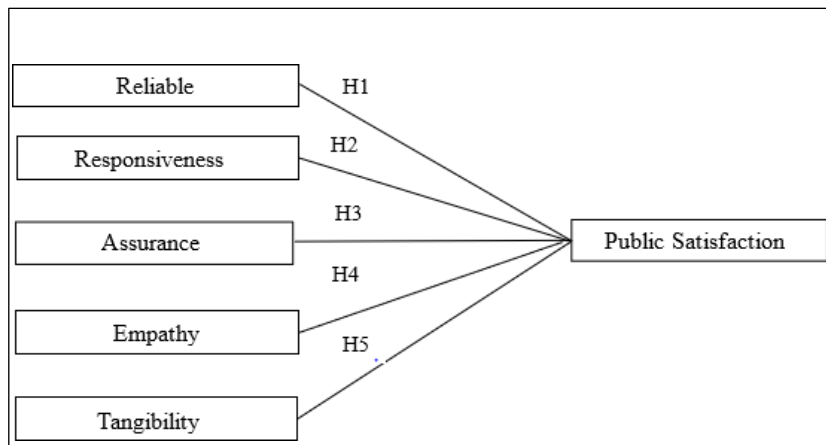
In this study, the relationship between public satisfaction and service quality in public sector organizations is explored. Customer satisfaction, defined as the degree to which individuals feel about a product's performance in comparison to their expectations, is crucial for understanding and improving service quality. Managers need to identify areas requiring attention to enhance customer satisfaction, especially in a market monopoly where customer choice is limited. The study emphasizes that exceeding customer expectations leads to satisfaction. Public satisfaction, vital in the service industry, is the overall assessment of service quality and performance of public institutions, particularly in the context of local authority areas. The complexity of evaluating customer expectations and

fulfillment is acknowledged, highlighting the importance of narrowing the rating experience. The study recognizes the challenge of objectively measuring public satisfaction with public services, as officials' judgments may differ from public perceptions. The SERVQUAL model is identified as suitable for examining service quality and public satisfaction in public sector organizations (Dewi & Riani, 2017), (Bejou et al., 1998).

Conceptual Framework and Hypothesis Development

Figure 1

Research Framework



Source: Author, 2024

As per the study hypothesis states as below.

H1: There is a significant relationship between reliability and public satisfaction of the service quality in GMC.

H2: There is a significant relationship between responsiveness and public satisfaction of the service quality in GMC.

H3: There is a significant relationship between assurance and public satisfaction of the service quality in GMC.

H4: There is a significant relationship between empathy and public satisfaction of the service quality in GMC

H5: There is a significant relationship between tangibility and public satisfaction of the service quality in GMC.

Reliability and Public Satisfaction

The reliability component assesses an employee's capacity and dedication to provide services in line with the contract. All clients will receive the same level of service as a result of this decision, which was motivated by the goal to adapt performance to meet customer expectations (man et al., 2019). The assistance offered by a respected service provider aids in the growth of the company and guards against an unplanned decline. The hypothesis therefore develops as follows.

H1: There is a significant relationship between reliability and public satisfaction of the service quality in GMC.

Responsiveness and Public Satisfaction

Responsiveness is the capacity of a company's staff to react swiftly and communicate information in response to client requests. Employees can increase their skills in serving clients by being rated favorably by customers for their ability to respond to what they have. When people are motivated to address the issues, clients encounter when utilizing services, customer happiness increases (man et al., 2019). Therefore, the hypothesis is can developed as below.

H2: There is a significant relationship between responsiveness and public satisfaction of the service quality in GMC

Assurance and Public Satisfaction

Johnson & Karley uses assurance as one of the essential elements of service quality to determine how satisfied their clients are. Customers are more likely to have a

great degree of trust in a dependable service provider. The staff's process of gaining expertise may provide customers with great comfort when they apply their desired conditions during service delivery. Clients can have faith that the individual providing the service will perform their responsibilities in an ethical and professional manner. (Johnson et al., 2018).

H3: There is a significant relationship between assurance and public satisfaction of the service quality in GMC

Empathy and Public Satisfaction

Asserts that there is a favorable relationship between public satisfaction and empathy. He also realized that without compassion, customers would not be content with the quality of the services they received. Therefore, empathy has a big role in customer happiness. (Al- Marri et al., 2007) This factor will significantly help the organization build long-term relationships with its customers (Wieseke et al., 2012). Therefore, the hypothesis is advanced as below.

H4: There is a significant relationship between empathy and public satisfaction of the service quality in GMC

Tangibility and Public Satisfaction

In organizations, a tactile dimension is a tool that is physically utilized to create and complete tasks. Both the use of assistive technology and the manner in which clients are served can leave a lasting impression. Customers receive first-rate treatment while using the company's services. As a result, the practical dimension is becoming more important as employees are required to meet client requests fast. Customer service is improved by improving the organization's touch points (man et al., 2019) Therefore, the hypothesis is advanced as below.

H5: There is a significant relationship between tangibility and public satisfaction of the service quality in GMC.

Methods

This is the study aims to analyze the satisfaction level of users on service quality of Gampaha municipal council. This is used quantitative research approach. Purposive sampling technique used to select the sample of 100 people who are utilizing service from Gampaha Municipal council. The study utilized the SERVQUAL model developed by Parasuraman, Zeithaml, and Berry to assess service quality and customer satisfaction. This model measures five dimensions of service quality: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. These dimensions were evaluated using a structured questionnaire comprising 23 statements, each rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). This approach helps gauge respondents' perceptions of the service quality provided by the Gampaha Municipal Council. (Refer table 1). Data analysis done by using SPSS software.

Table 1

Variables and constructors

Variable	Indicator	Sources
Reliability	R1: Staff is reliable. R2: Staff is genuinely interested in solving my problems. R3: Service period is suitable for my needs. R4: staff is collecting and recording the information correctly.	(Karunaratne et al. 2015; Piyasunthornsa kul et al., 2022)

Responsiveness	<p>RES1: The service is fast.</p> <p>RES2: The staff is happy and willing to serve.</p> <p>RES3: The staff is very convenient and has a hassle-free service process.</p> <p>RES4: Ability to perform the Promised service accurately and dependably.</p>	(Karunaratne et al. 2015; Piyasunthornsakul et al., 2022)
Assurance	<p>A1: have a good feeling and impressed after receiving about the service.</p> <p>A2: The staff is polite to me.</p> <p>A3: Safe transactions.</p> <p>A4: The staff has the knowledge and skill to answer my questions.</p>	(Karunaratne et al. 2015; Piyasunthornsakul et al., 2022)
Empathy	<p>E1: The opening hours are convenient for me.</p> <p>E2: The staff serves equitably without discrimination.</p> <p>E3: The staff understands my needs.</p> <p>E4: Give customers individual attention.</p>	(Karunaratne et al. 2015; Piyasunthornsakul et al., 2022)

Tangibility	<p>T1: The service location is clean.</p> <p>T2: The served system is modern.</p> <p>T3: Materials associated with the service is visually appealing.</p> <p>T4: Easy to understand when getting the service.</p>	<p>(Karunaratne et al. 2015; Piyasunthornsakul et al., 2022)</p>
Public Satisfaction	<p>P1: Overall, I think the service quality of this office is good.</p> <p>P2: Overall, I think I am satisfied with the service provided.</p> <p>P3: Overall, I think I am satisfied with the service provided.</p> <p>P4: Overall, I think the service from this office is worth the tax I paid.</p>	<p>(Karunaratne et al. 2015; Piyasunthornsakul et al., 2022)</p>

Source: Author, (2024)

Findings of the Study

Demographic profile

The gender analysis of survey respondents reveals a predominant male majority (61%), possibly indicating a gender disparity in the subject matter or survey approach, potentially influenced by more male visitors to the Gampaha Municipal Council during data collection. However, age distribution in the sample is well-balanced, with notable representation across various age groups. The majority fall into the 20–30 and 41–50 categories (24%), providing diverse insights. Educational levels display a diverse range, with 34% having advanced level education and 33%

holding bachelor's degrees. The occupational profile showcases a varied workforce, with 36% working for themselves, 15% as business owners, and 8% in government employment. Noteworthy is the 13% retired or unemployed, emphasizing unique perspectives. Students constitute 7%, and the "Other" category (13%) adds richness to the dataset. This comprehensive profile enhances the understanding of respondents, contributing valuable insights for customized analysis and decision-making in diverse contexts.

Table 2*Demographic profile*

	Categor ies	Percentage (%)
Gender	Male	61
	Female	39
Age	20 – 30	24
	31 – 40	22
	41 – 50	24
	51 – 60	21
	More than 60	09
Educational level	Ordinary level	16
	Advanced level	34
	Diploma level	12
	Bachelor's degree level	33
	Higher than bachelor's degree	05

Occupation	Student	07
	Self-employment	08
	Government officer	08
	Business owner	15
	Private employees	36
	Farmer	0
	Unemployment/ retirement	13
	Other	13
	Total	

Source: Author, (2024)

Preliminary Analysis

Under the development as preliminary analysis, I test the validity test, Reliability test and Normality test.

Sampling Adequacy test

In factor analysis, sampling adequacy is evaluated to make sure the data is appropriate for this statistical method. In SPSS, the Kaiser-Meyer-Olkin (KMO) metric is frequently employed to assess sample adequacy. A good fit for factor analysis is indicated by a KMO value that is near to 1. So, according to this analysis, the value is 0.868. Which means the sample is adequate to do the analysis. Refer table 3.

Table 3

KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.868
Bartlett's Test of Sphericity	Approx. Chi-Square	605.702
	Df	15
	Sig.	.000

Source: Author, (2024)

Reliability Test

The internal reliability of the measures employed in this study was evaluated using Cronbach's alpha which is more than 0.7 (Hair *et al.*, 2021) indicating all the constructs in the model have good internal consistency. All the variables shown Cronbach's alpha value more than 0.7. Therefore, the reliability of data set is very high.

Normality Test

Table 4

Normality test

	Kolmogorov-Smirnov^a		Shapiro-Wilk			
	Statistics	Df	Sig.	Statistic	Df	Sig.
Average of Reliability	.218	100	.000	.906	100	.000
Average of Responsiveness	.197	100	.000	.916	100	.000

Average of Assurance	.168	100	.000	.948	100	.001
Average of Empathy	.212	100	.000	.904	100	.000
Average of Tangibility	.157	100	.000	.936	100	.000
Average of Public satisfaction	.265	100	.000	.869	100	.000

Source: Author, (2024)

Here, two normality tests are conducted. The Shapiro-Wilk test is used for datasets with lower than 2000 elements; for larger datasets, the Kolmogorov-Smirnov test is employed. In this instance, the Shapiro-Wilk test is applied because there are only 100 items. The p- value from A is 0.000. By rejecting the alternative theory, we are able to determine that the data is distributed not normally. Refer table 5.

KMO and Bartlett's Test was used to test the sampling adequacy. Cronbach's alpha was computed for each dimension of the SERVQUAL model and factor analysis carried out to test validity. When check the normality of data the p-value from A is 0.000. By rejecting the alternative theory, we are able to determine that the data is distributed not normally. The data is not normal distribution. So, it used nonparametric spearman's correlation to test the hypothesis mainly. I get the "public satisfaction" as the dependent variable to test the affection for the service quality of GMC. But, to further justify the results, when collecting data got a question as "satisfied or not". So, when checked out the relationship between dependent and independent variables, it used above question as a categorical variable to test the hypothesis.

The study acknowledges a non-normal distribution of data and employs nonparametric Spearman's correlation to test the hypothesis, with "public satisfaction" as the dependent variable to assess the impact of GMC service

quality. To strengthen the findings, the relationship between dependent and independent variables is further explored using a categorical variable derived from the "satisfied or not" question during data collection. As an additional evidential measure, the study conducts a descriptive cross-analysis, specifically a cross-tabulation, based on the "satisfied or not" question. This approach enhances the robustness of the results, providing a comprehensive examination of the relationship between service quality and public satisfaction.

Table 5

Results of the hypothesis

Hypothesis	P value	Accepted / Rejected
H1: There is a significant relationship between reliability and public satisfaction of the service quality in GMC	0.784	Accepted
H2: There is a significant relationship between responsiveness and public satisfaction of the service quality in GMC	0.729	Accepted
H3: There is a significant relationship between assurance and public satisfaction of the service quality in GMC	0.747	Accepted
H4: There is a significant relationship between empathy	0.719	Accepted

and public satisfaction of the service quality in GMC		
H5: There is a significant relationship between tangibility and public satisfaction of the service quality in GMC	0.403	Accepted

Source: Author, (2024)

Discussion and Recommendations

The findings of this study shed light on the intricate relationship between service quality dimensions and public satisfaction within the context of the Gampaha Municipal Council. The analysis reveals nuanced insights into the varying impacts of different dimensions on overall satisfaction.

In terms of reliability, while Piyasunthornsakul et al. (2022) found a non-significant relationship between reliability and satisfaction, our study in the Gampaha Municipal Council contradicts this, establishing a strong positive correlation. The discrepancy emphasizes the need for context-specific investigations and the recognition that the dynamics between reliability and satisfaction may differ across diverse organizational settings.

Responsive service delivery emerges as a crucial factor influencing public

satisfaction, aligning with previous studies in Thailand (Piyasunthornsakul et al., 2022.). The Gampaha Municipal Council should prioritize the establishment of effective communication channels and a culture of responsiveness to address citizen inquiries and concerns promptly, fostering a positive perception of the council's commitment to community needs.

Assurance, encompassing staff knowledge and financial transparency, significantly correlates with public satisfaction. To enhance assurance, the council should focus on clear mechanisms for citizens to monitor fund allocation and engage in proactive communication. This aligns with the findings of Akroush et al. (2015) and underscores the importance of financial transparency in ensuring public trust and contentment.

Empathy, reflective of considerate and individualized care, proves vital in strengthening the relationship between the City Council and the community. Actively addressing public concerns and demonstrating a commitment to understanding community needs will contribute to building a responsive and empathetic organizational culture.

Tangibility, involving physical facilities, exhibits a positive relationship with public satisfaction. The study suggests that improving physical facilities can further enhance overall satisfaction, emphasizing a potential avenue for the Gampaha Municipal Council to invest in to meet public expectations.

Conclusion

This research aimed to address the prevailing dissatisfaction among the public regarding government services, with a specific focus on the Gampaha Municipal Council in Sri Lanka. The investigation delved into the application of the SERVQUAL model to measure service quality, considering the dimensions of Reliability, Responsiveness, Assurance, Empathy, and Tangibility.

The findings revealed a significant positive relationship between these SERVQUAL dimensions and public satisfaction with the services provided by the Gampaha Municipal Council. Despite the challenges faced by public institutions, such as resource waste and errors stemming from improper management, this study sheds light on the potential for improvement. The non-parametric analysis, including correlation and crosstabulation, was employed due to the non-normal distribution of the dataset. In summary, this research not only contributes to understanding the specific challenges faced by the Gampaha Municipal Council but also offers a roadmap for future improvements in local government services. By identifying key dimensions that influence satisfaction, the study provides empirical insights into how the public perceives the quality of services in government institutions, ultimately contributing to the broader discourse on enhancing public satisfaction in the government sector.

Research Implication

This study underscores the significance of adhering to service quality characteristics, specifically assurance, tangibles, empathy, responsiveness, and customer happiness, in the context of local government services. The research employs the SERVQUAL model, revealing that in Gampaha Municipal Council, reliability, responsiveness, assurance, empathy, and tangibility significantly impact the satisfaction of service receivers.

Limitations of the study

The research on the quality of services provided by the Gampaha Municipal Council has certain limitations that need consideration. Firstly, the questionnaire was only accessible to individuals who had utilized the council's services, potentially excluding a broader population. Additionally, the study gathered opinions from visitors on specific days, limiting the overall representation of the municipality's

service quality. The reliance on self-report data introduces the possibility of bias and inaccuracies. While quantitative methods offer statistical insights into public satisfaction, the study could have been enhanced by sampling a more diverse population and incorporating qualitative interviews. A combination of qualitative and quantitative approaches, such as semi-structured interviews, could have provided a more comprehensive understanding of influencing factors not captured in the analysis.

Future Research Direction

This study emphasizes the need for improved services from Divisional Secretariats to enhance satisfaction among service recipients. Suggestions include implementing streamlined service delivery systems, staff education for client accommodation, and upgrading facilities with technology. The importance of fostering a customer-oriented organizational culture is highlighted. The study proposes expanding research instruments to other service industries through cross-cultural and comparative studies. It also acknowledges discrepancies in the literature regarding the impact of service quality on customer satisfaction and recommends future investigations using qualitative or quantitative research designs.

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Impact of Microfinance Services on the Performance of Micro and Small Enterprises Special Reference to Maharagama Area

Weerasekara, P. H.¹ and Wijetunge, W.A.D.S²

Microfinance is an economic development tool that provides financial services such as small loans, savings, micro leasing, and money transfers to poor people. Micro and small-sized enterprises (MSEs) are recognized around the world for their critical role in driving grassroots economic growth and promoting equitable, sustainable development. The purpose of this study is to examine the impact of microfinance services on the performance of MSEs in the Maharagama area. A sample of 357 micro and small enterprises benefiting from Samurdhi Bank in the Maharagama area was selected using simple random sampling method. The Microfinance services - micro-credit, micro-savings, and micro-training were considered as independent variables while the enterprises' performance was considered as dependent variable. Data were collected by issuing a structured questionnaire and correlation analysis, regression analysis and factor analysis were done to measure the impact of financial services on performance of MSEs. The results indicated that microfinance services significantly affect MSE performance. Specifically, micro-credit enhances operational capacity and growth potential, while micro-training improves managerial skills and business practices. These insights are valuable for policymakers, for formulating policies to foster economic growth, job creation and creating an environment conducive to the success of micro and small enterprises.

Keywords: *Maharagama, Micro Credit, Micro and small enterprises, Micro Finance, Micro Savings*

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Introduction

Microfinance is a mechanism for empowering low-income individuals and small businesses who are excluded from traditional banking services. According to the literature finance access to small and micro businesses is limited by weak financial literacy, poor internal and external controls, insufficient collaterals and limited financial reports. (Rathnayake, 2021) Therefore, microfinance has been established with the intention of increasing the living condition of low-income people by reducing poverty and taking on an active role in the economic development of the country. (Central Bank of Sri Lanka, 2018). Micro-financial institutes provide both financial and non-financial services. Financial services include savings, loans, payments services, micro leasing, pension remittance and etc. (Rathnayake K.M.N.D, 2019) and non-financial services include group formation, development of financial literacy and self-confidence, marketing, consultancy services and improvement of technology for MSEs. Microfinance Institutions are established to ensure financial inclusion, facilitate economic growth and support the development of MSEs that are deemed to be vital in the creation of employment opportunities, poverty alleviation and economic prosperity. (Lasya, Shalini, Krishnamurthy, & Raju, 2023) Various institutions in Sri Lanka currently offer microfinance services. This includes state banks, Regional Development Banks and other licensed specialized banks, cooperative rural banks and other co-operatives, thrift and credit cooperative societies (TCCSs/Sanasa societies), Samurdhi bank societies, non-governmental organizations (NGOs), and other financial institutions. (Pushpanathan & Swarnika, 2021)

Micro and small enterprises (MSEs) sector can be known as an emerging sector and that has become the main job creation sector in Sri Lanka. This is the key section of the private sector, especially in developing countries.(Jayasekara & Thilakarathna, 2013) There are different definitions under different themes for MSEs. But commonly accepted definition cannot be identified around the world. In

most cases, this has been defined by using the number of employees, annual turnover and value of the assets. (John Adams, 2007) defines enterprise size based on asset value as less than one million micros, asset values between 1-20 million are small while the department of census and statistics identifies micro industries as employees less than 4 and between 5-24 as small in respectively (Economic census 2013/ 14, 2013).

MSEs provide a significant contribution to the economic development of a country in variety of ways, such as generating profits, establishing new business outlets, creating employment opportunities, increasing the value of the business etc. but the development of MSEs has been hampered by the Lack of access to finance, lack of access to technology and lack of training and business development opportunities, especially in developing countries.(Longo, 2023). According to the Saito and Villanueva (1981), these businesses have to face higher transaction costs than large-scale businesses in obtaining credit. Despite these claims, some research demonstrates that a considerable number of MSEs fail due to non-financial reasons (C Liedholm, 2001)

Microfinance has received considerable recognition in recent years as a strategy for boosting entrepreneurship and poverty alleviation mechanism while promoting economic development at the same time.(Wasike, 2023) According to the studies, micro financial services have a positive impact on the performance of micro and small businesses by increasing their access to capital, improving their ability to manage their finances, and boosting their capacity to invest in their firms. (Holcombe, 1995). This, in turn, can lead to greater sales, earnings, and employment, as well as contribute to poverty reduction and economic growth in the local community.

However, there is an argument regarding the use of microfinance services. According to Cook et al. (2000) when compared to other business owners, consumers who used microfinance services have successfully returned their first and second loans and saw a substantial rise in profits and household income. However,

some individuals discontinued the program after obtaining only one loan. Therefore, this shows the necessity of find the impact of the microfinance services and MSEs performance.

Further there were limited studies conducted in this sector. Many of the studies have focused on the effect of microfinance services on small and medium enterprises' performance. But the performance of the micro-enterprises hasn't been addressed in these cases. Further most of the studies have addressed the rural context when it comes to micro finance services. Limited research has addressed the unique dynamics and outcomes in this urban setting. (Rathnayake et al., 2019)

Therefore, this shows the importance of conducting a study in the urban context to fulfill the existing awareness gap. Hence the researcher selected the Maharagama area for current study, which is classified as an urban area.(Urban Development Authority, 2017) Furthermore this area has 7.9% of small and micro businesses established in Sri Lanka, making it the third highest among the divisional secretariats in the Colombo district. (Economic census 2013/ 14, 2013)

The general objective of this study is to investigate the impact of micro finance services on performance of micro and small enterprises in Maharagama area.

This study specially attempts to achieve the following objectives.

1. To find the impact of Micro savings on micro and small enterprises.
2. To find the impact of Microcredit on micro and small enterprises.
3. To find the impact of Training programs on micro and small enterprises

Literature Review

Micro and small businesses are essential for economic growth, employment, and innovation in the ever-changing global economy. Acknowledging their potential, microfinance services have become important tools for empowering company owners and promoting long-term, steady development. The goal of this study is to shed light on the complex link that exists between the performance of micro and small businesses and different aspects of microfinance services.

Theoretical Background of the Study

Originating from the concept of offering financial services to those who are economically disadvantaged, microfinance has developed into a versatile instrument that can influence the course of micro and small businesses (Godson, 2013). This study's theoretical underpinnings are derived from many important frameworks, providing insight into the complex connections between microfinance services and small- and micro business success.

Financial growth theory (Berger et al., 1998) explores how businesses' financial needs evolve as they grow, highlighting challenges in accessing capital and the higher cost of capital for small businesses. It proposes that microfinance institutions can serve as crucial funding sources, particularly tailored to the unique needs of micro businesses.

Savings Mobilization and Economic Resilience, drawing on behavioral economics, posits that encouraging businesses to save contributes to economic resilience at both individual and organizational levels. (Kumari, 2014). The study aims to investigate how micro savings affect the financial performance and well-being of small and micro companies.

Financial Inclusion and Microcredit, rooted in the Grameen Bank model, underscores microcredit as a means of ending the cycle of poverty and promoting socio-economic development. (Aladejebi, 2019) The research recognizes the need to consider contextual elements like interest rates and repayment conditions.

Asymmetry in Information and Training Programs, grounded in information economics and the principal-agent theory, addresses the importance of Training programs in resolving knowledge imbalances between lenders and borrowers. (Abiola, 2012) It is hypothesized that offering training programs helps entrepreneurs make better decisions, thereby improving the performance and sustainability of their businesses.

An Integrated Framework aims to combine these theoretical stances, recognizing the interdependence of microcredit, training programs, micro savings. By

integrating various theoretical frameworks, the study seeks to unravel the intricate web of microfinance's influence on small and micro business performance, offering valuable insights for professionals, decision-makers, and academics alike.

Microfinance Services

Microfinance can be known as a development tool that is often used in emerging economies to provide financial services such as small loans, savings, micro leasing, and money transfers to poor people. Through this government expects to support poor people to expand or start their enterprises by avoiding the lack of accessibility to financial services (Marguerite, 2019). According to M. A. Khan & Rahaman (2007) most of the research only considers micro-credit. But microfinance is a broader concept which includes insurance, transactional services, and important savings. He further mentioned that microfinance has been appreciated by micro-entrepreneurs and some poor clients as a “bankable product” since they can repay both the principal and the interest on time and saving schemes are suited to their requirements. (M. A. Khan & Rahaman, 2007)

Micro and Small Enterprises

The micro and small enterprise (MSE) sector has emerged as a dynamic and crucial component of the private sector in developing countries like Sri Lanka. MSEs play an important role in the development of the economy by generating employment opportunities, mobilizing domestic savings, alleviating poverty, promoting income distribution, fostering regional development, and providing training for workers and entrepreneurs (Jayasekara & Thilakarathna, 2013). Micro and small enterprises are the primary source of job creation in Sri Lanka, highlighting the importance of this sector's accelerated development for the country's economy. Microfinance institutions play a pivotal role in supporting MSEs, as many of these enterprises rely on the microfinance services offered. These institutions primarily provide microcredit but also offer non-financial services such as business training and financial management support to enhance the capabilities of MSEs. (T.D.H.S

Dissanayake, 2017)

Micro Savings and Micro and Small Enterprises

The literature increasingly focuses on investigating the impact of micro savings on small and micro businesses, revealing insights beyond traditional financial models. Fauster (2015) shows that micro savings plans are tools for fostering a disciplined financial culture among business owners rather than just being systems for holding money. Micro savings are proposed as instruments that enable people to make plans and build up a financial safety net against shocks and uncertainty in the economy.

Goto, (2014) highlight their role in reducing risks for small and micro enterprises, acting as a safety net to help company owners overcome financial difficulties. (Dissanayaka, 2017) notes that the micro savings programs help firms build a more solid and secure foundation by motivating entrepreneurs to save, hence lowering their susceptibility to unanticipated financial downturns. This is consistent with more general economic theories that highlight the role that savings play as a moderating influence on both individual and societal financial paths.

Although micro savings is often indicated in the literature as a beneficial phenomenon, some researchers like (Banuka, 2019) dive into the difficulties in promoting savings behavior among business owners. Research on the effects of micro saving on small and micro businesses shows how these initiatives support sustainability and economic resilience. Beyond financial transactions, this research demonstrates the behavioral elements of saving and the complex dynamics of financial planning at the individual and corporate levels.

Microcredit and Micro and Small Enterprises

The impacts of microcredit on small and micro companies have been the subject of scholarly investigation, which has produced a diverse range of findings and complicated points of view. The amount of study on this topic provides readers a thorough grasp of how microcredit influences company operations in complex ways. Research by (Mpanju, 2019) and others has shown that microcredit can revolutionize

small company financing. Microcredit is considered as an instrument for economic empowerment and poverty reduction, not just a commercial approach. Microcredit may be provided to business owners who cannot use banks. This helps these entrepreneurs build their businesses and give back to the community.

However, various research suggests that microcredit has several effects. Their critique (George Mutuma & Omagwa, 2019) emphasizes contextual elements including interest rates and repayment situations. This nuanced perspective recognizes that microcredit terms and conditions are crucial to the overall effect on small and micro firms and advocates for a deeper understanding of them. Additionally, (Olugbenga & Mashigo, 2017) examines the social aspects of microcredit, notably how it influences female entrepreneurs' company growth. Beyond financial injections, the literature underscores the multifaceted effects of microcredit on community dynamics, entrepreneurial attitudes, and the broader socioeconomic fabric.

Training Programs for Micro and Small Enterprises

The research consistently emphasizes the transformational potential of training programs, as Pushpanathan, 2020) writings demonstrates. These programs enhance entrepreneurs' management competency, providing avenues for acquiring new information and skills. It is thus hypothesized that this increased competency will have a favorable impact on small and micro business performance and sustainability. The research emphasizes how training affects organizational structures and operational efficiency in addition to individual skill development. Rathnayake K.M.N.D (2019) explores how training initiatives help firms make better decisions by encouraging flexibility and perseverance in the face of adversity.

Sewwandhi (2021) propose that training encompasses wider entrepreneurial qualities and technical skills, recognizing the dynamic interaction of financial management, strategic planning, and capable leadership for entrepreneurial success. Despite acknowledging challenges in efficacy and execution, particularly regarding

the longevity of influence and further education opportunities, the research emphasizes the necessity for training curricula supporting immediate impact and sustained growth. Examining the significant improvement of small and micro companies, research suggests that investing in human capital through well-designed training programs not only benefits individual entrepreneurs but acts as a catalyst for the resilience and expansion of the small and microbusiness sectors. Publications by (Badullahewage, 2020) highlight the role of training programs in reducing information asymmetry, serving as navigational aids for entrepreneurs by providing essential data, tactical insights, and mentoring.

Guided by the principal-agent theory, which views entrepreneurs as balancing their interests with external parties, (Aladejebi, 2019) suggests that training programs may bridge gaps and promote harmonious partnerships. However, the literature acknowledges challenges in effective implementation, as (Godson, 2013) discusses obstacles like access challenges for certain business owners, emphasizing the importance of creating inclusive training programs tailored to diverse requirements. Illustrating the critical role of training programs in shaping small and micro business performance and strategic direction, research extends beyond financial considerations to highlight how consulting services foster holistic growth.

Literature Gap

The body of research on the effects of microfinance services—such as microcredit, micro-savings accounts, and training programs on small and micro businesses has greatly advanced our knowledge of several intricately intertwined aspects of the field. Although a great deal of study has been done on the individual benefits of these services, there is a significant literature vacuum when it comes to a complete synthesis of their cumulative effects. The development of an integrated framework that encapsulates the interactions and synergies among microfinance components has been the subject of little research. Additionally, more in-depth studies are needed to look into the outside factors that affect how well these services work, such as the

local economy, cultural norms, and how the financial technology environment is changing. Closing these gaps would improve our knowledge of the overall effects of microfinance and provide practitioners, researchers, and policymakers with useful information for improving and optimizing microfinance interventions for small and micro-business owners.

Conceptual Framework and Hypotheses Development

The conceptual framework visually organizes the research, clarifying principal constructs and their hypothesized associations to be examined. Based on reviewed literature and theoretical reviewing of microfinance operations and MSE dynamics, this study tests linkages between various financial services and enterprise performance based on the (S. A. Khan, 2022) s conceptual framework.

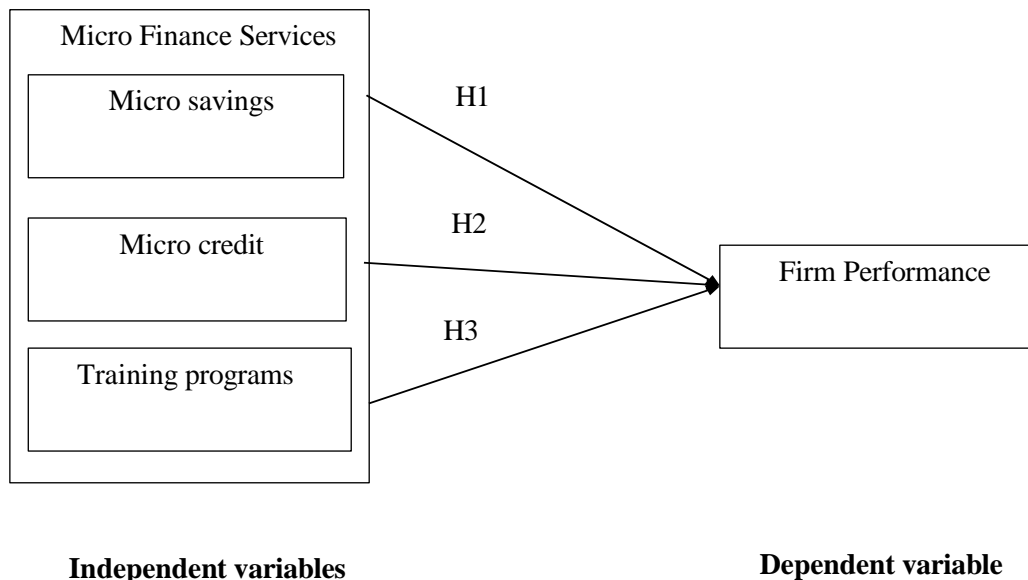


Figure 1

Conceptual Framework

Source: (S. A. Khan, n.d.)

The dependent variable named MSEs' performance was evaluated using capital increase, profit increase, cash collection, production level and sales volume. Based

on the conceptual framework, three hypotheses were developed as follows.

H1: There is a significant impact from Micro savings on the performance of MSEs in Maharagama area.

H2: There is a significant impact from Microcredit on the performance of MSE in Maharagama area.

H3: There is a significant impact from Training programs on the performance of MSEs in Maharagama area.

The operationalization of variables is summarized below.

Table 1

Operationalization of Variables

Variable	Dimension	Indicators	Questions	Scale
Micro Savings (Kingsley Bernard et al., 2017)	Reasonableness, Attractiveness, Simplicity, Accessibility	Reasonable Minimum Savings, Interest Rate, Product Options, Procedure Simplicity, Withdrawal Ease	MS1 - MS5	Likert Scale (5-point)
Micro Credit (Kingsley Bernard et al., 2017)	Reasonableness, Simplicity, Sufficiency, Accessibility	Interest Rate, Loan Procedure, Repayment Period, Repayment Procedure, Minimum Loan Amount	MC1 - MC5	Likert Scale (5-point)
Training Programs (Kisaka & Mwewa, 2014)	Utility, Adequacy, Business Impact, Knowledge Improvement	Social Status Improvement, Family Life Improvement, Adequacy of Number, Business Benefit, Management Knowledge	MT1 - MT5	Likert Scale (5-point)
Entrepreneurial Performance (S. A. Khan, n.d.)	Financial Growth, Operational Improvement	Capital Increase, Profit Increase, Cash Collection, Production Level, Sales Volume	EP1 - EP5	Likert Scale (5-point)

Research Methods

This study utilizes a quantitative correlation design for testing hypothesized relationships. The deductive approach, guided by established theories in microfinance, entrepreneurship, and small business performance, aims to develop associations through survey questionnaires. This study employs a cross-sectional time horizon, where data are collected once over a short period to answer the research questions (Saunders et al., 2019). The entire user base of microfinance entrepreneurs in the Maharagama region, who are clients of the Samurdhi Bank, are considered as the target population. This encompasses a total of 4,657 entrepreneurs. In accordance with Morgan's Sampling Table, a sample size of 357 Micro and Small Enterprises (MSEs) who use microfinance services provided by the Samurdhi bank has been selected utilizing the simple random sampling method. Here micro-enterprises will be defined as 1-4 persons engaging with the business and small enterprises will be defined as 5-15 persons engaged with the business. (Department of Census and Statistics, 2015). For this study purpose, closed ended questionnaires were prepared to collect the primary data. The research questionnaire consists of three major sections. To measure both variables, the researcher has used a five-point Likert scale.

The pilot test was conducted using 30 entrepreneurs as per the general rule of thumb (Lancaster et al., 2004) to measure the reliability of the questionnaire. All the Cronbach's alpha values were greater than 0.7 which indicates that questions used to test the quality of variables have higher internal consistency and the questionnaire is eligible to further use in the main study.

Data analysis is done through descriptive statistics and inferential statistics. Here, descriptive statistics are used to obtain frequency distribution, central tendency measurements, and dispersions. To test the hypothesis and identify the impact of microfinance and the financial performance of MSEs in the Maharagama area, the researcher used Pearson correlation and, to test the impact between variables, used multiple regression analysis. Cronbach's alpha has been used to measure reliability.

Findings of the Study

This section involves results and discussion in relation to achieve objectives

Demographic information of the sample

Table 2

Demographic Information of the Sample

Gender	%	Age	%	Marital status	%	Education level	%
Male	49.44	<18-24	27.8	Single	24.4	No formal School	6.11
Female	50.56	<25-34	34.7	Married	75.7	Primary School	24.1
		<35-44	33.9		6	G.C.E O/L	43.0
		<45-54	1.9			G.C.E. A/L	19.7
		>55	1.7			Professional Qualification	3.89
						Bachelor's degree	3.06
Years of running the business		Years of using micro finance services		Type of the business			
<1year	19.17	<1 year	35	Trade	31.3		

				and other	9		
<1-2 years	41.67	<1-3 years	47.5	Sewing	26.1 1		
<3-5 years	29.72	<4-6 years	13.8 9	Manufac turing	21.3 9		
<6-10 years	6.11	>6 years	3.61	Constru ction	5.28		
>10 years	3.33			Agricult ure	15.8 3		

Source: Survey data

According to the statistics above, the majority of participants engaged in microfinance activities are females, accounting for 50.56%. Among the total respondents, the highest proportion falls within the age category of 25-34, at 34.7%, while the lowest is in the age category of 55 and above, making up only 1.7%. Regarding marital status, there is a significant difference between singles 24.44% and married individuals 75.56%. Concerning the education levels, the majority of respondents belong to the G.C.E O/L group, representing 43.06%, while those with a bachelor's degree from the smallest group at 3.06%. In terms of business duration, 41.67% have been running their enterprises for 1-2 years, while the smallest percentage 3.3% represents those in business for over 10 years. Additionally, the majority of respondents, 47.5% have been using microfinance services for 1-3 years, and the smallest percentage 3.61% belongs to those using these services for more than 6 years. Regarding industries, the majority of respondents work in the trading and other service industry 31.39%, followed by those in manufacturing 26.1%, and 21.3% work in the swing industry.

Test of reliability

Table 3

Reliability Test

Item	Cronbach's Alpha values.
Micro Saving	.820
Micro Credit	.808
Training Programs	.776
Entrepreneurial performance	.817

Source: Survey data

The reliability of a measure is established to test both consistency and stability of the data set and measured through Cronbach's alpha. According to that, micro savings has 0.820 Cronbach values which indicate higher internal consistency. Cronbach's alpha for micro credit, training programs and entrepreneurial performance are 0.808, 0.776 and 0.817 respectively. All the result of reliability greater than 0.7, meaning that all questions used to test the quality of certain variables had better internal consistency and indicating that all questions for the analysis were highly reliable.

Test of Validity

Table 0

Reliability Test

Item	Cronbach's Alpha values.
Micro Saving	.820
Micro Credit	.808
Training Programs	.776
Entrepreneurial performance	.817

Source: Survey data

The Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were used to measure the validity of the research model. The KMO measures the sampling validity and sampling adequacy should be greater than 0.5 for a satisfactory level. The measure can be interpreted as meritorious if it carries a value of 0.80 or above. Higher the value indicates higher the validity of the research instrument. The score of KMO - Bartlett is 0.850, which is in the range of “Meritorious” and supports this study in terms of validity. Moreover, according to the Bartlett’s Test of Sphericity the P value is 0.000, which is also good enough to reject the null hypothesis and accept the alternative hypothesis since the P value should be 0.05 as per the rule of thumb.

Descriptive Analysis

Table 5

Descriptive Statistics

Descriptive Statistics	Minimum	Maximum	Mean	Std. Deviation
Micro Saving	2.00	5.00	4.0	.66868
Micro Credit	2.00	5.00	3.8	.73067
Training Programs	2.20	5.00	3.9	.62990
Entrepreneurial performance	2.00	5.00	3.9	.69346
Valid N (listwise)				

Source: Survey data

According to the above table, all the variables show a high mean value, indicating a

relatively high level of agreement among respondents towards the variables. The standard deviation (SD) is also higher than the acceptable level of 0.5 for all the variables, suggesting that all the variables are in a good position. The maximum and minimum values for all the variables fall between 2 and 5.

Correlation analysis

Table 6

Correlation Analysis

	Entrepreneurial performance
Micro savings	0.663
Micro Credit	0.725
Training Programs	0.752

Source: Survey data

All the independent variables are positively correlated with the Entrepreneurial performance due to having Pearson Correlations of 0.663, 0.725, and 0.752, respectively. And also, all the significant values are less than 0.05 which demonstrate a significant relationship between these variables.

Regression Analysis

Table 7

Regression Analysis

	Variable	Model
Model Summary	R - square	.639
	F - Value	210.148
Micro Savings	B	0.181
	Std. Error	0.049
	Sig.	0.000
Micro Credit	B	0.295
	Std. Error	0.049

	Sig.	0.000
Training Programs	B	0.406
	Std. Error	0.057
	Sig.	0.000

Source: Survey data

Regression investigation on entrepreneurial performance employing training programs, micro savings, and microcredit as predictors shows a strong model to explain changes in the dependent variable. According to the model summary, there is a relatively good match which suggests that the combined effects of micro savings, microcredit, and training programs explain for around 63.9% of the variability in entrepreneurial performance.

The findings of the ANOVA demonstrate the statistical significance of the regression model ($F = 210.148$, $p < 0.0001$), confirming that a minimum of one predictor has a substantial impact on the explanation of the variation in entrepreneurial performance.

The statistical significance of the coefficients pertaining to Micro Savings, Micro Credit, and Training Programs ($p < 0.001$) indicates their separate contributions to Entrepreneurial Performance. According to the coefficients, there is a favorable correlation between entrepreneurial performance and micro savings, microcredit, and training programs. More specifically, the Entrepreneurial Performance is anticipated to rise by 0.181, 0.295, and 0.406 units, respectively for every unit increase in Micro Saving, Micro Credit, and Training Programs. The standardized influence of each predictor, taking into account their combined effect in the model, is shown by these coefficients.

When comes to the hypothesis testing the hypothesis related to Micro Saving influencing Entrepreneurial Performance is accepted. The coefficient is positive and statistically significant ($p < 0.001$), suggesting that an increase in Micro Saving is associated with a significant positive impact on Entrepreneurial Performance. In the micro credit the coefficient is shown to be positive and has a high level of

significance ($p < 0.001$), demonstrating a strong correlation between increased Micro Credit and enhanced Entrepreneurial Performance. Training Programs have an effect on the performance of entrepreneurs is also recognized. The coefficient is shown to be positive and has a substantial level of significance ($p < 0.001$), indicating that there is a correlation between increased engagement or participation in Training Programs and increased entrepreneurial performance.

Finally, the study found that the microfinance services have a significant impact towards the performance of to the micro entrepreneurs in Maharagama area in Sri Lanka.

Discussion and Recommendation

Discussion

The study shows that MSEs' financial health is improved by features of micro savings programs that are reasonable interests, easy withdrawals, and user-friendly interfaces [positive correlation between H1 confirmed]. It is notable that respondents reported notable enhancements on capital growth, profit margins, and cash collections, emphasizing the importance of the micro-savings towards the financial stability and resilience of MSEs. It is in line with (Dupas & Robinson, 2013) that shows the need for microfinance programs to provide easy to access and use savings options for vulnerable individuals such as low-income ones as well as businesses. Further the finding shows that there is a statistically significant positive relationship between accessing microcredit and improved small enterprise performance (H2, $p < 0.000$). Short-term loans with flexible terms of payment, low interest rate serve as powerful drivers towards business growth that is characterized by high sale volumes, heightened production and expansion. This goes alongside (Bernard et al., 2016) that microcredit is useful to small and medium enterprises for growth of the economy. This highlights the importance of these types of training programs so that MSEs can acquire vital business skills and improve performance in a range of indicators [supported by H3]. It was found that areas like record keeping, financial

management, and pre-loan preparation improved decision-making, increased sales, and ensured sustainability in the long run. In general, (Beck, 2015) emphasizes the importance of capacity and skills build up for microfinance interventions and this finding resonates in regard to empowering the MSEs to effectively deal with the intricate complexities of running a business and foster sustainable development.

However, there is a contradiction in some of past literature. There were some researchers who mentioned that training programs did not have a significant impact on the financial performance of MSEs while some were said that training programs had a significant effect on the financial performance of MSEs. Here it should be particularly discussed. (Aladejebi, 2019) also noted that training programs did not have a significant effect on the performance of MSEs in Lagos Metropolis. Based on the Sri Lankan literature, some researchers also mentioned this negligible effect between training programs and the financial performance of MSEs. According to (Rajapakshe, 2021) training programs do not affect the performance of MSEs in central province. In addition, the author said that if there are training programs that are more targeted to the businesses that the respondents run. Therefore, train them with a tailored approach that is tailored to that industry's needs and wants.

Recommendations

Using technology in microfinance and developing more efficient ways of providing micro finance services in urban areas can be recommended. Microfinance institutions can be focus on using mobile banking and other digital services in order to reach larger urban clientele. Further, microfinance institutions should consider adding new products such as microcredit, micro savings, and training programs that receive widespread acceptance. Novel financial products and services could be used to cater for different requirements and strengthen the urban micro-entrepreneurial financial capacity. Furthermore, there should be strong monitoring and evaluation systems in place for tracking the effects of microfinance services on urban micro-enterprises. This makes it possible for interventions to stay in tune with the changing

nature of the urban micro-business environment and allows for timely adjustments and improvements to be made.

Conclusion

The objective of the current study was to determine the impact of micro finance services on performance of micro and small enterprises with special reference to the Maharagama area. In here researcher has selected Samuradi Bank as the microfinance institute since most of the micro entrepreneurs take services provided by Samurdhi bank. The Impact of the micro finance services seek out through the three independent variables which are Micro savings, Micro credit and training programs along with the one dependent variable which is performance of small and micro enterprises. According to the survey outcome, it can be concluded that micro savings, micro credit and training variables indicated a significant positive impact towards the performance of MSEs. Therefore, the researcher can conclude that when assessing the impact of micro finance services on the performance of MSEs truly impacted by the micro-savings, micro-credit and training programs.

Implications of the Study

This study can be used to develop and implement specific microfinance strategies tailored to the unique challenges and opportunities of urban micro-enterprises in Maharagama area. Microfinance institutions should diversify their product offerings, including microcredit, micro savings, and training programs, to meet the diverse needs of urban micro-entrepreneurs. Adoption of technology, including mobile banking, is critical in improving service delivery efficiency for urban areas. Aware of the critical role played by social factors, such initiatives as networking events, collaborative projects and forums should be created to promote community development among urban micro entrepreneurs. As such, it is crucial to develop strong monitoring and evaluation systems to follow up the effects of microfinance

services among urban micro-enterprises. therefore, makes it possible for interventions to stay in tune with the changing nature of the urban micro-business environment. Policymakers can leverage these findings to craft policies that support economic growth and job creation, fostering an environment conducive to MSE success. Microfinance institutions stand to benefit by tailoring their offerings according to these insights, thus enhancing the competitiveness of MSEs and managing risks more effectively. Collaboration among stakeholders, including government, policymakers, and microfinance providers, is crucial to maximizing the impact of microfinance on MSE development, ultimately contributing to broader economic resilience and prosperity.

Limitations

The findings of this study will be limited by the sample and the sample size. The sample of the 357 Entrepreneurs could not represent the entire population.

Since this study is limited to clients of Samuridi Bank in Maharagama area, the findings might not be applicable to other districts, countries, or different banking institutions. Furthermore, the study uses only cross-sectional data and this will not track MSE performance over time. Therefore, this could limit our capacity to make long-term judgments about the impact of microfinance services on entrepreneurial performance. Moreover, this study only measures the effect of microfinance services on entrepreneurial performance. Therefore, it may fail to capture the impact of other factors on MSE performance, such as macroeconomic conditions, industry-specific factors and Entrepreneur specific factors.

Directions for Further Research

The current study has contributed to exploring the impact of micro finance services on performance of micro and small enterprises in Maharagama area. In addition to that the researcher can direct that to gain more quality outcome, future researchers better to pursuing their research studies with quantitative data analysis method as

quantitative approach ensures statistical rigor, objectivity, and efficient analysis. As well as engaging with the Maharagama area this research touched urban context which can provide an opportunity to discern unique challenges and advantages specific to urban MSEs. The study identifies key variables (micro savings, microcredit, training) explaining 60% of enterprise performance variability, suggesting further investigation into additional factors like technology, digital financial services, and insurance. This research provides avenues for advancing sustainable MSEs development for researchers, policymakers, and practitioners.

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The Impact of Disclosure of Key Audit Matters in Audit Reports on Shareholders' Reactions

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According to auditors' professional judgment, Key Audit Matters (KAMs) are the most significant issues reported in the audit of financial statements for a given accounting period. This study aims to investigate whether disclosure of KAMs influences shareholders' investment decisions. In this study, KAMs are measured using three dimensions namely, the total number of KAMs, the number of new KAMs and the number of recurring KAMs, whereas cumulative Abnormal Returns (CAAR) are used to measure shareholders' reactions. The study sample consists of 14 non-financial companies listed in the S & P Sri Lanka 20 index. Data were collected for the period 2018-2023. A Generalized Least Squared (GLS) regression analysis is used to analyze data. The results of GLS regression depict that the total number of KAMs have a positive insignificant association with shareholders' reactions. Number of new KAMs and number of recurring KAMs have negative insignificant relationships with shareholders' reactions. It reflects that KAMs create no value for investors. This paper contributes to the literature on new developments in audit reports. The study provides an important policy implication for practitioners to employ their professional skepticism to decide which matters are the most significant facts to be disclosed as KAMs and the content of KAMs paragraph. Also, the study provides vital connotations for standard setters and the Colombo Stock Exchange to direct the SLAuS 701 effectively to optimize the benefits received by audit report users.

Keywords: *Cumulative Average Abnormal Returns, Key Audit Matters, S & P Sri Lanka 20 Index, Shareholders' reactions*

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Introduction

In the earliest stage, the independent auditor's report prevailed at a very preliminary stage and it failed to provide detailed explanations of its objectives. Especially non-professional investors faced difficulties in understanding its content (Tuder et al., 2018). The language used in traditional audit reports was very technical and the users of audit reports were not provided with enough details to understand why the particular opinion has been issued (Cordos et al., 2020). Due to the difficulty in understanding the content of independent auditor's report, users of audit reports were not used to read the whole report thoroughly and they just referred to the audit opinion paragraph. Most of the traditional independent auditor's reports seem similar in content and no company specific information can be observed (Gold & Heilmann, 2019). Due to the above loopholes of traditional audit report, shareholders and other users of auditor's report were having the necessity of a detailed and value relevant auditor's report over a long period that provides information specific to companies.

To overcome this problem, regulators all over the world were in a process of introducing new audit reforms. For example, the UK requested companies listed on the London Stock Exchange to disclose the risks of material misstatements in 2013 (Lawati et al., 2022). In 2003, French auditing standards decreed companies listed in the French stock market to disclose Justifications of Assessments (JOAs) which are critical information existing in annual report to improve the understanding of users (Bedard et al., 2018). The introduction of ISA 701 (Communicating Key Audit Matters in the Independent Auditors Report) by the International Auditing and Assurance Standards Board (IAASB) in 2016 was also another audit reform. Accordingly, CA Sri Lanka converged SLAuS 701 (Communicating Key Audit Matters in the Independent Auditors Report) as a new audit standard which is

effective for audits of financial statements for periods ending on or after 31 March 2018. The main objectives of the SLAuS 701 are enhancing the informative value of the audit report, enhancing the transparency of auditors' work and focusing more on auditors' responsibilities (SLAuS 701).

As per the SAuS 701 and its implementation guide, practitioners should follow a funnel approach in determining KAMs. In determining which matters are required to be reported as KAMs in the auditor's report, firstly the practitioner should select KAMs from the matters communicated with those charged with governance. In making the selection, the following three things shall be taken into account. Those things are, the identified significant risks or financial statement level risks, areas in financial statements that involved significant management judgments including accounting estimates which contain a high level of estimation uncertainty and significant events and transactions that occurred during the period. As the second stage, practitioner needs to decide what matters require significant due attention among those communicated matters. Finally, among the matters which require significant due attention, practitioner needs to select the matters most significant to the audit as KAMs (SLAuS 701). Generally, KAMs are selected from areas on which auditors sacrifice more time and effort and they deploy more professional skepticism (Li, 2020).

Statement of the problem

Previous scholars have done several investigations to assess how the disclosure of KAMs impacts the shareholders' reactions. However, there are contradictory findings on the research question. The different capital market characteristics among developing and developed countries might cause those contradictory research results. For example, the supplementary research conducted in the UK and the USA which are considered developed countries by the IMF (International Monetary Fund)

and the United Nations conclude similar findings. The dependent variables measured by cumulative abnormal returns and abnormal trading volumes have not been significantly impacted by the disclosure of new KAMs and shareholders do not value information uncovered in new audit reports in the UK (Gutierrez et al., 2018). Lennox et al. (2021) also supported the triviality of KAMs by concluding insignificant market reactions to KAMs in audit reports of the UK. They justified their findings by stating that, investors are well aware of company's risk via prior earning announcements, conference calls and annual reports, before reading the KAMs paragraph. Further, Files and Gencer (2020) also found little impact of critical audit matters on investors' responses in the UK. Then the research arena has moved towards the developing countries. Contradictorily, according to the findings of Kithinji (2021) investors receive beneficial information from KAMs and KAMs assist investors in decision making in Kenya which is considered as a developing country as per the classifications of IMF and United Nations. Therefore, the researcher attempts to fill the research gap which has risen out of the existing contradictory findings at the global level through this study. The researcher is interested in the Sri Lankan context as there is a dearth of studies available in the Sri Lankan context. Furthermore, in this research the researcher has measured shareholders' reaction using CAAR and the researcher has omitted observations containing other significant Colombo Stock Exchange (CSE) announcements such as corporate disclosures, dealings by directors, trading halted, sub division of shares, share SWAP, cash/ scrip dividends which can influence shareholders' investment decisions to realize the shareholders' reaction only for the disclosure of KAMs when deriving CAAR. Even if there are several studies carried out by previous scholars such as Kithinji, 2021 and Abu et al., 2021 to investigate the impact of KAMs on shareholders' reactions measured using CAAR, again there is a dearth of studies which has excluded such other significant announcements in deriving CAAR.

Furthermore, SLAuS 701- Communicating Key Audit Matters in the Independent Auditors Report is a recent development to auditing standards which offers a wide range of substantial benefits to stakeholders. Thus, this standard is an important domain to study. Inefficient corporate governance practices can cause corporate failures even if companies are having good financial performances (Lakshan and Wijekoon, 2012). Most interestingly, including the well-known giant companies such as Pramuka Bank PLC, ETI Finance and Golden Key Company, 35 companies listed in Colombo Stock Exchange were collapsed during the period 2012 – 2017 (Jayasooriya et al., 2018) and all of the collapsed companies contained clean audit opinions in their auditor's reports even in the financial distressed periods. Therefore, disclosing KAMs brings an extra communicative value to auditor's report specially in the Sri Lankan context.

To improve the auditor's report and make it more informative, they should be more detailed and clearly link KAMs to how broader economic factors in Sri Lanka affect the entity that is currently missing. This will enhance transparency and provide better insights into the audit process (KPMG, 2021). For instance, if a company operates in a volatile market, it could impact revenue recognition or asset valuation. Accordingly, KAMs can provide explanations on how it has influenced the entity's financial position and performance. Further, in Sri Lanka, there are concerns about the limited number of KAMs reported even by large, diversified business groups and the lack of detail in these KAMs, which are often described briefly. This may undermine the goals of transparency and providing useful information (KPMG, 2021). Thus, KAM disclosures are an evolving area in Sri Lanka, with notable weaknesses in how local practitioners apply the standard. Consequently, researching this area is essential.

Thus, in order to fulfill the research purpose, this study answers the following research question,

How does the disclosure of KAMs impact the shareholders' responses of non-financial listed companies in the S & P Sri Lanka 20 index in the Colombo Stock Exchange?

Objectives of the study

1. To examine the effect of the total number of KAMs in audit reports on shareholders' reactions.
2. To assess the effect of new matters in the KAMs section in audit reports on shareholders' reactions.
3. To assess the effect of recurring matters in the KAMs section in audit reports on shareholders' reactions.

Research Questions

1. What is the impact of the total number of Key Audit Matters in audit reports on shareholders' reactions?
2. What is the impact of new matters in the Key Audit Matters section in audit reports on shareholders' reactions?
3. What is the impact of recurring matters in the Key Audit Matters section in audit reports on shareholders' reactions?

Literature Review

Theoretical Foundation

Audit expectation gap theory

The audit expectation gap is the difference between what the general public expects as the auditor's role and what actually the auditor's role is. Typically, people tend to believe that auditors are fraud detectors whereas auditors' actual role is to provide a reasonable assurance on whether financial statements are materially misstated or not. Disclosure of KAMs assists in reducing the audit expectation gap because, by reading the KAM paragraph in audit reports, shareholders can be aware of the nature, timing and extent of audit procedures performed by auditors on identified KAMs. Therefore, it gives a sense of auditors' actual role to shareholders.

Signaling theory

When two parties have entrance to diverse information, their behavior is explained by signaling theory. One party in the relationship can be identified as the signaler and the other party is the receiver of information. Signaler has the power to decide whether they communicate the information or not. Receivers can only interpret the information sent by signalers (Spence, 1973). In companies, typically managers like to communicate good information early and to withhold/ delay bad information to shareholders because managers can increase share prices by disseminating good information whereas it will negatively affect share prices if managers disseminate bad news regarding the company (Connelly et al., 2010). It can be concluded that signaling theory is relevant in explaining the relationship between KAMs and shareholders' responses since the involvement of an auditor is essential because then only shareholders can get a reasonable assurance that information presented in financial statements by those charged with governance has a true and fair view.

Information asymmetry theory

From a business perspective, information asymmetry arises when management and other business insiders of companies possess more information than shareholders. Therefore, management can misuse the information to take advantages (Andrian, 2021).

For instance, management can withhold negative information such as threats to the going concern of companies and prevent the shareholders from taking optimum decision making. Also, management can engage in insider trading and buy the shares before positive information is disclosed and sell shares before bad information is disclosed. Information asymmetry theory supports explaining the relationship between KAMs and shareholders' reactions because, shareholders can read KAMs paragraph in the audit report and get a clear understanding of significant risks of material misstatements, significant management judgments and significant events and transactions. It reduces the unequal flow of information.

Empirical Literature

KAMs is a quite new area to conduct research. Before the ISA701 became effective, different scholars were investigating the usefulness of audit report for investors to make decisions. After the ISA 701 standard became effective, the informative value of audit reports was more strengthened. For example, before the ISA 701 was effective, the findings of some scholars are as follows. Ittonen (2010) has found that audit reports provide valuable information since auditors have more information which are not exposed to shareholders and auditors disclose that information when preparing audit reports. According to him, audit reports provide two types of information, which are on the riskiness of future cash flows and the stability of companies. Further, before the KAMs came into discussion, the scholars like

Ianniello and Galloppo, (2015) have stated that when an audit report contains a qualified opinion, there will be a negative impact on stock prices.

After ISA 701 was introduced, the additional information contained in audit reports became an emerging topic and scholars tended to find out the impact of additional information containing audit reports on market reactions. Accordingly, the researchers like Tahinakis and Samarinas (2016) and Gutierrez et al. (2018) have found that KAMs carry incremental information which will result in significant movements in stock prices. Christensen et al., (2014) have stated that KAMs contain more company specific information and hence they are highly useful.

With time, scholars tended to investigate deeply the effect of KAMs on different investor types and different industry categories. The researchers like Rapley, Robertson and Smith (2018), and Christensen et al. (2014) have enquired whether professional or non-professional investors respond to KAMs significantly. Accordingly, they have found that there is a high probability for non-professional investors to change their investment decisions after they discover KAMs in audit reports. Bode and Klerk (2017), have focused on the specific categories of KAMs and concluded that the KAMs relating to information technology are more useful for investors compared to other KAM categories. Another area on which scholars have focused on is the impact of KAMs on quality of financial reporting. Gold et al. (2020) have found that KAMs positively impact financial reporting quality. Reid et al. (2019) also have ended up with the same findings by concluding that auditors' insights lead to generate public trust and confidence in the financial reporting process.

However, contradictory evidence also can be found and research results are mixed across countries. For example, according to Christensen et al. (2014), investors are reluctant to invest in companies when they discover critical audit matters in audit

reports. Rapley et al. (2018) have concluded that investors perceive management is reckless in financial reporting when investors found KAMs in audit reports. Similarly, Kachelmeier et al. (2017) perceive KAMs as a warning and they lose confidence on financial statements. In the same way, Banham (2018) has noted that some investors become confused by misunderstanding KAMs and tend to believe that there is an issue with the company even though the auditors have provided a clean audit opinion. A similar finding can be extracted from the research conducted by Pelzer (2016) and he has stated that some investors lack awareness of KAMs and they tend to misunderstand the function of auditor. As per the researcher, the main reason for this is the poor communication between investors and auditors as investors fail to grab the message conveyed through KAMs. The research conducted by Velte and Issa (2019) revealed mixed findings. According to them, KAMs help in reducing the audit expectation gap of risk seeking and risk neutral investors whereas KAMs expand the audit expectation gap of risk averse investors and ultimately, they tend to leave the company.

Methods

The study's population is all 290 listed companies in CSE, and the sample consists of 14 non-financial listed companies in S & P Sri Lanka 20 index. The selected sample companies belong to different industry groups in CSE. However, the sample excludes banking, financial and insurance companies since those companies have different and non-routine operations than companies in other industry groups. Finance, insurance, and leasing companies' total asset base and financial structure are not comparable with other company sectors (Chirakool, 2021). Companies operating in financial, banking and insurance industries have different financial structures and specific ways to evaluate their financial positions which are different from other industries (Yang, 2021).

This study covers six annual reporting periods from 2018 to 2023 since SLAuS 701 became effective in Sri Lanka from 2018. Therefore, each of the 14 non-financial listed companies in the S & P Sri Lanka 20 index have six years of observations.

Secondary data for the dimensions of KAM disclosures are collected manually from sample companies' annual reports which can be downloaded from CSE website. In order to compute CAAR, share prices of sample companies and the S & P 20 market index are collected from the Investing.com website.

Operationalization

Key Audit Matters

In this study, the independent variable, KAMs is measured using main three constructs namely the total number of KAMs, new KAMs and recurring KAMs.

Shareholders' reactions

In this study, shareholders' reactions are measured using CAAR. The event study method is used to compute CAAR. The previous researchers Kithinji, (2021), Bedard et al. (2018) and Boonyanet and Promsen (2018) have also used event study methods to derive CAAR.

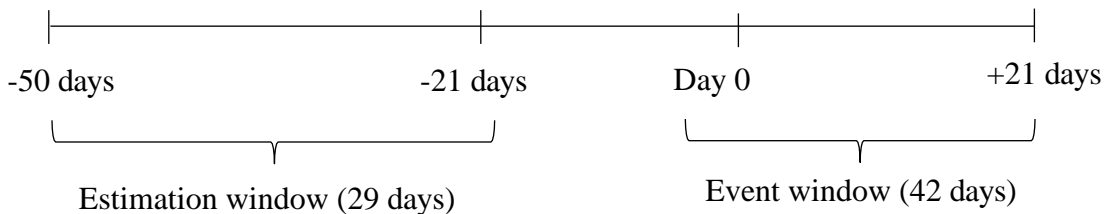
In an event study, there is a specific event, an event window and an estimation window. Event date is the date on which a particular information is released to the market. The event date of this study is the date on which companies publish their audited financial statements/ annual reports containing the KAMs paragraph on the CSE website. Recognizing the exact date on which information is read and incorporated into investment decisions by market participants is crucial since an efficient market will react to publicly available information abruptly. However, it is

practically impossible to identify the exact date on which participants are responding to disclosed KAMs.

The period throughout which share prices were observed can be defined as an event window. An event window should not be too wide since market reactions may be influenced by different events other than the disclosure of KAMs in audit reports. Also, an event window should not be too narrow since the observed time range may not be adequate to capture the full reaction of market participants (Nazir et al., 2014). The event window of the study is 21 days prior to and 21 days after the event date. The estimation window of the study is 50 days before the event date. The following figure depicts the time range used for the event study. The study of Perera and Nimal (2017) as well as Kavinda and Anuradha (2022) also employed an event window of -21 to +21 trading days and an estimation window of 50 trading days before the event window to realize market participants' behavior.

Figure 1

Event window and Estimation window



Source: Kavindra and Anuradha (2022).

However, it has been noticed that shareholders' reactions over the event window are not only influenced by the disclosure of KAMs. For example, CSE announcements on AGM dates, appointment/ resignation/ retirement of directors, capitalization of reserves, cash/ scrip dividends, change of company secretary/ registrar, corporate

disclosures, dealings by directors, initial public offerings, trading halted, sub division of shares, share SWAP, right issues, repurchase of shares can impact on shareholders' reactions. Therefore, when observing the event windows, the researcher omitted the observations which has significant announcements such as corporate disclosures, dealings by directors, trading halted, sub division of shares, share SWAP, cash/ scrip dividends to realize the shareholders' reaction only for the disclosure of KAMs. There are strong findings of previous scholars on the impact of director dealings on shareholders' reactions. For instance, Perera and Nimal, (2014) have found that shareholders react to directors' share purchases/ sales on the same date on which the directors' dealing happens in an efficient market. Therefore, the shareholders receive a high amount of abnormal return in the short run immediately after the directors' dealings happen, compared to the other dates within the financial year.

After deciding the event date, event window and estimation window, CAAR for each observation of 14 sample companies were derived using the below procedure employed by Kithinji (2021), Bedard et al. (2018).

Step 1. Calculating daily abnormal returns for each day within the event window (-21 to +21 trading days from the event date) using the below process.

* Calculating daily actual return (R_t) of each company's stock (for each year) throughout the event window by subtracting the previous date stock price from the current date stock price and dividing the whole amount by the previous date stock price.

$$R_t \text{ (Actual return of a particular company's sock)} = \frac{P_1 - P_0}{P_0} \quad \text{Formula 1}$$

Note: P_1 = Ending sock price, P_0 = Initial stock price

* Calculating daily actual return of the market (S & P Sri Lanka 20 index) over the event window using the same way as above.

$$R_{mt} (\text{Actual return of market/ S \& P Sri Lanka 20 index}) = \frac{MP1 - MP0}{MP0} \quad \text{Formula 2}$$

*Calculating the Expected return of the market (S & P Sri Lanka 20 index) over the event window using the below formula.

$$ER_t = \alpha + (\beta * R_{mt}) \quad \text{Formula 3}$$

Note: β = Slope, α = Intercept

Step 2. Calculating daily abnormal returns of each company's stock (for each year) throughout the event window by subtracting the expected return of S & P Sri Lanka 20 index (ER_t) from the actual return of the respective company stock (R_t).

$$AR_t = R_t - (ER_t) \quad \text{Formula 4}$$

$$AR_t = R_t - [\alpha + (\beta * R_{mt})] \quad \text{Formula 5}$$

There are three possible methods to calculate Abnormal Returns namely, mean adjusted return model ($AR_t = R_t - \text{Average return of stock}$), market adjusted returns model ($AR_t = R_t - R_{mt}$) and the Risk Adjusted Returns model ($AR_t = R_t - (a + BR_{mt})$). Among them, Risk Adjusted Returns model (RAR) is considered as the most superior method to calculate abnormal returns in this study, since it incorporates systematic risk factors.

Step 3. Finally, the CARR is calculated by adding each daily abnormal return in the event window to the sum of its predecessors.

Table 3.1

Operationalization

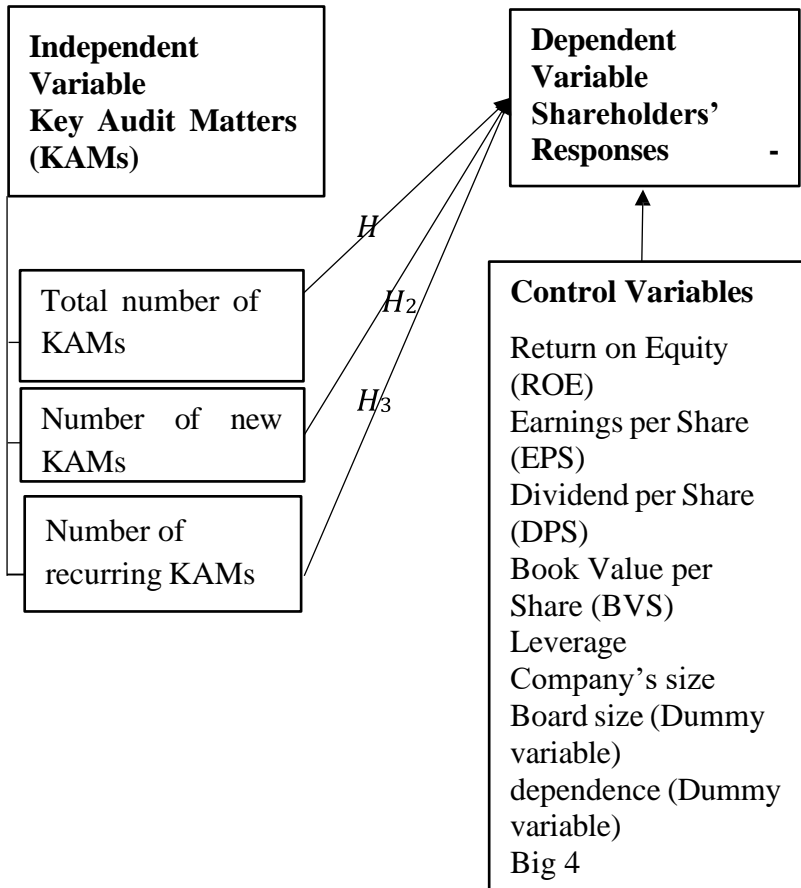
Operational definition of constructs	Reference
<p>Total number of KAMs [NUM_KAMs]</p> <p>Total number of KAMs disclosed in the audit report.</p>	<p>Abu et al., 2021</p> <p>Chirakool, 2021</p>
<p>Number of new KAMs [NEW_KAMs]</p> <p>The number of new KAMs disclosed in the current year audit report other than recurring KAMs.</p>	<p>Abu et al., 2021</p>
<p>Number of Recurring KAMs [RE_KAMs]</p> <p>The KAMs disclosed in the audit report of current year and previous year</p>	<p>Abu et al., 2021</p>
<p>Cumulative Average Abnormal Returns [CAAR]</p> <p>Once a company is listed publicly and starts trading shares on a stock exchange, the company's share price is decided by supply and demand in the stock exchange. When there is a high demand for shares, the share price will increase. When shareholders get dissatisfied, they sell their shares and it causes to decrease in the share price. When share prices increase, shareholders receive unusual profits in terms of capital gains. When share prices decrease, they receive unusual losses. The total of these unusual</p>	<p>Kithinji, 2021</p> <p>Abu et al., 2021</p>

<p>profits and losses which deviate from shareholders' expected returns are called CAAR.</p>	
<p>Return on Equity [ROE]</p> $\frac{\text{Annual net income}}{\text{Shareholders' equity}}$	
<p>Earnings Per Share [EPS]</p> $\frac{\text{Profit Attributable to Ordinary Shareholders OSH}}{\text{Weighted Average Number of Shares}}$	<p>Abu et al., 2021</p>
<p>Dividend Per Share [DPS]</p> $\frac{\text{Annual Dividends}}{\text{Weighted Average Number of Shares}}$	
<p>Leverage [LEV]</p> $\frac{\text{Total Debt}}{\text{Total Assets}}$	
<p>Book Value per Share [BVS]</p> $\frac{\text{Shareholders' Equity}}{\text{Weighted Average Number of Shares}}$	
<p>Company's Size [SIZE]</p> <p>Natural Logarithm of total assets</p>	
<p>Board size (Dummy variable) [BDSIZE]</p>	

<p>If the number of directors on the Board is within 6-8, the value is 1. Otherwise, the value is 0</p>	
<p>Board Independence (Dummy variable) [BDIND]</p> <p>If the fraction of independent directors is more than 1/2 of the total members, the value is 1. Otherwise, the value is 0.</p>	
<p>Big 4 [BIG4]</p> <p>If the company's audit is conducted by one of the big 4 audit firms, the value is 1 Otherwise, the value is 0</p>	

Figure 2:

Conceptual Framework



Source: Author Generated.

Conceptual Framework and Hypotheses Development

3.2 Hypothesis development

As per the definition of KAMs in SLAuS 701, auditors can only disclose audit matters communicated with management as KAMs in audit reports. According to Tysiac (2014), if auditors disclose negative things about the company with a misunderstanding of the company, it can build a negative perception in the minds of investors regarding the company which will result in hindering the stock purchase. In order to avoid auditors from disclosing such negative items, management tends to communicate actively with auditors and try to give a clear elaboration on the

company specific events, transactions, management judgments and risks. Such that, KAMs cause to improve the communicative value of the entity and reduce investors' uncertainty.

Also, other than the opinion paragraph, other contents in an audit report are prepared according to a standard template and it's the same for most of the companies generally. Therefore, if the KAM paragraph is absent, there is no way to understand the company's associated risk for shareholders (Humphrey et al., 2011).

KAM section can be mainly divided into two parts which are "Item description" which explains an entity's business model and operating conditions and "Audit response section" which explains audit procedures performed by auditors. In both ways, shareholders can get a good knowledge of the existing condition of the company and verify the fact that auditors have communicated with management (Hansen and Yang, 2021).

Also, Sirois et al. (2018) conducted an experimental study using 98 graduate accounting students in Canada and asked them to play the role of bank loan officer. According to the study, they found that the number of KAMs increase investors' attention to KAM-related information in the financial statement disclosures. Limaporn et al. (2019) conducted a study to investigate the relationship between the number of KAMs and common share price. The study concluded that there is a positive relationship between the number of KAMs and share prices because disclosing KAMs gives more informative value compared to traditional auditor reporting.

Thus, it can be built the hypothesis 1 as,

*H*₁: The Total number of Key Audit Matters has a positive relationship with shareholders' reactions.

Bedard et al. (2019) examined the relationship between French JOAs which are similar to the concept of KAMs and market reaction for the period 2003 – 2011. They have analyzed the impact of JAOs on market reaction which is measured by abnormal trading volume and abnormal returns in the first year after mandating JAOs and in subsequent years. Their research findings indicate a higher abnormal trading volume in the first year after mandating JAOs but in the subsequent years, they have not found any significant association between those two variables. They concluded that investors' reactions were detected only when JAOs were mandated for the first time. Also, Kithinji and Mwedwa (2021) have investigated the association between KAMs and stock market reaction for the first three years after the implementation of the KAMs regulation which was effective from 2016 in Kenya. Their findings indicate that KAMs led to an increase in stock market reaction which was measured by cumulative abnormal returns in the first year of implementing KAMs standard in Kenya. In the following years, KAMs led to a decrease in cumulative abnormal returns indicating a possible reduction in the information relevance of KAMs over time.

Thus, it can be built the hypothesis 2 as,

H₂: The number of new Key Audit Matters has a positive relationship with shareholders' reactions.

As per the auditing standard SLAuS 701, KAMs recurring over time for a long period highlight specific circumstances related to a particular entity or industry. Therefore, when such KAMs are recurring over time, those matters become overly standardized and less useful for shareholders' decision making. These KAMs may recur over time due to specific industry conditions or complexities in financial reporting and auditors' report. These matters emphasize aspects specific to the entity (International Auditing & Assurance Standards Board, 2015). Moreover, the

findings of Bedard et al. (2019) and Kithinji and Mwedwa (2021) conclude that the presence of KAMs led to a decrease in CAAR indicating reduced abnormal returns earned by investors when time passes after the first year of implementation as stated earlier. According to them, after reading KAMs for the initial time, shareholders consider KAMs as generic usual disclosures and KAMs will no longer be able to bring a value relevance for shareholders.

Thus, the hypothesis 3 can be constructed as follows.

H₃: The number of recurring Key Audit Matters has a negative relationship with shareholders' reactions.

The constructed hypotheses are tested using the following model:

$$\text{CAAR} = \beta_0 + \beta_1 \text{NUM_KAM} + \beta_2 \text{NEW_KAM} + \beta_3 \text{RE_KAM} + \beta_4 \text{BVS} + \beta_5 \text{ROE} + \beta_6 \text{EPS} + \beta_7 \text{DPS} + \beta_8 \text{SIZE} + \beta_9 \text{LEV} + \beta_{10} \text{BDSIZE} + \beta_{11} \text{BDIND} + \beta_{12} \text{BIG4} + \varepsilon$$

Formula 6

Findings of the Study

Industry categories and the frequency of KAMs

The number of KAMs recorded by companies in each industry are represented in Table 4.1.

Table 4.1

Industry and frequency of KAMs

Industry	Frequency of KAMs					Total
	0	1	2	3	4	
Food Beverage and Tobacco	-	-	3	6	3	12
Materials	1	5	4	8	-	18
Transportation	-	1	-	4	1	6
Capital goods	-	-	11	10	9	30
Energy	-	6	-	-	-	6
Telecommunication services	1	-	5	-	-	6
Utilities	-	-	-	4	2	6
Total observations	2	12	23	32	15	84

Source: Author developed based on independent auditor's reports included in annual reports of S & P Sri Lanka 20 companies from 2018 to 2023.

As per the findings, the maximum number of KAMs found from an audit report is four and companies operating in food beverage and tobacco, transport, capital goods and utilities industries have recorded four KAMs in audit reports. The least number of KAMs found from an annual report is zero and companies operating in materials and telecommunication industries have recorded zero KAMs. As a whole, the capital goods industry is the industry group that has disclosed the highest number of KAM observations which is 30 out of the total number of KAM observations 84.

Types of issues recorded in the KAMs section

Table 4.2 shows the types of issues recorded in the KAMs section in the selected annual reports.

Table 4.2

KAMs issues in sample companies

KAMs Issue	Number of KAMs
Goodwill and intangible assets impairment	32
Subsidiaries and equity accounted investees	12
Biological assets	20
Business combinations and acquisitions	6
Leases	3
PPE and investment property	30
Performance incentives and discounts to customers	5
Inventory	14
Impairment of Trade receivables, loans and hire purchase receivables	22
Retirement benefit obligation	5
Revenue	30
Interest bearing borrowings	3
Insurance contract liabilities	6
Other	6
Total KAMs	194

Source: Author developed based on independent auditor's reports included in annual reports of S & P Sri Lanka 20 companies from 2018 to 2023.

According to the findings, KAMs on goodwill and intangible assets impairment are identified as the most common issue. It appears 32 times among the total identified KAM issues. It is reasonable to consider impairment as the top KAM because it

involves lots of management judgments on estimating the carrying value. Estimating fair value is more or less similar to a science and valuations arrived by different experts may not be similar (Investopedia, 2024). Since companies need to assess impairment annually, it is frequently subjected to auditors' attention (Abu and Jaffar, 2020). Li (2020) has stated that auditors spend more time and effort and use more professional judgment on areas like goodwill impairment and financial instruments valuation. According to Bedard et al. (2018), it is more probable to disclose KAMs by auditors when management is using a model to estimate fair value. For example, the discounted cash flow model is used to assess goodwill impairment.

Secondly, KAM issues regarding property plant and equipment (PPE) and investment property and revenue have obtained the same significance and they have been recorded 30 times among the total identified KAMs issues. The institute of CA Sri Lanka has published SLFRS 15 – Revenue from contracts with customers, effective as of 1st January 2018. The KAMs on revenue recognition may be influenced by the new accounting standard since its first-time implementation. According to Chirakool, W. (2021) some auditors consider revenue recognition as a generic risk while some auditors explain revenue recognition incorporating complex accounting treatments such as criteria for revenue recognition, trade volume and type of trade and significant management judgments on revenue.

According to the experimental study carried out by KPMG (2018) in the first year of implementation of SLAuS 701 in Sri Lanka, there were 290 listed entities in CSE and those listed companies have disclosed 510 KAMs. Out of 510 total KAMs, 92 were regarding impairment of financial instruments, 70 were regarding the valuation of PPE and 44 were regarding inventory. Thus, KPMG (2018) has identified impairment of financial instruments, valuation of PPE and valuation of inventory as the top 3 KAMs in 2018 in Sri Lanka. In the same way, KAM issues on PPE are identified as the second most frequent KAM by the researcher in this study as well.

Also, the nature of the KAM issues on PPE was reviewed by KPMG (2018) and they have found that 93% of KAM issues on PPE are regarding revaluation, 6% are regarding impairment and 1% are regarding measurement of PPE.

Descriptive statistics

The descriptive statistics of the dependent variable, independent variables and control variables are summarized in Table 4.3.

Table 1.3

Descriptive statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>Min</i>	<i>Max</i>
<i>NUM_KAMs</i>	84	2.548	1.023	0.000	4.000
<i>NEW_KAMs</i>	84	0.905	0.989	0.000	4.000
<i>RE_KAMs</i>	84	1.631	1.084	0.000	4.000
<i>CAAR</i>	84	0.018	0.190	-0.366	1.510
<i>SIZE</i>	84	10.970	0.489	9.748	11.872
<i>LEV</i>	84	0.589	0.256	0.255	1.517
<i>ROE</i>	84	0.144	0.175	-0.078	0.785
<i>BDSIZE</i>	84	0.929	0.259	0.000	1.000
<i>BDIND</i>	84	0.381	0.489	0.000	1.000
<i>BIG4</i>	84	1.000	0.000	1.000	1.000
<i>W_BVS</i>	84	64.863	52.231	8.076	168.121
<i>W_EPS</i>	84	6.225	5.183	0.364	15.826
<i>W_DPS</i>	84	1.983	2.255	0.000	7.000
<i>_est_fe</i>	111	0.757	0.431	0.000	1.000
<i>_est_re</i>	111	0.757	0.431	0.000	1.000

Source: STATA output

Initially, the researcher observed that the control variables: BVS, EPS and DPS have wide dispersions after drawing box plot diagrams. Accordingly, there was a large difference between the minimum and maximum values of the above three variables in the initially derived descriptive statistics. Therefore, the three variables: BVS, EPS and DPS were winsorized at 10% to avoid the effect of outliers.

The mean value of the total NUM_KAMs, is 2.547, with a standard deviation of 1.022. The mean value of NEW_KAMs is 0.905, with a standard deviation of 0.99. The mean value of RE_KAM is 1.631 with a standard deviation of 1.084. It indicates that sample companies disclose three total KAMs, one new KAM and two recurring KAMs averagely. CAAR possesses a mean of 0.018, and the maximum and minimum CAAR's are 1.51 and -0.366 respectively. The mean values of SIZE, LEV, ROE, W_BVS (Winsorized Book Value per Share), W_EPS (winsorized Earnings per Share) and W_DPS (Winsorized Dividends per Share) are 10.97, 0.589, 0.144, 64.863, 6.225 and 1.983 respectively.

Table 4.4 represents the correlation between variables.

Table 4.4

Pearson pairwise correlation

	CAAR	NUM_ KAMs	NEW_ KAMs	RE_K AMs	SIZE	LEV	ROE	W_BV S	W_EP S	W_DP S	BDSIZ E	BDIN D
CAAR	1.000											
NUM_ KAMs	-0.181 0.099	1.000										
NEW_ KAMs	-0.086 0.438	0.4332 *	1.000									
RE_K AMs	-0.096 0.385	0.5539 *	- 0.5049	1.000								
SIZE	-0.017 0.877	0.5765 *	0.142 0.198	0.4044 *	1.000							
LEV	-0.002 0.988	0.2598 *	0.020 0.859	0.2300 *	0.096 0.387	1.000						
ROE	0.029 0.791	- 0.3124 0.004	- 0.3484 0.001	0.030 0.788	- 0.4627 0.000	-0.035 0.752	1.000					
W_BV S	-0.028 0.800	0.3118 *	0.127 0.251	0.170 0.123	0.5971 *	-0.205 0.062	- 0.2398 0.028	1.000				
W_EP S	0.053 0.635	0.017 0.877	- 0.2705 0.013	0.2673 *	0.105 0.342	- 0.2816 0.010	0.5385 *	0.5078 *	1.000			
W_DP S	-0.027 0.807	- 0.2708 0.013	-0.157 0.155	-0.115 0.297	- 0.2304 0.035	- 0.3251 0.003	0.5307 *	0.203 0.064	0.6539 *	1.000		
BDSIZ E	0.046 0.681	- 0.1689 0.125	-0.121 0.273	-0.052 0.638	-0.173 0.117	-0.202 0.066	0.108 0.330	-0.160 0.147	0.085 0.444	0.2226 *	1.000	
BDIN D	-0.099 0.370	0.012 0.917	0.026 0.814	-0.004 0.969	0.2612 *	-0.024 0.828	-0.202 0.066	0.3083 *	0.106 0.336	-0.019 0.861	- 0.3536 0.001	1.000

Source: STATA output * Relationship is significant at the 0.05 level.

According to the correlation matrix, the highest correlation can be observed between W_EPS and W_DPS (Pairwise correlation = 0.6539; $p < 0.05$). Generally, mature companies that report stable earnings tend to distribute more dividend payouts (Investopedia, 2020). The strong correlation between EPS and DPS is due to this association. The correlation matrix shows that there is a negative insignificant correlation between NUM_KAMs, NEW_KAMs, RE_KAMs and CAAR. However, it is interesting to find that NUM_KAMs is having a positive significant correlation with SIZE (Pairwise coefficient = 0.5765; $p < 0.05$), LEV (Pairwise coefficient = 0.2598; $p < 0.05$) and W_BVS (Pairwise coefficient = 0.3118; $p < 0.05$). It can suggest that there is a greater likelihood of occurring unusual/ material events and transactions associated with complexities when the company is bigger and focuses on a number of different units. Further, it will result in an audit delay since auditors have to take a long time to complete the audit (Hanif and Ariani, 2023). Therefore, there is a high possibility for auditors to disclose KAMs. Similarly, when companies are funded with high debt components, auditors may have concerns about significant risks and they tend to disclose more KAMs. As per the findings of Zuliadi et al. (2022), leverage has a positive and significant effect on fraudulent financial statements. At the same time, NUM_KAMs have a negative significant correlation with ROE (Pairwise coefficient = -0.3124; $p < 0.05$), W_DPS (Pairwise coefficient = -0.2708; $p < 0.05$) and BDSIZE (Pairwise coefficient = - 0.1689; $p < 0.05$). When there are many directors on the board, it is less likely that the company's financial statements are subjected to frauds and errors for directors' self-interest. A significant relationship between board size and corporate fraud can be predicted since an effective board would assist in deterring corporate fraud (Salleh and Othman, 2016). Thus, auditors rarely detect significant risks. Moreover, NEW_KAMs has negative significant correlation with ROE (Pairwise coefficient = -0.3484; $p < 0.05$) and W_EPS (Pairwise coefficient = -0.2705; $p < 0.05$). Attractive ROE, DPS and EPS ratios are reflections of a better performing and financially

stable company. A higher EPS ratio depicts that the company generates a high profit relative to its share price. Thus, investors are willing to pay a high consideration for a company's stocks (Investopedia, 2024).

Regression Analysis

Initial Diagnostic Tests

Hausman Specification Test

In order to select between random effects and fixed effects models of panel data regression, the “Hausman test” was performed. A Prob>chi2 value greater than 0.05 implies that there is no systematic difference between the coefficients of the two models and a random effect model can be used. Accordingly, Prob>chi2 value of the Hausman test was obtained as 0.3147 which is greater than 0.05 and the null hypothesis is accepted. Therefore, a random effect model is selected (Table 4.5).

Table 4.5

Hausman test results

hausman fe re

	<i>fe</i>	<i>Re</i>	<i>Difference</i>	<i>S.E.</i>
<i>NUM_KAMs</i>	-0.003	-0.069	0.066	0.097
<i>NEW_KAMs</i>	-0.047	0.013	-0.060	0.082
<i>RE_KAMs</i>	-0.073	-0.010	-0.063	0.079
<i>SIZE</i>	0.065	0.062	0.004	0.155
<i>LEV</i>	0.916	0.073	0.843	0.307
<i>ROE</i>	-0.079	-0.198	0.119	0.191
<i>W_BVS</i>	-0.002	-0.001	-0.001	0.001
<i>W_EPS</i>	0.014	0.016	-0.002	0.005

<i>W_DPS</i>	0.006	-0.018	0.024	0.014
<i>BDSIZE</i>	-0.086	-0.019	-0.067	0.149
<i>BDIND</i>	-0.156	-0.071	-0.085	0.084

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(11) = (b-B)[(V_b-V_B)^{-1}](b-B) = 12.68$$

$$\text{Prob}>\text{chi2} = 0.3147$$

(V_b-V_B is not positive definite)

Source: STATA output.

Panel data regression assumptions.

Panel data regression assumption 1: Independence/ Ergogeneity/ No-Autocorrelation

a. Breusch-Pagan LM (BP/ LM) test

Table 4.6

Independence assumption - Breusch-Pagan LM (BP/ LM) test

<p>xttest2</p> <p>Breusch-Pagan LM test of independence: chi2(91) = 108.046</p> <p>Pr = 0.1073</p> <p>Based on 6 complete observations over panel units</p>	<p>After selecting the random effect model, it was tested for panel data regression assumptions. The first assumption checked is “Independence/ Ergogeneity/ No – Autocorrelation” which means variables are independent from each other and the residuals across entities are not correlated. The “Breusch-Pagan LM (BP/ LM) test” of independence was performed to the autocorrelation. The null</p>
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<p><i>Source: STATA output</i></p>	<p>hypothesis in the B P/LM test of independence is that residuals across entities are not correlated. In this case, the Pr value was 0.1073 which is greater than 0.05. Therefore, the null hypothesis is accepted and it can be concluded that the panels are not correlated (cross- sectional dependence is not there).</p>
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b. Pasaran CD test

Table 4.7

Independence assumption - Pasaran CD test

<p>xtcsd, pesaran abs Pesaran's test of cross sectional independence = 1.801 Pr = 0.0717 Average absolute value of the off-diagonal elements = 0.372 <i>Source: STATA output</i></p>	<p>Further, the “Pasaran CD test” also was performed to check the data set for independence/ No – Autocorrelation. The null hypothesis in the “Pasaran CD test” of independence is that residuals across entities are not correlated. The Pr value of the test was 0.0717 which is greater than 0.05. Therefore, the null hypothesis can be accepted and it can be concluded that panels are not correlated.</p>
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Panel data regression assumption 2: Non – Serial correlation

Table 4.8

Non-serial correlation assumption - Wooldridge test

<p>xtserial CAAR NUM_KAMs NEW_KAMs RE_KAMs SIZE LEV</p>	<p>Secondly, the data set was checked for the panel data regression assumption “Non – Serial correlation” which means residuals across time intervals are not correlated. In order to check serial correlation, the</p>
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<p>ROE W_BVS W_EPS W_DPS BDSIZE BDIND BIG4 Wooldridge test for autocorrelation in panel data H0: no first-order autocorrelation F(1,13) = 0.640 Prob > F = 0.4381 Source: STATA output</p>	<p>“Wooldridge test” was performed. According to the results, the P value was 0.4381 which is above 0.05. Thus, the null hypothesis can be accepted and it can be concluded that the residuals across time are not correlated.</p>
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Panel data regression assumption 3: Homoscedasticity

Table 4.9

Homoscedasticity Assumption - Wald test

<p>Panel Groupwise Heteroscedasticity Tests Ho: Panel Homoscedasticity Ha: Panel Groupwise Heteroscedasticity Lagrange Multiplier LM Test = 8.08e + 04 P-Value > Chi2(13) 0.0000 Likelihood Ratio LR Test = 14.9780 P-Value > Chi2(13) 0.3087 Wald Test = 9.12e+05</p>	<p>In another word, Homoscedasticity is the absence of Heteroscedasticity. Homoscedasticity means the variance of the dependent variable changes when the independent variable increases. For instance, in a regression of income tax expense on taxable income, people who earn a lower taxable income, pay little income tax while people who earn higher taxable income, pay high income tax which means the constructs should vary with the change of other constructs. To test the Homoscedasticity in the random effect model, the “Wald test” was used and the results contained a p value of 0.000 which is less than 0.05. The null hypothesis of the “Wald test” is the panel subjected to homoscedasticity. Here the null hypothesis cannot be accepted since the p value of the Wald test is less than 0.05</p>
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P-Value > Chi2(14) 0.0000 <i>Source: STATA output</i>	which means heteroscedasticity is present in the data set.
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Thus, an ordinary kind of panel data linear model cannot be employed for this data set since regression assumption Homoscedasticity is violated. When the panel data assumptions like homoscedasticity and non-autocorrelation are violated in panels, it is suggested to use the “generalized least squares regression method (GLS)” for data analysis (STATA Manuals). The results of generalized least squares regression are presented in Table 9. Yaqub et al. (2015) have also employed GLS regression in their study since the data panel is subjected to heteroscedasticity and autocorrelation.

Regression Results

To achieve the objectives of this study by answering the research questions one, two, and three testing hypotheses H_1 , H_2 , H_3 , the researcher used GLS regression conducted through STATA software. Results derived through such regression analysis are stated in Table 4.10.

Table 4.10

Results of GLS Regression

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: heteroskedastic

Correlation: no autocorrelation

Estimated covariances	=	14	Number of obs	=	84
Estimated autocorrelations	=	0	Number of groups	=	14
Estimated coefficients	=	12	Time periods	=	6
			Wald chi2(11)	=	4.32
			Prob > chi2	=	0.9597

CAAR	Coef.	Std. Err.	Z	P> z	[95% Conf.]	Interval]
<i>NUM_KAMs</i>	0.0492	0.0991	0.5000	0.6190	-0.1450	0.2435
<i>NEW_KAMs</i>	-0.0500	0.0965	-0.5200	0.6040	-0.2392	0.1391
<i>RE_KAMs</i>	-0.0657	0.0959	-0.6800	0.4930	-0.2537	0.1223
<i>SIZE</i>	0.0130	0.0275	0.4700	0.6370	-0.0410	0.0669
<i>LEV</i>	-0.0025	0.0597	-0.0400	0.9670	-0.1195	0.1145
<i>ROE</i>	-0.0185	0.0838	-0.2200	0.8250	-0.1828	0.1457
<i>W_BVS</i>	-0.0002	0.0003	-0.5800	0.5590	-0.0007	0.0004
<i>W_EPS</i>	0.0025	0.0035	0.7000	0.4860	-0.0045	0.0094
<i>W_DPS</i>	-0.0035	0.0055	-0.6400	0.5250	-0.0142	0.0072
<i>BDSIZE</i>	0.0090	0.0317	0.2800	0.7770	-0.0532	0.0712
<i>BDIND</i>	-0.0054	0.0194	-0.2800	0.7790	-0.0434	0.0326
<i>BIG4</i>			0.0000 (omitted)			
<i>_cons</i>	-0.1113	0.2852	-0.3900	0.6960	-0.6702	0.4476

Source: STATA output.

The Total number of KAMs (GLS = 0.0492369, probability = 0.619) as an independent variable appears to have a positive but insignificant effect on shareholders' reactions at 5% level. Thus, hypothesis 1 cannot be accepted. (H₁: Total number of Key Audit Matters has a positive relationship with shareholders' reactions). Yang, H. (2021) also has found that there is a positive insignificant relationship between KAMs and shareholders' responses. According to Yang (2021), KAM paragraph creates little value for both institutional and non-professional investors. Institutional investors can reveal information which is not publicly available. Therefore, the provision of additional information by KAM paragraph creates no value for institutional investors since they have already received information from other sources. On the contrary, non-professional investors are lack knowledge on interpreting KAMs. Thus, disclosure of KAMs provides little value for non-professional investors. Yang (2021) also has stated that investors have the habit of reading the audit report carelessly, especially when the

companies' audit reports contain an unqualified audit opinion over a long period of time. Likewise, Boonyanet and Promsen (2019) also found that there is a positive insignificant relationship between KAMs on revenue recognition, obsolete sock and improper liability provision with shareholders' reactions. Further, they have found a negative insignificant relationship between KAMs on PPE, investment impairment and goodwill with shareholders' reactions. Therefore, Boonyanet and Promsen (2019) have concluded that KAMs provide less useful information to shareholders.

The independent variable, a number of new KAMs (GLS = -0.0500424, probability = 0.604) has a negative insignificant effect on shareholders' reactions at 5% level. It depicts that hypothesis 2 also cannot be accepted (H₂: The number of new Key Audit Matters has a positive relationship with shareholders' reactions). A number of recurring KAMs (GLS = -.0656861, probability = 0.493) also indicates a negative insignificant effect on shareholders' reactions at 5% significance level. Thus, hypothesis 3 is not empirically supported (H₃: The number of recurring Key Audit Matters has a negative relationship with shareholders' reactions). The results of this study are in line with the previous study of Abu et al. (2020) who found that the total number of KAMs, New KAMs and Recurring KAMs have a less probability of influencing shareholders' reactions measured by share prices.

Discussion and Recommendation

KAM section is a recent development introduced to audit reports in 2018. However, there is an unsolved question whether shareholders incorporate this vital information into their investment decisions. Therefore, this study examined the relationship between KAMs and investors' reactions to non-financial companies included in the S & P Sri Lanka 20 index.

The study's GLS regression results indicate a positive but insignificant relationship between the total number of KAMs and shareholder reactions. Additionally, both

new and recurring KAMs depict a negative but insignificant relationship with shareholder reactions. Therefore, Hypotheses 1, 2, and 3 are not supported by the regression findings. This indicates that the disclosure of KAMs does not significantly impact the shareholder reactions in Sri Lanka, addressing the research problem. Under the descriptive statistics, the top five KAMs are identified as KAMs related to 1) goodwill and intangible assets impairment, 2) PPE and investment property, 3) revenue, 4) impairment of trade receivables, loans and hire purchase receivables and 5) biological assets. Further, according to Pairwise Pearson correlation also, there is a negative insignificant correlation between the total number of KAMs and CAAR, new KAMs and CAAR, and recurring KAMs and CAAR.

The results of this study argue that investors do not consider KAMs in making investment decisions. This is an inexcusable reprehension towards practitioners since what they find as the most significant areas of the client company, after a serious effort, will be wasted without being subjected to any attention by the major users of financial statements. As a policy recommendation, auditors can be suggested to represent the KAM section in a way that investors can easily understand the noteworthy information. Therefore, the researcher would like to encourage auditors to avoid standardized and technical terms in KAM paragraph and replace them with simplified and layman words. Otherwise, most of the non-professional investors who lack adequate knowledge to interpret KAMs will misinterpret the content and the ultimate purpose of disclosing KAMs which is adding a communicative value to the audit report by enhancing the transparency of the audit will depart from its objective. Ultimately, those shareholders' misperceptions of KAMs will increase the audit expectation gap rather than reduce. Also, the researcher would like to suggest audit practitioners to employ their professional skepticism in a superior way and decide what matters should be brought to shareholders' attention and the quality of KAM disclosures. At the same time,

auditors can concentrate more on disclosing KAMs on shareholders' most focused areas in financial statements. Then, shareholders can refer to KAM section as an annotation when referring to financial statements to have a sound understanding of the financial statements' content.

The IAASB and CA Sri Lanka also can emphasize the quality of KAMs more in future auditing standards reversals. Also, the CA Sri Lanka can be proposed to come up with professional training for practitioners on how to develop the inclusion and outline of KAM section to meet the authentic objective of the SLAuS 701 which is providing relevant and meaningful information to investors and other users of the audit reports.

Furthermore, since no any significant shareholders' reaction is identified for disclosed KAMs as per the findings, it can be predicted that shareholders make their investment decisions relying on less reliable information such as share prices. Nevertheless, share prices can be subjected to manipulations by fraudulent market players. Therefore, especially non-professional and minor shareholders can be advised to trust only legitimate and objective information sources like independent auditor's reports.

Moreover, Colombo Stock Exchange (CSE) can contribute to safeguard minor shareholders who are not cautious on company-specific risk indications disclosed by auditor's reports by hardening the corporate governance requirements such as board composition, director dealings, directors' remuneration, audit committee effectiveness for listed companies in CSE and strictly regulating them.

Finally, the researcher has identified few limitations of the study. In the event study approach utilized in the study, the date on which audited financial statements are published on the CSE website is considered as the event date. However, the actual date on which shareholders read the KAMs in an audit report can be different from

the event date. The sample of the study is non-financial listed companies in the S & P Sri Lanka 20 index. They are the largest and most liquid companies in the Sri Lankan equity market. Thus, shareholders might tend to invest in such companies disregarding the risk factors disclosed by KAMs. Therefore, future researchers can consider a more representative sample.

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Strengthening Customer Loyalty: Exploring the Role of Relationship Marketing in Sri Lanka's Public Sector Banks

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Customer loyalty is seen as critical to the long-term success of businesses, where relationship marketing has emerged as a key strategy used to attract, maintain, and enhance customer relationships. However, past studies have found significant differences between factors affecting customer loyalty and satisfaction between private and public sector banks, with calls for public sector banks to adopt more dynamic marketing strategies to bridge such gaps. The purpose of this study is to empirically investigate the impact of relationship marketing on customer loyalty in the context of the public sector banks in Sri Lanka. More specifically, this study examined the direct relationship between trust, commitment, communication, and conflict handling, which are seen as key attributes of relationship marketing with customer loyalty of public sector commercial banks in Sri Lanka. The study used a convenient sampling design with 384 respondents acquired through a structured questionnaire, which captured state commercial bank customers in the Colombo district of Sri Lanka. Data analysis was done using correlation and regression techniques with the support of SPSS software. The findings suggest that all four variables associated with relationship marketing significantly explain the variations in customer loyalty. These findings differ from those of past studies focusing on private sector banks that found trust and communication to be the key relationship attributes that lead to customer loyalty. This research contributes to the limited body of knowledge on relationship marketing and customer loyalty in the public banking sector. It also provides critical input to public sector bankers on avenues for strengthening customer loyalty from a customer relationship perspective.

Keywords: *Commitment, Communication, Conflict Handling, Customer Loyalty, Relationship Marketing, Trust.*

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Introduction

The issue of customer loyalty, or the growing absence of it, has gained much attention in recent times. Increased competition, customers becoming smarter and demanding personalized experiences, the role of social media that makes it easy to spread both positive and negative word of mouth, and the increasing use of online shopping that makes it easy to switch from one brand to another appear to have all contributed to this growing discourse on customer loyalty. Given the crucial role customer loyalty plays in enhancing repeat purchases and cross-selling opportunities (Winer, 2001), marketers attempt to employ many strategies to build and strengthen customer loyalty. Such strategies include enhancing the quality and experience of products and services, building stronger customer relationships through customer relationship management strategies, practices and technologies, and using online marketing strategies and digital media. However, the fundamental change in businesses shifting from transactional marketing to relationship marketing puts relationship marketing efforts at the forefront of building, maintaining, and enhancing customer loyalty (Volkov, 2004; Malik et al., 2017).

Relationship marketing can be defined as all marketing activities directed at establishing, developing and maintaining successful relational exchanges (Morgan & Hunt, 1994; Gaurav, 2016). Scholars have also highlighted the significant role of relationship marketing in modern businesses. For instance, Berry (1995) and Alrubaiee and Al-Nazer (2010) describe relationship marketing as a tool that leads to customer loyalty, enhancing both customer satisfaction and competitiveness. Ndubisi (2004), citing Webster (1992), describes relationship marketing as a means of better understanding

customers, leading to increased customer loyalty. A review of relationship marketing literature indicates that past studies have discussed several key dimensions of relationship marketing, including customer centricity, commitment, trust, communication, conflict handling, bonding, satisfaction, and cooperation (Gaurav, 2016; Malik et al., 2017; Alrubaiee & Al-Nazer, 2010).

The role of relationship marketing in customer loyalty has also received much contextual attention. They include the automobile industry (Gaurav, 2016), the telecommunication industry (Malik et al., 2017), the sports industry (Bagheri, 2024), and the banking sector (Sivesan, 2012; Liu & Huang, 2024; Taneja, 2024). Within the banking and broader financial services sector, relationship marketing was found to generate higher returns from customers because the service nature of the sector is better catered by relationship marketing initiatives (Alrubaiee & Al-Nazer, 2010). However, more in-depth studies on the banking sector reveal mixed results related to relationship marketing and customer loyalty. For instance, while Daabseh et al. (2024) found trust to significantly affect customer loyalty, Alyahya (2024) highlighted the role of communication by way of reputational risk management to be a more significant enabler of customer loyalty, whereas Taneja (2024) found that communication and conflict handling boosted by personalized services to result in better customer loyalty.

Moreover, several studies have also highlighted the differences in relationship marketing and customer loyalty between private and public banks. Singh (2024), in a comparative study of public-sector and private-sector banks in India, found significant differences between factors that shape customer perceptions and loyalty. In another study focusing on the private sector and public sector banking divide in India, Paul (2015) highlights the differences

between perceived service quality by public and private bank customers and attributes such differences to different customer profiles and expectations. While these findings suggest that the role of relationship marketing and customer loyalty may vary between private and public sector banks, a review of the literature highlights a lack of in-depth research to adequately substantiate these claims. Given these limitations, scholars such as Paul (2015), Abeysekera and Kumaradeepan (2012), and Sekaran (2003) have called for more focused studies on the specific attributes of relationship marketing within public sector commercial banks to better understand its impact on customer loyalty.

The present study, thus, investigates the role of relationship marketing and its key attributes (i.e., trust, commitment, communication, and conflict handling) in strengthening customer loyalty in Sri Lanka's public sector banks. The study used mainly cross-sectional data collected through a structured questionnaire targeting the two leading public sector banks in Sri Lanka – Bank of Ceylon and People's Bank. The data analysis was carried out using correlation and regression techniques with the support of SPSS software. The findings of our study reveal that, unlike previous research which emphasized trust (Daabseh, 2024) and communication (Alyahya, 2024; Taneja, 2024) as key relationship attributes influencing customer loyalty in the banking industry, all four relationship marketing attributes play a significant role in customer loyalty within public sector banks. These results offer a more nuanced understanding of the dynamics between relationship marketing and customer loyalty in the context of the public sector banking industry.

Literature Review

Relationship Marketing

Relationship marketing is attracting, maintaining, and enhancing relationships with customers and stakeholders for mutual profit, ensuring that all parties' aims are achieved through mutual exchange and the fulfilment of promises (Taleghani, 2011). Shani (1992) described relationship marketing as a combined effort to identify, maintain, and build a network with individual customers, continuously supporting the relationship where the network works for the mutual benefit of both sides through interactive, individualized, and value-added contact over a long period. Traditionally, relationship marketing focused on attracting customers. However, McIlroy and Barnett (2000) argued that relationship marketing aims to develop long-term and cost-effective relationships between customers and the company. Furthermore, it encompasses various tactics, including providing enhanced services, treating customers fairly, and ensuring services are tailored to their needs. Arnett and Badrinarayanan, as cited in Alrubaiee and Al-Nazer (2010), conceptualize “relationship marketing competence as a firm’s ability to identify, develop, and manage cooperative relationships with key customers characterized by trust, relationship commitment, and communication” (p.157).

Ndubisi (2004) proposed four essential virtues that underpin relationship marketing - trust, commitment, communication, and conflict handling. Trust is the confidence in the other party's intentions within a relationship. In relationship marketing, trust reflects the degree to which each side believes in and relies on the other's honesty when making promises. It is

the willingness to place faith and dependability in another, indicating how much one can guarantee the other's actions (Wong, 2002). Commitment is a robust and enduring desire to maintain a valued relationship. Zineldin (2006) describes it as the intention to continue a course of action or the desire to sustain a relationship. Moorman (1992) emphasizes that commitment reflects a high level of obligation to ensure a relationship's success, making it mutually satisfying and beneficial. Individuals who perceive greater value in a relationship tend to show higher commitment and are more likely to reciprocate efforts due to past benefits received (Mowday, 1979). Communication involves providing timely and trustworthy information. In relationship marketing, it means staying connected with valued customers, sharing service updates, and proactively addressing any delivery issues. Effective communication is expected to build awareness, foster consumer preference, and encourage purchase decisions (Ndubisi, 2004). Finally, Conflict Handling prevents potential conflicts, resolving issues before they escalate, and openly discussing solutions when problems arise (Dwyer, 1987). It's an opportunity for companies to demonstrate their commitment to addressing consumer concerns, leading to stronger relationships and increased loyalty (Naoui & Zaiem 2020; Ndubisi, 2011).

Customer Loyalty

Customer loyalty refers to the ongoing support a customer gives to a specific organization or company. Over the past 80 years, loyalty has garnered significant attention in marketing (Verhoef, 2003). Ndubisi (2011) defines customer loyalty as the intention to repeatedly purchase a specific product or service in the future. Loyalty reflects a customer's willingness to consistently choose a company's goods and services over

a long period, often on an exclusive basis, while voluntarily recommending them to others (Berry, 2002). Loyal customers are typically willing to pay higher prices and are more understanding when issues arise. Additionally, they are less price-sensitive, and companies benefit from reduced costs, as the need to attract new customers is minimized (Rowley, 2000). Customer loyalty is often more effective in prioritizing existing customers over acquiring new ones (Walsh, 2005). Both academic and industry literature support this approach, highlighting that fostering and enhancing customer loyalty is essential for a company's growth, performance, and long-term success (Umaru, 2012). Loyal customers are not only less costly to serve (Ndubisi, 2011) but also contribute significantly to sustained business success.

Relationship Marketing and Customer Loyalty

One of the core purposes of relationship marketing is to cultivate customer loyalty by establishing enduring relationships, thereby maximizing customer value (Gilaninia, 2011). It is argued that merely satisfying customers is insufficient for an organization's success, as satisfaction alone does not guarantee repeat business (Taleghani, 2011). According to Baron and Harris, as cited by Sivesan (2012), a single negative service experience can drive a customer to a competitor, highlighting that maintaining loyal customers is essential to a successful organization. Indeed, customer loyalty is more critical than customer satisfaction, as it represents a deeply held commitment to repurchase or re-patronize a preferred product or service despite situational influences or marketing efforts that could encourage switching (Sivanandamoorthy, 2012). Therefore, maintaining long-term customer relationships is critical to securing a moderate or greater market share (Sivesan, 2012).

Hypothesis

Relationship Marketing and Customer Loyalty

Relationship marketing emphasizes attracting the customer, and its objective is to develop a long-term and cost-effective relationship between the customer and the company. Studies focusing on the banking sector (e.g., Sivesan, 2012; Daabseh, 2024; Alyahya, 2024; Taneja, 2024) have generally found relationship marketing to play a significant role in customer loyalty. Therefore, the first hypothesis is suggested as follows:

H1: There is a significant impact of relationship marketing on customer loyalty in the public-sector commercial banks in Sri Lanka

Trust and Customer Loyalty

Trust is defined as the element of a business relationship that determines the extent to which each party believes in and relies on the honesty of the promises made by the other. Studies conducted by Sivesan (2012) and Daabseh (2024) indicate a positive relationship between trust and customer loyalty within the banking industry. Based on such findings, the second hypothesis is proposed as follows:

H2: There is a significant impact of trust on customer loyalty in public-sector commercial banks in Sri Lanka

Commitment and Customer Loyalty

Commitment is another crucial factor that determines the strength of relationship marketing and serves as a valuable indicator for measuring the likelihood of customer loyalty and predicting future purchase behavior. Research conducted by Sivesan (2012) in the context of the Sri Lankan private banking sector indicates a positive relationship between commitment and

customer loyalty. In a recent study, Dilshan and Patabendige (2023) found a strong connection between customer bonding intentions and purchase behavior, suggesting that a perceived strong commitment to customer relationships will likely enhance customer satisfaction and loyalty. Based on such finding, the third hypothesis is proposed as follows:

H3: There is a significant impact of commitment on customer loyalty in public-sector commercial banks in Sri Lanka

Communication and Customer Loyalty

Communication refers to the ability to provide timely and trustworthy information. Today, communication is viewed as an interactive dialogue between a company and its customers across the pre-selling, selling, consuming, and post-consuming stages (Anderson, 2003). Effective communication between an organization and its customers leads to stronger relationships and increased customer loyalty (Ndubisi, 2011). Based on these findings, the fourth hypothesis is proposed as follows:

H4: There is a significant impact of communication on customer loyalty in public-sector commercial banks in Sri Lanka

Conflict Handling and Customer Loyalty

Conflict handling refers to an organization's ability to prevent potential conflicts, resolve visible conflicts before they escalate, and openly discuss solutions when issues arise. These efforts can lead to stronger relationships and increased loyalty to the organization (Ndubisi, 2011; Kumar & Sankar, 2024). Accordingly, the fifth hypothesis is proposed as follows:

H5: There is a significant impact of conflict handling on customer loyalty in public-sector commercial banks in Sri Lanka

Conceptual Framework

Figure 1 presents the study's conceptual framework and the hypotheses to be tested.

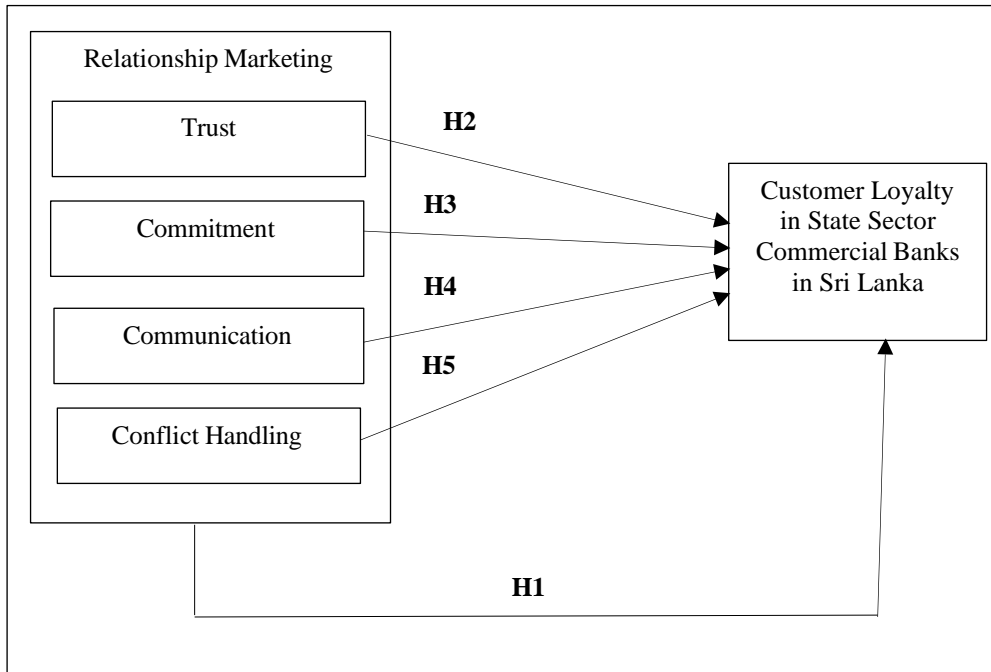


Figure 1: Conceptual Framework

Research Methods

Research Design

The study adopts a quantitative research design to test the validity of the five hypotheses. A survey method was chosen as the research strategy as the study's objective was to explicate the relationship between relationship marketing and its key attributes - trust, commitment, communication, and conflict handling with customer loyalty of public sector commercial banks in Sri Lanka. A cross-sectional perspective was adopted as the time horizon.

Population and Sample

The study gathered evidence from customers of the two largest state-owned commercial banks in Sri Lanka: Bank of Ceylon and People's Bank. This approach was deemed appropriate given the study's overall aim of empirically investigating the impact of relationship marketing on customer loyalty within the context of public sector banks in Sri Lanka.

The population of interest in this study included individuals aged 18 to 58 who are either customers or have had any transactions with these two public sector commercial banks and received any form of customer service from them. However, the target population of this study was unknown, leading to an undefined sample frame. Bank of Ceylon operates 651 branches across Sri Lanka, with 131 branches located in the Colombo district (Bank of Ceylon Annual Report, 2023). Similarly, People's Bank has 731 branches nationwide, with 124 branches in the Colombo district (People's Bank Annual Report, 2023). Given that Colombo district has the highest number of branches and the highest population density in Sri Lanka (Department of Census and Statistics, 2018), the researcher selected this district to conduct the survey.

According to the sample size determination table provided by Krejcie and Morgan (1970), a sample size of 384 was considered adequate for a population exceeding one million, making the obtained sample of the same number appropriate for this study.

Data Collection and Analysis

This research employed a questionnaire as the primary tool for data collection. The distribution of the questionnaire was facilitated by handing it out physically, targeting a sample of male and female participants between 18 and

58 residing in the Colombo district. The questionnaire was divided into three distinct sections. Part A was aimed at gathering demographic data about the respondents, including factors such as gender, civil status, age, educational qualifications, and monthly income. Part B aimed to gain insights into the respondent's attitudes towards each attribute of the independent variables of the study, namely, trust, commitment, communication, and conflict handling. All measurement scales related to the independent variables were adapted from previously employed scales by Ndubisi (2011), Bloemer (1999), Churchill (1982), and Morgan and Hunt (1994). Lastly, Part C focused on the dependent variable - customer loyalty by drawing on five questions proposed by Bloemer (1999). All questions in Part B and C used a 5-point Likert scale, which ranges from "strongly agree" (score of 5) to "strongly disagree" (score of 1).

Given the quantitative nature of this study, the acquired data was processed and interpreted utilizing the SPSS-21.0 version of the software. The analytical procedure involved various stages, including assumption testing, correlation analysis and regression analysis. These steps are seen as adequate in rigorously testing the proposed hypotheses of the study.

Findings of the Study

Demographic Profile

The study was conducted within Sri Lanka's Colombo district in Western province. A summary of the respondents' demographics is provided in Table 1.

Table 1: Demographic Profile of the Respondents

Variable	Frequency	Percentage (%)
Gender		
Male	171	44.5
Female	213	55.5
Civil Status		
Married	280	72.9
Single	104	27.1
Age Distribution		
Below 18 years	24	6.3
19-28 years	78	20.3
29-38 years	132	34.4
39-48 years	68	17.7
49-58 years	30	7.8
Above 58 years	52	13.5
Educational Qualification		
Up to O/L	103	26.8
Up to A/L	111	28.9
Graduate	100	26
Postgraduate	70	18.2
Income Level		
Below Rs. 25,000	128	33.3
Rs. 25,000 - Rs. 49,999	134	34
Rs. 50,000 - Rs. 74,999	69	18
Over Rs. 75,000	53	13.8

Reliability Tests and Validity Tests

A reliability test was undertaken to measure the consistency of the data. Reliability, in this context, refers to the degree to which a study's measures consistently capture the underlying constructs they are intended to represent (Hair et al., 2019). Values of Cronbach's alpha exceeding 0.7 generally indicate acceptable consistency (Bougie & Sekaran, 2019). Subsequently, the reliability of all variables was satisfied. The following table provides a detailed breakdown of these values (Table 2).

Table 2 : Cronbach's Alpha Values for Study Variables

Variables	Cronbach's alpha
Trust	0.745
Commitment	0.701
Communication	0.703
Conflict Handling	0.733
Customer Loyalty	0.716

Consequently, validity can be defined as the degree to which a measure or set of measures presents the study concept appropriately (Hair et al., 2019). The study ensured the validity by applying two tests: the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. According to recommended benchmarks, an acceptable KMO value should exceed 0.5, while Bartlett's test of sphericity should yield a statistically significant result ($p < 0.05$), indicating a lack of sphericity (Hair et al., 2019). Table 3 demonstrates that the validity of each variable was fulfilled.

Table 3: Results of Validity for Study Variables

Variables	KMO Measures	Bartlett Measures
Trust	0.583	0.000
Commitment	0.558	0.000
Communication	0.595	0.000
Conflict Handling	0.681	0.000

Hypotheses Testing

Multiple regression was adopted to evaluate the hypotheses formulated in this study. The hypotheses were verified by examining their P-values (significance level) and the Coefficient (B) values extracted from the multiple regression table. Table 4 details the statistical relationships underpinning the variables of interest. The P-values associated with these variables are less than the 0.05 significance level. This denotes statistically significant relationships and concludes that all the study's hypotheses have been accepted. The results collectively demonstrate the relationships between relationship marketing and its key attributes with customer loyalty in the public sector banks in Sri Lanka, supporting the conceptual framework and the relationships underpinning the study.

Table 4: Results of the Hypotheses Testing on Direct Paths

Hypotheses	β	P	Result on Hypotheses
H1: There is a significant impact of relationship marketing on customer loyalty in state sector commercial banks	0.614	0.000	Accepted
H2: There is a significant impact of trust on customer loyalty in state sector commercial banks	0.282	0.000	Accepted
H3: There is a significant impact of commitment on customer loyalty in state sector commercial banks	0.424	0.000	Accepted
H4: There is a significant impact of communication on customer loyalty in state sector commercial banks	0.745	0.000	Accepted
H5: There is a significant impact of conflict handling on customer loyalty in state sector commercial banks	0.524	0.000	Accepted

Discussion

The findings suggest that all four variables associated with relationship marketing (i.e., trust, commitment, communication, and conflict handling) significantly explain the variations in customer loyalty. Past studies have suggested some of the relationship marketing attributes to be positively related to customer loyalty. For instance, Daabesh (2024) found that trust has a significant impact on customer loyalty. Alyahya (2024) identified communication as the most influential factor. Meanwhile, Taneja (2024) highlighted that both communication and conflict handling, when supported by customized services, have the greatest effect on enhancing customer

loyalty. However, the present study finds that all relationship marketing attributes significantly relate to deepening customer loyalty within the public banking context. The findings also answer calls by scholars (Singh, 2024; Paul, 2015) for a more nuanced understanding of relationship marketing and customer loyalty in the public banking sector and suggest that compared to private banks, public banks may need to step up much on their relationship marketing efforts.

Within relationship marketing, the findings suggest that communication has the highest beta factor, indicating its significant role in relationship marketing. This finding aligns with Sivesan (2012), who identified communication as the most prominent predictor of customer loyalty in private sector banks in Sri Lanka. However, contrary to previous studies (Sivesan, 2012; Daabesh, 2024), trust was found to have the lowest explanatory effect on customer loyalty. This may indicate that the government backing of public banks reduces the need for trust in relationship marketing, or alternatively, skepticism toward the government itself may lead to a weaker trust-customer loyalty dynamic.

Conclusion

This study investigated the role of relationship marketing and its attributes in influencing customer loyalty in public sector banks. The collected data were analyzed mainly through correlation and regression analysis. The findings indicate that the independent variables on relationship marketing – trust, commitment, communication, and conflict handling – significantly positively impact the dependent variable, customer loyalty. Consequently, all hypotheses of the study were accepted.

The study's findings offer several theoretical and managerial implications. Firstly, the study contributes to the theory by identifying the key attributes of

relationship marketing that affect customer loyalty in public sector banks. Specifically, it underscores how trust, commitment, communication, and conflict handling significantly explain customer loyalty in these banks. This conclusion is supported by evidence showing that all four relationship marketing variables significantly account for variations in customer loyalty. Secondly, this research provides valuable insights for bankers and marketers in the public sector, helping them understand which relationship marketing attributes are most critical for strengthening customer loyalty. Furthermore, this study fills an important gap by providing empirical evidence from a developing country's context, where customer loyalty dynamics may differ from those in more developed markets.

As with any research, the study's findings should be interpreted with an awareness of its limitations. The scope of the study is confined to measuring the impact of relationship marketing on customer loyalty within the context of public sector banks in Sri Lanka. Consequently, the findings from this research may not be directly applicable to other public sector organizations or other countries. These limitations highlight the importance of contextualizing the results within the specific parameters of the study and recognizing that the insights gained may not be readily transferable to other industries without further investigation. Additionally, the study's sample size was limited to 384 respondents, which may constrain the ability to obtain outcomes that accurately reflect the larger population. The study's geographic scope was also confined to Sri Lanka's Western Province, the smallest region in the country. This restriction limits the sample population and may not accurately represent consumer behavior across the nation. Furthermore, using a convenience sampling technique introduces another limitation, as it may be susceptible to researcher bias.

While this study underscores the pivotal role of relationship marketing in enhancing customer loyalty within public sector commercial banks in Sri Lanka, it also offers further exciting research avenues. For instance, future research may explore the differences in relationship marketing strategies and their effectiveness across sectors, industries, or regions. They can also investigate the role of new technologies, such as AI and big data analytics, in relationship marketing strategies and their effects, and perhaps undertake more longitudinal designs to understand the long-term effects of such transformations within relationship marketing strategies.

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A Conceptual Review on Effectiveness of AI-generated Content on Customer Experience; Special Reference to Social Media Platforms

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This paper reviews the impact of AI-generated content on customer experience on social media platforms, focusing on automation and personalized consumer engagement with the key aspects. The review examines current literature to identify critical factors for leveraging AI technology in social media content creation, addressing both the benefits and potential drawbacks, including emotional authenticity and ethical concerns. Further, the articles that were referred from the indexed journals account for over 25 papers. When looking for the articles, the terms "generative AI," "AI-generated content," and "customer experience" were entered as keywords. In conclusion, this study's deductive approach reviews the concepts and empirical contributions. AI can enhance consumer engagement through personalized experiences and increased efficiency. However, concerns about emotional authenticity and ethical considerations need to be addressed. The study emphasizes the need for ethical AI practices and robust evaluation methodologies. The review is conceptual and may lack empirical data to support some findings. Further the findings will be changes based on the generative AI platforms as well. The paper highlights the importance of interdisciplinary collaboration to understand the interplay between AI, content creation, and consumer experiences. It emphasizes the need for ethical AI practices and robust methodologies to evaluate AI-generated content's impact on user experience.

Keywords: AI-generated content, content marketing, customer experience, ethical considerations, social media platforms

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Introduction

The cognitive science of artificial intelligence (AI) studies intelligent machines that can carry out tasks previously solely done by humans. Its primary focus is on using computers to perform activities that call for cognitive, perceptual, reasoning, and comprehending skills. Training AI systems to use user actions, interests, preferences, and beliefs to tailor experiences is possible. It is possible to teach machines to think like people (Rahman, 2023). They can provide them the capacity to hear, see, move, write, and speak. AI is far more adept than humans at picking up these habits. AI technologies are employed in various industries to automate tasks and increase their effectiveness. Social media has become an essential component of daily life. Customers use social media regularly. They frequently use social media sites like Instagram, Pinterest, LinkedIn, and Facebook. Social media is one of the primary industries where marketers may use AI to dramatically increase performance and efficiency. Businesses are using AI to utilise social media better. AI is regularly used to accumulate and evaluate data about your social media behaviour. Social media combines big-data analysis techniques to deduce tendencies and infer social behaviour (Sadiku, Ashaolu, Ajayi-Majebi and Musa, 2021). According to studies (e.g., Waqas et al., 2021; Varshneya et al., 2017; Nayeem et al., 2019), many businesses today closely monitor the online and offline customer experience (McLean, 2017; Rezaei and Valaei, 2017). This has yielded significant organisational benefits, including growth in sales and profitability and improved word-of-mouth, loyalty, and referrals.

The rapid progress of artificial intelligence (AI) has facilitated extensive digital transformation and led to the emergence of avatars, AI platforms for content development, and computer-generated universes that encourage unparalleled levels of social interaction (Ahn, 2022; Miao, 2022). AI systems such as ChatGPT and DALL·E2 can produce textual and visual material, enabling the development of appealing and engaging content in several sectors. The advancement described

facilitates enhanced consumer engagement across multiple sectors, including entertainment (Kim and Yoo, 2021) and retail (Chuah and Yu, 2021). According to Rahman (2023), using non-human digital communications to replicate a more authentic experience has significant and wide-ranging effects, leading to improved customer engagement. With significant implications for management scholars, the development and uptake of generative artificial intelligence (AI) technologies and large language models (LLMs), in particular, have started to change how people produce, share, and consume content across a variety of domains (Berg, 2023). One of the most sophisticated versions of big language models, ChatGPT, broke the record by exceeding 100 million active users in just two months after its debut in November 2022. Recently, Google Bard, the equivalent of ChatGPT, was made available to the company's more than 1 billion users worldwide.

Artificial intelligence (AI)-driven content creation is revolutionising numerous industries by simplifying various tasks and facilitating decision-making processes quickly (Ameen, 2021). It uses several algorithms to produce texts, pictures, or videos. AI-powered automated content generation is widely used across many industries, especially in marketing initiatives and customer service providers. In today's highly competitive economic world, customisation is essential. Businesses could benefit from personalised content produced using data-driven algorithms that consider user behaviour patterns, especially as AI technologies take centre stage (Aguirre, 2015).

Purpose of the Study

AI is a self-contained, autonomous electronic system that performs tasks like those of a human expert. Artificial intelligence (AI) is used in many aspects of our daily lives today, including computer games, automated transportation, driverless cars, computer aides, facial recognition at passport checks, and companion robots. AI is a collection of computer models and algorithms rather than a single technology

(Sadiku; Ashaolu; Ajayi-Majebi and Musa et al., 2021). The usage of AI-generated material involves drawbacks in addition to its advantages. Human authenticity and emotional nuance are lacking in machines, which may impact user engagement (Ebrahimi & Fanaeepour, 2020). Furthermore, AI systems might generate repetitive and unoriginal work, eventually harming brands by failing to differentiate themselves (Ebrahimi & Fanaeepour, 2020).

Creating content using AI has a lot of promise to enhance the user experience. But it's crucial to seriously consider its drawbacks, moral dilemmas, and possible effects on consumer involvement. Businesses can capitalise on the advantages of AI-generated content while reducing its defects by being aware of these aspects and taking appropriate action to solve them. Hence, this study aims to identify critical factors to consider when using AI technology to generate social media content to enhance the user experience.

Methodology

Even while prior literature has acknowledged the relevance of AI-generated content in social media, there are divisions in what organisations should do to enhance the consumer experience. As a result, it restricts our ability to comprehend the variables that influence the AI-generated components best suited to a company or brand. To increase the concept's applicability, the key elements that affect the creation of effective AI-generated content that improves the customer experience will be investigated in the first part of this study.

Without undermining the study's objectives, AI-generated content and customer experience have been chosen as the literature on this concept. The empirical and conceptual articles on AI-generated content and customer experience that have been published in indexed journals have been filtered for this study's literature. Further, the articles that were referred from the indexed journals account for over 25 papers. When looking for the articles, the terms "generative AI," "AI-generated content,"

and "customer experience" were entered as keywords. In conclusion, this study's deductive approach reviews the concepts and empirical contributions. Theories and journal articles are used as research tools in literature survey methodologies to produce findings and conclusions. This study concludes with potential directions for future research and provides an empirical, evidence-based discussion. Further it has provided how generative AI content has been structured in modern day marketing context with the special reference to social media platforms. It has explained that how this generative AI has affected to the modern-day customer experience aspects as well.

Literature Review

Introduction to AI-generated Content and Customer Experience

Artificial intelligence (AI) is a cognitive science concerned with intelligent machines capable of executing tasks previously exclusive to humans (Habibi & Salim, 2021). It encompasses a spectrum of tasks involving knowledge, perception, reasoning, understanding, and cognitive abilities, enabling machines to emulate human-like behaviors such as seeing, hearing, speaking, moving, and writing (Habibi & Salim, 2021). Across various industries, AI has become integral, driving automation and enhancement of diverse activities (Habibi & Salim, 2021). Social media platforms like Facebook, Twitter, and Instagram have become indispensable aspects of modern life, with users constantly engaging with them. AI significantly enhances user experiences on these platforms through personalized content delivery and targeted advertising (Habibi & Salim, 2021).

The rapid advancement of AI has precipitated the emergence of avatars, content-generation AI, and computer-generated universes, thereby revolutionizing digital transformation and social connectivity (Ahn et al., 2022; Miao et al., 2022). Content-generation AI systems like ChatGPT and DALL·E2 are crucial in creating

immersive and engaging content across diverse industries (Ahn et al., 2022). This revolutionization fosters more immersive interactions with consumers in sectors such as entertainment and retailing (Kim & Yoo, 2021; Chuah & Yu, 2021). Moreover, AI-powered content generation streamlines tasks and enhances industry decision-making processes (Ameen et al., 2021). Personalization, recognized as vital in today's competitive landscape, is significantly improved through AI-driven personalized content, enhancing customer experiences (Aguirre et al., 2015).

The study by Habibi and Salim (2021) investigates the pivotal role of AI in shaping customer experiences on social media platforms, with a specific focus on TikTok. Their exploration goes deeper into the collaborative relationship between user and machine agencies, particularly in content consumption, creation, and online networking. Their research findings suggest that AI features significantly influence user experiences on social media, primarily by facilitating personalized and convenient content consumption, content creation, and networking experiences. Participants in various studies have provided valuable perspectives on the value, advantages, disadvantages, quality, relevance, personalization, impact, and key factors related to AI and human-generated content (Burlacu, 2024). Preserving anonymity through assigned codes ensures the integrity of research outcomes (Burlacu, 2024).

The emergence of computer-generated influencers (CGI) in recent years has introduced a new dimension to the social media landscape (Yu et al., 2024). These developments reflect the transformative nature of AI-generated content on user engagement and content creation dynamics. Integrating AI technology into social media platforms has revolutionized user experiences, empowering users to control the communication process while introducing content consumption and creation complexities. AI-based algorithms autonomously learn users' preferences and interests, curating personalized content tailored to individual users. Additionally, AI facilitates content creation through features like face-detecting filters and smart

sound editing tools, further shaping the dynamics of user engagement and interaction on social media platforms (Kang et al., 2021).

The Role of AI in Content Creation

Artificial intelligence (AI) encompasses many computational models and algorithms, including expert systems, neural networks, machine learning, deep learning, natural language processors, and robots (Habibi & Salim, 2021). These technologies are crucial in facilitating tasks such as content creation, language translation, and decision-making. Machine learning (ML) and deep learning enable systems to autonomously perform tasks without explicit programming, thereby enhancing production efficiency through insights gained from data analysis (Habibi & Salim, 2021).

Content-generation AI systems, exemplified by ChatGPT and DALL·E2, possess the capability to generate textual and pictorial content, thus enabling immersive content creation experiences (Ahn et al., 2022). Moreover, CGI influencers leverage AI to create digital personas that emulate real humans, thereby pushing the boundaries of virtual media (Drenten & Brooks, 2020).

AI-generated content revolutionizes how businesses produce vast amounts of text, images, and videos, influencing customer perceptions throughout their journey (Davenport et al., 2020). However, despite its effectiveness, AI-generated content may sometimes lack emotional nuances and authenticity, impacting user engagement (Bilgihan et al., 2016). Participants in various studies acknowledge AI's potential in content creation, citing benefits such as improved quality, productivity, knowledge gathering, automation, and cost-efficiency (Burlacu, 2024). However, concerns have been raised regarding AI's limitations in personalization, reliability, potential for repetitive and generic content, and ethical considerations (Burlacu, 2024).

AI technologies are pivotal in content creation, empowering businesses to automate and personalize their content generation processes (Grewal et al., 2009). Leveraging natural language processing (NLP) algorithms and machine learning (ML) models, AI systems can analyze vast amounts of data to produce tailored content that resonates with individual customer preferences and behaviors (Bleier et al., 2019; Homburg et al., 2017; Bustamante & Rubio, 2017). Furthermore, the advancement and adoption of generative artificial intelligence (AI) technologies, particularly large language models (LLMs), have begun to transform the way individuals create, share, and consume content across various domains (Burtch et al., 2023). Generative AI has the potential to alter the dynamics of content consumption, creation, and exchange, potentially leading to changes in community characteristics and dependencies on AI for problem-solving and knowledge acquisition (Burtch et al., 2023; Alexander & Nitz, 2015; Shumailov et al., 2023). In the context of social media platforms, AI technology enables more convenient content creation by offering features like video and music editing tools and filters (Bucher, 2017). However, excessive features may serve as psychological barriers to content creation, highlighting the delicate balance between customization and cognitive effort (Kang & Sundar, 2013).

Understanding Customer Experience in Social Media Context

AI integration into social media platforms like Facebook, Instagram, Snapchat, LinkedIn, and Pinterest has become commonplace, aiming to personalize user experiences and optimize content delivery (Habibi & Salim, 2021). Through analysing user behavior and preferences, AI recommends connections, job vacancies, and tailored content, thereby enhancing user engagement (Habibi & Salim, 2021). AI-powered chatbots enhance customer experience on social media platforms by providing personalized support, thus significantly improving user satisfaction (Habibi & Salim, 2021). Research on computer-generated influencers

(CGI), such as Lil Miquela and Imma, demonstrates their ability to engage with consumers on social media, effectively expressing emotions and fostering interactions (Ahn et al., 2022). The emotional displays of computer-generated influencers (CGI) significantly influence user engagement, reflecting the dynamics of emotional exchange on social media platforms (Jones & Lee, 2022). A study by Ryan and Deci (2000) sheds light on user experiences within the context of AI-powered social media, particularly TikTok. Through interviews, the study explores how users interact with AI-based features for content consumption, creation, and networking, revealing the heavy reliance on AI-driven algorithms for personalized content consumption (Ryan & Deci, 2000).

Despite its indispensability, AI technology poses challenges such as the lack of emotional understanding and the potential for unoriginal content, raising concerns about negative customer experiences and ethical considerations (Blumer, 1969; Burgoon et al., 1978; Daft & Lengel, 1986; Burlacu, 2024). Opinions vary on AI's impact on customer perception, with concerns about content fatigue, trust, reliability, and personal aversion to AI-generated content (Burlacu, 2024). Furthermore, AI-driven effectiveness metrics, such as image cluster evaluations, contribute to understanding AI's impact on customer experience (Yu et al., 2024). Social media platforms have become vital touchpoints for customer interactions, influencing brand perceptions and experiences (Becker & Jaakkola, 2020). AI-powered analytics tools enable businesses to extract actionable insights from social media data, enhancing understanding of customer sentiment, preferences, and behaviors (Gentile et al., 2007; Bueno et al., 2019; Silva et al., 2021). The evolving landscape of customer experience (CX) research reflects a shift from traditional service-oriented approaches to technologically innovative touchpoint-based strategies, including virtual/augmented reality touchpoints (Ciuchita et al., 2019). Early CX research focused primarily on service quality, customer satisfaction, and consumer behavior within service contexts but expanded in subsequent years to

include broader consumption experiences, service operations, and cultural aspects (Parasuraman et al., 1985; Lemon and Verhoef, 2016).

Top customer experience-publishing journals, such as the *Journal of Business Research* and *Journal of Services Marketing*, have played pivotal roles in shaping discourse surrounding customer experience, with seminal works significantly influencing the field (Pralhad & Ramaswamy, 2004; Novak et al., 2000). Chief customer experiences themes include customer experience through the customer journey, S-D Logic-informed customer experience, interactive service-based customer experience, servicescape-based customer experience, and customer experience and consumption (Lemon and Verhoef, 2016; Vargo and Lusch, 2004; Brodie et al., 2011; Bitner, 1992; Schouten and McAlexander, 1995; Carù and Cova, 2003).

Effectiveness Metrics for AI-generated Content

AI-powered social media advertising employs behavioral targeting and demographics to optimize ad performance, leading to increased engagement and return on investment (ROI) for marketers (Habibi & Salim, 2021). By targeting prospects and customers with tailored messages, AI-driven advertising enhances user experience and drives better outcomes (Habibi & Salim, 2021). The introduction emphasizes the evaluation of AI-based approaches using automatic metrics and human evaluators, highlighting the importance of assessing the quality and effectiveness of AI-generated content (Rajpurkar et al., 2016).

Measuring the effectiveness of AI-generated content is crucial for assessing its impact on customer engagement and business outcomes (Grewal & Roggeveen, 2020). Metrics such as engagement rates, conversion rates, sentiment analysis scores, and ROI metrics are essential for evaluating the efficacy of AI-driven content strategies (Grewal & Roggeveen, 2020). Studies examining the impact of AI-generated content on platforms like Stack Overflow and Reddit provide insights into

how AI influences user activity and engagement patterns (Burtch et al., 2023). Understanding user behavior and perceptions is key to evaluating the effectiveness of AI-generated content in achieving communication goals (Golino, 2021). Cho and Sundar (2022) discuss effectiveness metrics for AI-generated content based on user engagement patterns observed on TikTok. They highlight the importance of reevaluating traditional metrics to account for passive engagement indicators with AI-generated content, underscoring the need for comprehensive evaluation approaches (Cho & Sundar, 2022).

Impact of AI-generated Content on Customer Engagement

CGI influencers significantly influence consumer decision-making, brand evaluation, and online experiences, showcasing the impact of AI-generated content on customer engagement (Da Silva Oliveira and Chimenti, 2021; Mrad et al., 2022). AI-generated Content's Impact on Knowledge Gathering and Automation: AI services significantly impact knowledge gathering and automation, increasing business efficiency and productivity gains (Burlacu, 2024). Regarding AI in Marketing and Content Creation, AI's advancement challenges distinguishing between AI-generated and human-generated content, indicating a trend in utilizing AI for content creation (Burlacu, 2024). When considering Influence of Emotional Expressions on User Engagement, the findings revealed that they are taken with an artistic/creative approach to capturing motion or physical activities in various settings (Yu et al., 2024).

AI-generated content has profound implications for customer engagement, influencing how individuals interact with brands across various touchpoints (Stead et al., 2022). This section examines the ways in which AI-powered content personalization, recommendation systems, and chatbots enhance customer engagement, fostering deeper relationships and loyalty (Lim, Kumar et al., 2022; Mukherjee et al., 2022). By contrast, in community contexts that are highly centred

on the production and exchange of objective information (and relatively less so on creativity or socialization), the dynamics may be quite different (Burtch et al., 2023). If the demand for content declines and consumers ceases visiting the community, answering experts may have less potential to earn status and recognition (Burtch et al., 2023). This decline may imply a deterioration in high-quality responses and a drop in the public disclosure of expert knowledge (Shumailov et al., 2023). This reliance on AI-generated solutions might contribute to stagnation and an unfavourable equilibrium in creating new knowledge, impeding progress across various fields, including programming and other technical domains (Shumailov et al., 2023).

AI-generated content influences user engagement on social media platforms by providing personalized experiences and facilitating interactions. The collaborative dynamics between human agency and AI agency shape user engagement, affecting both cognitive and behavioral aspects of user interactions. Understanding how human and machine agency interact to influence user engagement is crucial for optimizing the impact of AI-generated content on customer engagement (Kaplan & Haenlein, 2019, p.17). The impact of AI-generated content on customer engagement is explored (Schellewald, 2021). The study reveals that AI-driven recommendations positively influence user engagement by providing personalized content feeds that enhance absorption and encourage content sharing. It suggests that AI-generated content fosters a sense of unpredictability and excitement, contributing to heightened levels of engagement among users.

Challenges and Ethical Considerations

AI technology, while indispensable, poses challenges such as the lack of emotional understanding and the potential for unoriginal content (Blumer, 1969; Burgoon et al., 1978; Daft & Lengel, 1986). Negative customer experiences may arise from inappropriate or offensive AI-generated content, raising ethical concerns (Burgoon

et al., 1978). Concerns were raised about AI's limitations in personalization, emotional understanding, trust, and the potential for biased or inappropriate content (Burlacu, 2024). Ethical concerns include privacy violations, mass manipulation, biased content, lack of transparency, and ethical issues regarding content attribution (Burlacu, 2024). Despite the fascination with computer-generated influencers (CGI), consumer reactions to virtual influencers within marketing contexts remain ambiguous, highlighting ethical considerations (Miao et al., 2022; Mrad et al., 2022). The ethics of computer-generated influencers (CGI) are debatable, necessitating further exploration and consideration in marketing practices (Drenten and Brooks, 2020).

Uncanny Valley Effect and Emotional Response: "As computer-generated influencers (CGI) are ultimately digital creations, this research adds original knowledge to the uncanny valley theory..." (Yu et al., 2024). While AI technologies offer immense potential for improving customer experiences, they also present unique challenges and ethical considerations (Kim and So, 2022; Donthu et al., 2021). Issues related to data privacy, algorithmic bias, transparency, and trust in AI-generated content are explored, highlighting the importance of ethical frameworks and regulatory compliance in mitigating risks and safeguarding consumer interests. "It is quite possible that informational content generated that non-expert users produce with the assistance of AI may fall short of that provided by individual human experts in many scenarios..." (Burtch et al., 2023). "Indeed, the issue has apparently become prevalent enough that Stack Overflow announced a policy temporarily banning individuals' use of ChatGPT when addressing peers' questions..." (Burtch et al., 2023). "Our study contributes to the growing body of literature on the social and economic implications of AI and generative technologies." (Burtch et al., 2023). "In sum, this paper aims to provide a comprehensive understanding of the impact of generative AI on online communities..." (Burtch et al., 2023).

"This reliance on these tools and technology will likely hollow out the demand for various skills and knowledge bases, e.g., artistry, programming." (Shumailov et al. 2023). The rise of AI-generated content on social media platforms raises ethical considerations regarding user privacy, algorithmic biases, and the manipulation of user experiences. Ensuring transparency, fairness, and accountability in AI algorithms is essential for addressing these challenges and maintaining user trust (Bucher, 2017; Swart, 2021). (Kennedy, 2020) discuss the challenges and ethical considerations associated with AI-generated content and customer experiences on social media platforms like TikTok. The study highlights concerns related to privacy, loss of user control, and algorithmic transparency. Users express ambivalent feelings towards machine agency, indicating a need for balancing personalized experiences with user agency and ethical considerations.

Best Practices and Recommendations

Trends indicate a growing use of AI tools like ChatGPT in content creation, but preferences for human-generated content still exist due to trust in human creativity and authenticity (Burlacu, 2024). Marketers are urged to prepare for next-level social, design, and creative experiences in AI to enhance knowledge in online influencer marketing (Grundner and Neuhofer, 2021). Understanding how consumers react to computer-generated influencers (CGI) is essential for encouraging user engagement and improving parasocial relationships on social media (Leung et al., 2022b; Mrad et al., 2022).

Optimizing Emotional Experiences: "By exploring how computer-generated influencers (CGI) can effectively communicate emotions to their audience, this research provides valuable insights..." (Yu et al., 2024). Drawing on insights from academic research and industry expertise, this section provides best practices and recommendations for leveraging AI-generated content to enhance customer

experiences (Marketing Science Institute, 2020). From content personalization strategies to AI governance frameworks, businesses can glean actionable guidance to optimize their CX initiatives and drive sustainable growth in an AI-driven era.

Best practices for AI-generated content on social media platforms include transparent communication about the use of AI algorithms, providing users with control and customization options, and promoting ethical AI development and deployment. Recommendations include implementing safeguards against algorithmic biases and ensuring compliance with privacy regulations (Lundahl, 2020). Based on their findings, (Ryan & Deci, 2000), offer best practices and recommendations for leveraging AI-generated content to enhance customer experiences on social media platforms. They emphasize the importance of providing balanced intelligibility and user control to mitigate the loss of user autonomy. Additionally, the study suggests reevaluating user engagement metrics and fostering transparent communication about algorithmic processes to address user concerns and promote ethical AI practices in content creation and customer engagement.

Discussion

The conceptual review on the effectiveness of AI-generated content on customer experience, with a special focus on social media platforms, offers a comprehensive examination of the intersection between artificial intelligence and consumer engagement. One notable aspect of the review is its emphasis on the transformative potential of AI-generated content across different industries. By leveraging algorithms and machine learning models, businesses can automate content creation processes and tailor experiences to individual preferences, enhancing customer engagement. However, the review also acknowledges potential drawbacks, such as the lack of emotional nuance and authenticity in AI-generated content, which may impact user engagement negatively. This raises important questions about the balance between efficiency and human connection in content creation.

Furthermore, the review highlights the ethical considerations associated with AI-driven content creation, including concerns about privacy, algorithmic bias, and transparency. As AI technologies become increasingly integrated into social media platforms, ensuring ethical AI practices and safeguarding user trust become paramount. However, the review does not examine the specific strategies or frameworks needed to address these ethical challenges effectively. Another critical aspect that warrants further discussion is the evolving role of AI in shaping consumer behavior and preferences. While AI-driven content personalization can enhance user experiences, there is also a risk of overreliance on algorithmic recommendations, potentially limiting user autonomy and diversity of content consumption. Moreover, the review touches upon the emergence of computer-generated influencers (CGI) and their impact on user engagement. Yet, it does not explore the long-term implications of virtual personas for brand-consumer relationships and authenticity in influencer marketing. Additionally, the review briefly mentions the importance of evaluating the effectiveness of AI-generated content using metrics such as engagement rates and sentiment analysis scores. However, it does not provide a comprehensive analysis of the methodologies or challenges associated with measuring the impact of AI on customer engagement.

In conclusion, while the conceptual review offers valuable insights into the effectiveness of AI-generated content on customer experience, several avenues remain for further research and critical discussion. Addressing the ethical challenges, exploring the evolving dynamics of consumer engagement, and developing robust evaluation methodologies are essential steps towards harnessing the full potential of AI in content creation and customer interactions. By engaging in interdisciplinary dialogue and collaboration, researchers can contribute to a more nuanced understanding of the complex interplay between artificial intelligence, content creation, and consumer experiences in the digital age.

Conclusion and Future Research Directions

In conclusion, the conceptual review provides a comprehensive overview of the effectiveness of AI-generated content on customer experience, particularly within the context of social media platforms. By exploring various dimensions of AI-driven content creation, including technological advancements, implications for customer engagement, and ethical considerations, the review offers valuable insights into the evolving landscape of digital marketing and consumer interactions. The review highlights the transformative potential of AI in automating content creation processes and personalizing user experiences, enhancing customer engagement across diverse industries. However, it also highlights important challenges, such as the need to balance efficiency with human connection, address ethical concerns surrounding privacy and algorithmic bias, and evaluate the impact of AI on consumer perceptions and behaviors. Also, this notion carries out a few limitations when compared with this study. This research's analysis and output could be different if we consider Artificial intelligence in an overall context rather than generative AI. Also, the study is limited to the context of customer experience, and the strategies and implications would be different if other aspects, such as brand loyalty, customer engagement, and e-customer experience, were included.

Future research directions should focus on addressing these challenges and advancing our understanding of the complex dynamics between AI, content creation, and customer experiences. Specifically, researchers could explore practical strategies for promoting ethical AI practices in content creation, develop innovative methodologies for evaluating the effectiveness of AI-generated content, and investigate the long-term implications of virtual influencers on brand-consumer relationships and authenticity in influencer marketing, Machine Learning implications for customer experience, Natural Language Processing, Artificial Intelligence on brand engagement, Artificial Intelligence on brand loyalty. Moreover, interdisciplinary collaboration and dialogue between academia, industry,

and policymakers will be crucial for navigating the ethical, legal, and societal implications of AI-driven content creation. By fostering a deeper understanding of the opportunities and challenges associated with AI in digital marketing, researchers can contribute to developing responsible AI technologies and creating more meaningful and engaging experiences for consumers in the digital age. On the other hand, AI-generated content can be helpful to some extent when it compares with customer engagement. Some people might embrace AI-generated content, while others totally neglect it. There are a few aspects to look at when the firms generate AI content for the advertising content with the relevancy they need to be aligned with. Also, AI-generated content will make it easier for advertisers to create campaign content. Still, they have to consider the realistic level of the content generated while addressing relevancy.

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The Level of Knowledge Management Practices and Barriers to Implement Knowledge Management in IT Projects in Sri Lanka

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Knowledge is a critical asset in an organization. New knowledge created while doing projects. IT projects are purely knowledge base projects. It is important to practicing knowledge management within IT projects to capture, store and review knowledge created while doing the project. This research is to identify the level of knowledge management practice within IT projects, what are the barriers to implement the knowledge management and what are the prerequisites to make the knowledge management implementation a success within project organization. A qualitative research approach uses in this research and data collected using semi structured interviews from 15 project managers. The data collected from completed IT projects in telecommunication industry. The code matching method use to analyze the data. The results reveal that knowledge management practicing within IT projects moderately. Further main barriers to implement knowledge management are, limitation of time, additional resources required for knowledge management activities, project culture, lack of leadership and project organization. When considering the prerequisites to implement knowledge management within IT project environment, it is revealed that, incentive schemes, leadership, and establishment of required infrastructure are main prerequisites to implement a successful knowledge management.

Keywords: *Barriers to Knowledge Management, Level of Knowledge Management, Prerequisites for Knowledge Management, Qualitative Approach*

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Introduction

Background

New economy has made organizations focus on innovation as a means of survival, they have increasingly turned to Information Technology (IT) to support and implement their plans for change. (Reich, Gemino and Sauer, 2012). Today, Organizations increasingly recognize the need to manage IT project investments to achieve business value. In many instances, information and communications technology (ICT) initiatives are implemented via projects (Cadle and Yeates, 2008).

Organizations regularly execute projects to improve their performance. (Meredith and Zwikael, 2019). In align with this argument, Fonseka (2010) stated that projects are essential to winning clients and company survival.

Organizational performance is enhanced when projects are completed successfully, hence, it is important managers understand project success correctly. Yet there is little agreement in the literature or in practice on evaluating project success. (Meredith and Zwikael, 2019). Even though there is no unique agreed method to measure the project success, scholars identified that most of the IT projects are low performers. Acceptable project performance may still be an elusive target (Sauer and Reich, 2006). Despite the recognition gained by Sri Lanka for its IT capabilities, the problem besetting the industry is the low completion rate of IT projects which is bound to impact adversely on industry progress. (Fonseka, 2010). Supporting to the same argument, Rosacker and Rosacker, (2010) stated that "...IT projects are far too often...wasteful, inefficient, mismanaged, expensive and behind schedule". As Reich (2007) state that, the high failure rate of IT projects is a major stumbling block to companies that are trying to innovate through new processes and service. While no industry is immune from project failure, the Information Technology (IT) industry is shown to be more susceptible to risk and failure than those of other industries. (Kaitlynn, Whitneya and Daniels, 2013). There are many reason for

failure of IT projects. While these causes of failure are quite common in IT projects, the largest stumbling block in IT projects, and one of the largest and most unrecognized reasons for failure, is the lack of proper knowledge management methodologies throughout the project management lifecycle (Brown, 2009). Knowledge management had positive relationship with implementation of projects. Langat and Kimutai, (2023). IT projects focus on knowledge yields new insights because IT projects are primarily knowledge work (Reich, et al, 2012). Software companies in worldwide face issues such as continuous rework, increased development time and decreased productivity which lead to failed projects due to inefficient and ineffective knowledge management (Ahmed, et al., 2017).

Zheng, (2017) stated that Knowledge is the organization's most important strategic resource that can provide organizations with a sustainable competitive advantage. Further to this argument, Knowledge is an essential resource to the companies in construction sector due to the nature of these organizations deal with projects. The performance of a project required new aptitudes, outlooks, models and responsibility all through the organizations. (Yusof, Yahaya, Awang, Hassan and Cheen, 2019).

The process of software development requires a high amount of knowledge to carry out knowledge-intensive development activities such as requirement gathering, analysing of problems, designing of solutions, implementing the solution via coding and testing the end product to ensure a quality, bug-free software product. Hence, software teams are required to have strong knowledge on software development methodologies, technologies, and project management processes to make their projects successful (Ryan and O'Connor, 2013). Globalization and market competitiveness create the need, in modern organizations, to adapt their internal policies and procedures, to this, new Era called Knowledge Economy. Therefore, organizations are now focused on understanding and managing the knowledge of people so they can increase their competitiveness in the markets. (Pereira, Santos, Dias and Costa, 2021). In line to this argument, (Kariyapperuma, 2015) stated that,

the world is moving fast from a production-based economy towards a knowledge-based one. Further he argued that, as a result, organizations are becoming more knowledge intensive and are increasingly dependent on innovative knowledge to create value.

KM has become a useful tool for survival within this competitive global arena. However, successful KM implementation should be informed by specific organizational objectives rather than a must-have initiative based on the popularity of KM as a concept. (Arthur, 2013). Companies should be aware that most knowledge-management initiatives in project-based firms have failed for a variety of reasons, which could be technological, cultural, knowledge content and project management reasons (Chua and Lam, 2005).

The article is structured on the following lines. It begins with a description of the research problem and a review of the literature relevant to the problem. This is followed by the conceptual framework and the study design. The data gathered during the field study are presented next, followed by the study findings and a discussion of the findings. The final section contains the conclusions of the study.

Problem Statement

IT projects are mainly knowledge base projects (Reich et al, 2012). Knowledge is created via projects and continuous creation of innovative knowledge is essential for the survival of organizations. (Yeong, 2010). It is required to practice knowledge management within the IT projects to capture and use this knowledge. What is the level of knowledge management practice within the IT projects and what are the barriers to implement this knowledge management within IT projects in Sri Lankan context is unknown. Also what are the prerequisites to make the knowledge management implementation a success?

Research Objectives

In order to answer the said research problem two (03) main objectives of the study were set. By conducting the research, researcher expected to,

1. Determine whether project knowledge management practise within business IT projects and what is the level it practise.
2. What are the identified barriers to implement project knowledge management.
3. Determine the prerequisite to implement project knowledge management.

Literature Review

Knowledge Management

There are many reasons for failure of IT projects. While these causes of failure are quite common in IT projects, the largest stumbling block in IT projects, and one of the largest and most unrecognized reasons for failure, is the lack of proper knowledge management methodologies throughout the project management lifecycle (Brown, 2009).

This can be achieved by having a proper knowledge management system in place to preserve and manage knowledge. Knowledge management can be defined as use of information and communication technology to manage the work of the employees of the organization, or the establishment of a corporate culture focusing on promoting social processes shared between individuals, aiming to achieve a sustainable source of advantages (Ouriques, et al., 2019).

Project Knowledge management

The Knowledge management (KM) and project management (PM) are two technics that provide competitive advantages within IT industry. (Jayasena and Jayasekara, 2017). Tilakaratne and Abegunawardhne (2016) stated that it is essential to get the right knowledge to the right people at right time that In IT projects. Langat and

Kimutai, (2023); Yeong, (2010) stated that there is a positive relationship between knowledge management and successful implementation of a project. Similar argument made by Ahmed, et al., (2017) that most of the rework of projects and increase development time led to IT project failure due to ineffective knowledge management in project environment. This gap needs to be filled by proper project knowledge management. (Jayasena and Jayasekara, 2017). In line to this statement, Barclay (2010) stated that the effective project knowledge management is one strategy to improve project success in It projects.

The effective Knowledge Management (KM) in projects environment affected by different factors. Such as available resources, KM tools, leadership, organizational culture, and project objectives and goals among others. (Alqudah and Shaalan, 2016).

Further, Alqudah and Shaalan, (2016) identified, five main stages in Project Knowledge Management Life Cycle. Such as, the knowledge creation, knowledge storage, knowledge dissemination, knowledge learning, and knowledge improvement. As per them, each phase is essential towards the attainment of overall efficiency in the integration of KM into projects.

As Ryan & O'Connor, (2013) stated software project activities are knowledge base activities. Further they stated that software development team should have strong knowledge on software development methodologies, project management methodologies.

Yeong, (2010), stated that, it is important to understand how knowledge could be created via projects and how the knowledge is transferred to other project team members in the form of tacit and explicit knowledge. Further, he stated that, the common factors are culture, process and technology that, in turn, might affect both knowledge management and project management.

Level of Project Knowledge Management Practice

Presently, in the IT project environment project practice the knowledge management in different levels. Where some projects they use the project knowledge management practices. (Terzievaa , 2014). Where they practice After action reviews, project status reviews, project postmortems etc. Shared project folders, shared drives. Shared status reports, program/portfolio master plans, etc . (Terzievaa, 2014;).

Some research reveal that they practice project knowledge management at moderate level. (Yusof, et al., 2019); Jayasuriya, 2018).

Some research found that still projects are not use knowledge management practices. (Pereira, et al., 2021). Where, However, the stages corresponding to i) knowledge transfer among employees within the Organization (Share), and ii) the evaluation of value or benefit of the knowledge transferred (Evaluation), are not being practiced. (Pereira, et al., 2021).

Barriers to implement project knowledge management

Scholars identified some barriers that affected to implement of knowledge management in IT projects environment. Main challenges are; Handling business coach exit, (Karapetyan and Otieno, (2010); Communicating lessons learned, (Karapetyan and Otieno, (2010); Creating knowledge map, (Karapetyan and Otieno, (2010); Jayasuriya (2018); Establishing knowledge network, (Karapetyan and Otieno, (2010); Selecting appropriate team, (Karapetyan and Otieno, (2010) Storing knowledge from previous projects, (Karapetyan and Otieno, (2010); Korkmaz and Bahidrah (2018); Organization culture (Arthur, 2013; Yapa, 2019); Poor and/or inadequate technology infrastructure'(Arthur(2013); Apostolou et al., (1999); lack of time (Arthur, (2013); Jayasuriya (2018); Integrating different expertise (Karapetyan and Otieno, (2010); Transferring complete knowledge. (Karapetyan and Otieno, (2010); More focus on project delivery (Jayasuriya (2018);

Complexity of projects constitutes the main obstacle blocking firms from utilizing knowledge in new settings.(Korkmaz and Bahidrah, 2018).

Prerequisite to success of Project Knowledge Management

Scholars identified different prerequisite to success of implementation of project knowledge management. Such as Culture to effective knowledge sharing (Apostolou et al., 1999; Kariapperuma, 2015; Pereira, et al., 2021; Priyangika and Perera, 2021), Project organization (Apostolou et al., 1999; Kariapperuma, 2015; Pereira, et al., 2021; Basnayake, 2016, Priyangika and Perera, 2021), Leadership to drive the Knowledge management (Alqudah and Shaalan, 2016; Priyangika and Perera, 2021; Basnayake, 2016), Knowledge base incentive program (Alqudah and Shaalan, 2016), Technology infrastructure (Priyangika and Perera, 2021), Knowledge Management Measurements (Priyangika and Perera, 2021), Top management support (Dissanayake and Senathiraja, 2021).

Methods

Introduction

The part discusses the research design, available research approaches, strategies, methods and data analysis techniques. Furthermore, this chapter includes the relevant justification for each selected criterion.

Research design

Research design implies research approach, methods, tools and techniques which are in collective manner to achieve the aims and objectives (Maxwell, 2004). Further, Wyk, (2012) stated that research design is a logical arrangement. In order to prove that statements, research has been designed with contend appropriate approach, strategies, methods, analyzing the collected data, and the recommendations.

Research Approaches

Research approaches have been described by Creswell (2014) as a plan and procedure to do the research which would take research from a more efficient way to details methods of data collections, analysis, and interpretation. Where Creswell (2014) stated that Qualitative studies basically deal with words. Qualitative studies help to answer the “why” and “how” questions (Rajasekar, Philominaathan, & Chinnathambi, 2013). On the other hand, qualitative approach provides personal perspectives and experience-based answers (Hammarberg, Kirkman, and de Lacey, 2016). Most of the time in-depth investigation studies have used the qualitative approach. According to the features that are presented by Creswell (2014) qualitative method was selected to carry out this research considering the nature of the study and the characteristics.

Research method

Research methods are the tools to give correct answers for the questions (Walliman N. , 2011). Researchers use different tools such as structured, semi- structured and unstructured interviews are the three fundamental types of research interviews. The structured interviews can be described as a set of predetermined questions used to administer the questionnaire directly through verbal communication modes with very few or zero variations and no further elaboration or follow-up question scope. Thus, structured questionnaire uses this research.

Data collection and Analysis

As the core stage of the data collection process of this research, fifteen (15) semi-structured interviews were conducted with the project managers who has experience in IT project management in telecom domain. The findings which hold different opinions and perceptions of project knowledge management with managing cost, scope and time of the project were analyzed using the content analysis. The respondents were interviewed face to face within approximately 60 – 90 minutes.

Interviews were based on completion of IT projects in telecom domain. Some respondents from operator side as well as some were from vendor side.

Findings and discussion

This is going to be elaborate different findings obtained over structured interviews conducted in order to collect required research data. For the analysis of interview data, it is used pattern matching method.

Respondents' details for interviews.

In that research fifteen (15) interviews were carried out successfully according to the structured interview guidelines. All the interviews were conducted with the IT project managers in telecom industry. As this research carried out in IT project success with project knowledge management, the sample of the experts was a heterogeneous purposive sampling, which helped to select those with experience and knowledge in the research area, in different contexts and different age groups. The interview respondents, who had to have more than 5 years of working experience in IT projects in telecom industry implemented in Sri Lanka were selected using purposive sampling. The sample selected includes participants from different age categories. Hence it was possible to get ideas based on their different levels of experiences. Importantly, selected sample contended with different level of industry practices related to measure the IT project success. Following table 4.1 illustrates the profile of the respective interviewees.

Table 1

Details of Interviews

Code	Designation	Experience (No. of Years of)	Type of Organization	Key Expertise Areas related
I1.	CIO	30 Years	Operator	<ul style="list-style-type: none"> • Project manager • Project sponsor
I2.	Senior Engineer	12 Years	Operator	<ul style="list-style-type: none"> • Project manager
I3.	General Manager	25 Years	Operator	<ul style="list-style-type: none"> • Project Manager • Project sponsor
I4.	Project manager	10 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager • Software Developer
I5.	Project manager	20 Years	System Integrator	<ul style="list-style-type: none"> • Software Developer • Project Manager
I6.	Project director	25 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager • Project sponsor
I7.	Deputy General manager	15 Years	Operator	<ul style="list-style-type: none"> • Project Manager • Software developer
I8.	Project manager	8 years	Operator	<ul style="list-style-type: none"> • Project manager • Software developer
I9.	Project Manager	8 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager
I10.	Project Manager	5 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager
I11.	System Engineer	14 Years	Operator	<ul style="list-style-type: none"> • Project Manager • System Integrator
I12.	Project Manager	5 Years	Operator	<ul style="list-style-type: none"> • Project Manager
I13.	Project Manager	5 Years	System developer	<ul style="list-style-type: none"> • Project Manager • Software developer

Code	Designation	Experience (No. of Years of)	Type of Organization	Key Expertise Areas related
I14	Deputy General Manager	14 Years	Operator	<ul style="list-style-type: none"> • Project manager • Business process designer
I15	Project manager	7 Years	System Developer	<ul style="list-style-type: none"> • Project Manager • Support Engineer

What is the level of project knowledge management practice now?

Majority of the respondent mentioned that project knowledge management does not practice presently. Respondent I7, I9, I10, I11, I12 and I14 said that they use at lower level. Respondent I8 and I15 said that they use the project knowledge management in their projects.

I1 respond that only the lesson learns documenting and no further usage of those lesson learns. Respondent I1, I2, I7, I10, I14 and I15 said that they presently practice lesson learn logs in their projects.

Respondents I3, I6, I7, I8, I10, I11 and I15 said that they have practice knowledge share between business team and technical team. Respondent I3, I11, I14 and I15 said that they have maintain the project meeting minutes where it captures the critical decision taken during the project. I9 stated that some of the knowledge capture during the project.

I6 response that if new person assigned to the project, previous project knowledge transfer to him for easy understand the customer requirements.

I13 stated that, effective project knowledge management in implementing a project will involve documenting system configurations, documenting system requirements, documenting solution, testing results for future reference & improvement, etc.

I3 specifically said that, Since the project took almost over three years some trained team members promoted and some were transfer for other division. That make a loss to the project. Further he said that it is an additional cost to maintain logs. But he think that it will be an investment.

When considering this response with literature, the results in line with the literature review results. Where literature review identified similarly that some projects use knowledge management, some project moderately use knowledge management and some project does not use project knowledge management at all. Further some projects use knowledge sharing at different level within their projects.

What is the impact of not practicing project knowledge management and barriers to implement project knowledge management?

Majority of respondent said that knowledge does not capture during the project affected to operation of the system. Respondent I3, I6, I10, I11 and I15 said that it will ease the operation when capture the knowledge during project period. I12 stated that when similar project going to implement, similar effort needs to be done to complete the project.

I9 specifically stated that, lack of practice in project knowledge management will lead to, inefficient decision-making, reduced productivity, limited innovation, and poor risk management.

When considering the barriers to project knowledge management, some respondents said that due to additional time required for maintain documenting the knowledge develop during the project time, they were not capturing the project knowledge.

Respondent I6, I7, I8, I9, I10, I13 and I15 mentioned that they need additional time and resources to document the knowledge. Due to that they were not practice the project knowledge management. In line to the response, I8, I10, I11 and I15 said that due to project time limitation, they cannot capture the project knowledge. Respondent I9, I11 and I13 said that due to project cultural issues it is difficult to practice the project knowledge management. Respondent I9, I11 and I13 said that lack of leadership and organization structure also are barriers for the project knowledge practice. Responder I2 said that not given proper priority for knowledge management where more technical problem had to resolve during the project. Further due to system integrator had to change during the project highly affect to the project implementation where at the beginning of the project he gains certain knowledge about the company requirements, company process knowledge lost after he left the project.

Respondent I6, I7, I8 and I15 said that project members reluctant to document the knowledge and experience is another barrier for project knowledge management.

I3 response that, company should have a policy to not allow transfer staff to transfer before completion of the project. It is required additional resources to log all the activities and lessons during project period and additional resources will cost to the project.

I6 mentioned that keeping knowledge capturing make ease the operational team life. Further he mentioned that another barrier for knowledge management is that most of the time staff assigned for assignment basis hence there is no permanent nature of their jobs and they move one company to another company within short period. Hence there is no requirement for them to log the new knowledge.

I7 responded that the lack of understanding about the knowledge management and poor awareness about the advantages that company can gain by knowledge management is another case. I15 response that there are several advantages with

maintain project knowledge management where it will be useful for the system maintain purpose.

The results indicated that poor project knowledge management leads to recurrent failures in projects. I12 stated that when similar project going to implement, similar effort needs to be done to complete the project. This is in line with the literature where (Ahmed, et al., (2017) stated that most of the rework of projects and increase development time led to IT project failure due to ineffective knowledge management in project environment. Further literature identified a relationship between project knowledge management, and project success (. Langat and Kimutai, (2023); Yeong, (2010).

Further I9 specifically stated that, lack of practice in project knowledge management will lead to, inefficient decision-making, reduced productivity, limited innovation, and poor risk management. This is prove by the literature where non practicing knowledge management increase the

Some respondents said that due to additional time required for maintain documenting the knowledge develop during the project time, they were not capturing the project knowledge. This is in line with the literature finding that time limitation is a barrier to implement knowledge management. (Arthur, (2013); Jayasuriya (2018).

Some responders identified the culture as a barrier for implementation of knowledge management. This too captured in literature, where culture identified as a barrier to implement knowledge management. (Arthur, 2013; Yapa, 2019).

Some responders identified leadership and organization structure as a barrier to implement knowledge management. Where literature did not identify the leadership as a barrier to implement knowledge management.

Respondents identified more focus on project technical components and not priority to implement knowledge management. This is in line with literature finding. Where literature identified that more focus on project deliverable as a barrier to implement knowledge management. (Jayasuriya, 2018).

Further respondents identified that lack of awareness about knowledge management as a barrier to implement knowledge management. In line to this response, literature find that communication of lesson learn (Karapetyan and Otieno, 2010) and developing knowledge maps (Karapetyan and Otieno, 2010; Jayasuriya, 2018) as barrier to implement knowledge management.

Another barrier that respondents identified is the knowledge loss during the project when project member leave from project team. This is similar to the findings of literature where, integrating different expertise (Karapetyan and Otieno, (2010) and transferring complete knowledge. (Karapetyan and Otieno, (2010).

What is the prerequisite to implement project knowledge management?

I7 response that Management should provide some mechanism to reward the staff who willing to share their knowledge.

I9 response that designating a knowledge management lead or team responsible for capturing and organizing project information. Further I4. Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I11 Identify the critical knowledge and implementing the processes to follow the knowledge repositories, documentation and sharing.

I12 Designating a knowledge management lead or team responsible for capturing and organizing project information.

I12 Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I13 1. Designating a knowledge management lead or team responsible for capturing and organizing project information. 4. Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I14 So, It will there forever. So, anybody can access, can refer, even after, like for an example, after file was shifted another upgrade is coming on, So, you can easily refer you don't need to search for what did you do? or how did you templates.

When compare the response with literature findings, Alqudah and Shaalan, (2016) identified the Knowledge base incentive program. Responders also identified the establishment of knowledge base incentive scheme as a prerequisite.

Literature identified, leadership to drive the Knowledge management (Alqudah and Shaalan, (2016); Priyangika and Perera, 2021; Basnayake, 2016). In line to this, respondents identified that leadership required to drive the capturing knowledge.

Literature review identified that, Technology infrastructure (Priyangika and Perera, 2021) as a prerequisite to successful implementation of project knowledge management. In line to these responders identified that requirement of proper knowledge management system.

Literature review identified that culture and organization structure as prerequisites for successful implementation of project knowledge management. But responders did not identify those factors as prerequisite for successful implementation of project knowledge management.

Conclusion

The results reveal the moderate level of practise of knowledge management within IT projects. Further barriers to implement the knowledge management with short period of time, lack of awareness about knowledge management, poor leadership. These barriers affect the knowledge management implementation and that may be the reason why the moderate level of knowledge management practise within IT projects. Mainly due to the limitation of time affect the knowledge management practises. Further moderate level of knowledge management practise due to additional resources required to practise the knowledge management activities. Due to require additional resources, these activities add additional cost to the project. The knowledge management practises gain most of the benefits in long run where it supports to improve the success rate of future projects. But considering the additional time required and additional cost require for the knowledge management activities directly impact to the ongoing projects. This may be a reason that project managers not highly supportive to implement the knowledge management activities.

Another main barrier of implementing a knowledge management is the project culture. Due to short period of time, it is not eased to change the project culture within short period. If the project team built with experience person who implemented project knowledge management, then it is much ease to implement knowledge management activities. Otherwise, it is required to have awareness sessions to practise the knowledge management activities. This affected the moderate practising of knowledge management within IT projects.

The incentive scheme for knowledge practitioners will increase the team members who use the knowledge management. This will increase the level of knowledge management within IT projects. Further leadership within project environment increase the knowledge management practitioners. Also the leaders can overcome the barriers and provide culture encourage to practise knowledge management.

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Dynamic Stakeholder Collaboration for Responsible Tourism Development: Insights from Sri Lanka's Tourism Governance

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The achievement of responsible destination management is widely acknowledged on the effectiveness of governance mechanisms while accompanied by a shift in the field of tourism planning and development towards prioritizing sustainability. This study employs content analysis to analyze data collected from interviews, aiming to understand the perspectives of diverse stakeholders, including policymakers, tour operators, service providers, community residents, and other tourism stakeholders. The findings reveal that stakeholders have diverse interests and concerns, including economic benefits, environmental sustainability, cultural preservation, and community well-being. Building on these findings, the researcher proposes a multi-stakeholder analysis model that emphasizes collaboration and the establishment of roles to govern sustainable destinations effectively. The model, depicted as a dynamic wheel of stakeholders, illustrates how each stakeholder group can contribute to promoting responsible tourism. This research contributes to the literature by providing insights into stakeholder dynamics and offering a practical framework for stakeholders to engage in responsible tourism development in Sri Lanka.

Keywords: *Multi-stakeholder analysis model, Responsible tourism, Stakeholder's perspectives*

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Introduction

Tourism is a global phenomenon with profound economic, social, and environmental implications. As one of the world's largest and fastest-growing industries, tourism generates significant revenue, creates jobs, and fosters cultural exchange. However, the rapid expansion of tourism also brings with it a host of challenges, including environmental degradation, cultural homogenization, and social inequality. These challenges have led to the emergence of responsible tourism as a critical paradigm, emphasizing the need for a more sustainable and equitable approach to tourism development. Tourism has long been considered a vital component of Sri Lanka's economy, offering a wealth of natural, cultural, and historical attractions to visitors from around the globe. However, as the tourism industry continues to flourish, the imperative for responsible tourism development becomes increasingly important. Responsible tourism emphasizes sustainability, equity, and community engagement, aiming to maximize the benefits of tourism while minimizing its negative impacts on the environment, society, and culture.

In Sri Lanka, responsible tourism development presents a multifaceted challenge that requires an understanding of the interests, concerns, and priorities of various stakeholders involved in or affected by tourism activities. From local communities and government agencies to tourism operators and environmental NGOs, each stakeholder group holds unique perspectives that shape the pathway of tourism development in the country.

This research seeks to undertake a comprehensive multi-stakeholder analysis model to determine the diverse array of perspectives on responsible tourism development in Sri Lanka. By engaging with stakeholders across different sectors and levels of engagement, this study aims to identify common ground, areas of interest, and potential improvement and strategies, thereby informing policy formulation, strategic planning, and decision-making processes in the tourism sector.

In addressing the research question, set the following objectives:

- To understand the engagement of stakeholders to foster responsible tourism development in Sri Lanka.
- To operationalize the dynamic wheel of stakeholders and their role in promoting responsible
- To propose a multi-stakeholder analysis model that will explain how tourism stakeholders can establish their respective roles and collaborative advantages in governing destinations

Literature Review

Tourism in Sri Lanka

With aiming to be recognized as the world's finest island for memorable, authentic, and diverse experiences it should be a high-value destination offering extraordinary experiences that reflect the natural and cultural heritage of Sri Lanka, socially inclusive and environmentally responsible, and provide economic benefits to communities and the country (SLTDA, 2017). Tourism has traditionally been the third largest foreign exchange earner in Sri Lanka. Over 1.9 million tourist arrivals were recorded in 2019. After the month of April 2019, Due to the Easter terrorist attack 21% drop from the previous year was recorded. The estimated value of that sector was around \$ 3.5 billion in 2019. The effects of the global COVID-19 Pandemic crippled the sector in 2020.

Sri Lanka has a rich history of tourism dating back to ancient times when traders and explorers visited the island attracted by its natural and historical attractions, cultural heritage, and strategic location in the Indian Ocean (Fernando, 2018). However, the modern tourism industry in Sri Lanka began to flourish in the post-independence era, particularly after the end of the civil war in 2009 (Ranasinghe & Pradeepa, 2020). The government has implemented various initiatives to promote tourism in Sri Lanka, including infrastructure development, marketing campaigns, and policy reforms (Jayawardena & Dissanayake, 2019). Despite its potential, the tourism industry in Sri Lanka faces several challenges due to the diverse scenarios. These include environmental degradation, cultural commodification, seasonality, and political instability, (Weerasooriya, 2017). Additionally, the COVID-19 pandemic has had a significant impact on the tourism sector, leading to a drastic decline in tourist arrivals and revenue (Fernando & Tisdell, 2021). Nevertheless, there are opportunities for the sustainable development of tourism in Sri Lanka. These include diversifying tourist attractions beyond traditional beach destinations, promoting ecotourism and community-based tourism, enhancing infrastructure connectivity, and leveraging digital technologies for marketing and management (Silva & Weerasinghe, 2020). Tourism influences quality-of-life indices (Yi, 2015). Its expansion has the potential to significantly enhance residents' quality of life (Uysal et al., 2016). As an outcome, tourism development will enhance people's standard of living if it is moderated by responsible tourism activities (Hanafiah et al., 2016).

Responsible Tourism

Responsible tourism is a novel approach that ensures that residents realize a fair share of the benefits of the development of tourism. It strives to enhance tourist hotspots and make the visitor experience more delightful (Mina and Alireza, 2021). According to Ford & Acott (2015), While sustainable tourism has its roots in the 1970s and 1980s, responsible tourism has been highlighted in tourism in recent decades. Although official statistics are not available, the current trends indicate that the responsible tourism approach is being developed (Mody et al., 2017). There are several sustainability initiatives such as alternative Tourism, Sustainable Tourism, green tourism, community-based tourism, pro-poor tourism, geo-tourism, eco-tourism, etc. have merged in response to the increasing social and environmental problems caused by tourism. Responsible tourism is considered as a recently emerged form of tourism, closely related to the above concepts (Chettiparamb & Kokkranikal, 2012). Green tourism and eco-tourism focus on the environmental aspects (Andari & Setiyorini, 2017). Pro-poor tourism is oriented to the economic aspects (Hrubcova et al., 2016; Mody et al., 2017), Community-based tourism is oriented to social aspects (Goodwin & Font, 2014), and alternative tourism is the initial form of sustainable tourism. There is a close relationship between sustainable tourism and Responsible tourism, they are often used interchangeably (Glen, 2017). According to Mahalic (2016), Sustainable tourism aspects and responsible tourism activities follow the same goals. However, the concept of sustainability is recognized as a theory while the concept of responsibility is recognized as a practice.

When the United Nations World Tourism Organization (UNWTO) adopted the guidelines of the "Global Code of Ethics for Tourism," which encourages responsible Tourism, Sustainable Tourism, and equitable tourism, the idea of RST was first set - up. It suggested ten elements, all of which should be considered while developing an effective strategy for RSTM development. They are as follows: The contribution of tourism to cross-cultural understanding and mutual respect, Tourism as an approach to achieving both individual and collective fulfillment, Tourism as a driver of sustainable growth, tourism, a user of the cultural heritage of humankind and contributor to its enhancement Tourism, a profitable industry for host nations and local communities, responsibilities of parties involved in the development of the tourism industry, right to tourism, liberty of tourist movements, rights of workers and entrepreneurs in the tourism industry, promotes respect between tourists and local people.

Responsible Tourism Development in Sri Lanka

Sri Lanka's Tourism industry was the hardest-hit industry in previous decades (Sri Lanka Tourism Alliance, 2021). There are many issues to take into account, sadly, when it comes to responsible tourism in Sri Lanka (Silva, 2021). Sri Lanka's government is starting to act upon this but, progress is still slow (UNHCR, 2019). Implementation for making Sri Lankan tourism sustainable & responsible: sharing and caring are more important (Silva, 2021). There is an urgent need for ground-level awareness and understanding of the necessary actions for responsible tourism development in Sri Lanka (Silva, 2021). The Sri Lankan government plays a pivotal role in driving responsible tourism development. The National Tourism Development Strategy outlines a comprehensive framework for sustainable tourism, emphasizing the integration of responsible practices across the industry (Ministry of Tourism Development and Christian Religious Affairs, 2017).

An initialization of responsible tourism in Sri Lanka is community engagement and empowerment. Initiatives focus on ensuring that local communities are active participants and beneficiaries of tourism activities. Homestays, community-based tourism projects, and partnerships with local artisans provide avenues for communities to share their unique cultural heritage while generating income (De Silva & Gurung, 2021). This approach not only enhances the authenticity of tourist experiences but also fosters a sense of pride and ownership among residents. Sri Lanka's commitment to responsible tourism is evident in its efforts to safeguard the island's natural treasures. Protected areas and national parks are managed with a focus on conservation, minimizing the environmental impact of tourism activities. Sustainable practices, such as waste management programs and eco-friendly accommodation options, contribute to the preservation of biodiversity and ecosystems (UNWTO, 2019). Responsible tourism development in Sri Lanka places a strong emphasis on the preservation of cultural heritage as well. The restoration and maintenance of historical sites, such as the ancient city of Polonnaruwa and the Dambulla Cave Temple, are integral components of sustainable tourism. Educational programs and guided tours promote respect for local traditions and encourage visitors to engage with cultural practices responsibly (Ruhanen & Cooper, 2020). The private sector in Sri Lanka's tourism industry is increasingly adopting responsible business practices. Hotels and tour operators are implementing sustainable policies, including energy-efficient measures, waste reduction initiatives, and the support of local suppliers (Gurung & De Silva, 2020).

Stakeholder collaboration to foster Responsible Tourism

Seraphin, Gowreesunkar, and Yallop (2024) highlight that effective stakeholder engagement is pivotal in implementing sustainable practices within responsible tourism, underscoring the need for a collaborative approach to ensure long-term sustainability. Moreover, Boley, McGehee, and Moscardo (2023) argue that stakeholder collaboration is a fundamental driver of responsible tourism development, as it fosters shared responsibility and facilitates the integration of sustainable practices across the tourism sector. The crucial role of stakeholder participation in advancing responsible tourism, particularly in coastal destinations, where collaborative efforts are essential for balancing environmental preservation with tourism development emphasize by the Kim and Park (2024). According to the Hall and Lew (2023) emphasize that fostering stakeholder participation is essential for effective responsible tourism and destination management, as it ensures that diverse perspectives are integrated into decision-making processes, thereby enhancing the sustainability and inclusiveness of tourism practices.

Methods

The sample of this study comprises policymakers, representatives from destination management organizations, tourism service providers including tour guides, accommodation suppliers, food and beverage suppliers' tourism entrepreneurs, local community residents, and tourists who are directly involved or affected by responsible tourism development in Sri Lanka. The goal is to capture a diverse range of perspectives on their multidisciplinary roles and responsibilities within their profession and develop a multi-stakeholder analysis model related to responsible tourism development in Sri Lanka. A purposive sampling method was employed to select 31 tourism stakeholders representing the above-mentioned stakeholder groups and structured interviews were used to collect data. Content analysis was employed for the qualitative data gathered from interviews and observations. Transcripts were coded to identify recurring content related to interests, roles, and responsibilities to promote responsible tourism. The research is rooted in a constructivist paradigm, which aligns with the qualitative approach of understanding the perspectives and experiences of various stakeholders in promoting responsible tourism. The research sites are strategically selected to represent a diverse range of tourism contexts in Sri Lanka as Yala National Park: Known for its wildlife and biodiversity, Yala provides insights into the role of stakeholders in managing ecotourism and conservation efforts within a protected area, Hiriwadunna Village Track is another location. This site offers community-based tourism, where local residents play a crucial role in

promoting sustainable practices and preserving cultural heritage. Moreover, Dambulla Cave Temple as a UNESCO World Heritage site, Dambulla illustrates the challenges and responsibilities of stakeholders in managing cultural and religious tourism. And Southern Coastal Belt including Mirissa, Rekawa, Habaraduwa, Kosgoda, and Bentota This region represents the complexities of coastal tourism, where issues such as marine conservation, beach management, and sustainable development are central to responsible tourism efforts.

Finding of the Study

Objective 1: To understand the engagement of stakeholder group to foster responsible tourism development in Sri Lanka

Targeting sustainable development and long-term economic growth

According to the respondent's perception, the first category was targeting sustainable development and long-term economic growth. Sustainable economic growth is an evolving concept that seeks to reconcile the pursuit of economic development with the imperative of environmental stewardship and social equity. Unlike traditional economic growth, which primarily focuses on increasing gross domestic product (GDP) and other financial indicators, sustainable economic growth emphasizes a balanced approach that ensures long-term prosperity while safeguarding natural resources and promoting social well-being. Effective governance and policy frameworks are essential for achieving sustainable economic growth. Then government policymakers have a huge responsibility to ensure sustainable economic growth within society.

"We believe that sustainable economic growth in tourism is not just about increasing visitor numbers, but about ensuring that tourism benefits our local communities and preserves our natural and cultural heritage."

(Participant 02: Personal communication, 2024)

"Nightlife tourism has high potential here. We can promote it sustainably. We are responsible for ensuring what should be permitted and how the overall economy should benefit..."

"Yes. Definitely.... Our goal is to promote tourism that contributes to sustainable economic growth by creating job opportunities,

supporting local businesses, and conserving our environment. we are committed to promoting responsible tourism practices that contribute to sustainable economic growth and enhance the overall well-being of our society."

(Participant 01: Personal communication, 2024)

Government policymakers play a crucial role in shaping the tourism industry, especially in promoting responsible and sustainable tourism in Sri Lanka. They create and implement policies, regulations, and strategies to promote and manage tourism development. Participants especially government policymakers underscored their participation and dedication to promoting tourism practices that foster economic growth and enhance societal well-being. As articulated by Participant 01, the goal is to create job opportunities, support local businesses, and conserve the environment through sustainable tourism. This integrated approach aligns with the principles of sustainable development, emphasizing the interconnection between economic prosperity, community welfare, and environmental stewardship. In summary, the respondents' reviews demonstrate that policymakers view sustainable economic growth in tourism as a multifaceted endeavor that requires concerted efforts to achieve economic, social, and environmental objectives. The insights gained from this analysis provide a valuable framework for developing policies and strategies that promote responsible and sustainable tourism, ultimately contributing to the long-term well-being of both the community and the environment. Moreover, Local communities are highly motivated to engage in responsible tourism as it directly contributes to their economic well-being and cultural preservation. eventually, many tour operators are motivated to adopt sustainable practices due to the increasing demand for ethical and responsible travel options in current scenarios. While engaging with this, balancing profit margins with sustainable practices creates challenges, especially for small operators facing economic pressures.

Environmental conservation and minimizing carbon footprint

According to the respondents' reviews, the second category was environmental conservation and minimizing carbon footprint. Environmental conservation is the practice of protecting and preserving natural resources and ecosystems to ensure their sustainability and health for future generations. This concept encompasses a broad range of activities, from the protection of wildlife habitats and biodiversity to the management of natural resources and the reduction of pollution. The urgency of environmental conservation has grown significantly in recent years due to increasing awareness of the environmental challenges posed by human activities, including

climate change, deforestation, and biodiversity loss.

I think you all know we have already facilitated the train, allowing travelers to enjoy the scenic beauty and also, we have an air-conditioned train to Jaffna. We are expecting to encourage more tourists to travel by train to reduce carbon foot print.

(Participant 03: Personal communication, 2024)

Cultural Preservation and Promotion

The third category was cultural preservation and promotion. Diverse perspectives have been gathered from diversified stakeholders. According to the majority of the respondents, Cultural preservation and promotion are vital components of responsible tourism development. They ensure that tourism not only brings economic benefits but also contributes to maintaining the cultural integrity and heritage of a destination. In Sri Lanka, a country rich in diverse cultural traditions and historical sites, this balance is particularly important.

"Our cultural heritage is our most precious asset. We strive to promote responsible tourism practices that protect and promote our unique cultural identity."

(Participant 02: Personal communication, 2024)

Community involvement and empowerment

Community involvement and empowerment was the fourth category of analysis. Community involvement and empowerment are emphasized by the majority of tourism stakeholders in Sri Lanka, including, government policymakers, destination Management Companies (DMCs), service providers, community residents, and entrepreneurs. This collaborative approach is integral to fostering a sustainable and responsible tourism industry.

"We actively involve the local community in our tourism initiatives, including through community-based tourism projects such as homestays and cultural tours. This not only provides economic benefits to residents but also helps to preserve and promote local traditions and culture."

Partnership and Collaboration

According to the results received, the fifth category of analysis is partnership and

collaboration to foster responsible tourism in Sri Lanka. In the tourism industry, sustainable growth is not just a desirable goal but a critical necessity. The multifaceted challenges faced by this sector, ranging from environmental impacts to economic and social dynamics, cannot be effectively addressed by any single entity alone. Partnerships and collaboration emerge as essential strategies in this context, enabling stakeholders to identify resources, expertise, and efforts towards common objectives. This collaborative approach is fundamental to promoting responsible tourism practices that ensure the long-term viability and prosperity of destinations worldwide.

"We recognize that no single entity can address the challenges facing the tourism industry alone. We actively seek partnerships with government agencies, private sector companies, and local communities to promote responsible tourism".

(Participant 03: Personal communication, 2024)

(Participant 2: Personal communication, 2024)

The insights from respondents reveal a clear and strategic vision among tourism stakeholders in Sri Lanka to promote responsible tourism through partnerships and collaborations. Recognizing that no single entity can effectively address the multifaceted challenges of the tourism industry, policymakers emphasize the necessity of engaging with government agencies, private sector companies, and local communities as external collaboration. By fostering partnerships grounded in mutual respect and shared objectives, they aim to leverage collective strengths to achieve significant and sustainable impacts.

Quality Tourism Experience (Quality over Quantity)

Based on the results, the sixth category of analysis is the expectation of quality tourism experience (Quality over quantity). In the ever-evolving tourism industry, the emphasis on quality over quantity has become a pivotal aspect of sustainable growth. As travelers increasingly seek meaningful and enriching experiences, the focus shifts from merely attracting a large number of tourists to providing high-quality, memorable interactions. This approach not only enhances visitor satisfaction but also supports the preservation of destinations and benefits local communities.

"We have capacity. But we don't know how it manages. Considering the Sigiriya we have approximately 5000 rooms, accommodating approximately 6000 tourists. but there is nothing for them to do in

the evening after 6 p.m. We need to create activities and provide opportunities for them to spend money so that both the economy and local community benefit”.

(Participant 02: Personal communication, 2024)

According to the respondent reviews, there is a potential gap in the tourism service sector. Through responsible tourism development with proper destination management mechanism, we can fill this gap.

Responsible Destination Marketing and Management

Based on the findings, the seventh category of analysis is the collaborative efforts in responsible destination marketing and management aimed at promoting responsible tourism in Sri Lanka. Responsible destination marketing is a holistic approach that integrates environmental stewardship, cultural sensitivity, economic inclusivity, and community engagement. Stakeholders emphasize the importance of sustainable tourism practices. This includes environmental stewardship, promoting eco-friendly infrastructure, and educating tourists on responsible behavior. By emphasizing these values, tourism policymakers can ensure that tourism is a force for good, creating lasting benefits for both travelers and local communities. Moreover, there is a shared focus on marketing and delivering authentic cultural experiences that respect and highlight local traditions and heritage.

“We aim to showcase Sri Lanka as a sustainable and responsible tourism destination that offers unique and authentic experiences.”

(Participant 03: Personal communication, 2024)

“Our destination marketing efforts highlight Sri Lanka's natural beauty, rich culture, and warm hospitality. We believe that by promoting these unique destination attributes, we can attract responsible travelers who respect and value our environment and culture”

(Participant 06: Personal communication, 2024)

The insights received from Sri Lankan government policymakers and DMCs reflect a deep commitment to responsible destination marketing. They stated a vision of tourism that is collaborative, sustainable, culturally sensitive, economically inclusive, and innovative. By adhering to these principles, Sri Lanka aims to develop a tourism industry that not only attracts visitors but also benefits local communities and preserves the country's natural and cultural heritage. Moreover, DMCs emphasize incorporating sustainable practices in their operations through marketing authentic Experiences

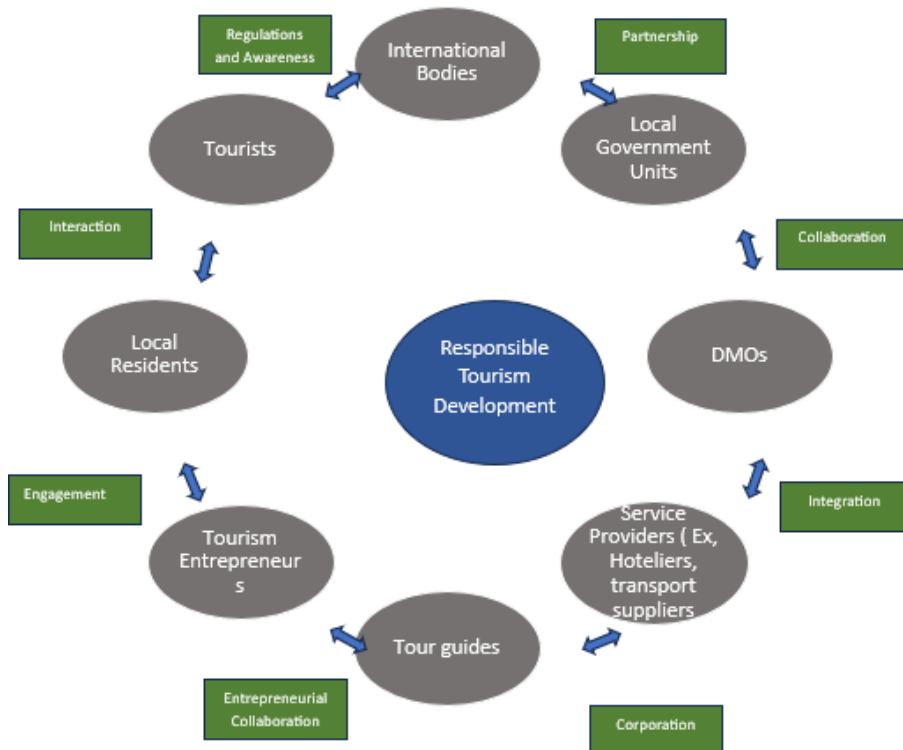
Table 1*Summary table of the content*

Codes	Categories	Subcategories
Economic benefits Social well-being Environmental sustainability Corporate social responsibility Conservation Management Sustainable development Planning Balancing conservation and tourism	Targeting Sustainable Development and Long-Term Economic Growth	Positive impacts Negative impacts
Natural resource conservation Reduction of carbon footprint Protection of wildlife habitats and biodiversity Green certification	Environmental Conservation and Minimizing Carbon Footprint	Direct effect Indirect effect
Cultural heritage preservation Cultural promotion	Cultural Preservation and Promotion	
Community engagement Community empowerment	Community Involvement and Empowerment	
Stakeholder collaboration Public-private partnerships	Partnership and Collaboration	Internal collaboration External collaboration
High-quality visitor experience Sustainable tourism experiences	Quality Tourism Experience (Quality over Quantity)	
Sustainable marketing/business Practices Destination management Sustainable travel choice Innovation in tourism Best practices implementation	Responsible Destination Marketing and Management	

Objective 2: To operationalize the dynamic wheel of stakeholders and their role in promoting responsible

Figure 1

Dynamic Wheel of Tourism Stakeholders with their role in promoting responsible tourism



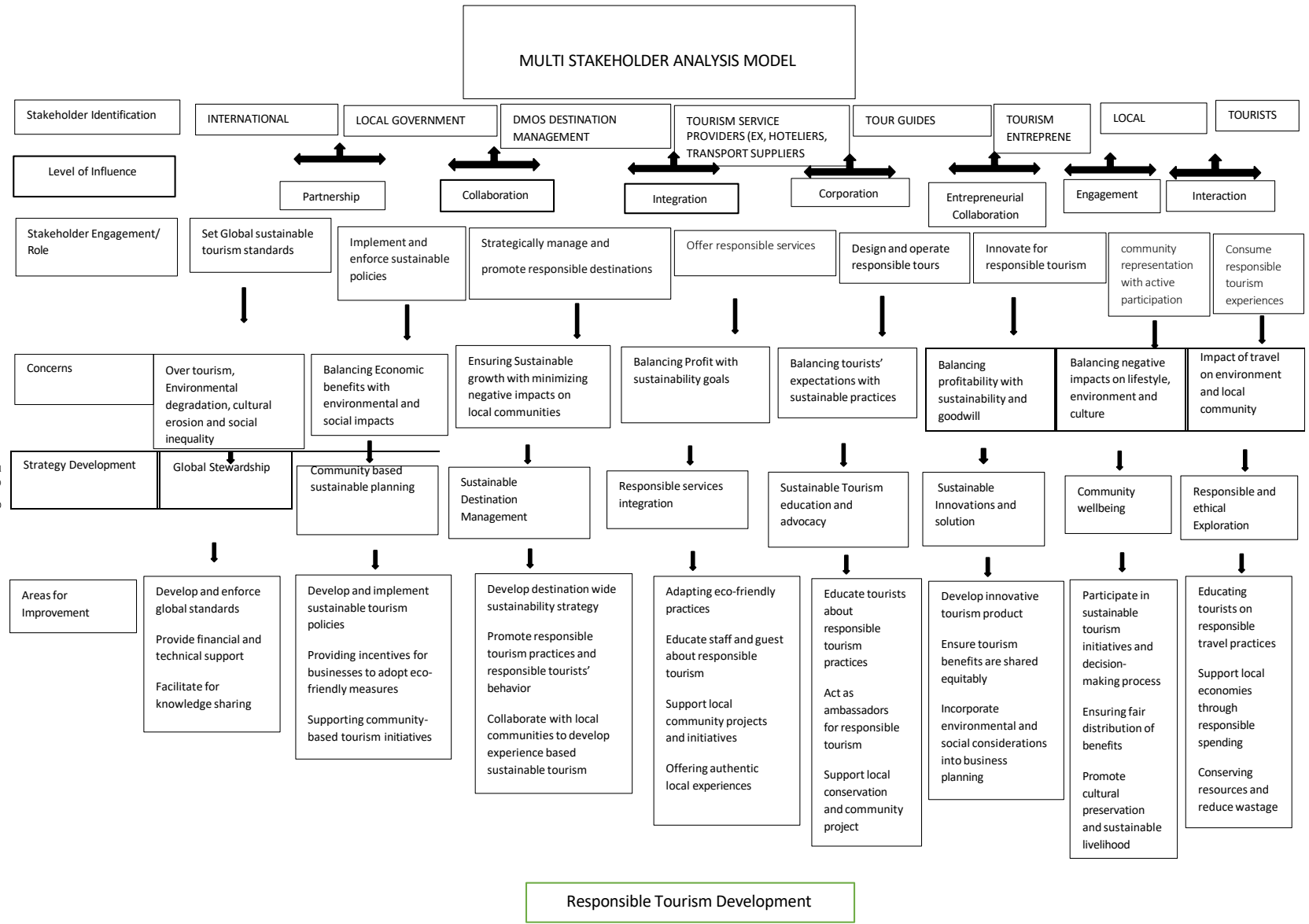
Source: Buhalis and Fletcher (1995); reconstructed by authors based on the respondent's reviews

According to the respondent's reviews, the dynamic interactions among the above-mentioned stakeholders shape the tourism industry's development, sustainability, and impact on destinations and communities worldwide. To promote and sustain responsible tourism in Sri Lanka collaboration among each stakeholder, responsible communication, and mutual understanding are essential for fostering positive outcomes for all involved parties. All should get the responsibility individually to ensure a responsible society. The researcher suggested that Local policymakers

should interact with international bodies to govern and implement tourism policies and initiatives in the Sri Lankan context. Government bodies at the local, regional, and national levels play a crucial role in shaping tourism development through regulations, infrastructure investment, and destination marketing strategies. They should collaborate with DMOs, to create an enabling sustainable environment for tourism growth while ensuring responsibility, sustainability, and local benefits. Destination management companies are responsible for promoting and managing destinations. They should integrate with service providers like hotels, restaurants, and transportation companies. Tour guides should cooperate with DMOs and service providers to design and deliver tours that showcase local culture, history, and natural attractions. The individuals or businesses develop innovative tourism products and services, such as adventure tours, cultural experiences, or sustainable accommodations. They should build entrepreneurial collaboration with DMOs, service providers, and tour guides to responsibly market their offerings and ensure their integration into the destination's tourism ecosystem. The community living in and around tourist destinations is directly impacted by tourism activities. They should interact with tourism entrepreneurs, tour guides, service providers, DMOs, and local policymakers to voice concerns, participate in decision-making processes, and ensure that tourism development benefits the community economically, socially, and environmentally. Additionally, they may engage and interact with tourists directly through, cultural exchanges, or community-based tourism initiatives. Travelers are at the heart of the tourism industry. They interact with all other stakeholders during their journey, seeking information, services, and experiences. Tourists provide revenue to service providers, feedback to DMOs and local policymakers, and opportunities for engagement with residents and tour guides under the established regulations by international tourism bodies.

Objective 3: To propose a multi-stakeholder analysis model that will explain how tourism stakeholders can establish their respective roles and collaborative advantages in governing destinations.

Figure 2 15th International Conference on Business and Information – 2024
Multi-stakeholder analysis model ISSN 2961-5283 (Online)



Source: Developed by the researcher based on 59 in-depth interview's responses and previous literature

Here, the researcher has developed a multi-stakeholder analysis model based on the interviews to examine and understand the various stakeholders involved in promoting responsible tourism in Sri Lanka. It provides a systematic approach to identify stakeholder groups, and categorize, and analyze the interests, preferences, and power dynamics among different stakeholders with their concerns, strategy development, and potential improvement.

Discussion and Recommendation

This research contributes to the theoretical understanding of responsible tourism by examining stakeholder perspectives within the context of Sri Lanka. It may help refine existing theoretical frameworks or develop new ones to better comprehend the dynamics of responsible tourism development with their specific role. The multi stakeholder analysis model showcases about policymakers in Sri Lanka with the diverse viewpoints of stakeholders regarding responsible tourism development. Moreover, the understanding of diverse stakeholders' perspectives and proper collaboration among those is essential. This can lead to the implementation of initiatives that benefit local communities economically, socially, and culturally, while minimizing negative impacts on the environment. Moreover, empowering the service providers with the necessary knowledge, resources, and authority to educate tourists about sustainable practices and encourage responsible behavior during tours will highly beneficial for the long-term prosperity. Insights gained from the study can also be leveraged for marketing Sri Lanka as a responsible tourism destination and there is an agent need to implement a mechanism for monitoring and evaluating the perceived impact of responsible tourism on destination sustainability and perceived quality of life of the residents.

Conclusion

In achieving sustainability, the governance of tourism destinations remains a challenge. Following the United Nations World Tourism Organization (UNWTO) 2030 Tourism Roadmap for Inclusive Growth, the achievement of Sustainable Development Goal (SDG) 17 (i.e., partnerships for the goals) requires strengthened partnerships and collaboration among stakeholders. According to the respondent's

perspectives, they have a clear understanding of their roles and responsibilities. But there is no strong interaction among them. This study has provided valuable insights into the perspectives of various stakeholders involved in responsible tourism development in Sri Lanka. The findings highlight the diverse interests and concerns of stakeholders, including policymakers' government officials, tour operators, service providers, and community representatives. However, it is essential to note that the interactions among these stakeholders are not extensively discussed in the existing literature. Therefore, this study recommends the adoption of a Multi-Stakeholder Analysis Model to map and analyze the interactions among tourism stakeholders. By understanding these interactions, policymakers and industry players can develop more effective strategies for promoting responsible tourism that benefits all stakeholders and contributes to the sustainable development of Sri Lanka's tourism industry. Furthermore, this study recommends the adoption of a Multi-Stakeholder Analysis Model to fill this gap and provide a more comprehensive understanding of the dynamics between tourism stakeholders.

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An Empirical Analysis of The Firm-Specific Internal Factors on the Profits of Insurance Companies in Sri Lanka

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The insurance sector plays an important role in the national economy, managing risks and providing financial security. The goal of every company is to achieve optimal profit. Profits are important to investors and management as sources of dividend payments and growth. For insurers and regulators, profits provide additional protection against insolvency. Therefore, companies must identify the factors that affect their profits. This study investigates the impact of premium income, claim expenses, risk-based capital, underwriting results, and investment return on the profit of life and general insurance companies in Sri Lanka.

The study sample consists of all life and general insurance companies in Sri Lanka from 2016 to 2022. A quantitative approach is used for this study. Independent variables include premium income, claims expenses, risk-based capital, investment returns, and underwriting results. Profit is considered the dependent variable in the regression model. Descriptive analysis, correlation analysis, and panel data regression are used to analyze the data in this study.

As a result, the profit margin of insurance businesses in Sri Lanka would be greatly impacted by premium income, claims expenses, risk-based capital, investment return, and underwriting performance. The regression results could not reject every null hypothesis for the life and general insurance industry. More specifically, neither model rejected the null hypothesis that claimed that profit is not much impacted by risk-based capital and investment return. The analysis showed that underwriting outcomes, claims costs and premium income significantly affect profit.

Keywords – *Claim Expenses, Premium Income, Investment Return, Risk-Based Capital, Underwriting Result*

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Introduction

Background of the Study

Insurance is a critical means of mitigating the financial consequences of unforeseen events. By pooling the risks of a large group of people, insurance companies can spread out potential losses, and policyholders can better manage them. This collective risk-sharing approach forms the basis of insurance. (Agustirana, I, & Darmawan, 2019). Agustirana et al. (2019) mentioned that Insurance plays an important role in modern society, providing a safety net against the financial repercussions of unexpected events. By facilitating risk transfer and offering financial protection, insurance empowers individuals and businesses to navigate the uncertainties of life with greater confidence and resilience. In addition, twenty-eight (28) companies were operating as insurers in the Sri Lankan insurance market. Insurance companies are critical in managing long-term funds, which are essential for financing development projects and infrastructure. These funds are primarily derived from premium payments made by policyholders. Assets are invested in a diversified portfolio, ensuring their stability and growth over time. (Gründl & Gal, 2017). Maximizing profit is a fundamental objective for businesses across industries. Profit serves as a key indicator of a company's financial health and operational effectiveness. Furthermore, a company's ability to generate consistent and increasing profits demonstrates the competence of its management team in allocating resources efficiently and strategically. (Jensen, 2010)

Table 1.1

Total Profit, Premium and Claim, Investment Return of General Insurance Companies for 2016 – 2022

Indicator	2016	2017	2018	2019	2020	2021	2022
Profit	15,771	9,373	11,737	11,130	23,360	19,042	27,992
Premium	83,142	97,086	105,281	114,202	111,634	115,813	130,593
Claim	40,443	47,921	76,831	82,433	42,534	48,317	60,172
Investment Return	13,887	8,182	9,780	12,296	10,282	11,282	22,867

Source: IRC SL Financial Reports 2022

Table 1.2

Total Profit, Premium and Claim, Investment Return of Life Insurance Companies for 2016 – 2022

Indicator	2016	2017	2018	2019	2020	2021	2022
Profit	13,616	39,268	26,025	19,540	19,143	23,130	24,836
Premium	63,477	71,504	80,294	88,781	103,000	124,752	136,271
Claim	23,388	27,183	35,130	36,843	39,863	48,060	65,526
Investment Return	27,759	34,056	37,032	42,970	45,686	54,250	68,131

Source: IRC SL Financial Reports 2022

The general insurance industry experienced significant profit fluctuations between 2016 and 2022. In 2016, profit was 15,771 million, dropping to 9,373 million in 2017. Profit gradually increased in 2018 and 2019, reaching 11,737 million rupees and 11,130 million rupees, respectively. However, profit surged to 23,360 million rupees in 2020, declining to 19,042 million in 2021. Profit further increased to 27,992 million rupees in 2022. The long-term insurance industry also experienced profit fluctuations during the same period. Profit was 13,616 million rupees in 2016, which soared to 39,268 million in 2017. Profit declined to 26,025 million rupees in 2018 and decreased to 19,540 million in 2019. Profit remained relatively stable in 2020 and 2021, reaching 19,143 million rupees and 23,130 million rupees, respectively. Profit increased to 24,836 million rupees in 2022. (IRCSL,2022)

One of the key factors that influence the profit of insurance companies is premium income. According to Sastri, Sujana, & Dan Sinarwati, 2017 Premium income refers to the sum of money collected from policyholders in exchange for the insurance coverage provided by the insurer as per the agreed-upon contract terms. The second crucial factor is the payment of claims. (Reschiwati & Solikhah, 2018) Defines claim payment as the cost borne by the insurer in fulfilling its obligation to provide protection benefits to policyholders against previously insured risks. This expense represents the financial outflow of indemnifying policyholders for losses covered under their policies. Risk-based capital is the third factor to consider when assessing an insurance company's financial stability in Sri Lanka. As per Government Regulation (RBC RULE), all loss insurance companies operating in Sri Lanka must maintain a minimum risk-based capital health ratio of 120%. This ratio indicates the company's financial resilience and ability to meet its obligations in the event of adverse circumstances. A higher risk-based capital health ratio signifies the insurance company's more robust financial standing. (IRCSL, 2022)

An important consideration for insurance firms is investment returns. The company's asset investment portfolio yields the returns necessary to meet the rising demand for managed funds. For the most part, insurance firms use the earnings on their investments to make up for policyholders' lower premium payments. Therefore, effective investment management is paramount for insurance companies to ensure financial stability and fulfil their obligations to policyholders (Purnamawati, 2019).

This study investigates the impact of premium income, claim payment, risk-based capital, investment return, and underwriting results on the profit of insurance companies from 2016 to 2022.

Problem Statement

According to Gottesman & Morey (2010), the profit of insurance companies is a crucial aspect of their long-term sustainability and growth. The insurance industry in Sri Lanka plays a significant role in the economy, with a gross written premium (GWP) amounting to billions of rupees in 2021 (IRCSL, 2022). Premium income is a key driver of insurance company revenue, representing the amounts collected from policyholders for coverage (Alipour, Rezaee, & Zare, 2019). Therefore, analyzing the relationship between premium income and insurance company profits is crucial to understanding its impact. Claim payment is another critical factor affecting insurance company profits. Understanding how claim payment levels influence profit can shed light on optimal claims management strategies (Hang , Ma, & Liu, 2018). Risk-based capital measures an insurance company's financial strength and ability to absorb unexpected losses. Investment returns are a significant contributor to insurance company profits. Insurance companies invest their premium income to generate returns and cover their operational costs and claims (Arzelan, 2017). Investigating the relationship between underwriting results and insurance company profits can reveal the effectiveness of underwriting practices and pricing strategies.

(Amani & Markonah, 2020). In Sri Lanka, understanding the factors influencing insurance company profits is very important to forecast the future.

Research Gap

According to Malik, 2011 One of the most significant aims of financial management is to maximize profit. The yearly reports of Sri Lankan insurance companies over the previous few years have revealed significant profit swings. This disparity in insurance firms' profits points to the importance of firm-specific factors in determining insurance company profits. Determining these variables and how they assist insurance businesses in making decisions that will boost their profits is crucial. There is a significant research gap concerning the thorough examination of the impact of premium income, claim payment, risk-based capital, investment return, and underwriting results on the profit of insurance companies in Sri Lanka, even though studies have been conducted on the subject. In particular, there isn't a study in the literature that looks at how these elements interact and work together to impact the financial performance of insurance companies in Sri Lanka. Therefore, the research gap in this context can be defined as the absence of a comprehensive investigation into the simultaneous influence of premium income, claim payment, risk-based capital, investment return, and underwriting results on the profit of insurance companies in Sri Lanka.

Research Questions

1. Does premium income, claim payment, risk-based capital, investment return, and underwriting results impact the profit of Life insurance and General insurance companies in Sri Lanka?

Research Objectives

1. To determine the impact of premium income, claim payment, risk-based capital, investment return, and underwriting results on the profit of Life insurance and General insurance companies in Sri Lanka

Significance of the Study

Practical Significance

This study offers practical insights for Sri Lankan insurance companies, helping them identify key profit-influencing factors and inform strategic decisions to optimize operations and achieve sustainable profits. Policymakers and industry regulators can use these findings to develop effective policies that enhance financial stability, consumer protection, and industry growth. Understanding the impact of premium income, claim payments, risk-based capital, investment returns, and underwriting results enables better risk management and profit maximization. This ensures that insurance companies remain financially viable, can invest wisely, adjust premiums appropriately, and continue providing valuable services to the public.

Academic Significance

This study fills a research gap by examining the impact of premium income, claim payment, risk-based capital, investment return, and underwriting results on Sri Lankan insurance company profits. It offers a holistic understanding of these factors, enhancing academic literature and providing insights applicable to the broader insurance industry in Sri Lanka.

Literature Review

Sri Lankan Insurance Industry

The insurance industry in Sri Lanka is relatively young, with its roots dating back to the early 1900s. The industry was nationalized in 1961 when the SLIC was formed. SLIC maintained a monopoly on the insurance market until 1980 when the NIC was established. The insurance industry in Sri Lanka is regulated by the IRC SL. The IRC SL was established in 1986 to oversee the insurance industry and protect the interests of policyholders. (IRC SL, 2022). Currently, 28 insurance companies operate in the industry.

Empirical Review

Insurance Profit

Dipoyanti (2014) mentioned that profit is the outcome of the business's financial health report after carrying out operations and business activities, which are determined by nominal outcomes. Profit arises from an organization's ability to effectively manage its operations to reduce costs and turn a profit. (Amani & Markonah, 2020) Profit is a measure of a firm's ability to make money that is used to determine how much money the company can make at a level that is considered acceptable. (Soegihono et al., 2021)

Premium Income

The concept of profit has been defined in different ways by different authors. According to Arzelan, 2017, premium income is the money an insurance company receives from its policyholders in exchange for insurance coverage. This income is the company's profit and a part of its future obligations. The company must set aside a portion of the premium income as a reserve to pay for claims that may be filed in

the future. Examines the use of premium income as a reserve to pay for claims. Dhaniati, 2011 finds that the amount of premium income that an insurance company sets aside as a reserve depends on several factors, including the type of insurance, the risk profile of the policyholders, and the expected claims experience. The reserve is typically invested to generate income that can be used to pay for claims.

Furthermore, premium income reserves impacted insurance company solvency. According to Zweifel (2014), the reserve is critical to an insurance company's financial stability. If the reserve is too low, the company may not be able to meet its financial obligations to its policyholders in the event of a large number of claims. Reserve is a key factor in determining the profit of an insurance company. If the reserve is too high, the company will have less profit. If the reserve is too low, the company may be at risk of insolvency.

Underwriting Result

(Markonah, 2021) The underwriting result is "the profit or loss from the main insurance activities obtained from the difference between underwriting income (premium income) and underwriting expenses. "The significance of underwriting results as a gauge of the profits of an insurance company's primary insurance operations is emphasized by this term. (Oscar Akotey, 2013) Defines the underwriting result as "supporting report summary income or loss." This definition emphasizes the role of underwriting results as a component of the company's overall financial performance.

According to Arzelan, 2017, the underwriting result is the amount left over after operating costs and claim expenses are deducted from underwriting results. It is a metric for the insurance industry's profit and one element that makes up net income. Investment uses underwriting results as well. Amani & Markonah, 2020 examine

the impact of underwriting results on insurance company performance. Underwriting results are a significant driver of insurance company performance. Insurance companies with better underwriting results are more likely to be profitable and have a higher market value. Furthermore, Htay et al. (2013) study the role of risk assessment in underwriting results. The risk assessment is a critical factor in determining underwriting results. Insurance companies that use better risk assessment tools are more likely to identify and price risk more accurately, leading to better underwriting results. Investment management can also have a significant impact on underwriting results. Insurance companies that manage their investments more effectively are more likely to generate higher investment returns, which can offset the cost of claims and improve underwriting results.

Risk-Based Capital

Risk-based capital (RBC) is a measure of the financial strength of an insurance company. It is calculated by dividing the company's Total Available Capital (TAC) by the amount of risk (Risk-based Capital Requirement (RCR) that it has borne.

(Bintang, 2019) Provided an explanation that Risk-Based Capital (RBC) is the minimum amount of capital insurance companies must maintain to support their business activities and minimize the risk of bankruptcy. (Bintang, 2019) Further, it states that RBC is a ratio that assesses capital adequacy relative to the risks assumed by insurance companies. It serves as a crucial indicator for evaluating the financial health of insurance companies, particularly their ability to fulfil their obligations.

Rather than following regulations set forth by the regulator and insurance providers, RBC is more concerned with risk management. Additionally, it provides a flexible framework for maintaining minimum capital requirements that consider the individual insurance firm's riskiness. The development of the RBC frameworks followed an assessment of the state of the local insurance market. These frameworks

include risk characteristics that insurance companies disclose, including credit, concentration, market, operational, and liability risks. (Sastri et al., 2017)

It also contains the methodology for valuing the assets and liabilities of insurance businesses as well as quantifiable capital charges for certain risk variables. Due to the long-term nature of their business, long-term insurance businesses tend to be more impacted by RBC than regular insurance companies. Since 2011, the RBC framework has been tested and improved, and as of early 2016, RBC is fully implemented. Templates and questions created specifically for life and general insurance companies throughout the previous years make up RBC's reporting to the regulatory body. (Pratiwi & Azib., 2018)

Investment Returns

Investment is placing money into something to earn it back later. Insurance firms invest the premiums they get from policyholders to make a profit. This return can be used to settle disputes, pay for ongoing costs, and create a profit for the company.

Investment returns are a major factor in insurance firms' profits since they dictate how much profit is split between the business and participants. The investment returns are the money earned before the manager's profit-sharing part is subtracted from the total investment outcomes. Based on certain ratios, the profit-sharing method is decided upon in accordance with Sharia rules. Research conducted by (Hissiyah & Meylianingrum, 2023), (Nurochim, 2020), (Nainggolan & Soemitra, 2020), (Wulandari et al., 2020), and (Haniva, 2018) has shown that investment returns have a significant impact on the profits of insurance companies.

However, in contrast to the aforementioned studies, (Markonah, 2021) found that investment returns did not have a significant effect on profits. This discrepancy suggests that the relationship between investment returns and profit may vary

depending on different factors such as the specific context, market conditions, and investment strategies employed by insurance companies.

Claim Expenses

Claim expenses are incurred by an insurance company to pay for claims filed by policyholders. These expenses can be significant and have a major impact on the company's profit.

A claim represents the coverage value paid to a participant or policyholder to compensate for the risks they have experienced. The payment of claims is based on the provisions agreed upon in the insurance policy and the results of an investigation into the incurred risk. In insurance companies, claim payments are not considered a burden of the manager's responsibility but rather an insurance or underwriting burden that is covered by the funds contributed by participants.

The claim payment is seen as an obligation that the company incurs when it decides to compensate the participant after the completion of the claim investigation process (Baynah et al., 2019)

Research conducted by Yolanda (2020 (Nurochim, 2020), (Nainggolan & Soemitra, 2020), (Haniva, 2018) and (Reschiwati & Solikhah, 2017) has shown that claims have a significant impact on the profit of insurance companies. However, (Santoso, 2020), (Wulandari et al., 2021), and (Luthfiati, 2018) found contrasting results, indicating that claims may not significantly affect profit in certain contexts.

Relationship of Internal Factors to Profit

Relationship of Premium Income to Profit

The amount of money that a policyholder pays an insurance firm in connection with the insurance agreement as specified in the insurance policy is known as premium income, according to (Ratnasiri, et al., 2018) (Mulyadi & Sinaga, 2019) Added that premium is the risk insurance cost, which the guarantor must pay for a specific risk, in a specific location, and for a specific amount of time. Insurance premiums, according to (Ahmed et al., 2006), are obligations of the insured party to the guarantor in the form of periodic payments of certain amounts of money.

Premium income is the amount of money paid by the insured party in return for protection services the insurer provides according to the previously agreed agreement. (Markonah, 2021) Research regarding the profit of Premium income has been carried out by several researchers. According to (Surantho & Walandouw, 2017) premium income has a significant positive effect on profit.

The result of the research conducted by (Sastri et al., 2017) discovered a positive correlation between insurance companies' profitability and premium income characteristics. For insurance firms, premium income is their primary source of revenue. Consequently, profit growth will be impacted by the size of the premium acquisition. The results of this research are consistent with research conducted by (Dhaniati, 2011), (Andriandin, 2013), (Dipoyanti, 2014), (Riani, 2014) and (Prasetyo et al., 2018). However, these results contrast with research conducted by (Bintang, 2019), which states that premium income does not significantly influence insurance companies' profits.

Premium income received by the company is not only the company's profit but also part of the company's obligations in the future (Mulyadi & Sinaga, 2019). According

to (Marwansyah, 2017) the premiums had a positive and significant effect on the profits of the insurance companies

Relationship of Underwriting Results to Profit

According to (Soegihono et al., 2021) The underwriting results are the profit or loss from the main insurance activities obtained from the difference between underwriting income (premium income) and underwriting expenses. This underwriting result is one of the variables that creates net income and is also used for investing. Meanwhile, according to (Sulastri et al., 2020) the results of underwriting support the report summary of income or loss. The Components of the underwriting results are premium income, claim expenses, and commission expenses.

Underwriting is the most crucial factor in boosting business profit in the insurance industry, aside from income from insurance premiums. The organization will ascertain the extent of potential risk and its capacity to assume that risk through the underwriting process. Not every client submission will be accepted immediately; instead, there will be a step in the process before the customer's submission is accepted. (Mutmainnah, 2015), which states that underwriting results have a noticeable positive impact on insurance company earnings. Whereas (Dhaniati, 2011) states that the underwriting ratio variable does not influence insurance companies' profits.

(Sastri et al., 2017) It was discovered that underwriting results variables and insurance company earnings had a substantial positive correlation. Underwriting results are the surplus funds that remain after an insurance company's underwriting expenditures are paid in full. A high underwriting result will impact on the insurance company's profits. The results of this research were consistent with the research conducted by (Mutmainnah, 2015) but the results of this research were opposite the

research conducted by (Lawson, 2006) and (Dhaniati, 2011), which states that there is no influence between the results of underwriting and the insurance companies' profits.

Relationship of Investment Return to Profit

An investment result may serve as a gauge for a company's performance, in which case the insurance provider might be seen as a type of portfolio. According to (Agung & Fikri, 2009), A portfolio is a collection of coordinated investment vehicles designed to generate returns on investments. The yield, an income from investments stated as a percentage of returns in the form of dividends or interest, is an investment return. While (Ramadhan, 2015) outlined the factors that determine investment returns, including revenue sharing from deposits, share trade profit or loss, building rental income, foreign exchange differences, interest income, and dividends, which are recognized at the time of the transaction rather than when cash is received.

According to (Noprika, 2020) Insurance businesses collect a certain amount of money to be distributed to insurance participants. The result of this process is investment returns. Once directly relevant investment expenses have been subtracted, investment returns become visible. Businesses can enhance their assets to reinvest since they will receive high investment returns from their well-managed assets. Many scholars have studied the profits and returns on investments. Profits were somewhat impacted negatively by the investment returns. (Dhaniati, 2011) While according to (Noprika, 2020), Investment Returns had a significant effect on profits.

The research found a positive influence on investment returns and insurance profits. However, the results of this research were opposite to the research conducted by (Putri et al., 2023), which states that the investment return variable does not influence the insurance companies' profits.

Investment uses funds to earn profits, while investment returns are income from the investment portfolio of insurance company assets (Dhaniati, 2011). The insurance company's operations yield an investment return by collecting a certain amount of money that is then disbursed to insurance participants. Investment returns become visible after immediately associated investment expenses are subtracted from investment income. Businesses that prudently manage their resources will see strong investment returns. They will thus be able to enhance the quantity of assets that need to be reinvested. Based on the aforementioned research findings, investment returns have a favorable and noteworthy impact on insurance businesses' profits.

Relationship of Claim Payment to Profit

Claim expenses are expenses the insurance company bears as part of its obligation to pay protection benefits to the policyholder based on previously insured risks. Insurance firms typically incur claims expenses about client disbursements, which include authorized claims, claims pending settlement, and claims that have been active but not reported. Various scholars have conducted studies concerning expenses and profit. As a result, claim expenses do not affect profit (Noprika, 2020), while based on (Riani, 2014) claim expenses had a significant negative effect on profit.

(Husnul, 2014) and (Mutmainnah, 2015) conclude that the claim expense on Sharia life insurance does not significantly and negatively impact profits since a high income can offset the low claim burden because the study's claim expenses variable has a low value in comparison to income. In the year of observation, this study (Dhaniati, 2011) determined that because the premium and claim variables do not contribute positively to the profit, they produce a negative value in the regression equation. Greater premiums translate into greater claim values because businesses pay premiums to offset the risk of claims. (Riani, 2014) Partial coverage does not

affect profit, so the decrease or increase in claims does not affect the profit growth of Islamic general insurance companies.

According to (Dhaniati, 2011) The claim expenses are the costs incurred by the insurer as a responsibility for the protection benefits provided to the insured, according to the risks that have been previously insured. Insurance firms' claims expenses are typically associated with payments made by clients, encompassing authorized claims, claims pending settlement, and claims that have been active but unreported. According to the results of the research conducted by (Ahmad & Presetyo, 2015),), claims expense has a significant effect on profit.

Relationship of Risk-Based Capital to Profit

Risk-based capital is the capital adequacy ratio to the risk borne and one of the main indicators in assessing the stability of insurance companies, especially those related to solvency or the company's ability to fulfil all its obligations (Surantho & Walandouw, 2017) Research on the effects of risk-based capital (RBC) on profits has been carried out by several researchers. (Sastri et al., 2017)Who explained if risk-based capital (RBC) had a significant positive effect on insurance company profits?

(Bintang, 2019) Investigates the impact of risk-based capital (RBC) rules on the profitability and solvency of Indonesian insurance companies. The author concludes that while RBC regulations have improved insurance companies' solvency, they have negatively impacted their profit margin. It is significant because it offers actual data regarding the impact of RBC requirements in the setting of emerging nations. According to his research, RBC requirements may have a detrimental effect on insurance company profit but can be a useful instrument for enhancing insurance company solvency.

According to the results of research conducted by (Sastri et al., 2017) risk-based capital has a positive and significant effect on profits

Theoretical Review

Efficiency Theory

The efficiency theory suggests that the operational efficiency of insurance firms can significantly impact profit. (Reschiwat & Solikhah, 2018) Factors such as cost management, underwriting discipline, claims management efficiency, investment management practices, and technology adoption can influence the firm's ability to generate profits. Insurance firms that effectively manage their operations, streamline processes, and minimize costs are likely to achieve higher profits compared to less efficient competitors. (Wulandari et al., 2021) The efficiency theory suggests that the operational efficiency of insurance firms can significantly impact profit. (Cummins, 1998)

Resource-Based View (RBV)

The RBV emphasizes the importance of firm-specific resources and capabilities in achieving a competitive advantage and superior profit. In the case of insurance firms, unique resources such as brand reputation, customer base, underwriting expertise, claims management systems and distribution networks can contribute to improved profit. By leveraging and effectively managing these resources, insurance firms can differentiate themselves from competitors and generate higher profits. (Barney, 1991)

These studies all found that firm-specific resources and capabilities are an important source of competitive advantage for insurance firms. Firms that have unique

resources and capabilities that are difficult to imitate are more likely to be successful in the long run. (Wernerfelt, 1984)

Overall, the RBV provides a useful framework for understanding the factors that affect the profit of insurance firms. Firms that can identify and exploit their unique resources and capabilities are more likely to be successful in the long run (Grant, 1991)

METHODS

Research Design

Research design is a straightforward synthesis of the underlying structure of several research methods and procedures a researcher employs. This study will be carried out as a quantitative research method to measure phenomena quantitatively through numerical analysis methods. It adhered to the positivist philosophy, which assumes the existence of an external and objective reality in the world. In addition, research followed a deductive logic, wherein the theory was utilized to develop hypotheses.

Data and sample

The population for this study, which investigates the influence of firm-specific internal factors on the profitability of insurance companies, consists of the 30 insurance companies licensed to operate in Sri Lanka as of December 31, 2022. Of the 30 insurance companies currently registered with the IRC SL, 28 comprise the study population. This research focuses on these 28 companies that have actively conducted insurance business in Sri Lanka over the past seven years. The two companies excluded from the study are a newly registered company and the National Insurance Trust Fund (NITF). Therefore, in this context, the sample and population are one and the same. This study utilizes annual data on insurance companies in Sri

Lanka, covering the period from 2016 to 2022. In addition, the secondary data enhances the validity and reliability of the study as it builds upon existing research. Secondary data, previously collected for a different purpose, can be adapted and utilized for current research. This study employed secondary data from various sources to examine the impact of firm-specific internal factors on the profitability of insurance companies in Sri Lanka. The researcher gathered data from annual financial statements for seven years, from 2016 to 2022. It emphasizes that the use of secondary data enhances the validity and reliability of the study by providing a foundation for the current research. In conclusion, this study analyzes 7 years of data from 2016 to 2022, using annual data from 28 insurance companies. (Appendix 01)

Method of analysis

This study adopted a quantitative research approach because it involved numerical and secondary data. To assess the performance of insurance businesses, the researcher used profit as a measure. As a result, the researcher intended to calculate premiums, claim expenses, RBC, investment return, and underwriting expenses. Descriptive statistics, regression, and correlation were used to analyze the data. The regression model was used to examine the impact of profit on insurance companies. A correlation analysis was conducted on the variables to determine their degree of association or linearity. Descriptive statistics generated a straightforward and easy-to-understand depiction of the variables. In this case, the mean and standard deviation were used as descriptive statistics.

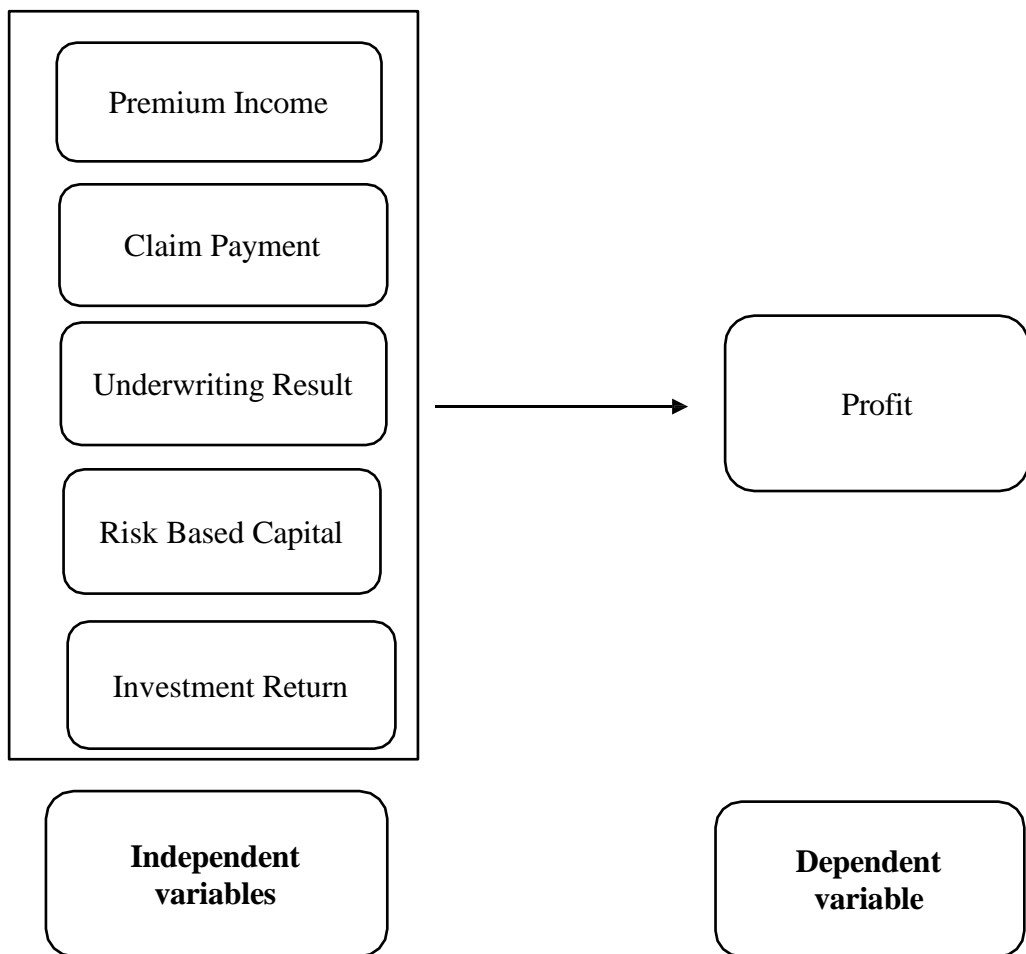
Conceptual Framework & Operationalization

The following figure (Table 3.2) will support identifying the independent variable and dependent variable of this study to identify the correct pathway for developing the research hypothesis under the different terms; also, the following operationalization supports identifying the different variable measurements with

proper research evidence according to the research contexts under the different circumstances.

Figure 3.1

Conceptual Framework



Hypotheses

According to (Osuala,2005), the essence of the hypothesis is to ensure the clear direction of the study, which will help avoid misleading data collection. Research hypotheses were developed as follows to determine the relationship between the independent and dependent variables.

H1_a: Insurance premiums have a significant impact on Profit in General Insurance Industry

H1_b: Insurance premiums have a significant impact on Profit in the Life Insurance Industry

H2_a: Insurance claim has a significant impact on Profit in General Insurance Industry

H2_b: Insurance claim has a significant impact on Profit in Life Insurance Industry

H3_a: Risk-Based Capital has a significant impact on Profit in General Insurance Industry

H3_b: Risk-Based Capital has a significant impact on Profit in Life Insurance Industry

H4_a: Investment return has a significant impact on Profit in General Insurance Industry

H4_b: Investment return has a significant impact on Profit in Life Insurance Industry

H4_a: Underwriting results have a significant impact on Profit in General Insurance Industry

H4_b: Underwriting results have a significant impact on Profit in Life Insurance Industry

Findings of Study

Descriptive Analysis

The study's basic features are described using descriptive statistics. Simple summaries of the sample and the measures should be provided. Table 4.1 provides descriptive statistics for profit, gross written premium (GWP), claim expense, risk-based capital (RBC), interest rate (IR), and underwriting return (UR) for both general insurance and life insurance. In general, life insurance companies have higher profits, lower claim expenses, and higher Risk-Based Capital than general insurance companies. Life insurance companies also have higher Investment Return (IR) but slightly lower Underwriting Results (UR) than general insurance companies.

Table 4.1

Descriptive Statistics – Model 01 & Model 02

	General Insurance					
	Profit	GWP	Claim Ex	RBC	IR	UR
Mean	0.7228	6.6433	3.0949	2.1492	0.5497	0.9060
Std. Dev	0.7836	6.0273	2.6959	0.4571	0.4628	0.8838
Minimum	-0.0685	0.8107	0.3011	1.5400	0.1097	0.0450
Maximum	2.3187	18.1379	8.2540	2.9100	1.3067	2.7432
Observations	91	91	91	91	91	91
	Life Insurance					
	Profit	GWP	Claim Ex	RBC	IR	UR
Mean	1.0946	6.3633	2.3117	3.2275	2.4414	0.9693
Std. Dev	1.3078	7.1777	2.7311	1.4414	3.2709	1.0302
Minimum	1.0000	0.3685	0.1089	0.4845	0.1132	-0.0137
Maximum	3.7437	29.1602	7.8444	8.8048	9.7832	4.9559
Observations	105	105	105	105	105	105

Source: Author Compiled

Test in Normality

Table 5.2 Result of the normality – Model 01 & Model 02

	General Insurance		Life Insurance	
	Skewness statistic	Kurtosis statistic	Skewness statistic	Kurtosis statistic
Profit	0.9162	2.5480	0.5199	1.5545
GWP	0.9538	2.4246	0.8119	2.0456
Claim Ex.	0.8911	2.3684	0.7235	1.7911
RBC	0.4049	1.8045	0.2525	1.7027
IR	0.7105	1.9336	1.3547	3.3586
UR	1.0654	3.8926	0.6838	0.3988

Source: Author Compiled.

The 4.2 table provides the skewness and kurtosis statistics. For skewness, values between -2 and 2 are considered acceptable for indicating normal distribution. As shown in the table, all skewness values for general and life insurance variables fall within this range, suggesting that the data sets are approximately normally distributed. For kurtosis, values less than 5 are considered acceptable for indicating normal distribution. Again, all kurtosis values for both general insurance and life insurance variables are below 5, further supporting the conclusion that the data sets are approximately normally distributed.

Test in Stationary

To test the unit root of the variables, we can develop hypotheses as shown below.

H0: Variable is not stationary (Unit root)

H1: Variable is stationary (No unit root)

Based on the results of the LLC test, all variables are statistically significant at the 5% level. This leads to rejecting the null hypothesis, indicating no unit root in the entire data set. Consequently, all variables can be considered stationary.

Table 4.3

Unit Root Tests – Model 01 & Model 02

Variable	General Insurance		Life Insurance	
	P Value	Stationery	P Value	Stationery
Profit	0.0000	At level	0.0000	At level
GWP	0.0000	At level	0.0032	At level
Claim Ex.	0.0000	At level	0.0000	At level
RBC	0.0003	At level	0.0000	At level
IR	0.0000	At level	0.0185	At level
UR	0.0000	At level	0.0000	At level

Source: Author Compiled.

Correlation analysis

The correlation table (Table 4.4) supports identifying the better correlation among the selected research variables in this study; according to the research contexts, the researcher has identified the correlation matrix for general insurance, which shows strong positive correlations between all of the variables, except for RBC. Profit has the strongest positive correlation with GWP (0.8138), followed by IR (0.8626) and

Claim Ex. (0.7876). This indicates that as GWP, IR, and Claim Ex. increase, profit. RBC has a weak positive correlation with profit (0.1753), indicating a very small positive relationship between the two variables. UR has a moderate positive correlation with profit (0.5627), indicating that profit also tends to increase as UR increases.

The correlation matrix for life insurance shows that there are strong positive correlations between all of the variables. Profit has the strongest positive correlation with GWP (0.9014), followed by IR (0.8326) and Claim Ex. (0.8666). This indicates that GWP, IR, and Claim Ex. increase profit. RBC has a moderate positive correlation with profit (0.3611), indicating a positive relationship between the two variables. UR has a strong positive correlation with profit (0.8875), indicating that profit also tends to increase as UR increases.

Table 4.4

Correlation Analysis – Model 01 & Model 02

	General Insurance					
	Profit	GWP	Claim Ex.	RBC	IR	UR
Profit	1.0000					
GWP	0.8138	1.0000				
Claim Ex.	0.7876	0.9478	1.0000			
RBC	0.1753	-0.0844	-0.0719	1.0000		
IR	0.8626	0.9342	0.9240	-0.0130		
UR	0.5627	0.3070	0.3186	0.1606	0.3896	1.0000
	Life Insurance					

	Profit	GWP	Claim Ex.	RBC	IR	UR
Profit	1.0000					
GWP	0.9014	1.0000				
Claim Ex.	0.8666	0.9758	1.0000			
RBC	0.3611	0.4365	0.4302	1.0000		
IR	0.8326	0.9330	0.9515	0.4893	1.0000	
UR	0.8875	0.9390	0.9105	0.4552	0.8652	1.0000

Source: Author Compiled.

Assumption Testing

Multicollinearity

Multicollinearity refers to a high degree of correlation among the explanatory variables in a regression model. When multicollinearity is present, the ordinary least squares (OLS) estimators exhibit inflated variances and covariances, leading to inaccurate and unreliable estimates of the model parameters.

According to the classical assumptions of the OLS regression model, the explanatory variables should not be perfectly correlated. Various diagnostic tools can be employed to assess the presence of multicollinearity, including the correlation matrix, variance inflation factors (VIFs), and tolerance values. For this particular study, VIFs were utilized to evaluate multicollinearity.

Table 4.5

VIF Test - Model 01 & Model 02

Variable	General Insurance		Life Insurance	
	VIF	1/VIF	VIF	1/VIF
Premium	12.48	0.080119	14.48	0.06906
Claim Ex.	9.75	0.102518	10.41	0.9604
RBC	2.29	0.437006	8.15	0.12273
IR	1.63	0.61198	7.5	0.13331
UR	1.01	0.987107	1.48	0.67719
Mean VIF	5.43		8.4	

Source: Author Compiled.

According to (Belsley et al., 1980) and (Hair et al., 2010) a VIF greater than 10 indicates that multicollinearity is severe and that the corresponding regression coefficient is likely to be unstable. According to Table 4.5, the mean VIF values are less than 10 for both life and general insurance. Specifically, the VIFs are 5.43 and 8.40 for general and life insurance, respectively. Therefore, there is no multicollinearity problem in this study.

Autocorrelation

If the error term is correlated with the error term of the previous period, this is called autocorrelation. The best regression model should be free from the autocorrelation problem, i.e. there should be no autocorrelation between the intercepts. The following hypothesis is developed to identify autocorrelation in the model:

(H₀): There is no autocorrelation between disturbances.

(H₁): There is autocorrelation between disturbances.

This study employed the Wooldridge test to measure autocorrelation.

Table 4.6

Wooldridge test for autocorrelation – Model 01 & Model 02

	General Insurance
F(1,12)	1.305
Prob>F	0.2756
	Life Insurance
F(1,14)	0.155
Prob>F	0.6994

Source: Author Compiled.

The Wooldridge test for autocorrelation was conducted for both general and life insurance. In both cases, the p-values were greater than 0.05, which means that the null hypothesis of no autocorrelation between the disturbances cannot be rejected. In other words, there is no evidence to suggest a problem with autocorrelation in either of the regression models. This is a good result, as it means that the regression models are likely to be reliable and that the estimated coefficients are not biased due to autocorrelation.

Heteroscedasticity

In the context of the classical assumptions of ordinary least squares (OLS) regression, homoscedasticity refers to the condition of equal variance of the error term or disturbance. When the error term or disturbance of the model is not constant, the variance is termed heteroscedasticity. An ideal regression model should exhibit

minimal variance. To assess the presence of heteroscedasticity in the model, the following hypotheses are formulated:

H₀: Homoscedasticity exists.

H₁: Heteroscedasticity exists.

The modified Wald test was employed to evaluate the presence of heteroscedasticity in the residuals. This test provides a statistical framework for determining whether heteroscedasticity exists in the model.

Table 4.7

Wald test for Heteroskedasticity – Model 01 & Model 02

	Chi-Sq. Statistic	Prob.
General Insurance	1.1e+06	0.0000
Life Insurance	4.4e+0.6	0.0000

Source: Author Compiled.

Based on the results, the p-value is less than 5% for both models, indicating statistical significance. This allows us to reject the null hypothesis for both models. Consequently, robust standard errors were employed to address heteroscedasticity in both models

Assumption Testing Summary

Table 4.8 Assumption Testing Summary

Assumption	Statistical Test	Result	Remedies
Multicollinearity	VIF Test	Absence of Multicollinearity	Not Required
Heteroscedasticity	Wald Test	Presence of Heteroscedasticity	Robust standard errors for panel regressions
Serial Correlation (Autocorrelation)	Wooldridge Test	Absence of Serial Correlation (Autocorrelation)	Not Required

Source: Author Compiled.

Empirical Model Testing

Table 4.9 Hausman Test Output

The Hausman test determines which model is more suitable: the fixed and random effect models. With the caveat that H₀ is accepted and H₁ is denied if the probability value is greater than 0.05. In the meantime, H₀ is rejected, and H₁ of this model is accepted if the probability value is less than 0.05. The following are the results of the Hausman test.

	Chi-Sq. Statistic	Prob.	Random/ Fixed
General Insurance	13.99	0.0156	Fixed
Life Insurance	84.09	0.0000	Fixed

Source: Author Compiled.

In the table above, the Chi-Sq. The statistics are 13.99 for general insurance and 84.09 for life insurance. The p-values are 0.0156 and 0.0000 for general and life insurance, respectively.

We reject the null hypothesis since the p-value is less than 0.05 for general and life insurance. This means the fixed effects estimator is more efficient than the random effects estimator for general and life insurance.

Fixed Effect Model Regression Result

This table presents the regression result of insurance firm-specific factors and the profit of insurance companies in Sri Lanka.

Table 4.10

Regression Analysis

	General Insurance				Life Insurance			
	Coefficient	Std. Error	t	Probability	Coefficient	Std. Error	t	Probability
Constant	-0.4540	0.1863	-2.44	0.0170	0.3355	0.2134	1.57	0.1200
GWP	0.1063	0.0274	3.88	0.0000	0.2771	0.5699	4.86	0.0000
Claim Ex.	-0.0781	0.0381	2.05	0.0440	-0.2579	0.1258	-2.05	0.0430
RBC	0.1197	0.0870	1.34	0.1730	-0.0345	0.0511	-0.68	0.5010
IR	0.2980	0.1737	1.72	0.0900	-0.0143	0.0795	-0.18	0.8580

UR	0.3618	0.1863	4.57	0.0000	-0.4562	0.2030	- 2.25	0.0270
No of groups	13				15			
No. of observations	91				105			
P value	0.0000				0.0000			
R-squared-within	0.645				0.2934			
R-squared-between	0.838				0.8167			
R-squared-overall	0.785				0.7483			

Source: Author Compiled.

Regression Model

General Insurance

$$\text{Profit} = \alpha + \beta_1\text{PI} + \beta_2\text{CE} + \beta_3\text{RBC} + \beta_4\text{IR} + \beta_5\text{UR} + \mu$$

$$\text{Profit} = -0.4540 + 0.1063\text{PI} + -0.0781\text{CE} + 0.1197\text{RBC} + 0.2980\text{IR} + 0.3618\text{UR} + \mu$$

Life Insurance

$$\text{Profit} = \alpha + \beta_1\text{PI} + \beta_2\text{CE} + \beta_3\text{RBC} + \beta_4\text{IR} + \beta_5\text{UR} + \mu$$

$$\text{Profit} = 0.3355 + 0.5699\text{PI} + 0.1258\text{CE} + 0.0511\text{RBC} + 0.0795\text{IR} + 0.2030\text{UR} + \mu$$

Regression Interpretation

Table 4.10 presents the robust fixed-effects regression results for interpreting life and general insurance. The R-squared-within value of 64.5% indicates that premium, claims ex., RBC, UR, and IR collectively explain 64.5% of the variation in the profit of the general insurance companies. Additionally, the R-squared-within value of 29.34% indicates that premium, claims ex., RBC, UR, and IR collectively explain 29.34% of the variation in the profit of the life insurance companies. The F-statistic with a p-value of 0.0000 confirms that the overall model is statistically significant at the 5% level for life and general insurance.

Discussion and Recommendation

The following conclusions have been derived from the research,

Based on the table below, the results of hypothesis tests on the impact of premium income on profit for general insurance and life insurance companies. The null hypothesis is that premium income has no significant impact on profit. The alternate hypothesis is that premium income does have a significant impact on profit.

Table 5.1

Hypothesis Testing

The hypothesis tests were conducted at a 5% significance level. This means the null hypothesis was rejected if the p-value was less than 0.05.

Models	General Insurance			Life Insurance		
	Probability	At 5% sig. level	Acceptance	Probability	At 5% sig. level	Acceptance
H1	0.0000	Significant	Do not reject	0.0000	Significant	Do not reject
H2	0.0440	Significant	Do not reject	0.0430	Significant	Do not reject
H3	0.1730	Insignificant	Rejected	0.5010	Insignificant	Rejected
H4	0.0900	Insignificant	Rejected	0.8580	Insignificant	Rejected
H5	0.0000	Significant	Do not reject	0.0270	Significant	Do not reject

Source: Author Compiled

H1a: Insurance premiums have a significant impact on Profit in General Insurance Industry

Based on the analysis results the p-value for the hypothesis test on premium income for general insurance is 0.0000. This is much less than 0.05, so the null hypothesis is rejected. This means that we can conclude that premium income has a significant impact on profit for general insurance companies.

H1b: Insurance premiums have a significant impact on Profit in the Life Insurance Industry

The p-value for the hypothesis test on premium income for life insurance is 0.0000. This is also much less than 0.05, so the null hypothesis is rejected. This means that we can conclude that premium income also significantly impacts profit for life insurance companies.

The study's findings are consistent with previous studies showing that premium income increases company profits. The research was conducted by (Agung & Fikri, 2009) and (Sastri et al., 2017)

H2a: Insurance claim has a significant impact on Profit in General Insurance Industry

The p-value for the hypothesis test on claim expenses for general insurance is 0.0440. This is less than 0.05, so the null hypothesis is rejected. This means that we can conclude that claim expenses significantly impact profit for general insurance companies.

H2b: Insurance claim has a significant impact on Profit in Life Insurance Industry

The p-value for the hypothesis test on claim expenses for life insurance is 0.0270. This is also less than 0.05, so the null hypothesis is rejected. This means that we can conclude that claim expenses also significantly impact profit for life insurance companies.

The hypothesis testing results show that claim expenses significantly impact profit for both general insurance and life insurance companies. This is consistent with claims being the main expense for insurance companies.

The result of this study is in line with research conducted by (Pratiwi & Azib., 2018) and (Reschiwati & Solikhah, 2018)

H3a: Risk-Based Capital has a significant impact on Profit in General Insurance Industry

Regarding RBC for general insurance, the p-value for the hypothesis test is 0.1730. As a result, the null hypothesis is not rejected because this is more than 0.05. For general insurance firms, this means that they are unable to draw the conclusion that RBC significantly impacts profit.

H3b: Risk-Based Capital has a significant impact on Profit in Life Insurance Industry

The p-value for the hypothesis test on RBC for life insurance is 0.5010. This is also greater than 0.05, so the null hypothesis is not rejected. This means that we cannot conclude that RBC significantly impacts profit for life insurance companies.

In this study, risk-based capital (RBC) had no significant effect on company profits, meaning that an increase in RBC did not result in an increase in insurance company profits. There are a few possible reasons for this finding.

First, RBC requirements are set by regulators to ensure that insurance companies are financially sound and able to meet their obligations to policyholders. Companies that fail to meet the minimum RBC requirement of 120% are typically required to take corrective action, which may reduce their profits in the short term. However, companies may also choose to maintain higher levels of RBC than required, which can also reduce their profits.

The result of this study is in line with previous studies conducted by (Andriandin, 2013) and (Erlinawati, 2019), which stated that the risk-based capital variable does not affect insurance company profits.

H4a: Investment return has a significant impact on Profit in General Insurance Industry

The p-value for the hypothesis test on investment performance is 0.1730. Since the p-value is higher than 0.05, the null hypothesis is accepted. Thus, we cannot conclude that investment outcomes significantly affect the bottom line of the general insurance business.

H4b: Investment return has a significant impact on Profit in Life Insurance Industry

For life insurance, the p-value for the hypothesis test on investment performance is 0.5010. If the p-values are higher than 0.05, the null hypothesis is accepted. Thus, we cannot conclude that investment outcomes significantly affect the bottom line of life insurance business.

The result of this study is in line with previous research, which proved that investment return has a positive influence on company profits. The research was conducted by (Arzelan, 2017), (Wulandari et al., 2021)

H4a: Underwriting results have a significant impact on Profit in General Insurance Industry

The findings of the hypothesis test demonstrate that underwriting results significantly affect the profit margin of general insurance. The general insurance firms' p-values are below the significance level of 0.05. As a result, we may rule out

the null hypothesis, which states that underwriting results have no discernible effect on profit and conclude that the two variables have a meaningful relationship.

H4b Underwriting results have a significant impact on Profit in Life Insurance Industry

Life insurance firms' p-values are below the significance level of 0.05. As a result, we may rule out the null hypothesis.

The study's findings indicate that premium income positively and significantly affects profit, meaning that when premium income rises, profit also rises. Profit is significantly impacted negatively by claims expenses; therefore, as claims costs rise, profit falls. Profits are positively and significantly impacted by underwriting results, meaning that larger profits result from successful underwriting. Returns on investments and risk-based capital have little bearing on profit. These data indicate that the primary factors influencing the profit margin of general insurance businesses in Sri Lanka are premium income, claims expenses, and underwriting outcomes.

However, risk-based capital or investment returns don't affect profit significantly. The study's conclusions are significant because they aid in identifying the primary variables influencing the profits of general insurance companies operating in Sri Lanka. Businesses can increase their profit by concentrating on these elements. Companies can concentrate on raising premium revenue, cutting claims expenses, and enhancing underwriting outcomes.

The study's conclusions also have consequences for Sri Lanka's regulatory bodies. The study's conclusions may be considered by regulators when creating rules pertaining to the general insurance sector. Regulators could wish to concentrate on ensuring general insurance businesses properly manage their investment portfolios and risk capital, for instance.

The study's findings show that the income from premiums, the costs incurred in handling claims, and the results of the underwriting process all significantly impact the profitability of the life insurance market in Sri Lanka. Premium income positively and significantly affects earnings, suggesting that more premium income causes earnings to rise.

Conversely, claims expense substantially and adversely affects earnings, suggesting that a rise in claims expense corresponds to a fall in earnings. Likewise, underwriting performance substantially and negatively impacts profitability, indicating that better underwriting performance raises earnings. On the other hand, it was discovered that there was little difference in returns between risk-based capital (RBC) and investment return.

According to this, the impact of RBC and investment income on returns may be somewhat influenced, but it is not statistically significant in the Sri Lankan life insurance market. For Sri Lankan life insurance firms, these findings have several significant ramifications. They first stress how crucial it is to handle premium income wisely. To boost premium income and profits, businesses should concentrate on tactics that draw in new clients and raise policy retention rates.

The findings further emphasize the necessity of efficient claims handling procedures. To reduce false claims and manage claim expenses, businesses must take action. By doing this, they can lower the cost of filing claims and raise total profitability. Thirdly, the results emphasize the significance of prudent underwriting procedures. To determine suitable rates, companies must carefully evaluate the risk profile of potential policyholders. By enforcing strong underwriting rules, they can enhance their underwriting results and boost their profit. Even if RBC and investment results might not have a big, direct effect on revenues, they can nevertheless be helpful to life insurance businesses' overall financial stability. Companies that maintain appropriate RBC levels can better endure unforeseen losses and keep investors' trust.

Moreover, producing robust investment returns can enhance profit underwriting and promote general stability in the financial system. To sum up, this study's results offer insightful information about the critical elements influencing the profitability of the life insurance market in Sri Lanka. Life insurance firms can achieve long-term financial success and boost profitability by comprehending and controlling these aspects well. (Appendix 03)

Recommendations

General Insurance

The results for general insurance in Sri Lanka make it abundantly evident that underwriting and premium performance are key factors in profitability. Insurance companies can use this by strengthening their underwriting procedures and concentrating on strategic premium pricing, improving their bottom line. Furthermore, claim costs are a major detriment to earnings, so efforts must be made to reduce them. This can entail putting strict risk management procedures into place and looking into creative methods to cut expenses associated with claims. Examine different approaches to investing. Companies can still gain from diversifying their investment portfolios and looking for chances for higher returns even while the influence of investment returns on profit is lessened. This can entail making investments in a larger variety of asset classes, such as stocks or real estate, as well as using more aggressive investment management techniques

Life Insurance

Given life insurance's favourable and large influence on profits, careful premium management is essential. Insurance companies want to consider fine-tuning their premium structures to optimize profit and maintain market competitiveness. Examining and modifying these procedures are necessary to address the detrimental effects of claim costs and underwriting outcomes. Examining economical and effective underwriting techniques might enhance the life insurance industry's overall profit.

It is recommended that insurance companies keep an eye on and improve their investment strategies even though research on general and life insurance indicated that risk-based capital and investment return had little effect on profitability. Long-term financial stability can be ensured by taking an active approach to investment management and keeping a solid risk-based capital position, even though these variables might not contribute much to profits right now.

Limitations of the Study

The primary focus of the research is on financial measures, including underwriting results, risk-based capital, premium income, claim payment, and investment return. Although these measures are significant, it's possible that they don't account for every aspect that affects earnings. Other influences may also be market competitiveness, consumer happiness, and operational effectiveness.

Research has no qualitative component—quantitative analysis is the main method used. The comprehension of profit drivers can be improved by incorporating qualitative information about rival tactics, market trends, and customer behaviour. This will help to contextualize the quantitative results.

Correlations are found in the research between the dependent variable (profit) and the independent variables (premium revenue, claim payment, risk-based capital, investment return, and underwriting result). It is not always clear whether one variable drives the other because two variables are moving together. More investigation will be needed to determine the causes and impacts of these variables.

The research does not cover the effect of regulatory changes on profit throughout the study period. The profit of insurance businesses may have been impacted by regulatory changes, such as new accounting standards or solvency requirements.

Suggestion for Further Research

Future studies should combine qualitative and quantitative methods to better understand the variables affecting the profit of the insurance business. This could entail reviewing client feedback, speaking with industry experts, and looking at market trends.

The insurance sector in Sri Lanka is the subject of the study that is being given. The analysis's purview could encompass insurance providers from other nations or areas. As a result, comparing profit drivers across various markets and regulatory frameworks would be possible.

Technology is rapidly transforming the insurance sector. Subsequent studies ought to examine how technological advancements, such as Insurtech, big data analytics, and artificial intelligence, impact profit drivers.

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Appendices

Appendix-01

Table 2.1

Population and Sample

	Name of insurer	Class of insurance	Effective date of license	Sample
1	AIA Insurance Lanka Ltd	Long Term Insurance	16-Dec-87	Yes
2	Allianz Insurance Lanka Ltd	General Insurance	1-Jan-15	Yes
3	Allianz Life Insurance Lanka Ltd	Long Term Insurance	1-Jul-08	Yes
4	Amana Takaful Life PLC	Long Term Insurance	1-Jan-15	Yes
5	Amana Takaful PLC	General Insurance	1-Feb-02	Yes
6	Arpico Insurance PLC	Long Term Insurance	20-Oct-11	Yes
7	Ceylinco General Insurance Limited	General Insurance	1-Jun-15	Yes

8	Ceylinco Life Insurance Limited	long Term Insurance	1-Jun-05	Yes
9	Continental Insurance Lanka Ltd	General Insurance	18-Dec-09	Yes
10	Continental Insurance Life Lanka Ltd	Long Term Insurance	29-Jul-22	No
11	Cooperative Insurance Company PLC	General Insurance	18-Sep-98	Yes
12	Cooplife Insurance Limited	Long Term Insurance	1-Jan-15	Yes
13	Fairfirst Insurance Limited	General Insurance	1-Jan-15	Yes
14	HNB Assurance PLC	Long Term Insurance	30-Aug-01	Yes
15	HNB General Insurance Ltd	General Insurance	1-Jan-15	Yes
16	Janashakthi Insurance PLC	Long Term Insurance	12-Aug-94	Yes
17	Life Insurance Corporation (Lanka) Ltd.	Long Term Insurance	18-Dec-02	Yes
18	LOLC General Insurance PLC	General Insurance	1-Oct-15	Yes

19	LOLC Life Assurance Limited	Long Term Insurance	30-Apr-10	Yes
20	MBSL Insurance Company Limited	Long Term Insurance	1-Apr-05	Yes
21	MBSL Insurance Company Limited	General Insurance	2-Aug-05	Yes
22	National Insurance Trust Fund	General Insurance	7-Feb-11	No
23	Orient Insurance Limited	General Insurance	15-Oct-11	Yes
24	People's Insurance PLC	General Insurance	2-Dec-09	Yes
25	Sanasa General Insurance Company Limited	General Insurance	1-Jul-19	Yes
26	Sanasa Life Insurance Company PLC	Long Term Insurance	8-Jul-03	Yes
27	Softlogic Life Insurance PLC	Long Term Insurance	8-Mar-00	Yes
28	Sri Lanka Insurance Corporation Ltd	General Insurance	3-Feb-93	Yes
29	Sri Lanka Insurance Corporation Ltd	Long Term Insurance	3-Feb-93	Yes

30	Union Assurance PLC	Long Term Insurance	8-Jan-87	Yes
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Source: IRCSL Website

Appendix 02

Table 3.2*Operationalization*

Variable	Meaning	Interpretation	Sources
Profit	Insurance company profit is measured by net income, the difference between premiums collected and claims paid out, plus investment income	Net income = (Underwriting profit + Investment income)	(Arzelan, 2017)
Premium Income	The total amount of money an insurance company receives from policyholders in exchange for insurance coverage.	PI = Total Premium Income	(Wulandari et al., 2021)
Investment Return	The total amount of money an insurance company earns from its investments in stocks, bonds, real estate, and other assets	IR = Total of Investment Return	(Mutmainn ah, 2015)
Underwriting Result	The measure of the adequacy of premium funds to cover these expenditures	UW = (Earned premiums - Total claims paid out) - Underwriting expenses	(Wulandari et al., 2021)
RBC	Finding out if the insurance firm is solvent and if it can handle the risk of claims	RBC = Total Available Capital (TAC)/ Risk-based Capital Requirement (RCR)	(Erlinawati , 2019)
Claim Expenses	The total amount of money an insurance company pays to policyholders for covered losses	CE = Total Net Claim Expenses	(Hang et al., 2018)

Source: IRC SL Website

Appendix 03**Table 5.2***Research Conclusion*

Hypothesis	Model 01	Similarities with this Research	Model 02	Similarities with this Research
Insurance Premiums Have a Significant Impact on Profit.	Significant	(Agung & Fikri, 2009) (Sastri et al., 2017)	Significant	(Arzelan, 2017)
Insurance Claims Have a Significant Impact on Profit	Significant	(Pratiwi & Azib., 2018), (Reschiwati & Solikhah, 2018)	Significant	(Reschiwati & Solikhah, 2018)
RBC has a significant impact on Profit	Insignificant	(Andriandin, 2013) (Erlinawati, 2019)	Insignificant	(Arzelan, 2017)

Investment Returns Have a Significant Impact on Profit	Insignificant	(Arzelan, 2017) (Wulandari et al., 2021)	Insignificant	(Wulandari et al., 2021)
Underwriting results have a significant impact on Profit	Significant	(Prasetyo et al., 2018) (Wulandari et al., 2021)	Significant	(Wulandari et al., 2020)

Source: Author Compiled

Financial Development and Environmental Degradation in the South Asian Region

Ranasinghe R. A. N. P.¹, Weerasinghe W. D. J. D.², and Abeyrathna R.M.L.M.³

This study evaluates the possible long-term effects of financial development on environmental degradation. It emphasizes how financial development, institutional structures, and foreign investment determine the level of green development. The research uses the deductive approach. The data is extracted from the World Bank Statistics. The sample comprises seven countries in the South Asian region, and information is gathered from 2000 to 2020. Foreign direct investment, broad money supply, and domestic credit to the private sector are used to evaluate financial development. Energy use, CO2 emissions, greenhouse gas emissions, and the depletion of natural resources are used to measure environmental degradation. The data are analyzed using panel data linear regression analysis. The researcher's findings conclude that Financial Development has a negative relationship with the four measures of Environmental Degradation in the South Asian region. This article reviews the relationship between financial development and environmental degradation in South Asia. In contrast to previous literature, the authors provide a broad money supply as an economic development variable instead of bank credit to the private sector. Also, this article reviews recent data up to the year 2020. Future researchers can develop an alternative methodology to study only using secondary data, and future researchers can use primary data for this type of study.

Keywords: *CO2 Emissions, Environment Degradation, Financial Development, Foreign Direct Investment, Natural Resource Depletion and Education*

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Introduction

Background of the Study

The group of institutions, products, and markets that make up the financial industry. It also consists of the legislative and regulatory framework that permits transactions to be carried out via credit extensions. Development of the financial sector primarily focuses on reducing "costs" associated with the financial system. The emergence of financial contracts, intermediaries, and markets is the outcome of this process of lowering information acquisition costs, contract enforcement costs, and transaction execution costs. Different kinds and combinations of information, transaction, and enforcement costs, along with various regulatory, legal, and tax regimes, have driven multiple types of agreements, intermediaries, and marketplaces in different nations at different periods. As a result, financial sector development happens when financial instruments, markets, and intermediaries reduce the effects of information, enforcement, and transaction costs and consequently perform the essential roles of the financial sector in the economy more effectively.

Environmental degradation is the deterioration of the environment due to resource depletion, including poor soil, water, and air quality, ecosystem disruption, habitat loss, wildlife extinction, and pollution. This definition includes any environmental transformation or disturbance deemed harmful or undesirable.

The topic of sustainable financial development has been widely discussed in recent years. Along with numerous other issues, environmental pollution affects the economic growth and the well-being of the people. In addition to being harmful to people, pollution affects resource depletion and increases the frequency of natural disasters brought on by rapid climate change. Among the effects of environmental pollution are degradation of the land, soil, water, and atmosphere. The overuse of fossil fuel burning for home and commercial energy needs is one of the leading causes of environmental degradation. Other significant factors include the waste generated at industrial sites and the harmful fumes from vehicles. Additionally, policymakers should consider deforestation, soil erosion, and resource loss.

Fundamentally, human activities like agriculture, transportation, manufacturing, and energy production lead to environmental deterioration. Over the past 20 years, there has been a significant growth in energy use and greenhouse gas emissions, which poses a very substantial global concern. Energy can be considered a requirement for economic activity since it is one of the main inputs for people and businesses. Higher energy levels will inevitably be utilized as globalization progresses, raising carbon emissions (Shahbaz et al., 2018).

The financial sector is one of the engines behind economic growth. Even nations with little financial resources can use them effectively with a solid management structure. Utilizing financial resources effectively encourages innovation in the finance industry, boosting economic growth (Furuoka, 2015). The growth of the financial and economic systems is closely related (Sadorsky, 2011). Investors find well-managed financial sectors more appealing and help the stock market and the economy by boosting economic activity. The financial sector stimulates Foreign Direct Investment inflows by fostering economic growth, which completes a development cycle by fostering even more economic growth (Azam, 2016).

Moreover, this paper emphasizes the necessity of institutional reforms in nations with high carbon and GHG emissions, high rates of natural resource depletion, and high energy usage concentration to highlight institutional quality and education's significant roles in sustainable financial development. It suggests ramifications for banks in screening enterprises that borrow money for a greener economy.

Research Problem Identification and Justification

One of the most significant issues facing the globe today is environmental degradation. The key drivers of world economic growth and major emerging market nations have a significant potential to contribute to environmental deterioration due to increased economic activity. This study thoroughly examines the potential long-term effects of financial development on environmental deterioration. It emphasizes how financial development, institutional structures, and foreign investment

determine the level of green development. This field of study has an empirical deficit. My investigation revealed that there had never been any studies on "Financial Development and Environmental Degradation in South Asian Countries."

When looking at the research gap, here are some main reasons for this study. First, the researcher uses a new variable to measure Financial Development. It is Broad money. The researcher selected this as a variable because the World Bank identifies Broad Money as an indicator to measure the depth of financial institutions. A comprehensive yet relatively straightforward conceptual 4x2 framework was created by the World Bank's Global Financial Progress Database to assess financial development throughout the world. Financial depth, access, efficiency, and stability are the four sets of proxy variables this framework identifies as characteristics of a healthy financial system. These four factors are then evaluated for the financial institutions and financial markets, which comprise the financial sector's two main pillars. According to my findings in previous research, they have not used this as a variable for measuring financial development. The following reason for the research gap is that most researchers have taken the data until 2019. However, researchers have used data from 2020 as well.

Problem Statement

The study focuses on whether financial development is related to environmental degradation over time in South Asian countries. The financing network becomes broader as the finance industry develops, reducing financial costs. This encourages businesses to borrow money to boost output. As a result, energy use increases, and so do carbon emissions. Therefore, it may be said that financial growth significantly affects environmental deterioration. The Environmental Kuznets Curve best captures the relationship between financial development and environmental quality (EKC). The severe financial crisis currently affecting Sri Lanka and the world due to the COVID-19 pandemic has shown that shocks to the financial system affect the entire economy. Therefore, if the financial sector contributes significantly to an economy's

overall health is acceptable. This raises the research question of whether financial growth influences environmental deterioration over time.

Research Objective

Consequently, the purpose of this study is to respond to the research question, does financial development have a relationship with environmental degradation in the South Asian context? Therefore, the objective of this study is to examine the relationship between financial development and environmental degradation in the South Asian context.

Significance of the study

The world economy's dynamics are evolving quickly and developing, and growth-leading economies now play a more significant part. Environmental degradation is a process that affects the health of the environment in general and the natural environment's ability to support biological variety. This process may start entirely naturally or be sped up or triggered by human activity. The advancement of technology is a significant factor in global financial development. The environment's quality may be related to financial development. The relationship between financial development and environmental degradation in the South Asian region is therefore examined through this study. Therefore, the government should oversee the distribution of loans for R&D, green financing, and efficient production that minimizes resource consumption and enhances environmental quality if financial development worsens environmental quality. Sustainability and environmental quality should not be compromised by financial development. Additionally, South Asian nations should encourage globalization to assist the influx of green technologies to improve environmental quality if financial development worsens environmental quality.

Literature Review

Numerous research findings on the relationship between financial development and environmental degradation in the South Asian region offer a thorough review of the potential long-term effects of financial development on environmental degradation. They emphasize how financial development, institutional structures, and foreign investment determine the level of green development.

Financial Development

Green finance and sustainable development in Europe (Afzal et al., 2022) an article researched by four authors suggests that four separate environmental degradation metrics have a negative link with financial development. In contrast, FDI and institutional quality seem to make the environmental measures worse. To slow down long-term environmental degradation, policymakers must create robust institutions and green financing regulations. As they proposed, this theory is applied in the European context, But the South Asian context is looked at in this study.

H2: There is a negative relationship between institutional quality and environmental degradation

Higher energy levels will inevitably be utilized as globalization progresses, raising carbon emissions (Shahbaz, Nasir, & Roubaud, 2018). One of the driving drivers for economic development is the banking industry. Even nations with little financial resources can use them effectively with a solid management structure. Utilizing financial resources effectively encourages innovation in the finance industry, boosting economic growth (Furuoka, 2015). The development of the financial and economic systems is closely related (Sadorsky, 2011). Investors find well-managed financial sectors more appealing and help the stock market and economy by boosting economic activity. The financial sector stimulates FDI inflows by fostering economic growth, which completes a development cycle by fostering even more economic growth (Azam, 2016). The financing network becomes more profound as the finance industry develops, lowering financial costs. This encourages businesses

to borrow money to boost output. As a result, energy use increases, and so do carbon emissions. Therefore, it may be said that financial development significantly contributes to environmental deterioration. The Environmental Kuznets Curve best captures the relationship between financial development and environmental quality. The global economy is affected by shocks to the financial system, as the financial crisis of 2008–2009 demonstrated. It is safe to argue that the financial sector contributes significantly to an economy's health.

Environmental Degradation

According to the researcher's findings in the South Asian context, some related articles were on Financial Development and Environmental Degradation in South Asian Countries.

'Fostering green finance for sustainable development in Asia' is one article that was researched by Ulrich Volz (2018). It will take a historic shift in investment away from resource-intensive businesses dependent on fossil fuels, greenhouse gases, and other natural resources to put Asian economies on the road toward sustainable development. The "green transition" will require the financial industry to take the lead. The necessity of greening the financial system and the function of financial governance is discussed in this paper. It provides an overview of green financial governance projects across Asia and evaluates the situation regarding green lending and investment in the region.

According to Pao and Tsai (Pao and Tasi, 2011), economic and financial progress first causes the environment to deteriorate (carbon emissions). However, over time, this deterioration slows down and, in some situations, even reverses. Like what Shahbaz discovered, there is a non-linear relationship between financial deterioration and environmental degradation (energy use and carbon dioxide emissions) in nations with varying levels of affluence. They also found that the rate of environmental deterioration increased because of FDI. Some scholars have used the term "Pollution Haven Hypothesis" to refer to these phenomena. Although increased greenhouse gas

emissions result from financial and economic progress, carbon emissions are under control after a certain point.

Further, it explains the concept of ‘Does financial development cause environmental pollution?’ (Md. Saiful Islam, 2022). Empirical evidence from South Asia’. This study uses energy consumption and per capita income as controls to examine how financial development (FD) affects CO₂ emissions in five South Asian economies. This study used the second-generation unit root and cointegration tests, panel pooled generalized least square (GLS) estimate, pooled mean group (PMG) estimate, and Dumitrescu-Hurlin panel causality test to carry out the study using annual panel data for the years 1980–2018.

Conceptual Framework and Hypothesis Development

A conceptual framework represents the link between the variables, traits, or features we want to investigate. They are often created using a literature analysis of previous studies on your issue. They can be textual or visually presented as in Figure 1.

The following hypotheses were formulated based on the variables represented in the conceptual framework and line with the study's objectives.

H1: There is a relationship between financial development and CO₂ gas emission

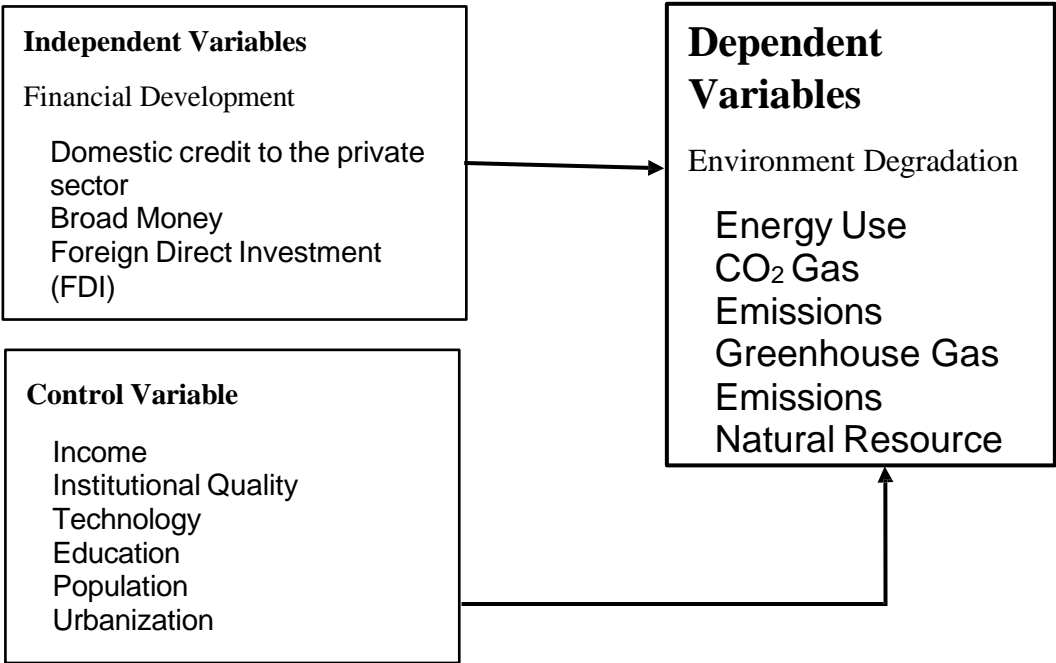
H2: There is a relationship between financial development and greenhouse gas emission

H3: There is a relationship between financial development and natural resource depletion

H4: There is a relationship between financial development and energy use

Figure 1

Conceptual Framework



This study also explores the relationship of institutional frameworks on the links between financial development and environmental sustainability. The justification for this is that institutional quality and the strength of regulatory frameworks are crucial. High-quality institutions are more likely to advance society's interests by pressing for legislation and regulations encouraging greener development. According to research, regulators significantly impact green investing policies study, which supports this, emphasizing institutions' crucial role in long-term environmental preservation. Even more recently, Ayesha Afzal, Ehsan Rasoulinezhad, and Zaki Malik (2021) asserted that financial development has a negative relationship with four different measures of environmental degradation, while FDI and institutional quality appear to worsen the environmental measures. Based on the evidence highlighted, the above hypothesis has been taken.

Methods

Research Design

Considering the literature reviewed above, financial development and environmental degradation are vital to consider in this study's context. Thus, previous studies have provided a platform to conduct this study and further clarify.

This study examines the philosophy of positivism. It emphasizes how financial development, institutional structures, and foreign investment determine the level of green development. Within this research, the researcher is following deductive research logic. Here, the researcher will see whether Ayesha Afzala, Ehsan Rasoulinezhadb, and Zaki Malik suggested a theory that financial development has a negative relationship with four different measures of environmental degradation. At the same time, FDI and institutional quality worsen environmental measures. Here, there is a quantitative approach. Quantitative research involves data, reasoning, and an impartial viewpoint. In contrast to divergent reasoning, detailed, convergent reasoning is the emphasis of quantitative research.

Operationalization

Table 1

Operationalization

Variable	Definition	Measurement/ Source	Evidence
Domestic Credit to the Private sector (DCP)	Domestic credit to the private sector is the term for money that financial institutions have given to the private sector in the form of loans, purchases of non-equity securities, trade credits, and other receivables	Domestic credit to the private sector, percent of GDP / World Bank	Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022)

	that create a claim to repayment.		
Broad Money (BM)	Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's cheques; and other securities such as certificates of deposit and commercial paper.	World Bank	
Foreign Direct Investments (FDI)	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, earnings reinvestment, and other capital.	Foreign Direct Investment (% of GDP) / World Bank	Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022)
CO₂ Gas Emission (CO₂)	Carbon dioxide emissions from solid fuel consumption refer mainly to emissions from coal as an energy source.	Carbon dioxide emissions per capita / World Bank	Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022)
Greenhouse Gas Emission (GHG)	Total greenhouse gas emissions in kt of CO ₂ equivalent are composed of CO ₂ totals excluding short-	Greenhouse emissions per capita / World Bank	Ayesha Afzal, Ehsan Rasoulinezhad

	<p>cycle biomass burning (such as agricultural waste burning and savanna burning) but including other biomass burning (such as forest fires, post-burn decay, peat fires, and decay of drained peatlands), all anthropogenic CH₄ sources, N₂O sources and F-gases (HFCs, PFCs, and SF₆).</p>		<p>& Zaki Malik (2022)</p>
<p>Natural Resource Depletion (NRD)</p>	<p>Natural resource depletion is the sum of net forest depletion, energy depletion, and mineral depletion. Net forest depletion is unit resource rents times the excess of roundwood harvest over natural growth. Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil, and natural gas. Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin, gold, lead,</p>	<p>Natural Resource Depletion (% of GNI) / World Bank</p>	<p>Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022)</p>

	zinc, iron, copper, nickel, silver, bauxite, and phosphate.		
Energy Use (EU)	Energy use refers to primary energy before transformation to other end-use fuels, equal to indigenous production plus imports and stock changes minus exports and fuels supplied to ships and aircraft engaged in international transport.	Energy use per capita (kg of oil per capita) / World Bank	Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022)

Source of definitions: World Bank

Control Variables	
Income Level (GDP)	GDP per capita, current U.S. dollar
Institutional Quality (GV)	Government effectiveness index
Technology (TECH)	Mobile phone subscribers per 100 people
Population (POPU)	Population size, in millions
Urbanization (URB)	Urban population (% of total population)
Education (EDU)	Secondary school enrollment, percent of all eligible children

Population and Sample Framing

The researcher will use South Asian countries for this study's sample size. This study will discuss Financial Development and Environmental Degradation in the context of the South Asian region. In the South Asian region, many related research articles can be seen, but not those on financial development and environmental degradation. Within all eight countries, Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, the researcher will use only seven countries for this research study. Afghanistan was removed from my sample due to a lack of data availability. The data includes a wide range of financial development and environmental

degradation measurements and a long list of control variables to adjust for confounding variables. Four proxies evaluate environmental degradation: energy usage, CO2 emissions, greenhouse gas emissions, and resource depletion. FDI, broad money, and domestic credit to the private sector are used to gauge financial development. The model considers income, institutional quality, technology, education, population, and urbanization. This study will explore the data of the seven countries during the period of 2000-2020. There could be some missing data for the variables mentioned above. Formulation

To see the relationship between Financial Development and Environmental Degradation, it is necessary to develop a model that will help the core objective of comparative analysis in the subject of the relationship between Financial Development and environmental degradation, using the dependent and independent variables, the following model can be

Model 01:

$$CO_{2\ it} = \beta_0_{it} + \beta_1 DCP_{it} + \beta_2 BM_{it} + \beta_3 FDI_{it} + \epsilon_{it}$$

Model 02:

$$GHG_{it} = \beta_0_{it} + \beta_1 DCP_{it} + \beta_2 BM_{it} + \beta_3 FDI_{it} + \epsilon_{it}$$

Model 03:

$$NRD_{it} = \beta_0_{it} + \beta_1 DCP_{it} + \beta_2 BM_{it} + \beta_3 FDI_{it} + \epsilon_{it}$$

Model 04:

$$EU_{it} = \beta_0_{it} + \beta_1 DCP_{it} + \beta_2 BM_{it} + \beta_3 FDI_{it} + \epsilon_{it}$$

CO₂ – CO₂ Gas Emission

GHG – Greenhouse Gas Emission

NRD – Natural Resource Depletion

EU – Energy Use

DCP – Domestic Credit to Private Sector

BM – Broad Money

FDI – Foreign Direct Investments

Findings of the study

Descriptive Statistics

A statistical summary of data gathering called "descriptive statistics" describes the simplified characteristics of all dependent and independent variables. The study's research methodology chapter states that the sample period was between 2000 and 2020. This study consists of secondary data. Measurements of dispersion and central tendency are available through descriptive statistics. While standard deviation, minimum, and maximum numbers represent dispersion, the mean measures central tendency. The table below gives a brief idea of the components of descriptive statistics.

Among the independent variables broad money has the highest mean value of 56.928 and the foreign direct investments have the lowest mean value of 2.015. When considering the dependent variables greenhouse gas emission has the highest mean value of 413068.640 and natural resource depletion has the lowest mean value of 1.021. Among the control variables population has the highest mean value while institutional quality has the lowest mean value.

Table 2*Descriptive Statistics*

Variable	N	Minimum	Maximum	Mean	Std. Deviation
DCP	147	.000	93.460	49.366	29.852
BM	147	.000	117.749	56.928	16.334
FDI	147	-.675	17.137	2.015	2.954
EU	147	.000	892.079	234.158	235.516
CO2	147	.000	2456300.049	251822.925	585558.153
GHG	147	.000	3394870.117	413068.640	860957.568
NRD	147	.001078	4.934	1.021	1.1991
GDP	147	229.4904	10561.613	2147.439	2220.417
GV	147	.000	4.000	2.153	1.502
TECH	147	.000	181.328	60.389	49.254
EDU	147	.000	100.335	43.045	30.924
POPU	147	279396.0	1380004385.0	229004170.272	416417887.976
URB	147	13.397	42.316	28.873	8.033
Valid N	147				

Source – Author Compiled

Correlation Test

Correlation measures the degree to which two sets of data are connected. The most used correlation measure among statisticians is the Pearson Correlation. Pearson Product Moment Correlation is its full name. It shows how variables are related linearly.

A correlation matrix would provide a general understanding of the correlations between the various study variables. There is no multi-collinearity if the coefficient of two variables is less than 0.8. Similarly, if it exceeds 0.8, there is significant multi-linearity. There is a significant link between the variables if the coefficient is less than 0.05 and the significance level is 95%. You may get a basic overview of the relationships between the variables from the information below.

Table 3

Correlation Analysis

Variables		CO2 Emissions	Green House Gas Emission	Natural Resource Depletion	Energy Use
Domestic Credit to Private Sector	Pearson Correlation	-.163*	-.162*	.406**	.102
	Sig. (2-tailed)	0.049	0.049	0	.217
	N	147	147	147	147
Broad Money	Pearson Correlation	.370**	.363**	.340**	-.164*
	Sig. (2-tailed)	0	0	0	.047
	N	147	147	147	147
Foreign Direct Investment	Pearson Correlation	-0.055	-0.072	-.198*	-.148*
	Sig. (2-tailed)	0.505	0.383	0.016	.043

	N	147	147	147	147
Income	Pearson Correlation	-0.155	-.187*	-.230**	-.318**
	Sig. (2-tailed)	0.061	.023	0.005	.000
	N	147	147	147	147
Governance	Pearson Correlation	-.164*	-.163*	.165*	.023
	Sig. (2-tailed)	0.047	0.049	0.045	.783
	N	147	147	147	147
Technology	Pearson Correlation	.265**	.262**	.187*	-.148
	Sig. (2-tailed)	0.001	0.001	0.023	.073
	N	147	147	147	147
Education	Pearson Correlation	-0.049	-0.083	-.192*	-.437**
	Sig. (2-tailed)	0.559	0.317	0.02	.000
	N	147	147	147	147
Population	Pearson Correlation	.928**	.947**	.174*	.207*
	Sig. (2-tailed)	0	0	0.035	.012
	N	147	147	147	147
Urbanization	Pearson Correlation	0.15	0.156	.400**	-.280**
	Sig. (2-tailed)	0.07	0.06	0	.001
	N	147	147	147	147

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source – Author Compiled

Discussion

As per Table 4.2 those results show the correlation of each dependents variables with each independent variable and each control variable. You may get a basic knowledge on the correlation between each dependent variable and the other variables one by one.

CO2 Emissions

According to the above table 4.2 Carbon emissions have a significant negative relationship with the Domestic Credit to Private Sector (DCP). Researchers have found that CO2 emission has a significant positive relationship with Broad Money (BM). But there is no significant relationship with Foreign Direct Investment (FDI). CO2 has an inverse relationship with one independent variable, positive relationship with one independent variable and there is no relationship with other variable out of the three independent variables. Therefore, we can't come to any suggestion because CO2 emission has a relationship with these three variables on three different ways. The relationship between carbon emissions and institutional quality is also an inverse relationship. The results also suggest that countries with bigger populations and higher rates of technological improvements happen face an increase in carbon emissions, while CO2 emissions not showing any significant relationship with the Gross Domestic Product (GDP), Education (EDU) and Urbanization (URB) of the 7 countries of the South Asian Region.

Green House Gas Emissions

Green House Gas emission follows a pattern like that of carbon emissions. The results indicate that Greenhouse Gas emissions (GHG) are the same as the results of the CO2 gas emission. Green House Gas emission also shows an inverse relationship with the Domestic Credit to Private sector, significantly positive relationship with the Broad Money and there is not any relationship with the Foreign Direct Investments. As per the above here also we can't come to an exact suggestion as this

variable reacts for the three independent variables in three different ways. The correlation between institutional quality and carbon emissions is also significant, suggesting that enforcing solid frameworks assists countries in bringing forth green programs. When considering about the relationship of the control variables to the greenhouse gas emission, income or the gross domestic production and the institutional quality has a significantly negative relationship. As per the results it shows that when there's an increasing trend of technology and the population it causes to greater the Green House Gas emission also. But the results of the greenhouse gas emission do not appear any significant relationship between education and urbanization.

Natural Resource Depletion

According to the results of table 4.2 Natural Resource Depletion (NRD) has given different results from the above two variables. Natural Resource Depletion has a significant positive relationship with both variables Domestic Credit to Private sector and Broad Money. But it has a significant inverted relationship with Foreign Direct Investments, suggesting that foreign inflows of investment decrease environmental degradation in the country. By considering these three types of relationships we can suggest that there is a positive relationship in between the natural resource depletion and financial development. When consider about the relationship of the control variables to the NRD there is a significant inverted relationship with GDP. Institutional quality appears to play an important role in reducing the depletion of resource and there's a significant positive relationship with the natural resource depletion. Also, the natural resource depletion has a positive relationship with the control variables technology, population, and urbanization. But there is an inverse relationship with the income or the GDP and the education of the countries.

Energy Use

Consumption of energy does not have a significant relationship with domestic credit to private sector and it mitigates that there is an inverse relationship between foreign direct investments and the energy consumption. One possible explanation is that as foreign investment increases, industries flourish and consumption of fossil fuels (for energy) decreases. But as per the results of the energy use has an inverse relationship with the country's broad money also. It mitigates that there is a significant negative relationship with the gross domestic products or the income, education level, and urbanization within the control variables. When the population increases the energy consumption of the country will also be increase, consumption of fossil fuels is further increased by growth of populations. It shows the regression results of the dependent variable energy consumption. But it has no role in mitigating this with control variables which are Institutional quality and the technology. Because there is no significant relationship of energy use of South Asian region, with the governance and the technological improvements.

Conclusion

Conclusion

This paper investigates the relationship between financial deepening and environmental degradation, considering the role of institutions in avoiding environmental degradation. Results suggest that Domestic credit to private sector has inverse relationship with the three independent variables because there's a negative relationship with two measures of the environmental degradation, positive relationship with one measure and there's no relationship with the other variable. As a summary of these relationships, it can be suggested that Domestic Credit to Private Sector (DCP) has an inverse relationship with the environmental degradation. It implies that when the DCP increases the environment pollution will reduce. When considering Broad Money (BM) there is a positive relationship with the three measures of the environmental degradation. There can be seen a positive

relationship with the remaining variable. Therefore, we can conclude that Broad Money (BM) has a positive relationship with environmental degradation. It says that when the BM increases in a country it causes a rise in environmental pollution. According to the results of the independent variable Foreign Direct Investments (FDI) appears to have no relationship with two measures and negative relationship with two other measures. The results suggest that Foreign Direct Investments has an inverse relationship with environmental pollution. It means when the FDI increases it causes to decrease the environmental degradation.

According to the above analysis finally we can conclude that there's a negative relationship between Financial Development and the Environmental Degradation. This result of the study in line with the results of the study done by Ayesha Afzal, Ehsan Rasoulinezhad & Zaki Malik (2022), George E. Halkos and Michael L. Polemis.

Managerial Implications

Results indicate that, there is some uncertainty in the relationship between institutional quality and environmental degradation. While institutional quality is helpful in reducing carbon emissions and greenhouse gas emissions, it does not seem to have a relationship on energy use. These results also imply that countries can pursue greener policies by putting in place strong institutions. Strong environmental protection institutions play a crucial role in ensuring that economic forces are kept in account and that new policies don't harm the environment. Education, as determined by secondary enrolment, has a significant inverse relationship with environmental degradation, according to a recurrent result. It implies that a decrease in environmental pollution results from an increase in secondary school enrollment. Focusing on post-primary education in particular will help countries create a more long-term sustainable environment.

Recommendations

However, in order to reduce, if not completely eradicate, long-term consequences on the environment, robust institutions must be linked with green finance practices. I've learned through this study that institutions' quality plays a big role in preventing environmental damage. This study has a wide range of useful applications. It can be applied to help in the formulation of financial regulations. It has brought attention to several types of environmental damage. This information can be used by authorities to implement required changes like implementing a tax on carbon emission. This can be executed from the vast factories that releasing tons of CO₂ to the environment. Also, it's good to design appropriate education programs that much needed for the reduction of environmental degradation by the relevant authorities.

According to the regression results that researcher have gained; the four measures of the environmental pollution have a positive relationship with the density of the population. When the population increases, it may easily cause to a rise in the environmental pollution. Therefore, as people survive from the environment, we should give our contribution to protect the environment as we can. As examples by using public transports, we can reduce the overall poisonous gas emissions and can see a reduction of traffic congestions. Also, we can use recycle and reuse concepts as the human beings survive due to the environment.

Suggestions for future research

This study has revealed how institutions can prevent environmental harm, which provides justification for creating effective institutions. Additionally, it has emphasized how important education is to the preservation of the environment. These should be seen as chances for future study on this subject. More variables can

be incorporated into the model, for example, increased variables for financial development or environmental degradation. Future research can choose a different sample; for example, it would be interesting to learn whether these results hold up in developing nations. Future researchers should develop an alternative methodology because this study only used secondary data and future researchers can use primary data for this type of study.

According to this study, the authors have explored the relationship between Financial Development and Environmental Degradation. Future research can be done to explore whether there's a relationship between Financial Development and Environmental Degradation by doing a regression analysis. Authors hope to do the regression analysis and find whether there's a relationship between Financial Development and the Environmental Degradation.

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The Factors Influencing the Undergraduates' Digital Entrepreneurship Intention: With reference to Undergraduates of the Faculty of Commerce and Management Studies of the University of Kelaniya

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This study explores the key factors influencing undergraduates' intention to start a digital business, with special attention to undergraduates at the Faculty of Commerce & Management Studies of the University of Kelaniya. Understanding what inspires students to pursue digital entrepreneurship is essential in the quickly changing digital economy. The study investigates how e-platform benefits, individual characteristics, social influences, entrepreneurial education, and academic programs influence students' ambitions for digital businesses. Three hundred thirty-nine undergraduate students were given an online survey to complete to gather data using a quantitative research methodology. Using SPSS, multiple regression analysis was used to examine the correlations between the variables. The results suggest that while e-platform advantages have no discernible impact, undergraduates' ambitions to launch digital enterprises are highly influenced by entrepreneurship courses, individual characteristics, social factors, and the university study process. The study highlights the need for university programs in entrepreneurial education to be improved to better prepare students for digital entrepreneurship.

Keywords: *Digital Entrepreneurship, Entrepreneurial Education, E-platforms, Social Factors, Undergraduates, University Study Process*

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Introduction

Evaluating and exploiting business opportunities is known as entrepreneurship (Shane & Venkataraman, 2000). Entrepreneurship is crucial to a nation's socioeconomic growth because it solves unemployment, inequality, and poverty, especially in developing nations. (Alain, Gailly, & Lassas, 2006). Therefore, one of the most critical components of a country's economic development that allows for and sustains a high degree of competitiveness is thought to be entrepreneurship (Harper, 2005) (Landes et al., 2012). It is also regarded as a mechanism for societal changes and improving quality of life (Ooi & Nasiru, 2015).

Sri Lanka is committed to building digital governance, e-commerce, e-agriculture, e-education, and other related fields based on technology. While this was going on, many Sri Lankan business owners chose to grow their operations online due to the country's 14.58 million internet users as of January 2023 and its 66.7 percent internet penetration rate, which was higher than average among younger generations, at the beginning of the year (Simon Kemp, 2023).

With the rising internet use and intelligent gadgets, particularly during the COVID-19 pandemic, e-commerce in Sri Lanka has developed dramatically. Sri Lanka's digital economy accounted for 4.37 percent of the country's GDP in 2022 (ICTA, 2022), and of the projected 11 million internet users, 43% had bought something online. About 56% of internet users claim to have bought a good or service because of an online advertisement (ICTA, 2022)

Digital business is crucial to surviving in the COVID-19 era. As evidenced by this period, young, jobless individuals have started online businesses, and traditional entrepreneurs sell their goods using digital platforms during closed hours. Following the pandemic, digital business has also gained popularity in Sri Lanka. In addition, the rise of the digital economy in terms of communication and commerce has made young people more likely to start their own businesses. Students are more driven to operate a business because they desire to use business ideas connected to entrepreneurship and

management (Hidayat & Lee, 2018). Also, undergraduates can start their own digital businesses by selling their products online. This makes sense, given that younger generations are more inclined to choose leisure and business over office jobs. These findings led them to launch a new digital-based business. Business strategy applications, such as marketing sales and customer service, have given rise to the use of the Internet in business (Bai & Chen, 2010).

"Digital entrepreneurship" includes terms such as computer, information, web, internet, e-entrepreneurship, and online entrepreneurship (Yetis-Larsson et al., 2014). Successful digital transformation is essential to a country's competitiveness in a digitalized business setting. Entrepreneurs need to surmount challenges and seize possibilities from the burgeoning digital marketplace (Suparno et al., 2020).

Literature Review

Theory of Planned Behavior

In entrepreneurship, phenotypic and demographic methodologies are less effective in explaining behavior than cognitive models because behavior is thought to be the outcome of person-situation interactions (Linan et al., 2011). Researchers have been motivated by cognitive models to create instruments that improve our knowledge of the decision-making and behavior associated with careers in entrepreneurship (Baron, 2004; Mitchell et al., 2002). Entrepreneurial intention is one of the most crucial elements in a person's thought process that leads to starting a new business (Krueger et al., 2002). Entrepreneurial intentions are the intentional mentality that precedes action and focuses on a specific goal, like launching a new company (Bird, 1998; Thompson, 2009). Based on the Theory of Planned Behavior states,

01. Attitude Towards Behavior

This component relates to a person's opinions and judgments about certain behaviors, such as whether they think a certain behavior is advantageous to oneself. It can also be broadly described as how someone feels, either positively or adversely, about the outcomes of a specific action (Ahmad et al., 2022).

02. Subjective Norms

The arbitrary standards serve as widely accepted social pressures on people to act in certain ways. Parents, partners, friends, spouses, or other influential figures may be the source of social pressure (Ajzen, 1991).

03. Perceived Behavioral Control

Perceived behavioral control is the idea that an individual can control a particular behavior and that it is within their power (Ajzen, 1991). When measuring students' entrepreneurial intents, researchers have empirically used the TPB and found that perceived behavioral control (PBC), subjective norms, and attitudes toward entrepreneurship all play a big part (et al., Karimi, Biemans, Lans, Chizari, & Mulder, 2016), (Liñán et al., British and Spanish Entrepreneurial Intentions: 2013), (Iakovleva et al., 2011) (Placeholder1) (Moriano, Zarafshani, Stephan, & Laguna, 2012). Thus, although the relative importance and degree of each motivational antecedent's impacts vary among situations and countries, Ajzen's (1991) assertion that all three are necessary for entrepreneurial aspirations is supported (Ajzen, 1991).

Digital Entrepreneurship and Digital Business

It is similar to traditional entrepreneurship to investigate entrepreneurial potential by launching new businesses or commercializing products and services (Davidson & Vaast, 2010). Therefore, an individual who develops and delivers essential business processes and services, such as production, marketing, distribution, and stakeholder management, using information and communication technologies (ICTs) is referred to as a digital entrepreneur (Hair, Wetsch, Hull, Perotti, & Hung, 2012). Given how quickly digital activities are expanding throughout all industry sectors, digital entrepreneurship will likely become more and more popular in the near future. This suggests a need for a greater knowledge of this phenomenon (Matlay & Westhead, 2007) (Walker, 2006).

The e-business (Digital Business) is the practice of conducting business using the Internet and digital technologies (Dubelaar et al., 2005); (Hertwig, 2012). Additionally,

e-business improves organizational reach and operational effectiveness (Ash & Burn, 2003); (Bordonaba-Juste et al., 2012). One important factor that helps businesses provide high-quality goods and services by promptly attending to customer needs is online cooperation among e-businesses (Kervenoael et al., 2009); (Harris, 2009).

Students' Intention to Start a Digital Business

Students' intentions and the elements that affect student intention can be used to determine whether a student intends to start a digital business (Alfabeta, 2011). The synthesis of entrepreneurial intention indicates that entrepreneurial intention in building a digital business is reflected in the following dimensions: the need for entrepreneurship, an entrepreneurial venture, readiness to start entrepreneurship, the ability to start an entrepreneur, and entrepreneurial goals (Suparno et al., 2020).

The main goal of earlier studies on entrepreneurship was to ascertain students' propensity to pursue entrepreneurial careers in industrialized nations (Karimi et al., 2015; Nabi & Liñán, 2011)

E-platform Advantages

An organization's information, computing, and connectivity technology platforms can be integrated and developed into new functionalities through a technology architecture that can be defined as a digital platform (Sedera et al., *Innovating with enterprise systems and digital platforms: A contingent resource-based theory view*, 2016). Korhonen et al. (2017) explore how start-ups use digital platforms to link users and producers in the process of creating value, as well as their capacity to profit from these "core interactions" (Korhonen et al., 2017). The existing research discovered no significant impact between student career intentions to become a digital entrepreneur and the advantages of e-platforms (Parven et al., 2023).

Personal Quality and Social Factors

There are three categories of elements that have a significant impact on business operations (Rozsa et al., 2019, Pejic, Aleksic, & Marjana, 2018, Grilli, Mrkajic, & Latifi, 2018; Dai & Si, 2018, Cepel, Belas, Rozsa, & Strnad, 2019, Ipinnaiye, Dineen, & Lenihan, 2017; Piątkowski, 2020; Rusu & Roman, 2017, Ključnikov, Belás, Kozubíková, & Paseková, 2016; Autio & Kun Fu, 2015; Adair & Adaskou, 2018).

1. Personality qualities that are strongly predisposed to entrepreneurship and are influenced by the economic, social, and political environments

2. The standard of the business environment, which is heavily impacted by the regulatory environment and the country's current economic status

3. The social environment and pertinent institutions (such as media, foundations, and schools) influence public perceptions of entrepreneurs as a particular social class.

According to Pejic Bach et al. (2018), entrepreneurial aspirations are positively correlated with one's attitudes toward pursuing an entrepreneurial activity, assessing one's degree of behavioral control, and the subjective standards of the external environment (Pejic et al., 2018). The existing research discovered a significant impact between student career intentions to become a digital entrepreneur and the benefits of social factors (Parven et al., 2023).

University Study Process

According to Mahlberg (1996) and Co & Mitchell (2006), educational institutions (EIs) play a useful role in fostering entrepreneurial education to boost regional and societal economies (Mahlberg, 1996); (Mitchell & Co, 2006). As providers of programs for entrepreneurship training, EIs must make every effort to create an atmosphere that can encourage entrepreneurial endeavors and, coincidentally, assist in instilling enterprising values in college and university students who are being prepared to become today's entrepreneurs (Roffe, 1999). The most significant influence on

students' conceptions of entrepreneurship and their convictions about it comes from the educational environment at EIs (Autio et al., 1997).

Entrepreneurship Education

Entrepreneurial education, or EE, strongly predicts digital entrepreneurial intention (Al-Mamary & Alraja, 2022; Ramadani et al.- Rashiti & Palalić, 2021). EE also offers chances to boost students' desire to pursue careers in digital business (Choi & Markham, 2019). With EE, students gain more knowledge, which makes it easier for them to enter the field of digital commerce (Wibowo et al., 2023).

Research Problem

According to Suparno's (2020) research, entrepreneurship education impacts entrepreneurship abilities (Suparno et al., 2020). Higher education and economic institutions can influence entrepreneurship through economic education and entrepreneurship, particularly to develop student intentions in the field (Suparno et al., 2020). A novel idea known as "digital entrepreneurship" has emerged and is quite popular (Akhter et al., 2022). Individuals use the internet and electronic gadgets to grow and improve their enterprises, and they have embraced online business in recent years because of realizing all the advantages it offers (Parven et al., 2023). For example, the digitalization process decreases entry barriers, removes company risks, lowers start-up expenses, and reduces the waste of raw materials for online business owners (Youssef et al., 2021).

Historically, the Sri Lankan education system needs to be more effective in encouraging students to develop entrepreneurial skills (Liyanage, 2021). Innovation brings enormous advantages, especially for an expanding economy like Sri Lanka. Based on the above facts, creating digital businesses can be mentioned as a way to achieve many advantages. It is important to find out to what extent the university students have an intention for it (Parven et al., 2023). While few studies have assessed the factors influencing undergraduates' intentions to launch digital businesses in Sri

Lanka, most of the literature on entrepreneurship has been on traditional entrepreneurship intention (Alkhalaileh, 2021). Therefore, a significant knowledge gap is prevailing in this area. Investigating the factors influencing undergraduates' desire to launch a digital business adds to the body of knowledge on entrepreneurship.

Therefore, the objectives of this study are to,

1. To examine the impact of E-Platform advantages on undergraduates' intention to start a digital business
2. To examine the impact of entrepreneurial education on undergraduate's intention to start a digital business
3. To examine the impact of personal quality social factors on undergraduates' intention to start a digital business
4. To examine the impact of the university study process on undergraduates' intention to start a digital business

Research Methods

Research Design

This study uses a quantitative research methodology to determine what influences undergraduates' intention to start a digital business. Using an online questionnaire, data is gathered once for the study using a cross-sectional survey approach. Four independent variables (the benefits of e-platforms, social and personal aspects, entrepreneurship education, and the university study process) and one dependent variable (the intention of undergraduates to start a digital business) contribute to the conceptual framework.

Population and Sample Size

The study's population comprises undergraduate students from the Faculty of Commerce and Financial Management, University of Kelaniya, Sri Lanka. The faculty records indicate that there are roughly 2,700 undergraduates in total. The Krejcie and Morgan Table (1970) for estimating sample size is used to calculate the proper sample

size. This table shows that a minimum sample size of 337 is needed for a population of about 2,700 to guarantee a 95% confidence level with a 5% margin of error.

Sampling Technique

A simple random sampling method was used to guarantee that every undergraduate member of the faculty had an equal chance to participate in the study. This technique minimizes sampling bias, and results are guaranteed to apply to all undergraduate students at the faculty.

Data Collection

An online structured questionnaire was used to gather data, and it was sent to the chosen undergraduates via email and social media. The questionnaire was created using established metrics from prior research studies to ensure the instrument's validity and reliability. To gather data on every characteristic under study, the questionnaire had a mix of Likert-scale questions (5-point scale ranging from “Strongly Disagree” to “Strongly Agree”).

Conceptual Framework and Measurement of Variables

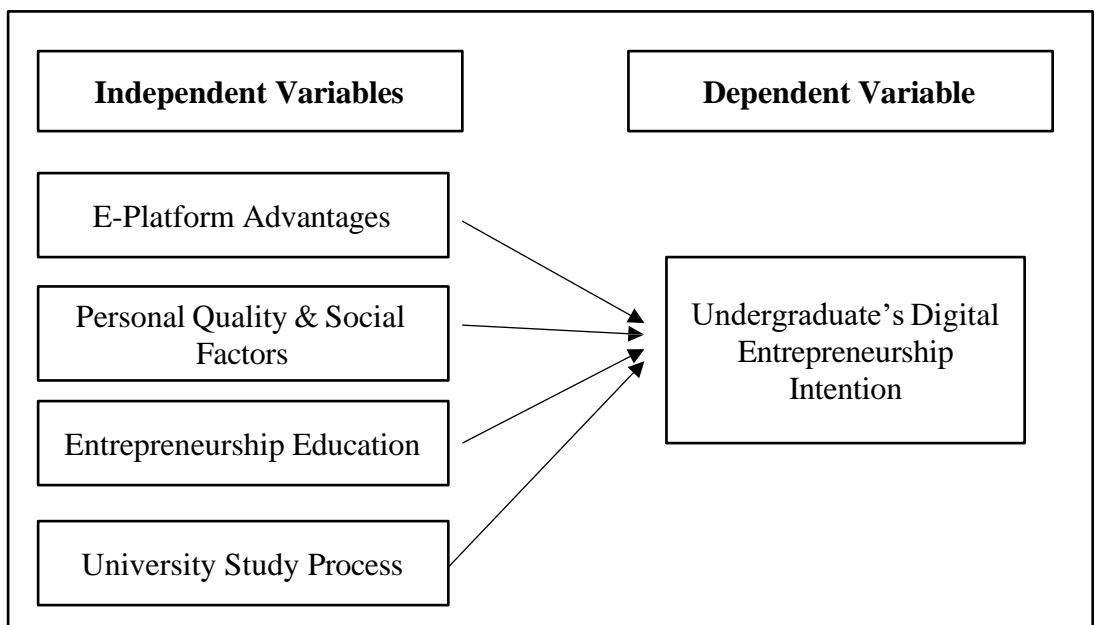
The study's conceptual framework consists of four independent variables and one dependent variable:

- Independent Variables:
 1. **E-Platform Advantages:** This variable assesses how undergraduates' intentions of starting a digital business are influenced by digital platforms' advantages, such as scalability, ease of use, and cost reduction. It is measured using a 5-item scale with questions derived from earlier research.
 2. **Personal Qualities & Social Factors:** This variable comprises social and personal factors influencing digital entrepreneurial goals, such as peer and family support and risk-taking abilities. It is quantified using a 5-item scale, and each item represents an individual aspect of social or personal influence.

3. **Entrepreneurship Education:** This assesses how well programs for entrepreneurial education inspire students to start their businesses. Students' perceptions of the relevance and quality of the entrepreneurial education they get are measured using a 5-item scale.
 4. **University Study Process:** This variable reflects how the university's academic programs, internships, and practical business experiences influence students' aspirations for digital businesses. Based on students' exposure to entrepreneurial activity in their university curricula, a 5-item scale is employed.
- **Dependent Variable:**
 1. **Undergraduates' Intention to Start a Digital Business:** To assess this, students are asked to state their willingness to start a digital business in the future or their plans. This variable is measured using a 5-scale modified from earlier entrepreneurship intention questionnaires.

Figure 1

Conceptual Framework



Reliability and Validity of the Instrument

The internal consistency of the scales was evaluated using Cronbach's Alpha to guarantee the measuring instrument's validity. Every variable had Cronbach's Alpha values greater than 0.7, signifying satisfactory reliability. Construct validity was verified by exploratory factor analysis (EFA), and content validity was used to ensure that the items sufficiently captured the constructs. These methods demonstrated the validity of the instrument.

Data Analysis

Data was analyzed using IBM SPSS Statistics 23 software. Descriptive statistics provided an overview of the sample's demographic characteristics. Multiple regression analysis was applied to test the relationships between the independent variables (E-platform advantages, personal qualities and social factors, entrepreneurship education, and university study process) and the dependent variable (intention to start a digital business).

The regression analysis aimed to determine the significance and strength of the relationship between each independent and dependent variable. Adjusted R-squared was used to assess the model's goodness of fit, and the significance of the regression coefficients was tested using p-values (with a threshold of $p < 0.05$).

Findings and Discussion

Research Findings

This study examined four independent variables to understand the factors influencing undergraduates' intention to start a digital business: the benefits of e-platforms, social and personal characteristics, entrepreneurship education, and the academic process at university.

1. Demographic Characteristics

There were 339 respondents, with a balanced gender distribution of 54% men and 46%

women. The Department of Commerce and Financial Management at the University of Kelaniya was dedicated to the bulk of participants, with notable presence from the other departments under the Faculty of Commerce & Management Studies. The Western Province accounted for 25.87% of the respondents; other provinces were also represented.

2. Regression Analysis

The results of the multiple regression analysis are summarized in Table 1 below.

Table 1

Multiple Regression Analysis

Variable	Standardized Coefficient (β)	t-value	p-value
E-Platform Advantages	0.047	1.139	0.265
Entrepreneurship Education	0.123	3.012	0.003
Personal Qualities & Social Factors	0.120	3.157	0.002
University Study Process	0.708	17.864	0.000

Table 2

R-Square & Adjusted R-Square

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780 ^a	.608	.603	.445

a. Predictors: (Constant), MEANUSP, MEANPQSI, MEANEE, MEANEP

Adjusted $R^2 = 0.603$ indicates that the independent variables can explain 60.3% of the variation in the dependent variable (undergraduates' intention to start a digital business).

Key Findings

- **E-Platform Advantages:** The regression results show that while E-platform advantages positively correlate to starting a digital business ($\beta = 0.047$), the effect is not statistically significant ($p = 0.256$). This suggests that the perceived benefits of using digital platforms may not strongly influence students' entrepreneurial intentions.
- **Entrepreneurship Education:** A significant positive relationship was found between entrepreneurship education and students' intention to start a digital business ($\beta = 0.123$, $p = 0.003$). This indicates that students who have received entrepreneurial education are more likely to express an intention to engage in digital business ventures.
- **Personal Qualities & Social Factors:** Personal traits and social influences significantly impact undergraduates' digital entrepreneurial intentions ($\beta = 0.120$, $p = 0.002$). Support from peers and family, as well as personal entrepreneurial traits like risk-taking and innovativeness, positively influence the decision to start a digital business.
- **University Study Process:** The university study process was found to have the most significant impact ($\beta = 0.708$, $p = 0.000$) on students' intention to start a digital business. This suggests that students' academic and practical entrepreneurial exposure during their studies is critical in shaping their digital business intentions.

The results of this study relate to the Theory of Planned Behavior's application to undergraduate digital entrepreneurship. Entrepreneurial aims were found to be strongly influenced by attitudes towards the behavior (personal qualities and social factors), subjective norms (university study process), and perceived behavioral control

(entrepreneurship education). These findings highlight how crucial it is to create an encouraging learning atmosphere for students and offer in-depth entrepreneurial education in order to improve confidence in their capacity to engage in digital entrepreneurship.

Discussion

The results of this study provide valuable insights into the factors that shape undergraduates' digital entrepreneurial intentions. The findings highlight the importance of the university study process and entrepreneurship education, while personal qualities and social factors also play a role.

- **E-Platform Advantages-** The results of this study show that, despite prior research suggesting that digital platforms offer notable benefits to entrepreneurs, such as cost-effectiveness, scalability, and ease of market entry, these elements are not significantly influencing undergraduates' intention to start digital businesses. One reason for this is that, even though students are aware of the technological advantages of digital platforms, they may not be sufficiently motivated to pursue entrepreneurship on their own without additional help from other sources, such as education and real-world experience.
- **Entrepreneurship Education -** Students' business objectives are greatly influenced by the knowledge, skills, and real-world experiences that entrepreneurial education programs impart. The literature clarifies that entrepreneurship education gives students the skills and self-assurance they need to develop their business endeavors, especially in the digital age. Previous research emphasizing the importance of formal education in entrepreneurship supports this conclusion. Suparno et al. (2020) claim that entrepreneurial education increases their confidence in starting a business by equipping students with the essential knowledge and abilities.

- **Personal Qualities & Social Factors** - It was discovered that personal entrepreneurial traits, including risk tolerance, inventiveness, and social influences like peer and family support, influenced students' intent to start their own businesses. This is consistent with research showing that social environments that support entrepreneurship and individual attributes have a critical role in encouraging entrepreneurial behavior. Additionally, social support from friends and family is a significant factor in forming students' entrepreneurial mindsets in a culture that increasingly values entrepreneurship. This finding aligns with previous research emphasizing the importance of social influences and individual characteristics in entrepreneurial behavior. Pejic Bach et al. (2018) discovered that social support from peers and family and individual characteristics like proactivity, creativity, and risk tolerance are critical in determining one's willingness to pursue entrepreneurship. Similarly, Khuong (2016) showed that a supportive social environment enhances students' entrepreneurial goals.
- **University Study Process** - It was shown that the university study process had the most significant impact on students' intentions to start a digital business. This emphasizes how important it is for universities to support digital entrepreneurship. The development of the skills and mentality required to engage in entrepreneurial enterprises is facilitated by university courses on business, internships, practical training, and exposure to entrepreneurial activity. According to the findings, universities must include more entrepreneurship education, especially in digital business. According to Autio et al. (1997), students' entrepreneurial aspirations significantly increase when exposed to entrepreneurship education and university support.

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Academic Success among Trincomalee Campus Management Students: Exploring Academic Self-Efficacy, Technological Self-Efficacy and Prior Learning in Accounting Education

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This study examines the multifaceted factors influencing academic success among first-year management students at Trincomalee Campus, Eastern University, Sri Lanka, focusing on the roles of Academic Self Efficacy, Technological Self Efficacy, and Prior Learning. Through a comprehensive analysis incorporating demographic profiles, survey responses, and regression modelling, the study elucidates the interplay between these variables and their impact on students' performance in accounting education. Results reveal a positive correlation between Academic self-efficacy, Technological self-efficacy, and academic success, underscoring the pivotal role of students' confidence in their academic abilities and technological proficiency. While Prior Learning also contributes to academic achievement, its influence appears comparatively weaker. These insights highlight the importance of cultivating a supportive learning environment that enhances students' confidence and proficiency in key academic and technological domains to optimize their academic outcomes in accounting education. The study contributes to the understanding of factors shaping academic success and informs targeted interventions aimed at fostering student empowerment and excellence in accounting education.

Keywords: *Academic Self Efficacy, Academic Success, Accounting Education, Prior Learning, Technological Self Efficacy*

Introduction

Accounting education is now undergoing major development, which is attracting more attention in research circles (Apostolou, Dorminey, Hassell, & Rebele, 2017). Accounting, a discipline that has been profoundly embedded in society for millennia has seen few modifications in its core concepts over time and the technique of accounting for transactions is still based on the underlying concepts (Lee, Bishop, & Parker, 2014). Despite the long-term stability of accounting systems, users must continue to get training in order to understand and properly run these systems, whether informally or formally (Beatson, Berg, and Smith, 2020). Formal and informal accounting education have coexisted alongside the stability of accounting systems. Despite the consistent framework, significant changes in accountants' roles have emerged due to technological advances and global business conditions. These developments have expanded accountants' duties beyond traditional responsibilities, showcasing the profession's dynamic character. Future accounting education must adapt to these changes.

In accounting education, the factors influencing this variation in achievement are frequently anchored in non-cognitive variables other than cognitive variables (Becker, Hubbard, & Murphy, 2010). According to Besterfield-Sacre et al. (1997), education is an “aggregate of both cognitive (content knowledge and technical skills) and affective (attitudes) processes.” It seems that the cognitive factors of undergraduate students are enough to succeed at the university, but many students fail to complete their degree programmes due to unmeasured non-cognitive factors which are significant to succeed in their degree programmes (Senkpeil & Berger, (2016). Examining the non-cognitive variables elements is increasing (Flood, & Griffin, 2014; Al-Sheeb, Hamouda, & Abdella, 2019).

According to Pajares and Schunk (2002), there has been renewed interest among educational psychologists in investigating the notion of self to acquire deeper insights into students' academic motivation and accomplishment since 1970. In

1997, Bandura made a revolutionary argument that turned the focus to self-efficacy beliefs as better indicators of success than actual ability (Bandura, 1997). This statement sparked a spike of study interest across various academic areas. Bandura formulated the social cognitive theory to study the dynamic connections between cognitive, environmental, and behavioural aspects in people's lives (Bandura, 2011). Self-efficacy is a key construct in that theory which reflects a non-cognitive trait linked to accomplishment (Kayes, 2002; Paunesku et al., 2015). According to Fishbein and Ajzen (1975), self-efficacy is an individual assessment of capacities to use all their capacities in performing their activity or set of activities. Self-efficacy is defined as the belief in one's ability to summon the motivation, cognitive resources, and proper courses of action needed to satisfy certain situational demands (Wood and Bandura, 1989). Bandura (1986) revealed the presence of a self-system, which allows individuals to integrate both cognitive and affective aspects of their being and further, it points out that self-reflection is the most distinctively human skill through which individuals evaluate their experiences using self-referential cognition, which influences their thinking and subsequent action. According to Pajares (1996), this self-system allows for reflection on previous behaviour and the exploration of alternate possibilities for future behaviours.

Schunk (1991) defines academic self-efficacy as a student's confidence in their ability to complete academic assignments at a specific level. According to Phan (2010) and Roman and Cuestas (2007), earlier studies have shown that students with a strong sense of academic self-efficacy have a higher intrinsic interest in academic activities, set more challenging goals for themselves, and are more committed to achieving them. Efficacy beliefs have a major influence on cognitive processes and emotional reactions (Byrne et al., 2014). According to Pajares (1996), individuals with poor self-efficacy view circumstances as more difficult than they actually are, which contributes to increased stress and possibly feelings of sadness, on the contrary, persons with higher self-efficacy are more likely to see difficult jobs as

chances for progress, promoting a sense of serenity and tranquillity while undertaking such endeavours.

The study of self-efficacy in accounting education is globally important as it helps understand the self-efficacy beliefs of accounting students and their impact on academic performance (Viviers et al., 2023). Many students face challenges in accounting, particularly non-specialists, who often struggle with engagement and academic success (Guney, 2009). As the accounting profession evolves, addressing issues in introductory accounting courses is crucial. This research explores non-cognitive factors that influence student outcomes, offering insights to improve accounting education's effectiveness and accessibility (Beatson, Berg, & Smith, 2020).

Despite extensive research on factors influencing academic success, several important gaps remain. First, recent research has frequently focused on demographic indicators, but several gaps remain that are critical to understanding student achievement, particularly within the context of accounting education (Pritchard & Wilson, 2003), which provides limited insight because academic performance is typically set before students join university. Furthermore, while broad institutional issues such as policies and support systems have been investigated (Astin et al., 2012), these approaches may not completely explain why many students do not succeed, despite greater access to higher education since these approaches do not fully account for personal and psychological factors that influence individual students' outcome (Kuh et al., 2006).

A significant gap exists in the limited investigation of academic self-efficacy within certain fields such as accounting. While self-efficacy is well recognised as an effective indicator of academic accomplishment in general (Britner & Pajares, 2006; Mulyadi et al., 2016), few researchers have examined how these beliefs affect accounting performance (Burnett et al., 2010; Byrne et al., 2014). The education

institutions use learning management systems and interactive whiteboards to increase the students' participation (Kimura et al., 2023). However, the affordability of such technology by all students is questionable and it leads to negative impacts on students' engagement and confidence (Vallo Hult et al., 2023; Kormos & Wisdom, 2023; Hughes et al., 2023). Furthermore, while studies have examined the impact of academic failure on student performance (Greene & Miller, 1996), more study is needed to understand how setbacks affect students' self-efficacy (Beatson et al., 2020). These psychological factors influence students' ability to persevere, but the link between academic and technical self-efficacy and these internal motivators has not been thoroughly studied.

This research paper focuses on the Trincomalee Campus Management Students of Eastern University, Sri Lanka. The uniqueness of this BSc in Management course is that 60% of Arts stream and 40% of Commerce stream students are usually enrolled for each batch. Arts stream students do not engage with accounting subjects whereas commerce students engage in financial accounting, cost accounting, and management accounting at their advanced level. Some students follow professional accounting courses irrelevant to their advanced-level subjects. Most of the students are struggling in their attempts to pass since they do not have prior knowledge of accounting subjects. According to the curriculum of this degree programme, Financial Accounting is a compulsory subject to be passed by each student to complete the degree programme. How does the requirement that students re-enroll in a course if they fail affect their confidence in their ability to pass it? In addition to that, technological learning is part and partial of the undergraduate programme. After COVID-19, lecturers usually conduct teaching, assignments, and examinations through online platforms and learning management system. When teaching management students, the department is expected to utilize the teaching strategies which support the computer fundamentals, usage of learning management system, and online learning platforms (Nguyen, Zierler, and Nguyen, 2011).

Research Questions

1. What is the relationship between Academic Self-Efficacy, Technological Self-Efficacy beliefs, Prior Learning and Academic Success in Accounting Education among first-year management students in Trincomalee Campus, Eastern University, Sri Lanka?
2. Is there any difference between Academic Self-Efficacy, Technological Self-Efficacy, Prior Learning, and Academic Success in Accounting Education based on gender and age among first-year management students in Trincomalee Campus, Eastern University, Sri Lanka?
3. Is there any impact of Academic Self-Efficacy Beliefs, Technological Self-Efficacy, and Prior Learning on Academic Success in Accounting Education among first-year management students in Trincomalee Campus, Eastern University, Sri Lanka?

Literature Review

Introduction to Self-Efficacy

Bandura's self-efficacy theory (1997) emphasizes the role of self-belief in motivation, cognition, and behavior. An individual's "self-system" helps regulate thoughts, emotions, and actions (Bandura, 1986), involving cognitive processes, learning from others, planning, self-control, and self-reflection (Pajares, 1996). Byrne et al. (2014) note that changes in self-efficacy beliefs affect performance, behavior, and future success. The four sources of self-efficacy are mastery experience, vicarious experience, verbal persuasion, and psychological states. Mastery experience, the strongest source, stems from past success, while vicarious experience is influenced by role models. Verbal persuasion involves feedback, with positive feedback boosting self-efficacy. Psychological states reflect how emotions impact self-efficacy.

Academic self-efficacy

Academic self-efficacy defines individuals' ability to learn in educational settings (Schunk, 1991). Prominent levels of success could be achieved by the students who have high level of individual efficacy through great level of efforts (Chemers, Hu, & Garcia, 2001; Phan, 2012). Solberg et al. (1998) state that high self-efficacy students feel less stress and have a good emotional state and they engage in deep learning, use time effectively, regulate and use their skills and knowledge (Salomon, 1984). Numerous studies have indicated that positive self-concept or self-efficacy improves students' academic engagement, goal setting, task selection, perseverance and effort, intrinsic motivation, strategy usage, performance and accomplishment, and even profession choices (Bong et al., 2003). According to Bong et al. (2003), despite a large number of studies demonstrating the strength of these conceptions, it is not always possible to find specific reasons or effective approaches for altering these beliefs in order to achieve such desirable results.

Technological Self-efficacy

Technology is an important aspect for students to adopt information technology in the educational environment (Hsieh et al., 2017). Acceptance of developing technologies that impact their successful learning and influence self-directed learning (Huang and Liaw, 2018). Multiple meta-analyses within the context of the technology-based behavior model have revealed a strong relationship between individuals perceived behavioral control and the utility of specific technology (Pan, 2020). According to Teo (2009), technological self-efficacy is viewed as the major factor in the intention to use technology. Bandura (1997) points out that Technology self-efficacy refers to students' perceptions of their ability to use websites, applications, and tools to engage in learning activities and, in the end, accomplish the desired learning goals. Students' mastery and familiarity of technical skills

impact students' intention to use the online learning platforms (Mew and Honey, 2010; Pan, 2020).

McDonald and Siegall (2001) define technical self-efficacy as the conviction that one has the necessary skills and aptitudes to complete a task using technology. Finding out if students will utilize technology to assist their education is important since self-efficacy and behavior have a broad correlation (Bandura, 2012). Self-efficacy in technology is crucial for many reasons. Isman and Celikli (2009) state that a large number of students who are going into universities and the workforce are not proficient with information technology. Students' self-efficacy is directly impacted by their lack of technological proficiency (Isman & Celikli, 2009). Concerns over the use of technology in the workplace and in the classroom are correlated with lower levels of technological self-efficacy (Shu, Tu, & Wang, 2011). Furthermore, it has been shown that a student's future academic and professional paths may be strongly predicted by their level of technological self-efficacy (Chronaki and Vekiri, 2008).

Prior Learning and Academic Success in Accounting Education

Researchers have worked to determine the factors that influence the academic achievement of students for many years (Beatson, Berg, and Smith, 2020). The two factors that determine an individual's chance of success are the amount of time they spend studying and the amount of time they need to learn (Carroll, 1963). It is common to apply prior learning to forecast performance in the future (Byrnes & Flood, 2005). Studies have indicated that students who studied accounting in high school outperformed those who did not, therefore prior learning may be utilized to predict academic achievement in accounting education (Duff, 2004; Beatson et al., 2020). According to Duff (2004), the literature on accounting education suggests that age and gender may influence academic achievement in addition to prior knowledge. Nonetheless, the evidence on the impact of prior learning in accounting varies significantly (Beatson et al., 2020). Studies on the effects of past learning in

accounting, however, differs. Students who had prior high school accounting knowledge fared comparably to those who did not (Koh and Koh, 1999). Still, their investigation covered more ground than just the first year of a three-year degree. A student's first-year exam scores, as opposed to their prior high school accounting knowledge, are a stronger indicator of their performance on the third-year exam (Bartlett et al., 2020).

Academic Self-efficacy and Academic Success in Accounting Education

There has been lack of study on self-efficacy in accounting, despite the fact that many professionals have lately been interested in the idea (Burnett, Xu, and Kennedy, 2010; Byrne et al., 2014). Self-efficacy is critical to student success, according to Wood and Bandura (1989), who state that "a strong sense of efficacy is required to deploy one's cognitive resources optimally and to remain task oriented in the face of repeated difficulties and failures." (p.488). Academic success is more likely for students who have high efficacy expectations and self-efficacy has a stronger predictive potential than demographic factors for academic achievement (Bandura, 1997; Zajacova et al., 2005). According to Byrne et al. (2014), Self-efficacy related previous research could be categorized into three such as accounting students' self-efficacy in general competencies (Lai, 2008; Hassall et al. (2013), the influence of adding new elements to modules or degree programmes on students' self-efficacy is examined on self-efficacy and accounting students (Ghaderi and Salehi, 2011; Burnett, Friedman and Yang, 2008), and the relationship between self-efficacy and academic performance (Waymire and West, 2012; Burnett, Xu and Kennedy, 2010). According to Tepper and Yourstone (2017), a student's self-efficacy has an important role in their success in a certain subject. A person's self-efficacy may be impacted by what they learn from both happy and bad situations (Tepper and Yourstone, 2017).

Byrne et al. (2014) conducted the first accounting study to use a survey to accounting to assess students' confidence in their ability to complete assignments and other

academic work associated with first-year financial and management accounting. The result indicates that the 21.4% of grade variance in the financial accounting course is explained by these non-cognitive traits. Viviers et al. (2023) conducted a study about impact of self-efficacy beliefs on academic success in the introductory accounting course held in tertiary education in South African context. The majority of first-year accounting students stated that they were confident in their abilities. There were substantial differences in the self-efficacy beliefs of students depending on program type, academic language, and gender, but not on study funds. Academic accomplishment and self-efficacy attitudes were shown to be significantly correlated, albeit there were differences seen amongst programmes. Hwang et al. (2016) conducted research regarding the relationship between self-efficacy academic achievement with the sample of 1117 Korean students by using an autoregressive cross-lagged model. Their findings indicate that Self-efficacy beliefs and academic accomplishment were shown to be correlated, with prior academic performance having a greater impact on self-efficacy views than self-efficacy beliefs did on academic achievement. Goulao (2011) examined the relationship, in an online environment, between a group of students' beliefs of themselves and their academic performance. Data was acquired from 63 students. Further, findings indicate students' levels of self-efficacy were high and there was a significant correlation between their levels of self-efficacy and their academic achievement.

Technological Self-efficacy and Academic Success in Accounting Education

Roney et al., (2017) researched technology use and technology self-efficacy among undergraduate nursing faculty by considering 272 samples. It was found that there is a weak relationship between age and technological self-efficacy among nursing undergraduates. According to Al-Hattami (2023), the findings state that 59.4% of the variation in the behavioral intention of Information Technology usage and further, it reveals that self-efficiency, attitude, perceived utility, and simplicity of

use were all significant predictors of behavioral intention, while social influence did not significantly affect it.

Pan (2020) conducted a study of technological acceptance, technological self-efficacy, and attitude towards technology-based self-directed learning to 332 undergraduates. The results show that technology use and technology self-efficacy are related to attitude towards technology-based self-directed learning. Dissanayaka et al. (2021) studied the effects of computer experience, internet self-efficacy, and technology readiness on 500 accounting students' employability. Accordingly, the result indicates that the employability of accounting students is significantly impacted by computer experience, internet self-efficacy, and technology readiness through ordinary least square regression analysis.

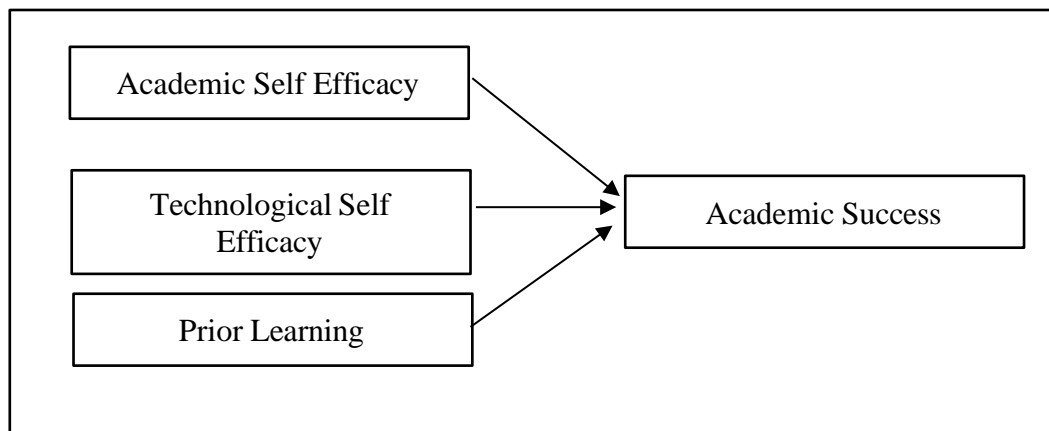
Methods

Conceptual Framework

This conceptual framework was developed using the literature review.

Figure 1

Conceptual Framework



Source: Beatson et al., (2020) and McDonald et al., (1992)

Research Design

This research uses positivist paradigm and evaluates the impact of academic self-efficacy, technological self-efficacy, and prior learning on academic success in accounting education among first year batches of 2019/2020 and 2020/2021 of Trincomalee Campus Management Students. The study uses a questionnaire to collect data on students' academic self-efficacy (Beatson et al., 2020), technological self-efficacy (McDonald and Siegall, 1992), prior learning (Byrne et al., 2014), and academic success is measured by the Financial Accounting course Grade Point Average (G.P.A.) (Vanderstraeten et al., 2024) followed by statistical analysis to interpret the findings. This approach was considered as appropriate since several researches were conducted based on Self-efficacy which has been shown as important predicator linked with academic performance in the field of social cognitive theory (Beatson et al., 2020; Byrne et al., 2014; Viviers et al., 2023).

Data and Sample

This study considered the first-year students at Trincomalee Campus, Eastern University, Sri Lanka pursuing a bachelor's degree in management from batches of 2019/2020 and 2020/2021. The total population is 444 and the entire population has been selected for the study. The questionnaire was administered to first year management students during 3rd week of academic session as directed by Beatson et al. (2020). The study's purpose and the fact that participation was voluntary was explained to the students before they had to fill out the questionnaire and they were also informed that data would only be presented in aggregate form. To correlate the participants' self-efficacy levels with their grades, the questionnaire asked for the participants' age and gender.

Data Analysis

The analyst has utilized both descriptive and inferential factual methods to examination the gathered information from the survey. SPSS (26.0) software was utilized to analyze the information. Descriptive statistics which include central tendency and dispersion measures have been used to describe the data set. Central tendencies include mean, while the measures for dispersion include standard deviation. The following statistical tools or techniques were used in the study.

Correlation Analysis

Correlation analysis examines the hypothesis of the relationship between academic self-efficacy, technological self-efficacy, prior learning and academic success variables. Bless and Higson-Smith (2000) define a correlation as “the relationship between two variables where change in one variable is accompanied by a predictable change in another variable”. The correlation coefficient (r) would be determined to identify the relationship between variables. The correlation coefficient ranges from -1 to +1 to explore the degree of relationship between the study variables. This study assesses the significant relationship of study variables, if the respective p-value is less than the 0.05.

Multiple Regression Analysis

Multiple regression analysis is an efficient estimator to overcome multicollinear problems between variables (Baltagi, 2001). According to Hsiao, Mountain, and Ho-llman (1995), advantage of using the multiple regression analysis has higher degree of freedom and sample flexibility than cross-sectional data. The multiple regression is as follows:

$$GPA = \beta_0 + \beta_1SE + \beta_2TE + \beta_3PL + \epsilon$$

Where GPA=Academic Success, SE=Self-efficacy, TE=Technological self-efficacy, and PL=Prior learning

Hypotheses Development

A hypothesis could be defined as a logically conjectured relationship between two or more variables expressed in the form of a testable statement. The relationships were conjectured on the basis of the network of associations established in the theoretical framework formulated for the research study.

- H₁ There is a relationship between academic self-efficacy and academic success in accounting education
- H₂ There is a relationship between technological self-efficacy and academic success in accounting education
- H₃ There is a relationship between prior learning and academic success in accounting education
- H₄ There is a significant difference in academic self-efficacy, technological self-efficacy, prior learning and academic success in accounting education based on gender among management students.
- H₅ There is a significant difference in academic self-efficacy, technological self-efficacy, prior learning and academic success in accounting education based on age among management students.
- H₆ There is an influence of academic self-efficacy, technological self-efficacy, prior learning on academic success in accounting education.

Findings of the Study

Demographic Information of First Year Management Students

The table 1 illustrates the demographic profile of first-year management students at Trincomalee Campus, Eastern University, Sri Lanka. It provides insights into

various factors including gender distribution, age demographics, motivations behind selecting the accounting course, students' prior background in accounting, levels of intelligence, proficiency with numbers, interest in the accounting course, and eagerness to excel in accounting subjects. Among the respondents, 11.3% are male students, while 88.7% are female students. Regarding age, 2.3% are aged 20, 51.8% are 21, 33.6% are 22, and 12.3% are 23 or older. Accounting subjects are chosen for a variety of reasons, including 31% for degree requirements, 0.8% for interest, 1.8% for family influence, and 66.4% for their usefulness in future jobs. Additionally, respondents' backgrounds in accounting vary, with 6.9% having taken it before, 1.5% having worked in the field, 32.6% having studied it in school, 3.3% at another institution, and 55.6% having no prior exposure.

Table 1*Demographic Information of First Year Management Students*

Particulars	Frequency	Percentage
Gender		
Male	44	11.3
Female	346	88.7
Age		
20	9	2.3
21	202	51.8
22	131	33.6
23 or older	48	12.3
Reason for choosing to take the accounting subject		
It is part of my degree requirements	121	31
It looked like an interesting course	3	0.8
I was encouraged by family	7	1.8
This subject is important for my future career	259	66.4
Background		
I have taken the Accounting Subject before	27	6.9

I have worked in the Accounting field before	6	1.5
I have studied the Accounting Subject at school	127	32.6
I have studied the Accounting Subject at another tertiary institution	13	3.3
None	217	55.6
Intelligence and you cannot really do much to change it		
Strongly Disagree	54	13.8
Disagree	129	33.1
Mostly Disagree	25	6.4
Mostly Agree	79	20.3
Agree	98	25.1
Strongly Agree	5	1.3
Good with numbers or you are not		
Strongly Disagree	51	13.1
Disagree	107	27.4
Mostly Disagree	22	5.6
Mostly Agree	66	16.9
Agree	136	34.9
Strongly Agree	8	2.1
Interested in the content of this Accounting		
Strongly Disagree	1	0.3
Disagree	20	5.1
Mostly Disagree	10	2.6
Mostly Agree	47	12.1
Agree	249	63.8
Strongly Agree	63	16.2
Eager to do anything to do well in Accounting subjects		
Strongly Disagree	5	1.3
Disagree	22	5.6
Mostly Disagree	3	0.8
Mostly Agree	52	13.3
Agree	195	50
Strongly Agree	113	29

Source: Survey Data (2024)

Examining the Descriptive Statistics of Academic Self Efficacy and Technological Self Efficacy of First Year Management Students

Table 2

Descriptive Statistics of Academic Self-Efficacy of First Year Management Students

Description	Mean (1-7)	SD	Not Confident (1-3) Percentage	Unsure (4) Percentage	Confident (5-7) Percentage
Ask for help from my lecturers	5.24	1.825	14.1	18.5	67.4
Ask for help from my tutor	5.27	1.717	13.1	18.2	68.7
Draw up a study plan	5.23	1.624	11.5	21	67.4
Find and write up additional notes	5.18	1.714	13.3	17.2	69.5
Plan my time to review effectively for exams	5.45	1.621	12.1	11.5	76.4
Understand the expectations to get good marks in my exams	5.57	1.619	12.6	12.1	75.4
Pass this Accounting Subjects	5.32	1.806	14.4	14.9	70.8
Respond to questions asked in tutorials/classes	4.91	1.724	21.3	9.2	69.5
Ask questions in tutorials/classes	4.66	1.823	24.6	13.8	61.5
Apply my knowledge to solve previously unseen questions	5.10	1.617	13.6	16.9	69.5
Produce my best work in exams	5.55	1.697	14.9	5.4	79.7
Make sense of theoretical aspects of this Accounting Subjects	5.28	1.479	10	17.2	72.8

Get the grade/mark that I want in this Accounting Subjects	5.62	1.499	7.7	12.1	80.3
Answer a word problem that describes an accounting situation	5.10	1.589	15.4	14.1	70.5
Answer a calculation/numeric style question	5.20	1.535	13.8	12.8	73.3
Study effectively on my own	5.50	1.595	13.1	10.5	76.4
Follow and make sense of material covered in lectures	5.39	1.557	11	11.8	77.2
Make sense of material I read in textbooks	5.21	1.652	15.4	10	74.6
Ask for help from my classmates	5.82	1.362	7.4	7.2	85.4
Answer a question that involves discussing my response	5.36	1.511	11.8	13.6	74.6
Academic Self Efficacy	5.30	1.27			

Source: Survey Data (2024)

The data shows that less than 20% of first-year management students lack confidence in academic self-efficacy, while around 80% are either unsure or confident. Students exhibit high self-efficacy in areas like seeking help from classmates (mean 5.82), achieving desired grades (mean 5.62), and understanding exam requirements (mean 5.57). However, they lack confidence in asking or responding to questions in tutorials, solving word problems, and understanding textbooks. These results highlight the need for more support in these areas to boost student confidence. Overall, the academic self-efficacy mean is 5.30, reflecting these findings suggest a positive and empowered student body within the Accounting Subject, poised for academic achievement and success.

Table 3*Descriptive Statistics of Technological Self-Efficacy of First Year Management Students*

Description	Mean (1-5)	SD	Weak Level (1-2.5) Percentage	Moderate Level (>2.5-3.5) Percentage	High Level (>3.5-5) Percentage
When I have to learn a new task that is high tech, my first reaction is that I am sure I can do it	3.38	1.202	16.2	25.1	58.7
In terms of my ability to learn new tasks that are high tech, I would describe myself as one of the best in my group	3.17	0.811	18.7	45.1	36.2
In the past, I have had a great amount of experience (either on or off the job) working on high tech tasks	3.35	1.089	14.1	35.4	50.5
I am extremely confident that I can learn to use computer assisted technology on my task	3.48	0.768	7.2	32.3	60.5
Computer assisted technology will allow me to perform my task better and more efficiently	3.85	0.980	4.6	28.7	66.7
Technological Self Efficacy	3.45	0.74			

Source: Survey Data (2024)

Table 3 shows varied levels of technological self-efficacy among first-year management students. Most respondents (58.7%) demonstrate high confidence in learning new high-tech tasks, and 50.5% report substantial prior experience. Confidence in using computer-assisted technology is strong, with 60.5% highly

confident and 66.7% believing it enhances task performance. A mean score of 3.48 reflects high confidence in becoming proficient with technology, while a mean of 3.85 highlights belief in its positive impact on academic performance. However, some students exhibit moderate confidence, indicating room for further development in technical self-efficacy to boost performance in accounting education.

Relationship between Academic Self-efficacy, Technological Self Efficacy, Prior Learning and Academic Success in Accounting Education

Table 5

Relationship between Academic Self-efficacy, Technological Self Efficacy, Prior Learning and Academic Success in Accounting Education

	Academic Self Efficacy	Technological Self Efficacy	Prior Learning	Academic Success
Academic Self Efficacy	1			
Technological Self Efficacy	0.087	1		
Prior Learning	0.165**	-0.033	1	
Academic Success	0.426**	0.320**	0.122*	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source: Survey Data (2024)

The investigation shows that these factors have a strong link with one another. Academic Self-efficacy exhibits a moderate positive correlation with Academic Success ($r = 0.426$, $p < 0.01$), suggesting that students who have more trust in their own academic skills typically succeed more in their academic pursuits in the field of accounting. Technological self efficacy also exhibits a significant moderate positive correlation with Academic Success ($r = 0.320$, $p < 0.01$), suggesting that

students who feel more confident in their ability to utilize technology tend to perform better academically. Moreover, prior learning shows a significant positive correlation with both academic self efficacy ($r = 0.165$, $p < 0.05$). Prior learning experiences contribute marginally to students' confidence levels and academic achievements in accounting education ($r = 0.122$, $p < 0.05$). These findings imply that academic self-efficacy, technological self-efficacy, and prior learning experience to achieve academic success in accounting education.

Difference between academic self-efficacy, technological self-efficacy, prior learning, and academic success based on gender and age among first-year management students

Table 6

Difference between academic self-efficacy, technological self-efficacy, prior learning, and academic success based on gender among first-year management students

Measure	Male	Female
Academic Efficiency		
Mean	5.51	5.27
Standard Deviation	1.41	1.25
Sig. (2-tailed)	0.286	
Technological Efficiency		
Mean	3.42	3.45
Standard Deviation	0.81	0.73
Sig. (2-tailed)	0.817	
Prior Learning		
Yes	23	165
No	21	181

Source: Survey Data (2024)

This study examines gender disparities in academic and technological self-efficacy among first-year management students. Males and females show similar mean scores (5.51 and 5.27) in academic self-efficacy, (p -value = 0.286) and technological self-efficacy (3.42 and 3.45), indicating no significant differences (p -value = 0.817). However, a large disparity exists in prior learning experiences, with 165 females reporting such experiences compared to 23 males, and fewer females (21) reporting no prior learning compared to males (181). This suggests potential differences in educational backgrounds or preparation between genders.

Table 7

Difference between academic self-efficacy, technological self-efficacy, prior learning, and academic success based on age among first year management students

Measure	20	21	22	23	25
Academic Efficiency					
Mean	6.00	5.14	5.42	5.50	5.95
Standard Deviation	0.07	0.10	0.10	0.12	0.00
Sig. (2-tailed)	0.06				
Technological Efficiency					
Mean	3.44	3.40	3.49	3.55	3.47
Standard Deviation	0.83	0.80	0.66	0.63	0.92
Sig. (2-tailed)	0.73				
Prior Learning					
Yes	4	102	76	20	00
No	5	100	55	25	03

Source: Survey Data (2024)

The table 7 analyzes academic and technological self-efficacy, along with prior learning experiences among first-year management students by age. Academic efficiency peaks at age 20 (mean 6.00) and age 25 (mean 5.95), with a low standard

deviation for 20-year-olds (0.07). However, the p-value of 0.06 indicates marginal statistical significance. Technological efficiency shows minor variations, with a non-significant p-value (0.73). Prior learning is highest among 21-year-olds (102 students), while no 25-year-olds report prior learning experiences.

Influence of Academic Self-efficacy, Technological Self Efficacy, Prior Learning on Academic Success in Accounting Education

Table 8

Influence of Academic Self-efficacy, Technological Self-Efficacy, Prior Learning on Academic Success in Accounting Education

	Coefficient	Beta	t-statistics	p-value
Academic Self Efficacy	0.262	0.391	8.801	0.000
Technological Self Efficacy	0.333	0.288	6.584	0.000
Prior Learning	0.114	0.067	1.511	0.132

R square = 0.267, Adjusted R square = 0.261, F value = 46.849, p-value = 0.000

Source: Survey Data (2024)

The regression analysis investigated the impact of Academic Self Efficacy, Technological Self Efficacy, and Prior Learning on a dependent variable. Academic Self Efficacy represents an individual's belief in their ability to succeed academically, while Technological Self Efficacy pertains to their confidence in utilizing technological tools. The coefficients associated with Academic Self-Efficacy (0.262) and Technological Self-Efficacy (0.333) indicate that holding other variables constant, a one-unit increase in these factors corresponds to increases of 0.262 and 0.333 units, respectively, in the dependent variable. These coefficients are substantiated by robust t-statistics (8.801 and 6.584, respectively) and extremely low p-values (0.000), underscoring their statistical significance. Thus, it can be inferred that both Academic and Technological Self Efficacy significantly contribute to the

variation in academic success. Conversely, Prior Learning, denoted by its coefficient (0.114), exhibits a weaker influence on the dependent variable, as evidenced by its modest t-statistic (1.511) and comparatively higher p-value (0.132), signifying a lack of statistical significance of 0.05. Consequently, while Academic and Technological Self Efficacy emerge as influential predictors in this model, the impact of Prior Learning appears less pronounced.

Discussion and Conclusion

This study investigates the impact of academic self-efficacy, technological efficacy, and prior learning on academic success in accounting education among first-year management students at Trincomalee Campus, Eastern University, Sri Lanka. The students have diverse motivations and prior learning experiences (Pinxten et al., 2019). Results indicate that students are generally confident in their academic abilities, particularly in seeking help from peers and aiming for high grades. However, there is reluctance in asking questions during tutorials and understanding textbook materials, highlighting areas for targeted support to boost confidence (Vanderstraeten et al., 2024).

Findings on technological self-efficacy show a positive attitude towards adapting to high-tech tasks and using computer-assisted technologies to enhance academic success (Asyanova et al., 2024; Ibrahim & Aldawsari, 2023; Jin & Ibrahim, 2023; Navarro et al., 2023). Yet, improvements are needed to foster greater confidence and competence in these tools. Gender analysis reveals no significant differences in academic or technological efficiencies between male and female students (Clemente-Suárez et al., 2024; Wulandari et al., 2024). Age groups show varied patterns, with some fluctuations in academic efficiency, but no significant differences in technological efficiency (Wulandari et al., 2024).

A strong positive relationship exists between academic self-efficacy and academic success (Lane & Lane, 2001), and a positive association between technological self-

efficacy and academic success. Management students are confident in utilizing their academic capabilities and technological tools to achieve academic performance in accounting education. However, prior learning experience contributes only marginally to performance and this is consistent with prior literatures such as Alcock et al., (2008); Duff, (2004); Rohde & Kavanagh, (1996); Beatson et al., (2020). Regression analysis indicates that while academic self-efficacy (Jannah et al., 2024; Liu, 2024; Robi Hendra et al., 2024) and technological self-efficacy (Asyanova et al., 2024; Ibrahim & Aldawsari, 2023; Jin & Ibrahim, 2023; Navarro et al., 2023) significantly impact academic success whereas prior learning experience does not impact academic success in accounting education (Papageorgiou & Carpenter, 2019; Ree et al., 1995).

Implication and Recommendations

The study explores self-efficacy, technological self-efficacy, prior learning and academic success in accounting education by first-year management students at Trincomalee Campus, Eastern University, Sri Lanka. There are influences of academic self-efficacy and technological self-efficacy on academic success in accounting education. This suggests that the educator should focus on improving self-confidence by conducting self-efficacy workshops, mentoring programmes, and personal feedback mechanisms. Furthermore, findings of technological self-efficacy suggest that the educator could emphasize more on the availability of technological tools for all undergraduates and integrate digital literacy in the curriculum to ensure the undergraduates to be equipped with necessary technical skills in using the learning management system and other technological tools.

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Supervisory Styles and Their Impact on Affective Commitment: A Gender-Based Comparison of Non-Managerial Employees in the Apparel Industry in Western Province, Sri Lanka

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The study explores the impact of supervisory styles on affective commitment among non-managerial employees in the Sri Lankan apparel industry. This research addresses a critical gap by focusing on the Sri Lankan apparel industry, which struggles with affective commitment level of non-managerial employees. Additionally, this study has especially focused on whether male and female non-managerial employees have perceived supervisory style at work differently. Data were collected from 257 non-managerial employees across three knitted export organizations in Sri Lanka using validated scales for affective commitment, and supervisory styles while getting abusive supervision, task-oriented supervision and supportive supervision as dimensions of supervisory styles. Random sampling technique was adopted for the study. The methodological approach involved quantitative analysis to test the hypothesized relationships, utilizing principles from social exchange theory, particularly emphasizing exchange ideology. Statistical techniques, including regression analysis, and independent sample T-test were used to determine the impact of supervisory style on affective commitment. The findings highlight the critical need for organizations to address supervisory behaviour and foster positive social exchange to enhance employee commitment. In addition, gender alone is not sufficient to explain perception of supervisory styles. Therefore, the study also did not include other variables that may influence the difference in the perception of supervisory style.

Key words: *Affective commitment, Gender differences, Supervisory styles.*

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Introduction

A committed and dedicated workforce is essential for the organization's success and the fulfilment of its mission (Arimie, 2019). Therefore, building a solid bond and sense of belonging among employees and the organization is crucial for long-term success (Harter et al., 2003). Employees who have a strong emotional attachment (affective commitment) to their organisation are less likely to leave (Meyer et al., 2002). Previous research has extensively examined the significant outcomes associated with varying levels of Affective Commitment within organizational contexts. When employees have a strong Affective Commitment, they tend to engage in behaviours such as providing assistance to colleagues, dedicating additional time and effort, sharing valuable information, and receiving positive evaluations from their managers (Mercurio, 2015). Therefore, the study of Affective Commitment provides valuable insights into how organizations can create an environment where employees feel connected, motivated, and dedicated to the organization's goals and objectives.

Supervisors play a pivotal role in fulfilling the psychological contract between the organization and its employees, as well as empowering them (Kidron, 2018). A substantial body of literature has been dedicated to investigating the dynamics of manager-employee interactions, with a particular focus on either positive or negative styles (Trisakhon & Jermstiparsert, 2019; Kuvaas & Dysvik, 2010; Chu, 2014; Khan et al., 2010; Chen et al., 2022). In order to obtain a more comprehensive understanding of the intricate details within these relationships, it is beneficial for the researcher to consider both positive and negative styles Su et al., 2022; Liu et al., 2020; Liao et al., 2020).

However, a significant empirical research gap exists in understanding this relationship within the distinct context of non-managerial employees further.

The present study aims to examine the impact of supervisory styles (supportive, abusive and task- oriented) on Affective Commitment, and by exploring the relationships, this research seeks to enhance the understanding of the complex dynamics between supervisors and employees. The existing body of literature has examined the impact of leadership styles on a range of outcomes across various industries in Sri Lanka, including the software industry, banking sector, and public sector organizations (Raveendran, 2022; Wijesinghe, 2021; Rathi & Lee, 2017; Agarwala et al., 2014; Ali et al., 2020; Aryee et al., 2008). However, there remains a lack of research specifically investigating supervisory styles and their influence on Affective Commitment within the context of Sri Lankan apparel organizations.

Supervisors in the apparel industry play a significant role in fostering Affective Commitment and enhancing the overall performance and well-being of non-managerial employees. Research has consistently highlighted the critical role supervisors play in influencing job satisfaction, engagement, and organizational Commitment among employees in the apparel sector (Gnanayudam & Dharmasiri, 2007; Kiron, 2021; Jayasinghe, & Thavakumar, 2020). A supervisor's role in the apparel industry is to maintain quality and productivity, manage and motivate, and produce the right product. Studies conducted within the industry in Sri Lanka have emphasized the positive impact of supervisors' intrinsic and extrinsic rewards on the job satisfaction of non-managerial employees (Sankalpana & Jayasekara, 2017). Supervisor support has also been identified as a crucial job resource that significantly affects employee engagement in the apparel manufacturing industry (Thisera & Wijesundara, 2020). Wong and Wong, (2013) highlighted the importance of positive supervisor-employee relationships in fostering Commitment and loyalty. Considering the significant impact of supervisory styles on employee Affective

Commitment and the overall performance of employees, it is important to delve further into understanding how different supervisory styles influence Affective Commitment in the apparel industry. However, a significant empirical research gap exists in understanding this relationship within the distinct context of non-managerial employees operating in the apparel industry in the Western Province of Sri Lanka (Ranasinghe & Amarawansah, 2019; Raveendran, 2022; Wijesinghe, 2021; Agarwala et al., 2014; Ali et al., 2020; Aryee et al., 2008). Thus, the researchers intend to investigate the impact of supervisory styles, including supportive, task-oriented, and Abusive supervision, on Affective Commitment among non-managerial employees in the apparel sector.

But importantly, the individual characteristics of both the supervisor and supervisee (employee), including their gender, are key components that influence the nature and quality of the relationship (Bernard & Goodyear, 2004; Brock & Sibbald, 1988; Wetchler et al., 1989). From a review of the literature with respect to the gender of the supervisee, it influences to shapes one's beliefs, stereotypes, and behavioural expectations (Gilbert & Rossman, 1992). Hence, the supervisory relationship can be thought of as gender-sensitive and guided by a supervisor's and a supervisee's views and biases, but it is not yet conclusive (Hindes & Andrews, 2011). Therefore, the researchers examine how male and female non-managerial employees have perceived the supervisory styles that lead to their affective commitment to the organization.

Thus, based on the above identified gaps and the problem justification, the following problem statement of the study has been developed. The main research issue of this study is "Whether supervisory styles impact on non-managerial employees' Affective Commitment in selected apparel organizations in the

western province, Sri Lanka and to what extent does that association vary by gender”

Research Questions

Based on the main aspects of the research problem, the following two research questions are derived.

1. What is the impact of supervisory styles on the Affective Commitment of non-managerial employees in the apparel industry?
2. What extent does the impact of supervisory styles on affective commitment vary by gender among non-executive employees?

The objective of this study was to investigate the Affective Commitment and perceived supervisor styles using the theoretical framework of social-exchange theory. Therefore, this study holds potential importance and worth for organizations, practitioners, and scholars. Previous studies have primarily examined supervisory styles in various industries, but there is a lack of research specifically targeting the apparel sector (Manage & Dissanayake, 2021; Welmilla, 2020; Wijesinghe, 2021; Sumanasiri, 2020). By filling this gap, the study enhances the knowledge of supervisory styles and their implications in the apparel industry.

Literature Review

Supervisory Styles

The concept of supervisory styles pertains to the various methodologies and tactics employed by supervisors in the execution of their supervisory responsibilities and interactions with their subordinates (Holloway and Wolleat, 1981 as cited in Li et al., 2021). Therefore, Supervisory styles refer to

the diverse ways in which supervisors manage their teams and interact with their employees while carrying out their responsibilities. It's all about the methods and strategies they use to lead, guide, and communicate with their subordinates. Each supervisor may have their unique approach, and these styles can vary widely depending on the supervisor's personality, experience, and the specific needs of the team or situation they're dealing with. In essence, it's about how supervisors put their leadership into action, making sure their team performs well and operates smoothly (Holloway and Wolleat, 1981 as cited in Li et al., 2021). Supervision can be one of the strategies to enable employees to achieve the goal (Hoque et al., 2020). The concept of supervisory styles encompasses a range of behavioural patterns demonstrated by supervisors when establishing a professional relationship with their supervisees (Hunt, 1971). Which means that the idea of supervisory styles involves the various ways supervisors behave when building professional relationships with their subordinates. It's all about the patterns of behavior they exhibit while working with and guiding their supervisees. These styles can include how they communicate, provide guidance, offer support, and make decisions. Essentially, it's about the unique approaches and methods supervisors use to create effective working relationships and lead their teams toward success.

The identification of the most effective supervisory style is contingent upon the consideration of various contributing factors. There exists a range of attributes that are commonly linked to effective leadership. These attributes encompass intelligence, self-assurance, ethical conduct, adaptability, ingenuity, vigor, and sincerity (Guo et al., 2021). Antonakis (2003) claimed that the efficacy of supervisory style is notably impacted by the degree of emotional intelligence. According to Brown (2014), the establishment of an emotional connection between a leader and their subordinates is proposed to be a more dependable

indicator of good executive leadership in comparison to the conventional assessment of general intelligence. The supervisory style employed by leaders may be influenced by the organizational culture, which in turn can have an impact on how their effectiveness is perceived (Schimmoeller, 2010).

The concept of supervisory style, as expounded upon by Hartmann et al. (2010), encompasses a composite of two fundamental dimensions, namely the style dimension and the measures dimension. The style dimension refers to the specific leadership style adopted by a manager, while the measures dimension pertains to the performance measurement employed by their organization. The style dimension is a leadership style, as identified by the Ohio State Leadership Studies (Bass, 1990). Similarly, supervisors' styles can be categorized into two main forms: task-oriented and employee-oriented. However, the employees' perceptions of these styles and the specific behaviours expected from supervisors can vary (Tayeb, 1995). Thus, the perception of supervisory styles by employees may differ from the actual styles exhibited by supervisors. Thus, the present study aims to investigate supervisory styles such as supportive, Task-Oriented and Abusive styles on Affective Commitment in non-managerial employees in the apparel industry in the western province of Sri Lanka.

Affective Commitment

Affective Commitment refers to the employee's emotional attachment to, identification with, and involvement in the organization (Meyer & Allen, 1991, P.67). which means Affective Commitment describes the deep emotional connection an employee has with their organization. It involves a strong sense of belonging, a feeling of being closely connected to the company, and an active involvement and investment in its well-being.

The construct of Affective Commitment, as initially proposed by Kanter (1968), is grounded in the theoretical underpinnings of social cohesion and attachment. This study examines the concept of Commitment, specifically focusing on the emotional investment and sense of belongingness experienced by individuals. The research explores how individuals demonstrate their Commitment by actively integrating themselves within a collective entity.

Affective Commitment can be fostered through a range of factors, as explored in previous research (Morrow, 2011). The existing literature extensively supports the notion that demographic variables, individual differences, work experiences, and investments are significant factors contributing to Affective Commitment (Mathieu & Zajac, 1990; Meyer et al., 2002; Meyer & Allen, 1991). Pierce and Dunham (1987) conducted a study aimed at identifying a pre-entry individual difference that could serve as a predictor for Affective organizational Commitment. In addition, previous studies have identified several pre-entry factors that have a significant impact on Affective Commitment. Notably, Stumpf and Hartman (1984) and Kammeyer-Mueller and Wanberg (2003) have examined the influence of career exploration, pre-entry knowledge, and proactive personality on Affective Commitment.

According to Solinger et al. (2008), Affective Commitment is strongly correlated with several significant workplace outcomes, including performance, organizational citizenship behaviours, and a number of withdrawal behaviours, including absenteeism, intention to leave, and actual turnover (Meyer et al., 2002). Furthermore, Affective Commitment is closely tied to various behavioral aspects in the workplace.

The Relationship between Supervisory Styles and Affective Commitment

Previous studies have consistently demonstrated a positive association between supervision styles and organizational Commitment across diverse contexts. In this study, the phenomenon of Affective Commitment is commonly explained through the utilization of the theoretical framework of social exchange theory and the construct of reciprocity (Rhoades et al., 2001). The observation of perceived benefits obtained by employees from their organization produces a corresponding increase in their level of commitment. According to Radstaak and Hennes (2017), supervisors who possess the ability to establish strong interpersonal connections with their subordinates, characterized by trust, respect, and loyalty, can effectively cultivate a positive and gratifying work-related mindset among employees. This is primarily attributed to the fact that such supervisors are more inclined to actively create a stimulating and supportive work milieu, thereby encouraging employees to engage in proactive behaviours and utilize available resources effectively. According to a study conducted by Kidd and Smewing (2001), there exists a positive relationship between employees' perception of trust and authority granted by their supervisors and their level of organizational Commitment.

In order to effectively meet the evolving needs of supervisees and accommodate their individual characteristics, various styles of supervision have been identified and implemented (Saleem & Rana, 2020). The supervisory style employed by leaders has distinct characteristics and can significantly impact employees' perceptions and behaviours within an organization. In a study conducted by Hartmann et al. (2010), it was discovered that there exists empirical evidence supporting the notion that specific combinations of supervisory styles have the potential to fluctuate in accordance with the levels of goal clarity and evaluation

fairness. Supervisors contribute to fulfilling this contract by fostering a positive work environment, providing guidance and support to their subordinates, and ensuring a fair and equitable treatment of employees (Friedlander & Ward, 1984). In addition, it has been observed that supervisors have a significant impact on the emotional state of workers (Pohl & Galletta, 2016). Moreover, Yiing and Ahmad (2009)., Lapointe and Vandenberghe (2017), have conducted empirical research to examine the relationship between supervisor behaviours and organizational Commitment. Their findings provided evidence supporting a positive association between these two variables.

The Relationship between Employees Gender and supervisory styles and Affective Commitment

Gender serves as a pervasive organizer within cultures, shaping beliefs, stereotypes, and behavioral expectations (Gilbert & Rossman, 1992). Research indicates that female employees often prefer supervisors who exhibit considerate and nurturing behaviors, reflecting traditional gender norms (Vecchio & Boatwright, 2002). Conversely, male employees tend to value supervisors who emphasize structure and task-orientation. This contradiction presents organizational challenges, as supervisors must adapt their styles to meet the diverse preferences of their team members (Vecchio & Boatwright, 2002). Furthermore, Long et al. (1996) highlight significant gender-related differences in the perception of supervisory styles among non-managerial employees, particularly noted by female supervisees. Female supervisees perceive both male and female supervisors as more self-disclosing compared to their male counterparts, a finding attributed to gender stereotypes and role expectations. Women are often perceived as communal and nurturing, while men are viewed as agentic and dominant. Employees tend to respond more positively to

supervisors whose styles align with these gender-based expectations (Sargent et al., 2022).

Literature found that the gender-specific preferences for job attributes can influence how individuals perceive their commitment to the organization. According to Adamchik and Sedlak, (2024). Men tend to prioritize job attributes traditionally associated with masculinity, such as earnings, autonomy, and promotion opportunities. Male employees, who typically value these attributes more, feel more committed emotionally (Adamchik & Sedlak, 2024). Women, on the other hand, place higher value on job attributes traditionally associated with femininity, such as good interpersonal relationships, favorable work conditions, and intrinsically enjoyable and meaningful work. Therefore, female employees feel more committed if the organization emphasizes feminine attributes (Konrad et al., 2000). Some studies have found that women tend to have higher levels of affective commitment compared to men, even after controlling for other factors (Adamchik & Sedlak, 2024; Aydin, Sarier & Uysal, 2011). On the other hand, another study in Turkey also found that the gender of the employee did not influence affective commitment (Demir & Elci, 2023).

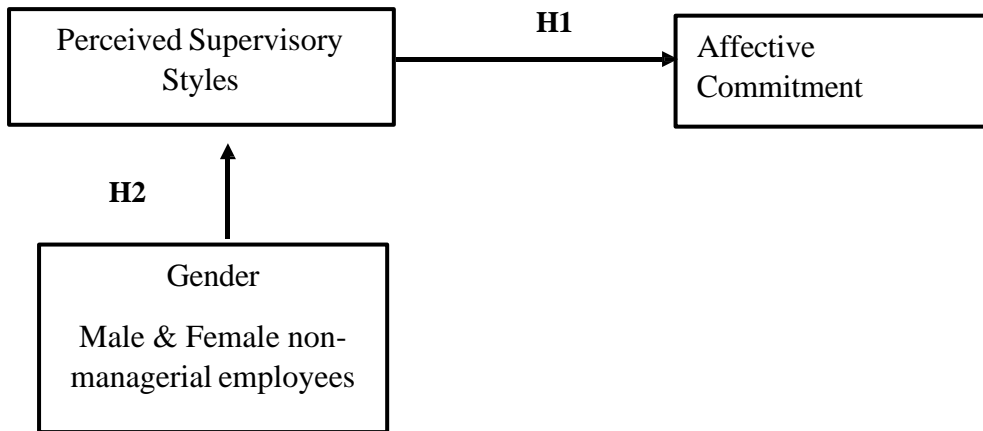
Based on the aforementioned evidence, the authors formulated three hypotheses as follows:

H1: There is an impact of supervisory styles on Affective Commitment of non-managerial employees.

H2: There is a significant difference in the perception of supervisory styles between male and female non-managerial employees

Figure 1

Conceptual Framework



Source: Authors developed (2024)

Methods

The unit of analysis of this study was individual non-managerial employee within the selected organizations. Primary data is gathered directly from the original source and a survey questionnaire is used to collect primary data. The target population focuses on non-managerial employees of three selected knitted export organizations and a total of 257 non-managerial employees were randomly selected from the targeted apparel firms. The applied sampling technique was a simple random sampling method. SPSS version 25 was used to analysis the data.

By analyzing the data, the researchers have found some demographic features which really explore the background of the respondents. When considering gender, it is notable that the workforce is predominantly female, with 63.4% being women, while men constitute 36.6%. In terms of age, the largest age group falls within the 26-35 category, representing 35.0% of the respondents, followed by the 36-45 age group at 31.1%. Younger employees below 25 account for 16.7% of the total, while those aged 46-55 and 56 and above make up 10.9% and 6.2%, respectively. Marital status reveals a relatively balanced distribution, with 53.7% of employees being married and 46.3% unmarried. In the context of work departments, cutting is the most prominent department, with 24.1% of respondents, followed by Sawing at 23.7%, Finish Good at 19.5%, Quality at 18.7%, and Store at 14.0%. Finally, when examining experience, it is apparent that the workforce has a balanced distribution of experience levels. The largest group, 26.8%, has 6-10 years of experience, closely followed by those with 16-20 years at 22.6%. Smaller percentages are observed for employees with below five years of experience (21.8%), 11-15 years (16.0%), and above 20 years (12.8%).

Scales and variables

In the present study, conducted within the apparel industry, the authors have employed the definition of Affective Commitment as posited by Meyer and Allen (1991) to operationalize it. Thereby working definition of Affective Commitment to scale the variable was “employee’s emotional attachment to, identification with, and involvement in the organization” (Meyer & Allen, 1991, P.67). The revised version of the Affective Commitment Scale developed by Meyer and Allen (2004) was used to measure affective commitment towards their organization.

The authors have working definition of supervisory style by drawing upon the works of Hunt (1971) and Boyd (1978), among other definitions available in the literature. Thereby working definition for supervisory styles in this study was “The various methods, behaviors, and strategies used by supervisors in their everyday interaction with employees are referred to as supervisory styles”. Measurement items of supervisory styles were taken from Friedlander and Ward (1984), and Tepper (2000). Gender of the respondents was considered by biological form of gender as male and female.

Measurement validation

Internal consistency was ensured using Cronbach’s α to measure the reliability coefficient of Supervisory styles (0.843), and Affective commitment (0.849). Composite Reliability value of affective commitment is above 0.842. the AVE of Affective Commitment is 0.474, which is slightly below the desired threshold of 0.5. However, it is worth noting that Affective Commitment standardized factor loadings exceed 0.5 and the CR value of Affective Commitment is above 0.7. Therefore, it can be seen that the Affective Commitment construct does possess convergent validity (Cheung et al., 2023). Moreover, the square root of the AVE (off-diagonal) exceeds the correlation between the constructs in the corresponding rows and columns. Therefore, the present study supports the acceptance of discriminant validity as well.

Findings of the study

H1: There is an impact of supervisory styles on Affective Commitment of non-managerial employees.

Table 1

Linear Regression of Supervisory Styles on Affective Commitment

Model	Unstandardized Coefficients		R	R ²	Adjusted R ²	F	Sig.
	B	Std. Error					
(Constant)	4.905	.355					.000
Supervisory Style	-.516	.109	.284 ^a	.081	.077	22.407	.000

Source: Survey data

The adjusted R square (R²) of this model is 0.077 With R² = 0.081 that means that model explains 7.7% of the variation in Affective Commitment, which is a relatively small portion. The significant coefficients beta value is -.516 with p value 0.000 < 0.05, the results revealed a significant negative relationship between supervisory styles and employees' Affective Commitment. The regression equation is presented as Affective Commitment = 4.905 - (0.516 Supervisory Styles). This formula shows that for each one-unit increase in Supervisory Styles, Affective Commitment is expected to decrease by an average of 0.516 units. This finding suggests that certain supervisory styles contribute to a decrease in non-managerial apparel employees' emotional attachment to their organization. Based on this H1 Accepted.

The apparel industry in Sri Lanka, as highlighted by the Sri Lanka Export Development Board (2021;2022), operates within a high-pressure environment driven by the demand for Sri Lankan-made apparel. This environment can foster

work conditions characterized by extreme pressure. When non managerial employees work in high-pressure environments with tight production schedules, that exacerbate stress levels and that further contribute to declining affective commitment. To reduce the impact, the organisations can conduct a thorough review of production targets to ensure they are realistic and achievable by involve employees in the goal-setting process without compromising employee well-being.

H2: There is a significant difference in the perception of supervisory styles between male and female non-managerial employees.

Table 2

Gender based comparison of the perception of Supervisory Styles

Description	Male (N = 94)		Female (N =163)		Equal variance assumed t (95)	Sig (2-tailed)
	M	SD	M	SD		
Supervisory Styles	3.2969	.47227	3.1743	.49525	1.944	.053

Source: Survey data

An Independent Samples t-test was conducted to compare the perception of supervisory styles between male (M = 3.296, SD = 0.47) and female (M = 3.174, SD = 0.49) groups. The assumption of equal variances was tested using Levene's Test, which indicated no significant difference in variances between the groups. The t-test results, assuming equal variances, showed no significant difference in the perception of supervisory styles between male and female groups ($t(95) = 1.944, p = 0.053$). Therefore, there is insufficient evidence at the 5% level of significance to conclude that there is a difference in the perception of supervisory

styles between male and female non managerial employees in the selected apparel organisations. Based on this H2 is not accepted.

In the context of the Sri Lankan apparel industry, “production targets can escalate to 200-250 pieces every thirty minutes” (Global Labor Justice, 2023, p.18). Supervisors in this industry face immense pressure to ensure maximum productivity from their teams. Despite this pressure, the statistical analysis indicates that both male and female non managerial employees perceive supervisory styles similarly. This lack of difference in perception may be due to the uniformly high pressure experienced by all employees, regardless of gender. The Sri Lankan apparel industry has implemented aggressive strategies to survive and recover from the COVID-19 epidemic and economic downturn, often at the expense of employee well-being and engagement (Manjaree & Shakyara, 2023). These strategies, including cost-cutting measures such as reducing wages, increasing workload, and enforcing inflexible production targets, create a work environment where supervisory styles perceived uniformly due to the consistent stressors faced by all employees.

Discussion and Recommendations

Managerial implications

Based on the findings of the study, there are several managerial implications worth considering. Firstly, the significant negative impact of supervisory styles on non-managerial employees' affective commitment underscores the importance of supervisors adopting more supportive approaches rather than poses of task-oriented or abusive supervisory styles at work. The Management of apparel organisation must walk the talk and lead the way, knowing the negative effects of uncomfortable behaviours of supervisors. Therefore,

organizations in the Sri Lankan apparel sector should invest in training programs for supervisors to enhance their leadership skills and promote a positive work environment (Kidd & Smewing, 2001; Radstaak & Hennes, 2017). Further, management needs to recognize that supervision is part of an ongoing exchange of information that can be perceived differently by employees. As with any type of communication in conflict resolution, both sides need to consider their roles and work to repair the relationship. More significantly, Supervisors should not only be interested in finding faults in employees, but more importantly, dialogue with employees to identify their strengths, weaknesses, desires, both personal and educational background which can be helpful to improve their job knowledge, skills and experiences. Also, management should create a work environment that is conducive to guarantee organizational co-existence which facilitates employees' responsiveness to supervision and thereby improving their affective commitment towards the organization. Additionally, gender did not significantly influence the perception of supervisory styles, suggesting a uniformity in how male and female employees perceive their supervisors' behaviors, at least in this study. As dissimilar employees often suffer from social exclusion. Because supervisors often prefer interactions with similar employees and exclude dissimilar employees from interpersonal interactions and networks. (Seong et al., 2015., Adamovic et al, 2023). Therefore, gender should not be a serious matter in recruitment in Sri Lanka apparel industry. However, this finding should prompt organizations to ensure that supervisory practices are equitable and supportive across all employees, regardless of gender.

Limitations

The results of this study were based on self-reports and from the perspectives of the non-managerial employees of the selected only apparel organization in the western province Sri Lanka. And the study relied solely on self-reported data

from non-managerial employees, which means it focused on perceptions rather than direct observations of supervisor behavior. This approach can introduce biases, such as respondents feeling inclined to agree with positive statements or consistently rating supervisors highly or lowly. Additionally, since many participants rated different supervisory style, there could be overlap in their responses, potentially affecting the data's independence and the study's overall findings. In addition, gender alone is not sufficient to explain perception of supervisory styles. Therefore, the study also did not include other variables that may influence the difference in the perception of supervisory style.

Conclusion

These results highlight the important role that supervisors play in shaping affective commitment. The findings revealed that supervisor style has a negative impact on affective commitment, highlighting the importance of supportive, abusive and task-oriented approaches in fostering employees' attachment to the organization. However, there was no significant differences between male and female employees' perceptions of supervisor style, and consistent perceptions were found across gender in the situations studied.

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The Impact of Quality of Occupational Health and Safety Practices on Job Performance among Operational Level Employees in Maritime Industry

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The purpose of this research is to examine the impact of the quality of occupational health and safety practices on job performance among operational level employees in the maritime industry. Extensive studies have been conducted on quality of occupational health and safety practices and job performance in the construction and hospital industries. However, there is limited research focus on the maritime industry. This research was conducted using a survey research methodology. Questionnaire was developed under standard measurement scales. The 135 selected sample was drawn from population using a simple random sampling technique. The collected data were analyzed using multiple linear regression analysis method. According to the output, the alternative hypothesis was tested and the result shows that the quality of occupational health and safety practices has a positive effect on job performance. Also, the level of quality of occupational health and safety practices and the level of job performance were moderate in the maritime industry. To overcome the limitations, future researchers can work on different type of employees including managers with the same theme, can examine other factors affecting job performance and increase the generalizability.

Keywords: *Job Performance, Maritime Industry, Occupational Hazards Prevention, Quality of Occupational Health and Safety Practices,*

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Introduction

Human resources are one of significant factors of any organization. It aims to use people to achieve organizational goals. According to Opatha (2003) the main purpose of HRM is to retain a favorable and satisfied workforce. For that the organization should have the best occupational safety and health practices which help to prevent and reduce issues in the working environment. Occupational health and safety management has become a major interest area for companies. Managing workplace safety is important for both company and its workers, if not it can be seriously affect an employee's wellness and subsequently job performance (Boyar, 2014).

This study investigated the Maritime industry which remarkably committed to development of the countries. Employees play a strategic role in this industry to achieve the organizational as well as government goals to gain more dollars to country and the society. It is estimated that shipping industry contributes more than 75% of the volume of world trade in commodities and manufactured products. After a 3.8 percent decline in 2020, international maritime trade rebounded in 2021 with an estimated increase of 3.2 percent and total shipments of 11 billion tons. Before container volumes declined in 2019, containerized cargo flows performed remarkably well (UN, Review of Maritime Transport 2022, 2022).

When it comes to the Sri Lankan context our island is strategically located in the Indian Ocean which is a central for all of South Asia shipping route. Because of this Sri Lanka is a strong competitor in the global shipping sector. However, Sri Lanka Ports Authority 2022 (SLPA) data shows that Colombo Port's container throughput declined by 5.3 percent year-on-year (YoY) to 6.86 million TEUs due to transshipment and lower volumes of imported containers. Transshipment volume handled by the port decreased 3.7 percent year-on-year to 5.63 million TEU, while transshipment volume accounted for 82 percent of the port's container output during the period of 2020.

Import container (loaded) volume fell sharply by 19.4 percent year-on-year to

441,062 TEU, while export container (loaded) volume fell 5.2 percent year-on-year to 301,447 TEU. Also, Colombo Port's actual capacity also declined by two percent year-on-year to 196,269 TEU. The Colombo International Container Terminal (CICT), the port's only fully operational deep container terminal, handled 3.18 million TEUs during the year, a slight decrease of 0.9 percent from the 3.21 million TEUs recorded in 2022. 1 million TEUs handled in 2021. Container volume handled by the South Asia Gateway Terminal (SAGT) decreased by 4.7 percent to 1.75 million TEU during the year. Total shipping traffic at Colombo Port recorded a decrease of 0.7 percent year-on-year to 3,648 vessels (Container throughput at Colombo Port drops, 2023).

The performance of employees is determined by various factors in the workplace. However according to (Kaynak, 2016), occupational health and safety practices are the main component of determining job performance. A good understanding of these practices helps in avoiding workplace injury hazards. Maritime industry the goal of a quality is to ensure that an organization's services meet established standards and expectations. Many researchers have formed a general opinion that quality and safety performance support the development of the organization's competitiveness and it ensure a basis for strengthening their planning and implementation.

Although there are many extensive studies on the topic of quality of occupational health and safety practices and job performance in the construction and hospital areas, there are few studies on the topic of the maritime industry. So, this study aims to overcome this gap issue by determining how important the quality of occupational health and safety practices affects employee performance in maritime industry.

Statement of Problem

Considering the port employment performance measured by using internationally recognized container throughput evidences as above, it appears that after 2019 the maritime industry is facing a critical situation not only in Sri Lanka but globally (UN, 2022), (Danelia, 2021) and (Container throughput at Colombo Port drops,

2023).

Job performance is behavior at work that contributes to organizational goals (AA Arulrajah, 2016). Job performance contribute directly or indirectly to the achievement of the organization's goals. Health and safety practices can improve by proper job design, testing and evaluating individual engagement with organizational goals. Every organization should have quality occupational safety and health practices which is the main factor in determining job performance. Social exchange theory, Plan-Do-Check-Act” Deming Cycle (PDCA), Continuous improvement cycle (CIC) model explain more deeply about how these quality of occupational safety & health practices of job performance connect with each other further. (ILO, OSH Management System: A Tool for Continual Improvement, 2011) There are several studies relating to health & safety practices on job performance especially in construction sector & hospital areas. In Sri Lanka context, there are less research focus on of quality of occupational health and safety practices specially related to maritime industry during the post pandemic eras.

Therefore, the research problem of this study is: What is the impact of Quality of occupational health and safety practices on job performance among Operational Level Employees in Maritime Industry?

In order to resolve above research problem following research questions will be assisted.

1. What is the level of quality of occupational health and safety practices among operational level employees in Maritime Industry?
2. What is the level of job performance among Operational Level Employees in Maritime Industry?
3. What is the impact of Quality of occupational health and safety practices on job performance among Operational Level Employees in Maritime Industry?

Research Objectives

The objectives mentioned below were established to assist the above research questions.

1. To determine the level of quality of occupational health and safety practices among operational level employees in Maritime Industry.
2. To determine the level of job performance among Operational Level Employees in Maritime Industry.
3. To determine the impact of Quality of occupational health and safety practices on job performance among Operational Level Employees in Maritime Industry.

Literature Review

Occupational Health and Safety

Occupational safety and health is a system that prevention of work-related injuries, illnesses, and protection or improvement of workers' health. This is a helps to achieving the 2030 Agenda for Sustainable Development. According to the International Labor Organization, occupational health is maintenance of the highest level physical and mental health and social well-being in all working environments. Also, safety can describe as the state of being away from hazards generated by natural forces or human error (ILO, 2016).

Costs of Inappropriate Maintains of Health and Safety

Improving health and safety practices is crucial these days as psychosocial risks and work-related stress are increasingly concerning to many employees in the workplace. Because it ultimately increase the direct or indirect costs of an organization's health and safety. Improper workplace design, avoidance of structure of work, hostile work environment, poor man-machine design and improper programs cause workplace accidents, worker health and injuries (Shikdar, 2003).

Also, it increases high compensation, high legal cost, high turnover, high absenteeism, low job satisfaction, low goodwill, low citizenship behavior and loss of customer satisfaction to the organization (Kularathna & Perera, 2016).

Labour Standards and Law on Occupational Health and Safety

The challenge of worker Health and Safety has been around for as long as people work or work in workplaces. Employers are responsible for the safety and well-being of their work. On the other hand developing, implementing and maintaining an occupational health and safety policy make good economic benefits as well.

Elements of Quality of Occupational Health and Safety Practices

Safety Procedure and Risk Management

Risk management is mainly good management practice. This is a scientific way of setting context, identifying, analyzing, monitoring and communicating risk-related activities and processes to help the organizations to minimize losses and maximize opportunities (Osabutey et al., 2013). The main purpose of establishing safety procedure and regulation is to control workplace accidents, protect workers and regulate worker performance.

Health and Safety Rules

To implement those rules in the workplace, employers and employees must cooperate with each other's ideas (Umeokafor, 2014). Further health and safety rules provide the right to the safety of their workers which ensure international standards. Where occupational health and safety rules play a key role in preventing accidents and illnesses. And also introducing and improving rules to reduce accidents and illnesses in an organization.

Occupational Hazard Prevention

Many accidents happen due to not taking steps to avoid accidents within the organization. Also, accidents can occur due to insufficient training, poor use of personal protective equipment, lack of properly explained safety procedures for use and operation of tool (Rodriguez, 2020). Occupational hazard has a high possibility to cause many injuries and illnesses. Factors influencing occupational hazards in the workplace are Physical, chemical, social, biological and psycho-social factors (Kio, 2019).

Organizational Safety Support

According to Shikdar (2003) social exchange theory affect when the employer provides some form of wages, training, social emotional support to its employees, employees' helps to the organization achieve positive work-related outcomes. It represents two-way support system to protect organizational safety (Hofinann & Morgeson, 1999) explained that safety communication, safety commitment and hazards should be addressed under organizational support practices.

Job Performance

Job performance is defined as the contribution of an employee to achieve the overall performance of an organization. This can be improve by proper job design and evaluating personal engagement with work. Job performance is a work behavior that can contribute to organizational goals.

According to Motowidlo (1993), task performance and contextual performance are two types of employee job performance which important for effectiveness. The performance of employees in the workplace is affected by many factors such as emotional commitment, compensation and benefits, organization management, organizational commitment, and work design. (Rokaya Saeed et al., 2013) says it means performing job tasks according to the formal job description.

Research Methodology

Occupational health and safety is a part of human resource maintenance. It helps to retaining employees to be loyal to the company, increasing employee motivation, and ultimately improving employee performance (Pandesiang, 2017). As disused after 2019 performance statistics of local and global maritime industry, it is clear that they are facing critical situation which is gradually reducing their performance. (UN, 2022), (Danelia, 2021) and (Container throughput at Colombo Port drops, 2023).

Hypotheses of Study

Companies must invest in occupational hazard reduction practices to improve their safety performance. As per Yusuf (2012), when management provide safety and comfort to their employees in the workplace, then workers improve their job performance.

This study represents workplace health and safety practices have an impact to the performance and have correlation with performance which helps to take decisions for every company to train or implement workplace health and safety programs to improve their performance (Jelimo, 2013).

Here are the testable hypotheses which are reviewed by the literature.

H1: There is a significant impact of quality of occupational health and safety practices on job performance

H2: There is a significant impact of safety procedure & risk management on job performance

H3: There is a significant impact of health and safety rules on job performance

H4: There is a significant impact of occupational hazards prevention on job performance

H5: There is a significant impact of organizational safety support on job performance

Conceptual Framework of the Study

Building on the evidence in extant literature quality of occupational health and safety practices are identified as independent variable affecting on the dependent variable of the current study; job performance.

The hypothesized relationship among the variables is shown as follows.

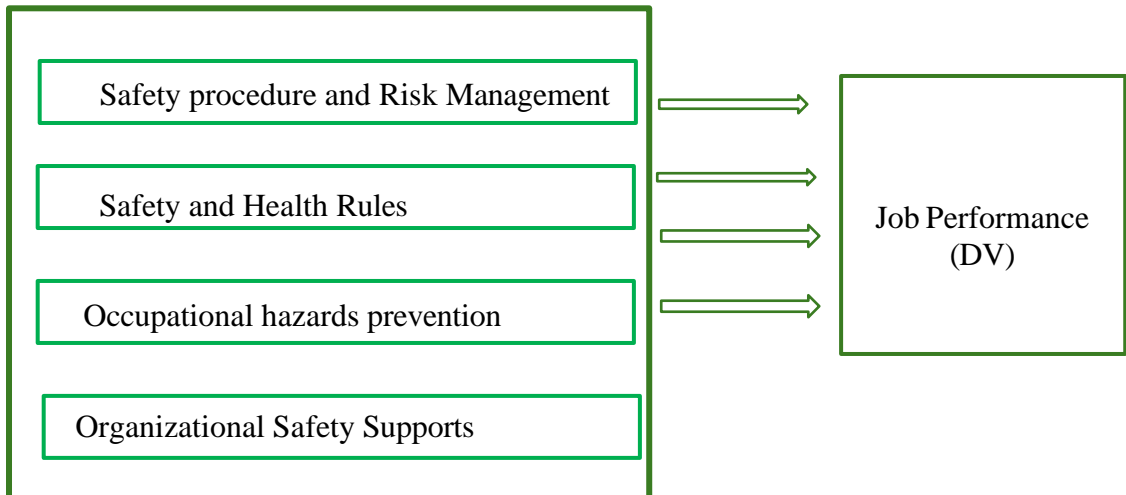


Figure 1

Quality of Occupational Health and Safety Practices (IV)

Source: Author, 2023

Research Design

The current study is a quantitative and primary data collected from Operational Level Employees in maritime industry via an online questionnaire survey made in English language. It was designed based on standard measurement scales.

The questionnaire consist of three sections and developed by previous researchers. In this study operational level employees in ABC container terminal at the port of Colombo are considered as population and also collect the data in none control environment. In here employees are selected from simple random sampling method. Sample is selected random basis. The data analyzed by using Statistical Package for Social Sciences (SPSS).

Unit of Analysis

The unit of analysis is the base of the entity that the researcher analyzes in the course of the study. These may be individuals, groups, artifacts, geographical units, and so on. On the other hand, it helps the researcher to determine what is being studied and what aspects are being studied. In this study, the problem statement focused on the Impact of Quality of Occupational Health and Safety Practices on Job Performance: evidence from maritime industry in. Hence, a unit of analysis is operational level employees at ABC Container Terminal at the Port of Colombo in this research.

Population, Sample, and the Sampling Technique

Population

This research, the target population is employees in maritime industry. The researcher has selected operational level employees in ABC container terminal at the port of Colombo used as the study population of the study. There are approximately two hundred 200 employees are available under the operational level.

Sample

In this research, two hundred seventeen (132) employees need as a sample in the study according to the Krejcie and Morgan Table (1970). This questionnaire were sent to operational level employees without having any special preference.

Sampling Technique

For this study the researcher has selected one of the random sampling methods which is simple random sampling. In this method each member of the subset has an equal probability of being chosen for the sample.

Data Collection

Primary data was collected using a self-administrated. Due to time, access to busy work nature of the respondents questionnaire method is best method is the best method to collect more reliable information. Further it reduces shortcoming in the gathering data and it assure the reliability and autonomy of participant's feedback. The questionnaire is design to measure the two variables which are quality of health and safety practices and job performance. The question items used in the questionnaire is taken from developed by earlier researcher which is standard measurement scales anchored on 5-point Likert scale. Section A cover questions related to demographic and personal aspects of respondents and it consist of multiple-choice questions. The personal aspects which are covered in the section A are age, material status, education background and work experience. Section B consist with the independent variable of quality of health and safety practices and Section C questions developed by using dependent variable of job performance.

Reliability Statistics

The rule of thumb for accepting reliability is Cronbach's alpha should be greater than 0.7 or else if it is dimension Cronbach's alpha needs to be greater than 0.5. This study, Cronbach alpha of internal consistency coefficients of the independent variable and dependent variable are greater than 0.7 which is Quality of Health and Safety Practices 0.879 and Job Performance is 0.715. This indicating that scales are reliable enough and have no bias. It shows that all items played a significant role in the conceptualization of the respective constructs.

Validity Statistics

According to (Sekaran, 1992) validity should to be tested to make sure whether the scale has ability to measure the intended concept. Two types of validity can be identified as, face validity and content validity.

Sampling adequacy were measured using the Kaiser-Meyer-Olkin (KMO) and the KMO coefficient is greater than 0.6 for both variables, and the Sig. value is less than 0.05 of sample of 135 means it is adequate enough to proceed. So, sampling adequacy meets the minimum criteria.

Table 1

Results of the KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.718
Bartlett's Test of Sphericity	Approx. Chi-Square	686.117
	df	378
	Sig.	.000

Source: Author, 2023

Table 1

Descriptive Statistics

Descriptive Statistics	Safety Procedure and Risk Management (IV- 1)	Safety and Health Rules (IV- 2)	Occupational Hazards Prevention (IV- 3)	Organizational Safety Supports (IV- 4)	IV (1+2+3+4) QOHSP	Job Performance
Mean	2.523	2.812	2.707	2.683	2.607	2.952
SD	0.395	0.375	0.332	0.369	0.273	0.305
Max	3.60	4.00	3.81	3.70	3.78	4.00
Min	2.00	2.20	2.00	2.00	2.14	2.30
Skewness	0.343	0.786	0.801	0.689	1.310	0.953
Kurtosis	-0.069	1.314	1.039	-0.317	1.827	1.994

In this research aims to identify the impact of quality of occupational health and safety practices on job performance among operational level employees in maritime industry. To achieve the objectives of to determine the level of quality of occupational health and safety practices among operational level employees in Maritime Industry. and to determine the level of job performance among Operational Level Employees in Maritime Industry researcher used to mean analysis. According to the table to identify the 1st objective; to determine the level of quality of occupational health and safety practices among operational level employees in Maritime Industry is currently overall in moderate level. Also as 2nd objective; to determine the level of job performance among operational level employees in maritime industry, is currently overall in moderate level which is 2.95 mean value. According to the above two objectives, improving the quality of occupational health and safety practices and job performance has been shown to help raise the overall quality level of current occupational health and safety practices and job performance in the maritime industry.

Testing for Linearity

Researcher has used scatter plot to evaluate linearity between each independent variables and the dependent variable. As a results all independent variables demonstrate positive linear relationship to the dependent variable.

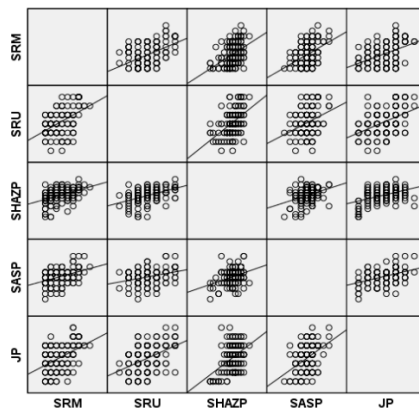


Figure 2
Scatterplot

Source: Analyzed data, 2023

Regression Model Analysis

Since the assumptions of Normality, Linear relationship and Multicollinearity has been checked in above, the database fits into the regression model. To achieved the 3rd objective of this research; to determine the impact of quality of occupational health and safety practices on job performance among Operational Level Employees in Maritime Industry below hypothesis to be tested.

To measure overall impact of quality of occupational health and safety practices on job performance used simple regression analysis and each sub dimensions tested for hypothesis via multiple regression model.

Simple Regression Model Analysis

H1: There is a significant impact of quality of occupational health and safety practices on job performance.

Table 3

Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.344	.221		6.094	.000
	QOHSP	.553	.084	.495	6.570	.000

a. Dependent Variable: MENYJP

According to the results of output H1c is accepted. It statistically says there is a significant impact of quality of occupational health and safety practices on job performance. Also the coefficient for constant term is significant because its p-value 0.000, which is smaller than 0.05.

Multiple Regression Model Analysis

Table 4

Model Summary

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.691 ^a	.549	.329	1.20082

a. Predictors: (Constant), SASP, SRU, SHAZP, SRM

b. Dependent Variable: JP

According to the results illustrated about R² is 0.549 with an adjusted R² of 0.691. It indicates that the fitted model can explain 0.69 of the variance in job performance.

ANOVA test on the regression model.

Table 5

ANOVA test results

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	100.543	4	25.136	17.432	.000 ^b
	Residual	187.457	130	1.442		
	Total	288.000	134			

<0.05 in order to consider model as statistically significant. According to results illustrated in table, the model was proven to be significant. Therefore, the research shows that that current model explain the significant amount of variance of dependent variable performance.

Analysis of Model Coefficient

Table 6

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4.310	1.069		4.031	.000
SRM	.126	.063	.176	1.998	.048
SRU	.209	.089	.203	2.343	.021
SHAZP	.102	.046	.189	2.238	.027
SASP	.233	.083	.223	2.804	.006

a. Dependent Variable: JP

Based on the above decisions rule researcher has concluded the following findings.

The coefficient for constant term (4.310) is significant. Because its p-value 0.000, which is smaller than 0.05. Further, the coefficient for independent variables and dependent variable is also significant because their p-values are smaller than 0.05.

Validity of Hypothesizes

Table 7

Illustrates the acceptability of hypothesizes based on the analysis

Hypothesis	Sig. Value	Result
H1: There is a significant impact of quality of occupational health and safety practices on job performance.	.000	Accepted
H2: There is a significant impact of safety procedure & risk management on job performance	.048	Accepted
H3: There is a significant impact of health and safety rules on job performance	.021	Accepted
H4: There is a significant impact of occupational hazards prevention on job performance	.027	Accepted

H5: There is a significant impact of organizational safety support on job performance

.006

Accepted

Summary of Findings

To acquire a competitive and strategic advantage over the market, most organizations now pay close attention to quality of occupational health and safety practices. This study is being conducted as a quantitative research study. In addition, to attain the research aim of this study questionnaire survey was used. Simple random sampling methods were used to select a sample. The research population for the study is 200 operational level employees, from a leading maritime industry company in Sri Lanka. But this study required a sample size of 132 according to Krejci and Morgan's table. The sample used 135 questionnaires for analysis. Further, SPSS used to analyze survey data.

1st two objectives are tested via descriptive statistics and used mean analysis for understand the current level quality of occupational health and safety practices and job performance in Maritime Industry which is currently in moderate level.

This study passed the minimum value of Cronbach's Alpha which is 0.6 and ensured the scale is reliable. Furthermore, the KMO tests showed that the scale is valid. Results and skewness and kurtosis depicted that the data set is normal which resulted, the researcher to proceed with the Pearson correlation and the Linear regression. From the correlation analysis, the researcher found there was a positive correlation between the independent variables and the dependent variable.

After applying the linear regression analysis, the researcher found that all the advanced hypotheses were accepted. It means there is a significant relationship and impact between the independent variable and the dependent variable. The test of hypotheses revealed a coefficient of multiple determination as indicated by the Adjusted R² which showed that the regression were able to explain 69% of the variations in job performance.

The model coefficients result showed the two constructs of quality of occupational health & safety practices used in the study had significant values below 0.05 ($p = 0.000$). It indicates that significant positive influence of the quality of occupational safety and health practices on job performance in the maritime industry which is the 3rd objective of to determine the impact of Quality of occupational health and safety practices on job performance among Operational Level Employees in Maritime Industry.

Conclusion

The main objective of this study is to investigate the relationships among quality of occupational health and safety practices and job performance. The researcher has selected one of the leading container terminal in Sri Lanka as the sample. Several important findings are identified through this study and overall results shows health and safety practices have a significantly positive impact on job performance.

Based on the results of the study, it is concluded that quality of occupational health and safety practices on employee job performance level is currently moderate level in Sri Lankan maritime industry. So, having proper safety procedure and risk management process, safety and health rules, hazard prevention and adequate control measures and provide regular organizational safety supports are essential to reduce the rate of occupational accidents and injuries, improve a favorable working environment and improve employees.

Limitations and Delimitations of the Study

There are number of limitations that this study needs to highlight which are this study was conducted for a very limited period and number of questionnaire distributed was limited. Also for this it used the self-reported questionnaires distributed was limited only for ABC container terminal port of Colombo, Sri Lanka. Also, due to the ethical issues name cannot be reveal. Further data collect from one sector by using only English medium questionnaire. So, generalizability and understanding the real

meaning issue and lack of prior research in this maritime industry is being limitation.

Discussion and Recommendation

To overcome the above limitations and delimitation future researchers can go with better sample with the same theme including other ports employees where Quality Occupational health and safety practices is an issue. Hence, it is suggested that future work would look at other types of industries in exploring Quality Occupational health and safety practices as to improve generalizability. And also suggested to increase the generalizability and can distributed Sinhala language translated questionnaire.

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Enhancing Online Shopping Behavior: A Deep Dive into Website Personalization, Usability, Content, and Trust Among Women, Sri Lanka

Prasadani, V. D. A.¹ and Niwarthana, H. W. R.²

With the increasing popularity of online shopping facilitated by the Internet, consumers are increasingly electing for the convenience and advantages offered by online platforms over traditional brick-and-mortar outlets. The research explores into the impact of Website Personalization (WEP), Website Usability (WEU), Website Content (WEC), and Website Trust (WET) on the Online Shopping Behavior (OSB) of the targeted demographic. The study employs rigorous methodologies to draw generalized conclusions based on the responses of 312 participants from the Central province. The sample respondents were selected through a convenience sampling method, comprising online retail customers who have either visited or made purchases from clothing websites. Results indicate a positive influence of WEP, WEU, WEC and WET on OSB, with significant relationships identified. Notably, WEU emerges as the most influential factor, as evidenced by its highest value in correlation analysis. The implications of the study's findings are discussed, and recommendations are provided based on the identified factors. The research contributes valuable insights to the understanding of OSB in the context of clothing websites, providing stakeholders with actionable information to enhance their platforms and better cater to the preferences and needs of Central province Sri Lankan female customers.

Keywords: *Online Shopping Behavior, Website Content, Website Personalization, Website Trust, Website Usability*

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Introduction

The trend of online shopping has increased into a global phenomenon over the years, shaped by a diverse formation of factors ranging from product offerings to the digital experience (Sharma et al., 2019a). Worldwide organizations have increasingly accepted online platforms to support virtual connections with their customers, marking a significant trend in consumer behavior. Strategic consumer decisions, facilitated by internet accessibility, have further impulse the growth of online shopping, demonstrating its predictive potential ((Kumar & Kashyap, 2018).

Consumer behaviors across web pages during the shopping journey vary dramatically today, highlighting the significant role of websites in engaging and retaining customers (Boardman & McCormick, 2021). Effective websites are diverse, integrating personalized experiences, intuitive usability, and compelling content to cater to different types of consumer needs. This study seeks to explore how website personalization, usability, and content collectively influence consumer online shopping behaviors.

In modern society, lifestyle shifts and changing attitudes have driven the preference for online shopping over traditional physical retail visits (Machi et al., 2022). According to Sheikh et al. (2015) consumer engagement with clothing websites is notably high, especially among women who are attracted by the ease and diverse options available on the internet. Despite global advancements, the utilization of websites by retailers in Sri Lanka remains relatively low. Efforts by the government to enhance technological infrastructure aim to bolster online business growth, reflecting broader shifts from offline to online shopping platforms. The increasing prevalence of online transactions underscores websites as pivotal in modern consumer activities, influencing purchase decisions through factors like personalization, usability, content relevance, and trust (Gupta & Bansal, 2016). This study builds on previous research examining the impact of website personalization,

usability, content, and trust on consumer behavior. It focuses specifically on Sri Lankan female consumers in the Central Province, targeting clothing websites. By addressing these factors collectively, this research aims to provide comprehensive insights into their influence on online shopping behaviors.

The Theory of Planned Behavior (TPB) serves as a theoretical framework, exploring the aspects of online shopping behavior in an e-commerce context (Awa et al., 2015). However, the dynamics of online shopping suggest a request for refined understanding beyond traditional trade behaviors. The researchers of this study endeavors to address the following research problem.

Research problem: What is the impact of website personalization, usability, content, and trust on online shopping behavior among Sri Lankan female consumers

Research Objectives

The study aims to achieve the following objectives:

- i. To identify the impact of website personalization, usability, content and trust on online shopping behavior of female consumers to clothing websites.
- ii. To identify the most influencing factor on online shopping behavior among website personalization, usability, content and trust of female consumers to clothing websites.

Literature Review/ Conceptualization & Hypotheses Development

Literature Review

The literature review explains key aspects influencing online shopping behavior, focusing on the Theory of Planned Behavior (TPB), which discusses how attitudes and subjective norms shape consumer intentions in online contexts. Theory of Planned Behavior (TPB) is the underpinning theory for online shopping behavior. Theory of Planned Behavior was introduced to predict the behavioral intentions of people and it describes how a customer is led to a particular buying behavior (Saleem

et al., 2022). Online shopping provides key advantages such as convenience and accessibility, fostering its popularity over traditional retail. Further, online shopping is a type of e-commerce which enables clients to directly acquire products or services by any retailer through internet using websites. Online shopping got much popularity in the users of Internet (Bourlakis et al., 2008). Website personalization is the process whereby products and services are tailored to match individual preferences utilizing consumer data (Montgomery & Smith, 2009). Website personalization experiences based on consumer data, generating satisfaction and driving engagement. Usability refers to the extent to which a website facilitates users to utilize its functions easily and appropriately (Pant, 2015). Usability discusses key aspects influencing online shopping behavior, focusing on the Theory of Planned Behavior (TPB), which indicates how attitudes and subjective norms shape consumer intentions in online contexts. Online shopping offers various advantages such as convenience and accessibility, fostering its popularity over traditional retail. Website personalization experiences based on consumer data, enhancing satisfaction and driving engagement. Usability ensures efficient website navigation, which is important for positive user experiences and commercial success. Content of a website includes a range of materials such as details related to the product and services offered, order status, corporate policies, and public relations of that particular organization.

The availability of information on a website is significantly important and it is critical for potential online customers (Thongpapanl & Ashraf, 2011). Website content influences consumer decisions by providing accurate information and reducing perceived risk. Trust is defined as a group of beliefs held by a person derived from his or her perceptions about certain attributes; in marketing this involves the brand, products or services, salespeople, and the establishment where the products or services are bought and sold (Geyskens et al., 1998). A Trust in websites and brands significantly impacts

consumer behavior, affecting purchase decisions and customer loyalty. Overall, these factors highlight the complex interconnection between consumer psychology, technological interfaces, and marketing strategies in e-commerce.

Conceptualization

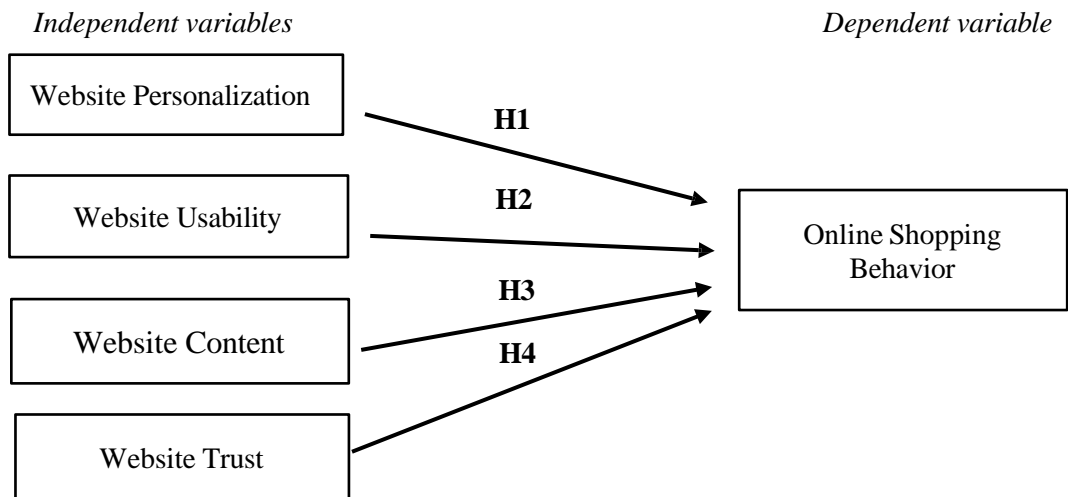


Figure 1

Conceptualization

Source: Author developed based on the literature

Hypotheses Development

Personalized information technology services in websites have become a universal phenomenon in today's business world. Most worldwide companies use their websites to provide personalized offerings and unique experiences to customers. To address the impact of personalization of websites, the present study develops by generating a hypothesis. The rapid increase of websites has turned the websites into an essential touchpoint of corporate service (Varadarajan & Yadav, 2009). Several previous studies have tested how website personalization impacts online shopping behavior.

Similarly, Bashar and Rabbani, (2021) have examined the model of website personalization and its factors that influence the online shopping behavior of customers. Furthermore, Thongpapanl and Ashraf, (2011) have investigated how website features such as website personalization impact online shopping behavior among online customers. Hence the following hypothesis is developed to assess how website personalization impacts online shopping behavior. Therefore, to address the impact of the personalization of websites, the present study develops a hypothesis;

Hypothesis 1 (H1) – Website purchase impacts on online shopping behavior

Website usability is the user's beliefs about the technology that enhances the efficiency and less effort to use the website. Website usability is a significant factor for a website of e-commerce and the main objective of it is presenting information as vividly as possible without any scope of ambiguity. Several previous studies have tested how website usability impacts online shopping behavior. According to Rawwash et al. (2020), website usability impacts on online shopping behavior. In addition, Ariff et al. (2013) have discovered that web-based factors including website usability positively affect online shopping behavior. Similarly, perceptions of website usability impacts on online shopping behavior (Pratesi et al., 2021). Therefore, to address the impact of the usability of websites, the present study develops a hypothesis;

Hypothesis 2 (H2) – Website usability impacts on online shopping behavior

Website content indicates the richness of the information contained in the website which includes information about the organization, products, non-commercial information, and transaction details including payment options and shipping. Several previous studies have tested how website content impacts online shopping behavior. According to Richard et al. (2010), website content impacts online shopping behavior. Furthermore, website content can provide further product

knowledge for its share and impact on the enjoyable shopping behavior of customers (Demangeot & Broderick, 2007). Therefore, to address the impact of the content of websites, the present study develops a hypothesis;

Hypothesis 3 (H3) – Website content impacts on online shopping behavior

Website trust can be identified as an important factor that can develop relationships with e-commerce customers. There were previous studies that have tested how website trust impacts online shopping behavior. Pavlou and Fygenson (2006) has been suggested that website trust has a direct impact on online shopping behavior. Also, website trust can play an important role because it is important to undertake while analyzing the online shopping environment through websites. Further, the trust of the consumers in the website impacts the behavior of customers for shopping purposes (Wu & Yu, 2020). According to Eneizan et al. (2019), trust is highly influential on the customer's behavior towards online shopping. Hence, to address the impact of website trust, the present study develops a hypothesis;

Hypothesis 4 (H4) – Website trust impacts on online shopping behavior

Research Methods

Research philosophy forms the foundational beliefs and assumptions guiding the development of knowledge within a study. For this study, positivism serves as the primary research philosophy. Positivism aligns with the use of quantitative data, which allows for accurate predictions and empirical testing of hypotheses. This philosophical position is well-suited given the availability of tangible quantitative data related to website personalization, usability, content, and trust, and their impact on online shopping behavior (Saunders et al., 2012). Descriptive research design relates to reflecting the experiences of respondents and it has appropriate framework. As an example, the demographic characteristics of a population subgroup can be reported. This research study is done with descriptive research design and sample,

sample size and sampling technique are done according to the true experience of respondents.

Purpose of the present study can be identified as descriptive hypotheses testing. Hence, researcher has to identify the influence of dependent variables including website personalization, website usability, website content and website trust on online shopping behavior. Researcher of the present study will try to carry out a descriptive study, to further comprehend and investigate the notion of issues since not many researches has been directed on website personalization, usability and content on online shopping behavior to Sri Lankan female consumers. Since the main purpose of this study is to examine the relationship between the variables, it can be considered as the correlational study.

The researcher has planned to conduct this study in non-contrived setting by taking a Sri Lankan female consumer who does shopping from clothing websites as a unit of analysis. A structured questionnaire will be provided to respondents to collect the data. According to Sekaran et al. (2003), the unit of analysis of this research study is an individual level, a female customer who purchases from clothing websites.

Research data were collected in present study as the first time and it will be a single cross-sectional study since the researcher has decided to collect data at a one point in time. The population of the present study consists of female customers in Central province who do shopping from clothing websites. Sample can be identified as the representative segment of a larger population (Bryman & Cramer, 2011). The present study aimed to identify respondents who do online shopping from clothing websites of Central Province female customers.

The sample size of this research study was 312 female customers in Central Province who do shopping from clothing websites (Krejcie & Morgan, 1970). Present study has been used primary data through the self-administrated and structured questionnaire with 5 Point Likert Scale to collect the primary data.

By using the structured data collection through the questionnaire, present study has

been used IBM SPSS Statistics 26 to analyze the data. Study has been used correlation analysis to identify the relationship between independent and dependent variables and regression analysis has been used to test hypotheses. Surveys are used in quantitative research studies and it involves sampling a representative proportion of the population.

Findings of the Study

Measurement of Validity and Reliability

Validity of the Questionnaire

Validity analysis indicates how accurately a method measures data. If a method measures what it claims to measure, and the results closely correspond to real-world values, then it can be considered valid. Keiser-Meyer-Olkin (KMO) sampling adequacy is mainly used to measure the validity as a result instrument.

In addition, all the factor loadings (KMO) values are above 0.7 and cumulative figure is more than 50% can be concluded multi-item measurement scale is validated enough.

Table 1

KMO and Cumulative Factor Analysis

Variable	Items	KMO	Loading Cumulative %
Website Personalization	5	0.836	69.611
Website Usability	6	0.836	72.385
Website Content	3	0.763	89.800
Website Trust	3	0.769	91.625
Online Shopping Behavior	8	0.904	78.615

Source: Survey data (2023)

Table 1 shows the validity output of the survey data. According to KMO of sampling adequacy all the factor loadings were more than 0.7. Based on the results, factor analysis is appropriate. Furthermore, all the cumulative figures of variables are more than 50%.

Hence, it can be concluded that measurement scale is validated enough

Reliability of the questionnaire

Normally, Cronbach's Alpha ranges between 0 to 1 and it indicates that there's no lower limit to the coefficient. Cronbach's Alpha coefficient is near to 1 it conveys the message of internally consistency of the items of particular variables.

According to the George and Mallery (2019), there are rules to interpret Cronbach's Alpha as following.

- $\alpha \geq 0.9$ - Excellent
- $0.9 > \alpha \geq 0.8$ - Good
- $0.8 > \alpha \geq 0.7$ - Acceptable
- $0.7 > \alpha \geq 0.6$ - Questionable
- $0.6 > \alpha \geq 0.5$ - Poor
- $0.5 > \alpha$ - Unacceptable

Table 2

Cronbach's Alpha

Variable	Number of Items	Cronbach's Alpha Value
Website Personalization	5	0.899
Website Usability	6	0.918
Website content	3	0.943
Website Trust	3	0.954
Online Shopping Behavior	8	0.961

Source: Survey data (2023)

Table 2 shows the reliability output of the survey data. According to George and Mallery (2019), the statistical figure of Cronbach's Alpha of website personalization was more than 0.8 and there was a good internal consistency among the five items of website personalization. Furthermore, the statistical figure of Cronbach's Alpha of website usability, website content, website trust and online shopping behavior

were more than 0.9 and there were excellent internal consistencies among the all items of above variables.

Multivariate Assumptions

Test of Normality

This study has been used one of the most common assumptions for statistical test procedures in the data to ensure the data set is normally distributed. Test of normality can be tested either graphical or numerical method.

For the graphical method, there are two types of illustrations including box plot analysis and histogram. In numerical method, researcher of the present study has been used Skewness and Kurtosis analysis.

Table 3

Skewness and Kurtosis Statistics

Variable	Skewness Statistic	Kurtosis Statistic
Website Personalization	-0.878	0.464
Website Usability	-1.132	1.088
Website Content	-1.648	2.886
Website Trust	-1.680	2.935
Online Shopping Behavior	-1.772	2.788

Source: Survey data (2023)

There is a statistical norm that if Skewness and Kurtosis slice between -3 and +3, the data set is normally distributed. Table 4.3 shows all the statistics of Skewness and Kurtosis are slice between under acceptable range. Hence, the data set of present research study has been normally distributed.

Test of Linearity

R squared is a measurement of how well in a linear regression model fits the data gathered from the questionnaire. Further, it can be discovered as the proportion of variance of the outcome Y described by the linear regression model. Hence, R squared value measures the strength of the relationship between research model and the dependent variable.

In general, R squared value slice between -1 and +1 shows that there is a linear relationship between particular independent variable and dependent variable of the model. Following table 4.4 shows the results from test of linearity of the present research study.

Table 4*R Squared Value*

Variable	R Squared Value
Website Personalization	0.703
Website Usability	0.775
Website Content	0.795
Website Trust	0.877

Source: Survey data (2023)

Table 4 shows all R-squared values between the dependent variables of online shopping behavior with separate independent variables. All R-squared values are slices between -1 and +1, and all are less than 1.

Therefore, the researcher has been proved that there is a linear relationship between dependent variable and independent variables in research model.

Test of Multicollinearity

Multicollinearity indicates the interrelationship among independent variables in multiple regression analysis. Tolerance level and VIP values can be used to measure

multicollinearity and tolerance level should be above 0.1 and the VIP value should not be more than 10 to run the regression analysis. According to Present study, table 4.5 shows that research output considerable level.

Table 5

Multicollinearity

Variable	Tolerance Level	VIP
Website Personalization	.286	3.495
Website Usability	.180	5.555
Website Content	.136	7.371
Website Trust	.153	6.525

Source: Survey data (2023)

Table 5 indicates tolerance level and VIP values of present study. Tolerance level of website personalization, website usability, website content and website trust are 0.286, 0.180, 0.136 and 0.153 respectively. All tolerance values were more than 0.01. Hence, multicollinearity assured according to tolerance level.

VIP values of website personalization, website usability, website content and website trust are 3.495, 5.555, 7.371 and 6.525 respectively and all VIP values were less than 10. Therefore, through the regression analysis of multicollinearity, present study has been assured multicollinearity.

Data Screening

Researcher has done linearity and multicollinearity analysis in order to identify missing values and if necessary to take actions for critical outliers. This questionnaire consists with 312 data sets and there were no any critical outliers in this study. No missing values were there. Hence, researcher has been done further analysis by using 312 data from respondents.

Descriptive Statistics

Table 6

Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Deviation
Website Personalization	1.40	4.80	3.4487	0.73668
Website Usability	1.83	5.00	3.6779	0.68200
Website Content	1.00	5.00	3.4850	0.86770
Website Trust	1.00	5.00	3.5235	0.85465
Online Shopping Behavior	1.00	4.63	3.5421	0.84636

Source: Survey data (2023)

Table 6 shows descriptive statistics calculated for four independent variables and one dependent variable. According to table 4.6, website usability has the highest mean value (3.67779) among other variables with 0.68200 standard deviation, 1.83 minimum value and 5.00 maximum value. Website personalization has the lowest mean value (3.4487) with 0.73668 standard deviation, 1.40 minimum value and 4.80 maximum value.

Minimum values of website content, website trust and online shopping behavior are 1.00 and maximum values are 5.00, 5.00, and 4.63 respectively. Hence, standard deviation of website content, website trust and online shopping behavior values are 0.86770, 0.85465 and 0.84636 respectively. Website content, website trust and online shopping behavior have the lowest minimum value (1.00) and online shopping behavior and website usability has the highest minimum value (1.83).

Hypotheses Testing

Hypotheses testing is a norm in statistic whereby analysis tests an assumption regarding a population parameter. Hence, hypotheses testing is used to access the acceptability of a hypotheses by using sample data. Hypotheses testing of present

study has been analyzed through correlation analysis and regression analysis. The study has been developed four hypotheses to identify the impact on independent variables on the dependent variable.

Regression analysis can be used to find out the impact of independent variable on dependent variable. Hence, to test the hypotheses of the study, regression analysis was performed and hypotheses can be tested by using P value (sig level) of each B coefficient of independent variables. Correlation analysis can be ranked statistical correlation according to Spearman and Pearson methods. Pearson analysis is widely used which measures the strength of the linear relationship between data. Current study has been used Pearson method because there was a linear relationship between variables of the study.

Correlation analysis

Correlation (matrix) analysis is used to identify the relationship between website personalization, website usability and website content. Those independent variables were applied to measure the impact on online shopping behavior. Table 4.7 revealed the rules of thumb about the strength of correlation and according to that, present study has been identified the correlation between variables.

Table 7

Rules of Thumb about the Strength of Correlation

Range of coefficient (+/-)	Description of Strength
0.81 to 1.00	Very strong
0.61 to 0.80	Strong
0.41 to 0.60	Moderate
0.21 to 0.40	Weak
0.00 to 0.20	None

Source: Hair et al., 2014

Table 8*Correlations*

Variable	Pearson Correlation	Sig. (2-tailed)
Website Personalization	0.839	0.000
Website Usability	0.880	0.000
Website Content	0.893	0.000
Website Trust	0.936	0.000

Source: Survey data (2023)

According to table 8, Pearson correlation of website personalization, website usability website content and website trust are 0.839, 0.880, 0.893, 0.936 respectively. All the variable values of Pearson correlation are in between the range of 0.81-1.00. Hence, the relationship between dependent variable and independent variables are very strong.

In correlation analysis of present study under 90% confidential level, P value should be less than 0.01. According to table 4.8, all the P values of variables are equal to 0.000 and all values are less than 0.01. Therefore, present study has been accepted the alternative hypotheses and rejected the null hypotheses.

Regression Analysis

Regression analysis is used to establish whether there is a mathematical relationship between variables of the study. Hence, through regression analysis, behavior of one variable can be used to measure the behavior of other variables. According to regression analysis of present study, it has been measured the impact on online shopping behavior on website personalization, website usability, website content and website trust.

Table 9*Model Summary*

Variable	R	R Square	Adjusted R Square	Std. Error of the estimate
Website Personalization	a 0.839	.703	.703	.46163
Website Usability	a 0.880	.775	.774	.40206
Website Content	a 0.893	.798	.797	.38113
Website Trust	a 0.936	.877	.877	.29729

Source: survey data (2023)

- a. Dependent Variable: Online Shopping Behavior
- b. Predictors: (Constant), Website Personalization, Website Usability, Website Content, Online Shopping Behavior

Table 4 represented the output of the regression analysis which interprets the model summary of the study. The regression coefficient of website personalization “R” is 0.839 according to present study. It can be identified as 83% that suggested a positive relationship between online shopping behavior with website personalization. In addition, in this model summary of website personalization, “R Squared” value is 0.703 and it represents that 70% of observed variability in online shopping behavior can be explained by the differences in the website personalization. Remaining 30% variance in online shopping behavior was attributed to other variables. According to the model summary of the preset study, that the value of website personalization “Adjusted R Square” is 0.703 and the value of “Standard Error of the Estimate” is 0.46163.

According to table 9, the regression coefficient of website usability “R” is 0.880

according to present study. It can be identified as 88% that suggested a positive relationship between online shopping behavior with website usability. In addition, in this model summary of website usability, “R Squared” value is 0.775 and it represents that 77% of observed variability in online shopping behavior can be explained by the differences in the website usability. Remaining 23% variance in online shopping behavior was attributed to other variables. According to the model summary of the preset study, that the value of website usability “Adjusted R Square” is 0.774 and the value of “Standard Error of the Estimate” is 0.40206.

By considering table 9, the regression coefficient of website content “R” can be identified as 0.893 according to present study. It can be identified as 89% that suggested a positive relationship between online shopping behavior with website content. In addition, in this model summary of website content, “R Squared” value is 0.798 and it represents that 79% of observed variability in online shopping behavior can be explained by the differences in the website content and remaining 21% variance in online shopping behavior was attributed to other variables. According to the model summary of the preset study, that the value of website content “Adjusted R Square” is 0.797 and the value of “Standard Error of the Estimate” is 0.38113.

According to table 9, the regression coefficient of website trust “R” can be identified as 0.936 according to present study. It can be identified as 93% that suggested a positive relationship between online shopping behavior with website trust. In addition, in this model summary of website trust, “R Squared” value is 0.877 and it represents that 87% of observed variability in online shopping behavior can be explained by the differences in the website trust and remaining 13% variance in online shopping behavior was attributed to other variables. According to the model summary of the preset study, that the value of website trust “Adjusted R Square” is 0.877 and the value of “Standard Error of the Estimate” is 0.29729.

Table 10*ANOVA Table*

Model	Sum of Squares	df	Mean Square	F	Sig.
Website Personalization	156.715	1	156.715	735.411	b .000
Website Usability	172.664	1	172.664	1068.121	b .000
Website Content	177.746	1	177.746	1223.648	b .000
Website Trust	195.377	1	195.377	2210.593	b .000

Source: Survey data (2023)

- c. Dependent Variable: Online Shopping Behavior
- d. Predictors: (Constant), Website Personalization, Website Usability, Website Content, Online Shopping Behavior

Table 10 shows the ANOVA table under regression analysis of the present study. Through this ANOVA table, can be identified the model fitness of the conceptual framework. There is a norm that Sig. value is less than 0.05, it gives the evidence to the model fitness of the conceptual framework.

Hence, the Sig. values of website personalization, usability, content and trust of the study are equal to 0.000 and all the values are less than 0.05. Hence, the model fitness of present study has been assured based on sig. value.

Furthermore, there is a norm that if the “F” value should be more than 100 to indicate there is a good model fitness of conceptual framework. The “F” value of website personalization, website usability, website content and website trust are 735.411, 1068.121, 1223.648 and 2210.593 respectively.

There is statistical evidence to prove that the model fitness of the study has been assured based on F value. Therefore, the model fitness of the conceptual framework of the present study has been assured.

Table 11

Coefficients

Variable	Unstandardized Coefficients		Sig. (P - value)
	B	Std. Error	
Website Personalization	.964	.036	.000
Website Usability	1.093	.033	.000
Website Content	.871	.025	.000
Website Trust	.927	.020	.000

Source: Survey data (2023)

Table 11 shows the coefficient values of the present study under regression analysis. According to the B values, they proved that website personalization, website usability, website content and website trust have impact on online shopping behavior.

Table 12

Hypotheses Testing

Hypotheses Number	Test Results	Status
Hypotheses One (H1)	Supported	Website personalization impacts online shopping behavior
Hypotheses Two (H2)	Supported	Website usability impacts online shopping behavior
Hypotheses Three (H3)	Supported	Website content impacts online shopping behavior
Hypotheses Four (H4)	Supported	Website trust impacts online shopping behavior

Source: Survey data (2023)

Discussion and Recommendation

Online shopping behavior can be identified as dominant chapter on today's business world. Many of the retailers are engage in developing and maintaining their e-commerce website in order to provide online shopping experiences to their customers. This study investigated that website personalization, website usability, website content and website trust on online shopping behavior to clothing websites. According to present study results, more than half (71.8%) respondents were less than 25. Therefore, it has been proved, majority of customers are young female customers who do online shopping from clothing websites.

Thongpapanl & Ashraf, (2011) have been investigated that website features including website personalization impact on online shopping behavior among online customers. Pappas et al. (2014) indicated that website personalization has significant impact on online shopping behavior. Present study findings show that B value of H1 is 0.964 and it shows the positive influence. Further, P-value is less than 0.05 under 95% confident interval and P-value is 0.000 and it can be identified as significant relationship between variables. Hence, findings were supported to H1 and it indicates that, website personalization has significant positive influence on online shopping behavior.

Verhagen and Van Dolen (2011) noted that website usability has positive effect on online shopping behavior and Hasbullah et al. (2016) proved that website usability has significant positive impact on online shopping behavior. B value of the website usability is 1.093. Since it was a positive value, there is a positive impact. P -value is 0.000 and it was in the level of significant. Therefore, present study H2 supported previous findings that website usability has significant positive impact on online shopping behavior.

According to Richard et al. (2010b) website content has positive impact on online shopping behavior. Shahzad (2015) proved that website content has significant positive influence on online shopping behavior. Results of the present study shows

that B value of website content is 0.871 and P – value is 0.000 and it is significant. B value is positive and there was a positive impact and P -value is in significant level. Therefore, present findings (H3) were supported that website content has significant positive influence on online shopping behavior.

Darmawan and Gatheru (2021) indicated that website trust has significant impact on online shopping behavior. Website trust has significant positive effect on online shopping behavior (Chen, 2012). Present study supported to H4 because B value is positive and it can be identified as 0.927. P – value is 0.000 and it was significant. Hence, present study has been supported to previous studies that website trust has significant positive influence on online shopping behavior.

According to present study findings based on the correlation analysis, website usability has highest B value (1.093) and it shows that website usability is the most influencing factor among website personalization, website usability, website content and website trust on online shopping behavior.

Conclusion

The research aims to examine how website personalization, usability, content, and trust impact online shopping behavior among female consumers in Sri Lanka's Central Province, particularly focusing on clothing websites. Online shopping has noticed significant growth globally, prompting many retail businesses to transition from traditional offline models to online platforms (Stafford et al., 2004; Nisar & Prabhakar, 2017).

As consumers increasingly engage with clothing websites, their expectations regarding website attributes depend, influencing their online shopping experiences. The study employed a quantitative approach with a sample of 312 female consumers selected through convenience sampling from the Central Province and data was collected using a structured questionnaire distributed online, and analysis was

conducted using IBM SPSS Statistics 26. The dataset was validated for normality and linearity, ensuring the strength of statistical analyses.

The study utilized regression analysis to identify the relationships between website attributes (personalization, usability, content, trust) and online shopping behavior, measured by R-squared values. All hypotheses proposed in the study were supported, as indicated by the positive coefficients (B values) and statistically significant relationships ($P < 0.05$) between website attributes (personalization, usability, content, trust) and online shopping behavior. The findings align with existing literature and contribute new insights into the Sri Lankan context, providing actionable insights for industry predictions and theoretical advancements.

This study validates existing literature through rigorous data analysis and presentation, corresponding closely with the Theory of Planned Behavior as a framework for identifying online shopping behavior. According to Salem and Nor (2020), in e-commerce contexts, consumers exhibit different decision-making processes compared to traditional physical retail stores, where factors like website attributes play a pivotal role.

Central to this study is the Theory of Planned Behavior, which indicates that consumer behavior is influenced by their attitudes, subjective norms, and perceived behavioral control. This theory has been widely applied to predict and discuss various behaviors, including online shopping decisions. By validating this theory, the study supports to a deeper understanding of how psychological factors engage with website features to shape consumer behavior online.

The study's model summary and ANOVA table highlights the significant positive impacts of website personalization, usability, and trust on online shopping behavior. These findings align with previous research indicating that enhancing these aspects of websites can improve consumer engagement and satisfaction. Moreover, website content was also found to positively influence online shopping behavior,

highlighting its role in providing valuable information that aids consumer decision-making.

By demonstrating a strong model fit, this study addresses a theoretical gap in the literature considering the specific impacts of website personalization, usability, content, and trust on online shopping behavior among Sri Lankan female consumers. The findings indicate a comprehensive framework that future researchers can utilize to explore deeper into these dimensions and their effects on consumer behavior in different cultural and market contexts.

In conclusion, this study enriches the understanding of how website features impact online shopping behavior within the context of Sri Lankan clothing websites. By coordinating with established theories like the Theory of Planned Behavior and substantiating hypotheses with empirical data, the study contributes valuable insights for both academic research and practical implication in optimizing online platforms. This framework not only aids in evaluating consumer behavior but also informs strategies for improving website effectiveness and customer satisfaction in the digital marketplace.

Limitations & Future Research Directions

This study has been used convenience sampling method because of the easiest to access. Convenience sampling is not chosen random selection and sample is limited. Future studies can be done by using probability sampling method and it can be more accurate than convenience sampling and reduce biases. Furthermore, this study has been limited to Sri Lankan clothing websites. Future studies could evaluate in different contexts.

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Customer Readiness and Adoption Potential of Fintech in Sri Lanka: An Empirical Investigation Using Online Platform

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This study investigates the readiness of Sri Lankans to adopt fintech and explores its adoption potential. The research uses demography, financial health, financial literacy, e-readiness, mental preparedness, and overall sentiment toward fintech as independent variables, with Customer Fintech Usage (CFU) as the dependent variable. The objectives were to assess the relationships between these factors and fintech usage and to build an index representing fintech readiness. Data were gathered through a structured questionnaire from a sample of 396 respondents across all nine provinces of Sri Lanka, derived from an internet user population of 1,458,000 as of January 2023. Regression analysis revealed that while demographics and mental preparedness did not show significant relationships with fintech usage, financial health, financial literacy, e-readiness, and overall sentiment positively influenced CFU. The model accounts for 42.14% of the variability in fintech usage ($R^2 = 0.4214$). Additionally, the findings indicate that a Customer Fintech Readiness Index can be constructed based on the supported relationships. The findings indicate that although Sri Lanka's current fintech readiness is relatively low, there is strong potential for growth in the future as these factors continue to evolve.

Keywords: *Adoption, Customer, Fintech, Readiness, Sri Lanka*

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Introduction

The integration of financial technology, or Fintech, has significantly transformed the financial landscape by enhancing accessibility, efficiency, and empowerment. Fintech merges finance and technology, using digital solutions to revolutionize traditional financial systems and services (Aravindhan, 2019). As technology permeates industries such as medicine, commerce, education, and finance (Mullan & Wajcman, 2017), handheld devices and basic technological literacy have become widespread. This shift has made global access easier and revolutionized the finance sector. Technologies like blockchain have addressed challenges in the industry by providing enhanced security and transparency, thus enabling reliable transactions and the introduction of cryptocurrencies (Tara et al., 2022). Fintech innovations have permeated society through peer-to-peer shopping, neo banking, and insurtech, among others.

The benefits of Fintech include improved efficiency, convenience, and accessibility, allowing people to access financial services anywhere, fostering financial inclusion and economic growth (Aravindhan, 2019). The COVID-19 pandemic accelerated Fintech adoption, emphasizing the need for contactless transactions and remote financial services. However, challenges such as data privacy, cybersecurity, regulatory compliance, and the digital divide must be addressed for responsible Fintech development (Tara et al., 2022). Understanding individuals' readiness to adopt Fintech is crucial for creating inclusive strategies. Factors like age, education level, financial literacy, and technological proficiency influence customer readiness (Aravindhan, 2019).

This research investigates Fintech adoption in Sri Lanka, focusing on online platform users. The study aims to identify factors influencing readiness and adoption, providing insights into barriers and enablers of Fintech adoption. A

quantitative approach using surveys will analyze the relationship between variables like age, education, financial literacy, e-readiness, and customer readiness. This study will inform policymakers, businesses, and researchers in Sri Lanka's Fintech ecosystem, helping to develop strategies promoting financial inclusion, innovation, and sustainability.

The research problem centers on customer readiness for Fintech adoption in Sri Lanka. Despite Fintech's potential, successful implementation requires customer readiness. With Sri Lanka's growing economy and increasing investment in Fintech driven by government initiatives, regulatory reforms, and technological advancements (Prakash, 2023; CBSL, 2020; Echelon, 2016), understanding customer behavior is timely. The rise in mobile payments, digital wallets, and investment platforms reflects Fintech's growing role in enhancing financial inclusion and economic growth.

Factors such as smartphone and internet availability, regulatory frameworks, and Fintech startups have contributed to the Fintech boom in Sri Lanka (Gamage et al., 2021; CBSL, 2020; Articulate, 2021). However, customer readiness is influenced by awareness, attitudes toward technology, perceived benefits, and risks (Feyen et al., 2023; Zakariyah et al., 2023). The study focuses on online platform users, analyzing their behavior toward Fintech adoption.

The research addresses questions regarding the relationship between demographic variables and Fintech usage, including education, financial literacy, e-readiness, and mental preparedness. It explores the potential to create a fintech readiness index. The study involves diverse participants representing each province in Sri Lanka, aiming to understand customer readiness comprehensively. By comparing findings to studies from countries like Bangladesh, the research aims to draw insights into customer readiness and adoption patterns.

The study's significance lies in filling a research gap, enhancing knowledge of customer behavior, guiding fintech development, informing policy, and contributing to economic development. It provides insights for fintech providers and policymakers to design effective strategies and interventions. By understanding factors influencing readiness, fintech developers can create user-friendly solutions tailored to Sri Lankan needs. Policymakers can design supportive frameworks to foster fintech innovation and address adoption barriers, promoting digital financial services and economic growth. Ultimately, the research aims to leverage Fintech for economic development, accelerating service uptake and enhancing financial access for inclusive growth in Sri Lanka.

Remainder of this paper has been organized as follows. Section 2 provides a comprehensive review of the relevant literature, highlighting key studies in the area. Section 3 outlines the methodology used for data collection and analysis. In Section 4, the results of the study are presented and discussed in relation to the existing literature. Section 5 concludes the paper by summarizing the findings and offering suggestions for future research.

Literature Review

Fintech Adoption Models

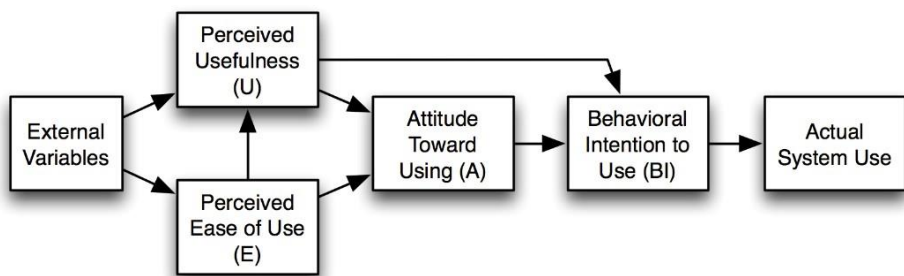
Fintech adoption was not an easy topic to be covered since still technology is not very cooperative with some people. Therefore, Fintech Adoption Models are used for the calculation of fintech adoption where multiple areas of a person's beliefs and preferences are tested just to get knowledge about the main topic. Similarly, there are people who studied the technology adoption among people using the "Technology Acceptance Model" where they analyzed the people using the data, they gathered through a questionnaire (Singh et al., 2020). Accordingly, we can see that there are three main models that are used to evaluate Fintech adoption.

Technology Acceptance Model

Fred Davis developed this theory in 1989 to model how users come to accept and use a technology which has been used to study the adoption of new technologies among people (Figure 1). There are three main constructs in this model which are **Perceived Usefulness (PU)**, **Perceived Ease of Use (PEOU)** and **Behavioral Intention (BI)** which finally builds up the model to calculate the actual technology usage of people (Ma & Liu, 2004).

Figure 1

Technology Acceptance Model



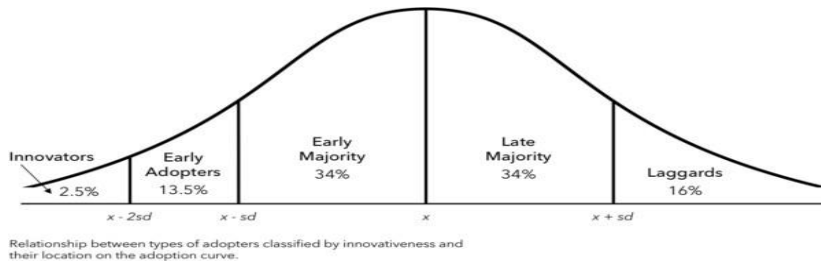
Source: Technology Acceptance Model (Davis, 1989)

Innovation Diffusion Theory

Innovation Diffusion Theory (Figure 2), otherwise known as DOI, was a theory that explains how, why and at what rate new ideas and technology spread. This theory was developed by Everett Rogers in 1962 and it was first introduced in his book “Diffusion of Innovations” (Rogers, 1962).

Figure 2

Innovation Diffusion Theory



Source: Everett M. Rogers, *Diffusion of Innovations*, 5th ed. (New York: Free Press, 2003)

Perceived Benefits and Barriers

Convenience and accessibility are two of the key factors that drives the adoption of Fintech (Moreira-Santos et al., 2022). People tend to use technologies that are easy to access and less costly, hence Online and Mobile access, Real-time transactions, simplified user interfaces and all-time customer support directly impacts the usage of technology with regards to Fintech. Though there are so many popular Fintech methods that we use, Mobile Banking, Online Investment and Peer-to-Peer Lending were the most popular methods that people use. Compared to the traditional finance institutions, it is less costly to use Fintech as they do not have the same Overhead Costs that the traditional methods have. Additionally, usage of Block Chain which uses a shared ledger saves a large amount of time and assures the accuracy of the data. Further, Robotic Process Automation is used among the companies where most of the tasks are automated. (Li, et al., 2023). Further, when it comes to financial inclusion, which can be derived as availability and equality of opportunities to access technology to provide financial services. Fintech has the potential to improve financial inclusion by making financial services more accessible, affordable, and convenient for people who are traditionally excluded from the financial system, Fintech has the advantage compared to the traditional methods (Tok & Heng, 2022)

Though Fintech is an advanced technology that uses advanced coding and other security implications there can be concerns that the users have due to the recent security breaches of the most secure websites which are Twitter, Uber, LinkedIn, and Facebook. Also Cyberattacks, frauds and privacy concerns could arise due to those incidents. But as these events happened and it's the company's duty to protect its customers from these events recurring, encrypted data, access controls, data governance policies, compliance with data protection laws and cloud computing technologies are used worldwide (Rehman et al., 2023). People still lack trust in Fintech due to several reasons such as lack of regulations, security concerns, newness and most significantly fear of the unknown (Cojoianu et al. 2020). Similarly, regulatory challenges which are faced by the Fintech companies can lead people to mistrust Fintech (Pascual & Natalucci, 2022). The companies have to ensure that their clients' data are secured, and the necessary privacy is given, comply with Anti-money Laundering compliances, protect the clients from frauds, enhance cybersecurity and move out of the regulatory arbitrage to become trustworthy to the people.

Figure 3

Loan Boom

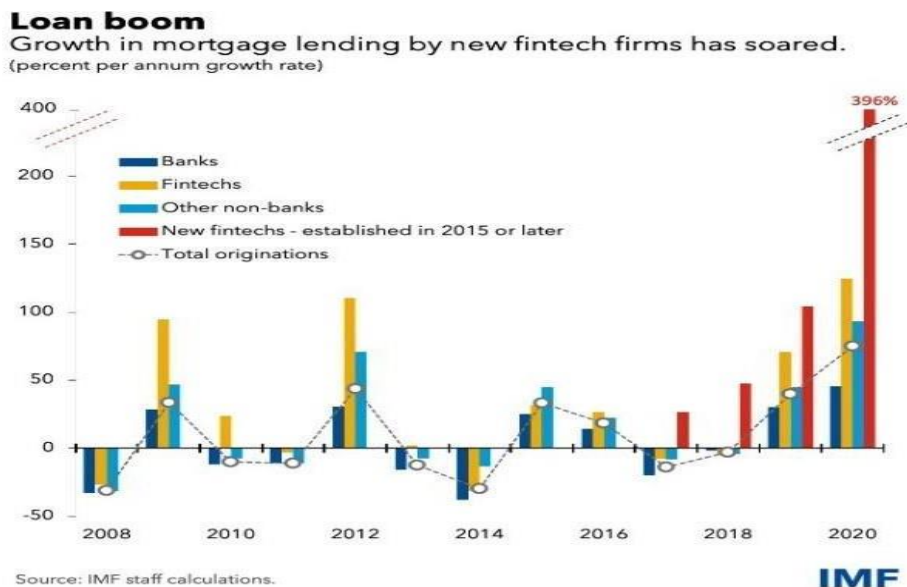
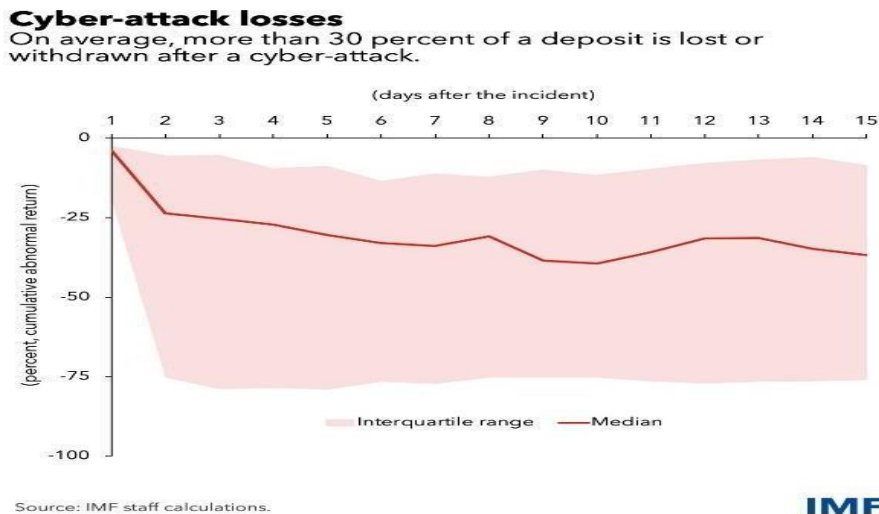


Figure 4

Cyber Attack Losses



Trust and Risk Perception

Building up trust among people about Fintech has become a must nowadays since it is crucial for the clients to invest or use any kind of fintech with a clear mind without doubts. There are six variables that decide the trust of people for technology which can also be used to determine the trust to use Fintech. Those factors are, Benevolence, Integrity, Capabilities, Interest Alignment, Shared Values and Communication (Nesevski & Andersen, 2019). Similar research was conducted in 2022 to build up a model of trust for Fintech and Insurtech which used Composite Reliability and Average Variance Extracted, Heterotrait-Monotrait Ratio of Correlations among the variables and finally became a success (Zarifis & Cheng, 2022)

Financial Literacy and Digital Skills

Financial Literacy is the ability to understand and manage personal finances where digital skills are the ability to use technology effectively. People need the knowledge of budgeting, saving, investing and credit to achieve the financial literacy which most people lack today. Though there are multiple methods that people can gain knowledge about these areas, most tend not to learn but rely on 3rd parties. Considering financial literacy and digital skills, financial literacy had a favorable effect on consumers' desire to adopt and utilize FinTech where digital skills have partial significant effect towards intention (Zahanor, et al., 2023). It was found that people possess basic knowledge about mobile banking and e wallets from research done using Vietnamese young people, and mobile P2P lending facilities were not much popular (Dinh, 2022). It is not a miracle that the younger generation or else Gen-Z is more into technology than others so they will adopt Fintech in no time. Therefore, knowledge in financial literacy along with the age of an individual will impact the adoption of Fintech (Lyons et al., 2020) (Nguyen, 2022).

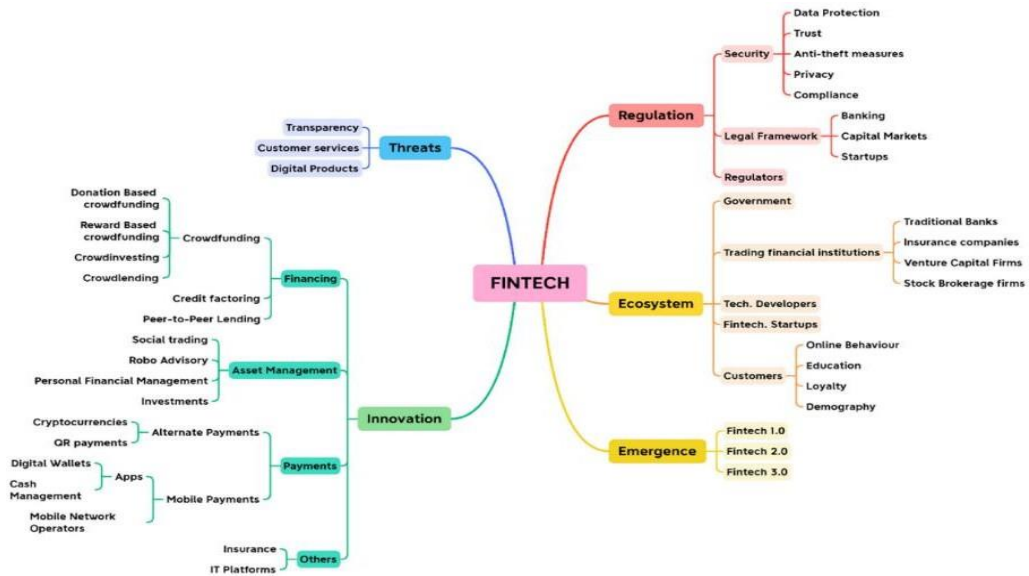
Customer Readiness and Adoption Behavior

Fintech has become a deeply concerning topic in the 21st century as it was changing aspects of Finance just in a very short period. Fintech was summarized to a mind map by (Anifa & Ramakrishnan, 2022). This helps to understand what Fintech really is in a simple way.

As per the - Mind map of Fintech (Figure 5), Fintech can be divided into four main groups, which are Financing, Asset Management. Payments and Other. As an emerging market, Sri Lanka is still in the early ages of adoption of Fintech even though Asia was on the fast pace adopting it (Chen, 2016). Considering the world's Fintech adoption rate (EY, 2019), Sri Lanka is surrounded by the countries who are using Fintech as a daily tool but still lagging in joining the line futuristic countries. China and India lead Asian market when there are countries that use AI for their managerial posts also (Bello, 2022). Considering the current economic situation and technological gap of knowledge in Sri Lankans, a considerable number of factors that affect in accepting Fintech can be identified (Piyanda & Aluthge, 2022). Accordingly digital accessibility, usefulness of Fintech services is social influence some key factors affecting the acceptance of Fintech and this theory was proved by previous research done in other countries as well (Zhou et al., 2010).

Figure 5

Mind map of Fintech



Source: Anifa, Mansurali & Ramakrishnan, Swamynathan. (2022). *Fintech Innovations in the Financial Service Industry*.

Success Stories of Fintech

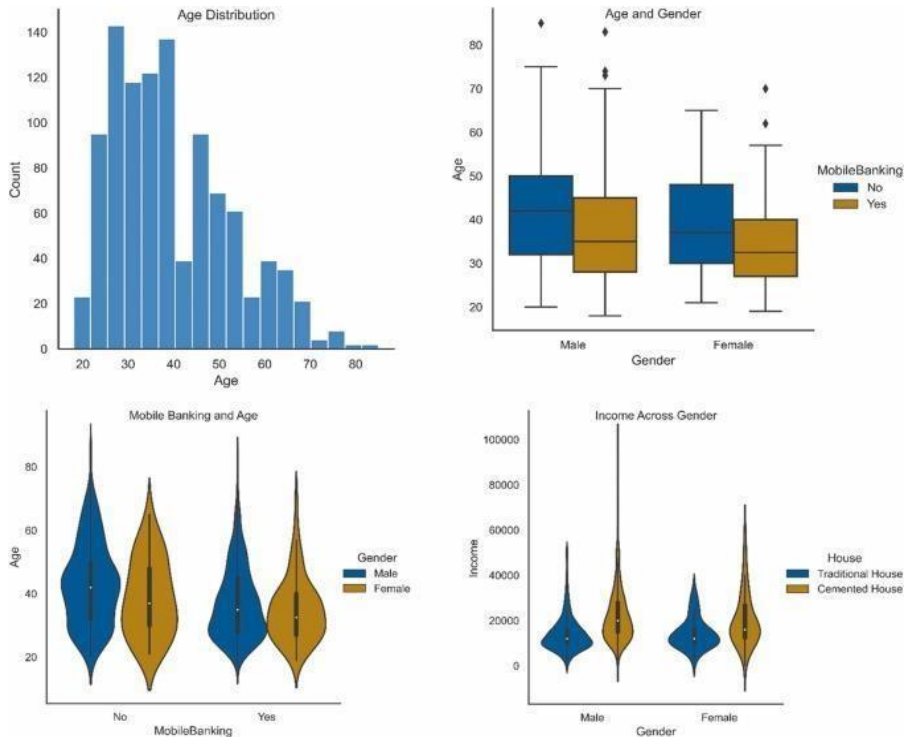
Aiding Fintech startups in Sri Lanka was giving hope to Sri Lankan Fintech adoption high time since that was the motivation that any entrepreneur need (FT, 2021). Similarly, the recent economic stabilization made it easy for the newest Fintech startups in Sri Lanka (Tracxn, 2023). Banks adopting Fintech made the first step in accepting Fintech and now we can witness that almost every bank in Sri Lanka has Online Banking features enabled for their customers (Panditharathna et al., 2020). It made a major impact on the economy by the continuous negative incidents happened in Sri Lanka and recently the Covid Pandemic made it even worse (Rishadini, 2021).

Market Trends and Industry Insights

Referring the research done in Bangladesh (Mahmud et al., 2023) there is a significant relevance in Customer Fintech Readiness for Fintech adoption of a country. Technological, demographic, economic and sentimental variables were tested against the Customer Fintech Readiness and showed a positive relationship with the correlation in it. Even though they used secondary data collected for a different purpose, they used the data effectively and made a reliable index to check customer readiness for Fintech. The seven key dimensions covered up all the aspects that a customer has against Fintech usage and the variables were chosen under the guidance of the experts of the field. And values were normalized when it was necessary to do so. After the analysis the following results were observed.

Figure 6

Market Trends and Industry Insights



A study on Customer Experience in Fintech was conducted regarding the Commercial Banks in Sri Lanka and through that it was found that there are factors that customers are eager to use Fintech when their service is user friendly and usefulness is at its highest (Jesuthasan, 2021).

Empirical Review

The demographic characteristics dimension was informed by previous research indicating a negative correlation between age and fintech readiness, while higher education levels showed a strong positive correlation (Hasan et al., 2022; Imam et al., 2022; Niu et al., 2020). To facilitate calculations, age was normalized, and

fintech readiness was assigned a 20-step increment for each level of education, reflecting the broader fintech usage among individuals with higher educational attainment (Niu et al., 2020; Jagtiani & Lemieux, 2017).

Methodology

The research on "Customer Readiness for Fintech in Sri Lanka: Assessing Customer Readiness among Retail Customers" relies on technological, demographic, economic and sentiment variables (Mahmud et al., 2023). This study employed a quantitative approach, underpinned by positivism and deductive research logic, to analyze the relationship between independent variables—demography, financial health, financial literacy, e-readiness, mental preparedness, and overall sentiment towards Fintech—and the dependent variable, Customer Fintech Readiness. Figure 7 displays the connections between the variables.

Internet users in Sri Lanka was about 1,458,000 by January 2023 according to statistics. Then according to the morgan table, sample size corresponding to that population size is 385. All the 9 provinces of Sri Lanka were covered where 396 filled questionnaires were selected for the study.

Figure 7

Conceptual Framework

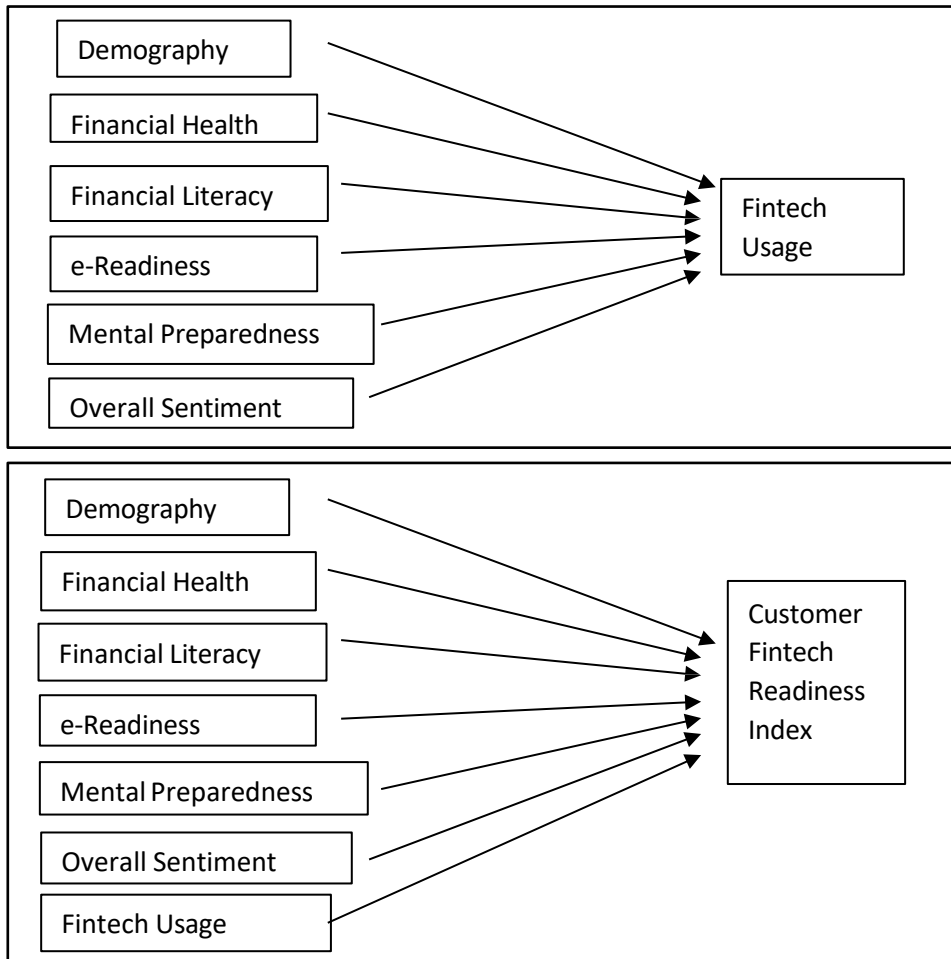


Table 1 presents the factors affecting fintech adoption and use, organized into seven key dimensions: demography, financial health, financial literacy, e-readiness, mental preparation, current fintech usage, and overall sentiment. In this study, modeled after Mahmud et al. (2023), a structured questionnaire was developed to explore these dimensions. Each factor was measured using a combination of nominal, ordinal, and Likert scales. The scores from the sample were coded and normalized on a scale of 0-100, with the results averaged to derive a score for each dimension, offering insights into the readiness and adoption of fintech.

Table 1

Dimension	Factors	How it is Measured (Scale)	Source of Variable
Demography	Age	Open-ended	(Mahmud et al., 2023)
	Province	Nominal (List of Provinces)	Self-developed
	Level of Education	Ordinal (None to Postgraduate/Other)	Self-developed
Financial Health	Monthly income	Ordinal (< Rs.10,000 to Rs.50,000 <)	(Mahmud et al., 2023)
	Annual savings	Ordinal (< Rs.10,000 to Rs.50,000 <)	(Mahmud et al., 2023)
Financial Literacy	Visits to Financial Institutes per month	Ordinal (Frequency: Never to Very Frequently)	Self-developed
	Confidence in financial activities alone	5-point Likert scale (Not confident at all to Very confident)	(Mahmud et al., 2023)
	Awareness of financial transactions	Ordinal (No knowledge to Expert)	(Mahmud et al., 2023)
E-readiness	Access to a computer	Nominal (Yes, No)	Self-developed
	Computer skills	5-point Likert scale (Not skilled at all to Very skilled)	(Mahmud et al., 2023)
	Smart phone skills	5-point Likert scale (Not skilled at all to Very skilled)	(Mahmud et al., 2023)
	Average data usage per month	Ordinal (Very low to Very high)	Self-developed
Mental Preparation	Mental preparedness towards fintech adoption	5-point Likert scale (Not prepared at all to Adequately prepared)	(Mahmud et al., 2023)
Current Fintech Usage	Fintech segments used via mobile phones	Ordinal (Only 1 to 5 or more)	(Mahmud et al., 2023)
	Fintech segments used via computer	Ordinal (Only 1 to 5 or more)	(Mahmud et al., 2023)
	Frequency of mobile and internet financial services	Ordinal (Never to Very frequently)	(Mahmud et al., 2023)
	Average money used for Fintech transactions	Ordinal (< Rs.10,000 to Rs.50,000 <)	(Mahmud et al., 2023)
Overall Sentiment	Costliness of Fintech	5-point Likert scale (I don't use Fintech to Very cheap)	(Mahmud et al., 2023)
	Satisfaction with Fintech usage	5-point Likert scale (I don't use Fintech to Very satisfied)	(Mahmud et al., 2023)
	Satisfaction availability of Fintech	5-point Likert scale (I don't use Fintech to Very satisfied)	(Mahmud et al., 2023)

Factors Affecting Fintech Adoption and Use Distilled in Seven Key Dimensions

In this study, a pilot survey was conducted with a pre-selected group comprising 30 participants university lecturers, undergraduates, and local residents to refine the questionnaire. This pilot phase helped clarify the questions and assess response rates, leading to adjustments in the questionnaire. Data analysis was performed using STATA software, chosen for its reliability in developing an index. Regression analysis identified relationships between independent and dependent variables, and weights were allocated based on predetermined values. Distribution of variables was visualized through charts and graphs, and the final index value was derived from the average score. Ethical considerations were adhered to, with personal data and names omitted due to sensitive questions. Income was noted as it was crucial for assessing financial health, and the collected information was used solely for academic purposes.

Hypotheses were formulated based on the research questions posed in the study, and these hypotheses provided the foundational framework for the research.

H1: There is a relationship between demographics and fintech usage.

H2: There is a relationship between financial health and fintech usage.

H3: There is a relationship between financial literacy and fintech usage.

H4: There is a relationship between e-readiness and fintech usage.

H5: There is a relationship between mental preparedness and fintech usage.

H6: There is a relationship between overall sentiment and fintech usage.

H7: There is a possibility to build up Customer Fintech Readiness Index.

Findings and Discussion

The study analyzed participants' readiness for fintech by evaluating the impact of age, education level, financial literacy, e-readiness, and mental preparedness. Age

highlighted differences in fintech adoption across various groups, while education level assessed participants' understanding of financial technology. Financial literacy evaluated their ability to make informed decisions using fintech tools, and e-readiness measured their access to and familiarity with digital platforms necessary for fintech engagement. Mental preparedness gauged their willingness to embrace new technologies. Collectively, these factors provided a detailed understanding of participants' readiness to engage with fintech, underscoring the significance of knowledge, digital access, and a positive attitude towards innovation

Findings

Age

Figure 8

Age bar graph

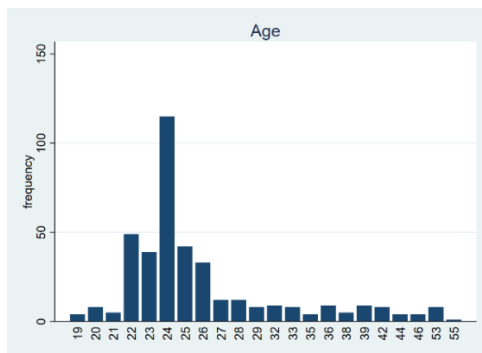
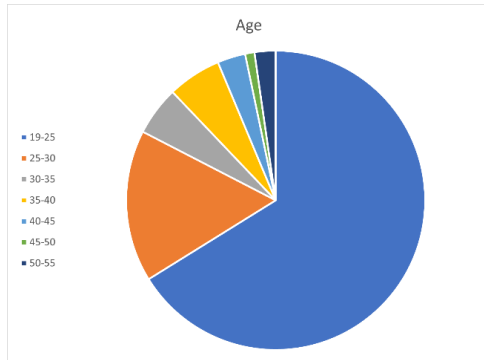


Figure 9

Age pie chart



The data set was collected from online platform users where mostly the young generation will be responding. Hence the data set contains majority of the respondents from the age category 22 – 26 which contains 66% of the total data points (Figure 9). According to the Figure 8, out of those categories 29% data points were gathered from 24-year-olds. The current generation is deeply immersed in technology from birth, easily navigating high-tech devices like smartphones and utilizing apps for tasks such as ordering food and making bank transactions. This familiarity with technology positions them to revolutionize the world, particularly in fintech and other emerging technologies. Notably, individuals over 40 are increasingly aware of and using fintech, indicating a breaking down of the generation gap. While many older adults struggle with modern technology, those who make an effort to learn are finding success and inspiring others. This adaptability can shift perceptions among older individuals, encouraging them to embrace fintech and modernize their financial practices. By demonstrating the practical benefits of these technologies, we can empower older generations to take control of their finances and improve their quality of life in today's digital landscape.

Education Level

Figure SEQ Figure * ARABIC 10

Education Level bar graph

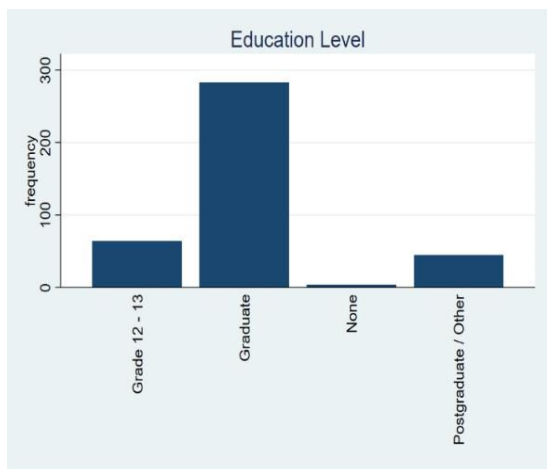
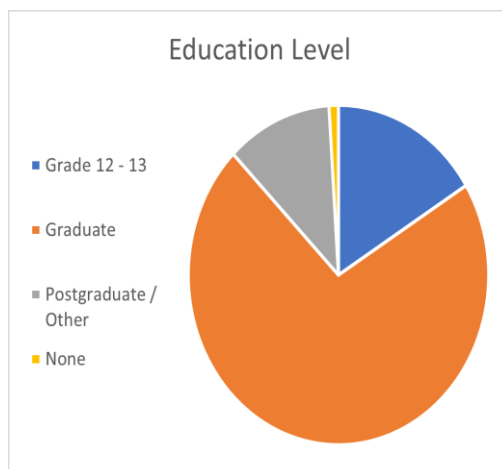


Figure SEQ Figure * ARABIC 11

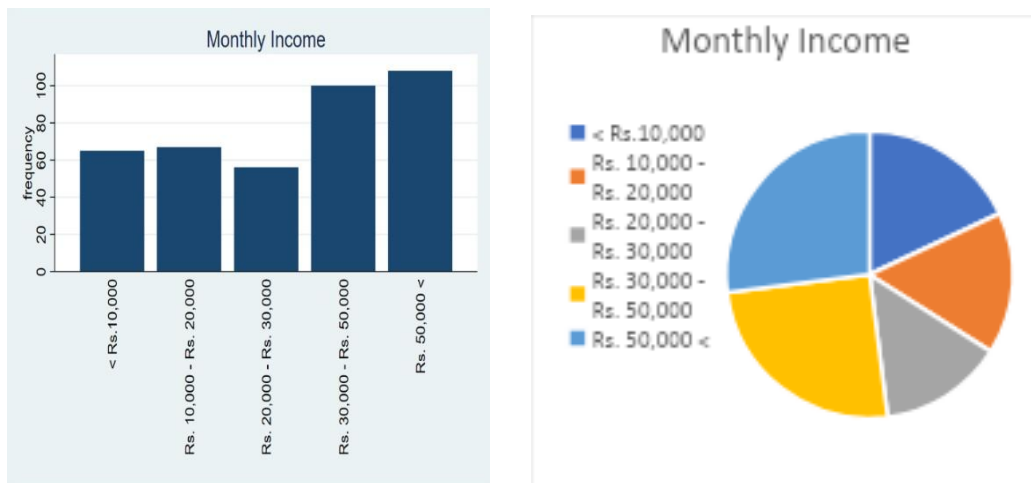
Education Level pie chart



The study was based on people who was aware of the online platforms, therefore people are much educated. According to the Figure 10 and Figure 11, the scores they took from the survey shows that over 80% of the respondents are educated enough. The majority is well educated to use Fintech as a daily tool and can be checked by their high scores on the survey. This suggests that the increasing popularity of online platforms has led to a rise in digital literacy among the general population. Additionally, it implies that the majority of individuals are comfortable using Fintech as a routine part of their lives, which bodes well for the continued growth and adoption of digital financial services. Furthermore, the survey results indicate that age does not seem to be a significant barrier to Fintech adoption. Both younger and older respondents showed a high level of familiarity and comfort with using digital financial services. This suggests that Fintech is becoming increasingly accessible to individuals of all age groups, further fueling its widespread adoption. Overall, these findings highlight the positive impact of online platforms on financial literacy and the promising future of Fintech in revolutionizing the way we manage our finances.

Financial Health

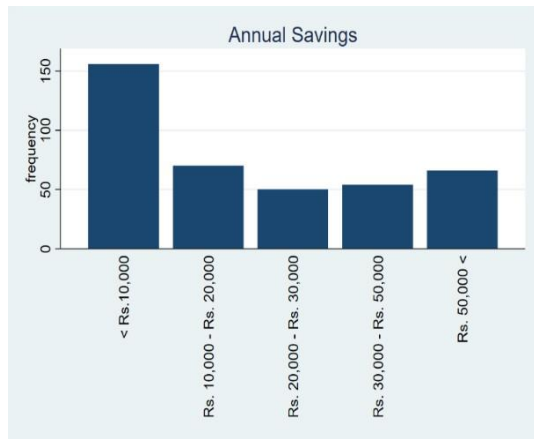
The distribution of monthly income (Figure 12 and Figure 13) among respondents reveals that a significant portion, 52%, earns over Rs. 30,000. This upper income bracket includes both older and younger individuals. Interestingly, the most



common allowance reported by interns is Rs. 20,000, which received the fewest responses. The group earning less than Rs. 10,000 primarily consists of teenagers who have recently completed their high school studies and A/L examinations. Many of these individuals are expected to transition into higher salary tiers in the near future. This shift in income distribution can be attributed to the increasing demand for skilled and specialized roles in the job market. As young people attain higher education and develop marketable skills, they are increasingly able to secure well-paying jobs at an early stage in their careers. Consequently, this trend is reshaping the traditional notion of high-income earners, who have historically been viewed as older individuals with extensive professional experience.

Compared to the income data that is shown Figure 14 and Figure 15, people tend not to save in banks nowadays. Though people don't save in banks, they invest in other methods due to the low interest paid by the banking system during the last few

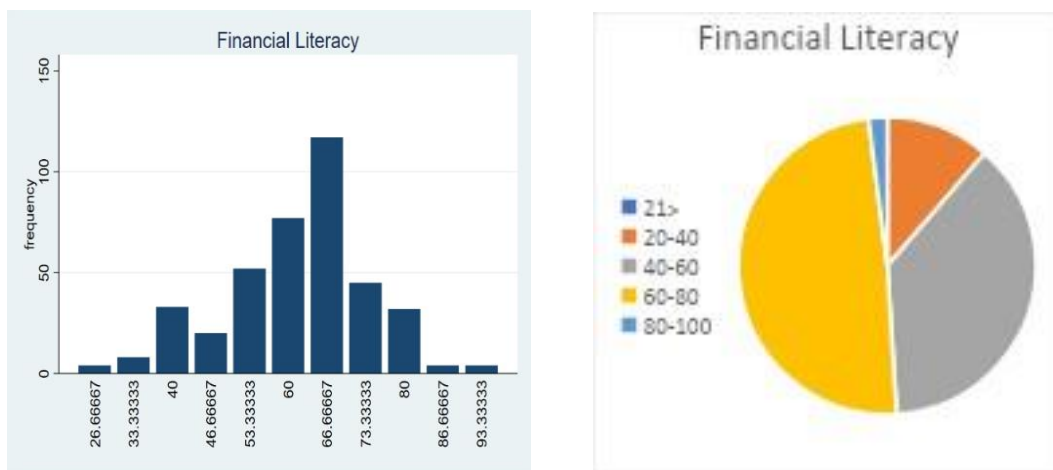
months in Sri Lanka. Data shows that there is 0.26 coefficient between Fintech usage and Financial Health variables and as a positive relationship shows in indicated that Fintech Usage



increases as the Financial Health increases.

There is a notable shift away from traditional savings methods, such as bank accounts, toward riskier investment avenues, including cryptocurrency, dollars, and gold. This trend highlights the increasing reliance on fintech, which provides essential real-time data for informed decision-making. The growing popularity of automated lending and robo-advisory platforms further underscores this change, as they have become more reliable than traditional human advisory services. This shift in reliability is attributed to the accuracy and efficiency of the algorithms used by robo-advisors, which analyze large volumes of data to deliver personalized investment advice based on individual risk profiles. Their capacity to quickly adapt to market changes offers a level of agility that human advisors often cannot achieve. As a result, more investors are embracing these automated platforms to maximize returns and minimize risks in an increasingly volatile financial landscape.

Financial Literacy

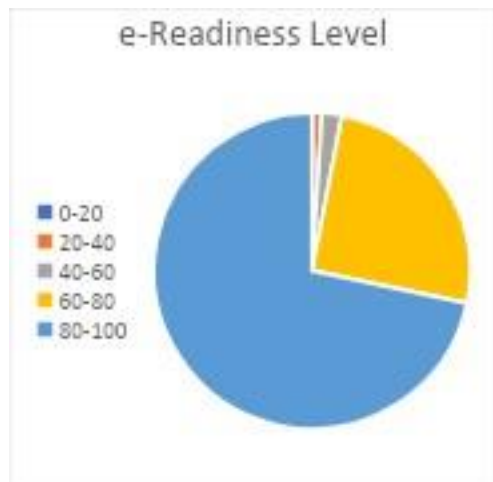
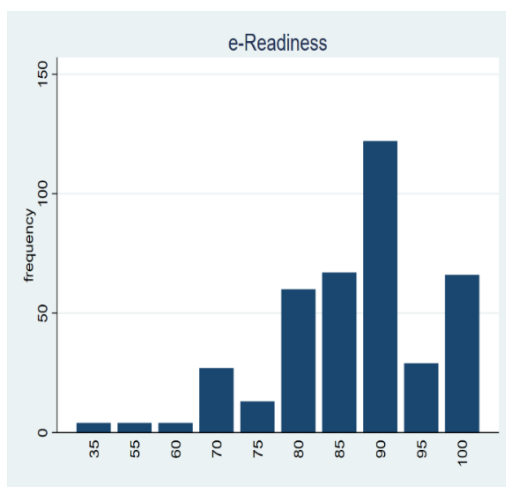


Analyzing financial literacy (Figure 17 and Figure 16) indicates that most people have the financial literacy to perform tasks and adapt to fintech easily. 87% of the respondents have a score between 60 and 80, where the least score was taken by 45% of the respondents. Financial literacy has a 0.28 coefficient level, and as it is a positive coefficient, fintech usage increases as financial literacy increases. The key to a sustainable future is financial literacy. Individuals with varying financial resources often find themselves in similar predicaments, lacking clarity on when and how to invest. Financial literacy is crucial, encompassing basic skills like filling out bank forms to making high-risk investment decisions. Numerous online platforms offer education on investing, aiming to help individuals rise from poverty and ensure a secure future for their descendants. Data collected indicates that many people feel confident in their basic financial literacy, enabling them to make decisions that benefit both their communities and themselves. Furthermore, those sharing their financial knowledge significantly impact society. While the current effects of this revolution may be subtle, small changes can lead to a better world in the next decade.

If society collectively invests effectively and businesses innovate using these funds, the result could be an eco-friendly and sustainable world. In this envisioned future, financial literacy becomes essential for individuals across all backgrounds. As more people understand personal finance and investment strategies, they gain the power to make informed decisions that benefit both themselves and their communities. This knowledge enables individuals to navigate the financial landscape, aligning their investments with their values and supporting companies committed to sustainability.

By directing capital towards environmentally conscious initiatives, such as renewable energy sources like solar and wind power, individuals can help reduce reliance on fossil fuels and combat climate change. Additionally, supporting companies that prioritize fair labor practices fosters a more equitable society. Ultimately, informed financial decisions hold the potential to create positive global change, paving the way for a sustainable future for generations to come.

e-Readiness



The e-readiness level (Figure 19 and Figure 18) is high among the participants for whom the data was gathered, which indicates that they are willing to adopt a technological leap in finance. Most of the participants have computer literacy and also possess a computer. Their data usage is high because they are constantly using

the internet. Further, they are confident that they have the necessary computing and mobile phone skills. E-readiness is a skill that everyone needs to have to adapt fintech to their day-to-day lives. It is the indicator that shows the participant is ready to embrace the technical advancements and explore new possibilities through them.

As individuals navigate the internet, they delve into a vast sea of knowledge, making fintech accessible to those already learning online. However, the true potential of this technology is often misunderstood, as many use it for trivial purposes. The COVID-19 pandemic highlighted fintech's value, forcing people to adopt online methods for education, work, and essential purchases. This shift led to an increase in online transactions among individuals who previously hesitated to embrace technology, resulting in a significant number of people now possessing basic transaction skills without extensive experience.

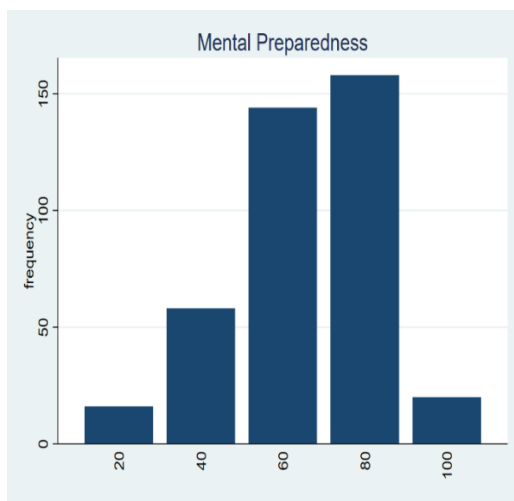
In this study, we assessed participants' skills in operating phones and computers, their internet usage, and their confidence in using these devices. The findings indicate that the majority of respondents are indeed proficient, with 72% scoring above 80 in their fintech-related knowledge, demonstrating a solid understanding of how to integrate fintech into their lives. Those comfortable with smart devices can more easily grasp the complexities of fintech. While the subject is not simple to master quickly, a foundational understanding greatly aids comprehension.

Beyond high scores in fintech knowledge, the study also revealed a strong desire among participants to learn more about the subject. This eagerness reflects the increasing significance of technology in daily life. As digital platforms advance and financial services become more integrated, staying informed and adaptable is essential. By acquiring necessary skills and knowledge, individuals can navigate the complexities of fintech and leverage its benefits to improve their financial well-being.

Additionally, the rise of fintech has facilitated innovative solutions that promote financial inclusion and empower underserved communities. Technology now enables individuals from diverse backgrounds to access banking services, make secure transactions, and invest in the global market. The convenience and efficiency provided by fintech have transformed financial management, allowing users to save time and make informed decisions with ease. Ultimately, embracing fintech not only enhances financial literacy but also opens up numerous opportunities for personal growth and financial success.

Mental Preparation

Considering the responses received (Figure 20 and Figure 21), it is understandable that most of the people are mentally prepared for Fintech. 81% of respondents have a score of 40% - 100% towards mental preparedness where the coefficient towards Fintech Usage is 0.04 which increment in Mental Preparedness shows a positive relationship towards Fintech Usage.



Having the necessary skills is insufficient if individuals lack the mindset to use technology effectively. Understanding fintech without utilizing it will not uplift society. Fear of trying new methods often holds people back, leading many to

abandon their dreams due to a reluctance to change. While some are willing to take risks and make progress, many still rely on traditional methods, such as using slips for bank transactions or paying bills in supermarkets, not solely out of unawareness but also due to a lack of trust in technology.

Despite the conveniences offered by fintech—such as purchasing groceries, booking hotels, and making reservations through mobile devices—there remains a group that is skeptical of these innovations. Data from the study indicates that most participants are mentally prepared for fintech adoption, suggesting a promising future for society. However, a small number of individuals may not be ready; with proper understanding, they too could embrace fintech.

Mentality plays a crucial role in economic progress, as new products and services cannot emerge without a shift in mindset. Some civilizations continue to use methods from centuries ago due to resistance to change. This stagnation could occur here as well, preventing the realization of technology's full potential. Therefore, it is essential to cultivate a culture that encourages risk-taking and openness to new opportunities.

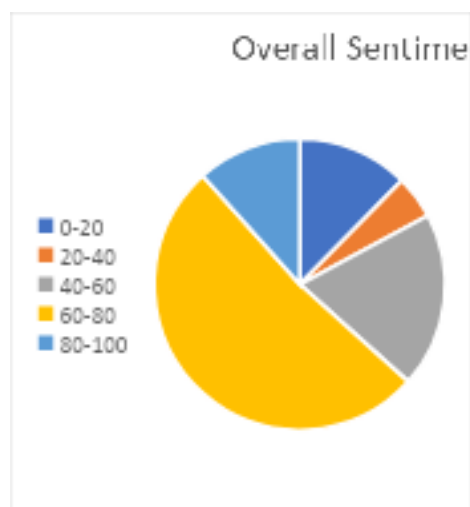
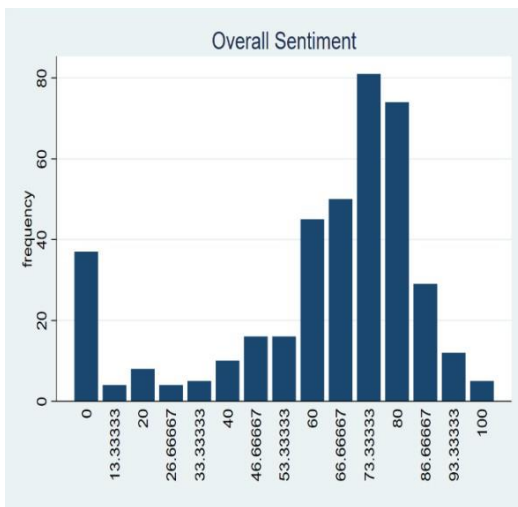
To foster innovation and progress, a mindset that embraces change and new technology is vital. Without this adaptability, societies risk stagnation in the global economy. By encouraging openness to new ideas and calculated risks, we can unlock societal potential and drive advancements across various sectors. This collective mindset shift can create an environment conducive to developing and implementing groundbreaking products and solutions.

As we navigate the evolving technological landscape, prioritizing education and training programs is crucial to equip individuals with necessary skills. Investing in STEM education and promoting continuous learning will ensure a competitive and adaptable workforce. Collaborations between academia, industry, and government can also leverage collective knowledge to tackle complex challenges and drive

innovation. Ultimately, by embracing continuous improvement and new technologies, we can position ourselves as leaders in the global economy, securing a prosperous future for generations to come.

Overall Sentiment Towards Fintech

As the final part of the questionnaire, current sentiment towards fintech was tested (Figure 22 and Figure 23). The responses show that they have more sentiment towards fintech in satisfaction on availability and costliness of fintech. 45% of the respondents represent the category where the overall sentiment towards Fintech usage is 60% - 80%. The coefficient level is 0.237 which has a positive relationship with the Fintech Usage of the participants. In the first question I checked the costliness of Fintech in the respondent's opinion and almost half of them were neutral about that. Then when it comes to the satisfaction of Fintech 54% of them were somewhat satisfied where there are 10% that are very satisfied which means the fintech services are doing great in making customers. And finally, where I tested the satisfaction about the availability of Fintech 45% were somewhat satisfied and 13% were highly satisfied.



Contrary to the perception that fintech is costly, it actually reduces expenses by eliminating unnecessary transaction costs, intermediary fees, and paper fees associated with traditional financial processes. Fintech enables users to complete tasks efficiently with just a few taps on their smartphones, streamlining even the most complex operations. Although many still rely on physical cash, virtual wallets offer a safer, more efficient alternative, allowing for precise payments without the hassle of counting change. Additionally, purchasing electronics can now be done from the comfort of one's home, eliminating travel costs.

Satisfaction with fintech services varies among users; while some find a platform's efficiency exceeds their expectations, others may feel it falls short. Modern technology is increasingly designed for accessibility, including features that allow visually impaired individuals to navigate mobile devices independently. For cryptocurrency users, a variety of choices empowers them to tailor their financial decisions to their preferences. The future promises even more customizable options, enabling users to meet their own expectations for satisfaction.

Fintech has transformed financial management by offering unprecedented convenience, accessibility, and personalization. With ongoing technological advancements, financial services are becoming more inclusive and tailored to individual needs. Whether managing investments, making payments, or accessing loans, fintech empowers individuals to take control of their financial journeys with confidence. Furthermore, it enables users to set financial goals and track their progress in real time. Interactive dashboards and budgeting tools help individuals understand their spending habits, facilitating informed decision-making about their financial futures. This personalization allows users to align their financial strategies with their unique needs and aspirations, ultimately enhancing financial satisfaction and security. Overall, fintech continues to evolve, adapting to the changing demands of consumers and empowering individuals to take charge of their financial well-being.

Factor Analysis

Table 2

Factor Analysis

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Fintech Usage	0.6316	-0.3387	0.0324	0.4854
Demography	0.1542	0.5765	-0.0356	0.6426
Financial Health	0.4262	-0.2354	0.3773	0.6206
Financial Literacy	0.6455	-0.0056	-0.0799	0.5769
E-Readiness	0.3674	0.5324	0.1758	0.5507
Mental Preparedness	0.5648	0.1665	-0.0337	0.6521
Overall Sentiment	0.5685	-0.1068	-0.2986	0.5762

Source: STATA Output

The factor analysis with six retained factors reveals significant relationships among variables in this data set. The Eigenvalues highlight the variance captured by each factor, with Factor1 being the most influential. Proportions of variance explained indicate substantial contributions from Factor1, Factor2, and Factor3 (Table 2). The pattern matrix showcases variable loadings on each factor, offering insights into their associations. Variables like Current Fintech Usage(CFU), Demography (DMO), and Overall Sentiment Related to Fintech Usage OSF exhibit notable loadings on Factor1, while Financial Health Level(FHL) and e-readiness Level (ERL) are prominent in Factor3.

Regression Analysis

Table 3

Regression Analysis

Fintech Usage	Coefficient	Std. Error	P> t
Demography	-0.0081109	0.0722701	0.911
Financial Health	0.2531123	0.0282535	0.000
Financial Literacy	0.2791804	0.0667096	0.000
E-Readiness Level	-0.1997942	0.792661	0.012
Mental Preparedness	0.0418599	0.446301	0.349
Overall Sentiment	0.2366506	0.0310461	0.000
Constant	19.70019	6.699169	0.003

Source: STATA Analysis

The model, with an F-statistic of 45.54 (p-value = 0.0000), is deemed statistically significant. FHL, FLL, and OSF exhibit positive coefficients, indicating a favorable impact on CFU, while ERL shows a negative association. The model accounts for 41.26% of CFU variability (R-squared = 0.4126). Notably, FHL demonstrates a substantial positive influence, emphasizing its significance in fostering CFU.

Table 4

Hypothesis Analysis

Hypothesis	Results
H1: There is a relationship between demographics and fintech usage.	Rejected
H2: There is a relationship between financial health and fintech usage.	Supported
H3: There is a relationship between financial literacy and fintech usage.	Supported
H4: There is a relationship between e-readiness and fintech usage.	Supported

H5: There is a relationship between mental preparedness and fintech usage.	Rejected
H6: There is a relationship between overall sentiment and fintech usage.	Supported
H7: There is a possibility to build up Customer Fintech Readiness Index.	Supported

Through regression analysis, the data set shows a 42.14% R-squared value, where 42.14% of the data represents the model. This was done considering current fintech usage as the dependent variable, and it shows promising results. Considering each independent variable, the coefficient values are as follows: Education Level has 0.003, Financial Health has 0.26, Financial Literacy has 0.279, e-Readiness has - 0.208, Mental Preparedness has 0.361, and Overall Sentiment Towards Fintech has 0.237. For the current fintech usage, it was taken as the dependent variable, and weights were allocated for each independent variable, so the final regression results were as above. Though this research was not intended to measure the regression between variables, the values were checked to ensure that there was a regression between variables. Through the results, it shows that there is a regression between the variables, and the index score I was generating will give a clear result.

Discussion

Further improvements could be taken to enhance the quality of the research by increasing the sample size that was taken and increasing the variables that were taken. As I have only considered 396 data points for this study it can be hard to predict a precise value. Therefore, the ones who would like to continue this study and measure whether Sri Lanka's customers are ready to adopt Fintech or not in the future more precisely. Also including more variables can help the study to increase accuracy of the value generated. As a developing country there can be more variables

that will affect the Customer Fintech Readiness index and further research can help to include them as well which will cause to recalibrate the weights and then create an advanced index.

Moreover, it is important to consider the cultural and social factors that may influence the adoption of Fintech in Sri Lanka. Factors such as trust in technology, awareness and understanding of Fintech services, and the availability of digital infrastructure play a crucial role in determining the readiness of customers. Additionally, the regulatory environment and government policies regarding Fintech can also impact the adoption rate. Therefore, conducting further research to incorporate these variables and recalibrate the weights will enable the creation of a more comprehensive and accurate Customer Fintech Readiness index for Sri Lanka. This index will allow policymakers and Fintech companies to better understand the factors that influence customer readiness for Fintech services in Sri Lanka. By taking into account technology awareness, digital infrastructure, regulatory environment, and government policies, stakeholders can develop targeted strategies to promote Fintech adoption and drive financial inclusion. Furthermore, continuously updating and refining the index will ensure its relevance as the Fintech landscape evolves and new technologies emerge.

Conclusion

The study developed an index to assess customer readiness for fintech by evaluating five variables: age, financial health, financial literacy, e-readiness, mental preparation, and overall sentiment towards fintech. This index provides insights into individual willingness to adopt fintech solutions, highlighting trends among different age groups. Younger individuals showed higher e-readiness and positive sentiment towards fintech. Financial health and literacy were significant factors, with those in better financial conditions and with higher financial knowledge being

more receptive to fintech services. The index can help financial institutions and policymakers tailor strategies and campaigns to boost fintech adoption.

This study reveals that Sri Lanka is still in the early stages of adopting technology, which means that the shift towards fintech will take more time compared to other countries. The data analysis confirms the possibility of constructing a Fintech index, fulfilling the study's objective. The findings suggest that variables such as customer fintech readiness are measurable and that there is a correlation between these variables and fintech usage. Despite the prevalent reliance on paperwork in Sri Lanka, especially for formal occasions, the younger generation's increasing use of technology shows potential for rapid fintech adoption. They are more financially literate, earning more, and investing in sustainable methods. Improving the financial literacy of the broader population is crucial, particularly as older generations may need more time to adopt fintech due to limited exposure. However, with proper educational efforts, they, too, may gradually embrace fintech solutions, which will improve financial accessibility and promote sustainable investments.

Implication

The study seeks to uplift Sri Lankan society by promoting technology adoption and financial literacy. It highlights the enthusiasm and continuous learning of the younger generation as a key driver. Calculating a Fintech index annually will track national progress, motivating financial companies to explore new opportunities and individuals to pursue personal growth. The integration of fintech, along with improved financial literacy, is identified as a crucial factor for national development.

Recommendation

To foster future growth, Sri Lanka must focus on enhancing both technology and financial literacy. Fintech presents innovative solutions that can transform financial transactions, making them more efficient, accessible, and affordable. Adoption of fintech could accelerate economic growth, create jobs, and promote sustainability.

Integrating fintech into traditional systems can improve efficiency, reduce costs, and, through data analytics and AI, offer personalized financial services. Additionally, blockchain can enhance security and transparency. However, challenges like data breaches and privacy concerns must be addressed with robust security protocols and regulatory frameworks to ensure consumer protection and financial stability.

Limitations

The study encountered limitations, particularly in recruiting a diverse sample of participants, which restricted the generalizability of the findings and introduced potential bias. The short data collection period further limited the number of participants and hindered comprehensive analysis. Future research should adopt more inclusive recruitment strategies, engage underrepresented groups, and extend the data collection period to ensure a more representative sample and accurate results.

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Appendices

. summarize

Variable	Obs	Mean	Std. dev.	Min	Max
CustomerID	396	198.5	114.4596	1	396
Province	0				
DMO	396	78.29966	11.22266	30	93.05556
FHL	396	58.05556	26.62457	20	100
FLL	396	61.61616	12.47322	26.66667	93.33333
ERL	396	86.60354	10.64463	35	100
MP	396	65.45455	18.29562	20	100
CFU	396	51.04798	17.93731	20	95
OSF	396	61.90236	25.50807	0	100
Demographic	396	.1282	0	.1282	.1282
FinancialHwh	396	.1082	0	.1082	.1082
FinancialLwy	396	.1578	0	.1578	.1578
EReadiness	396	.2108	0	.2108	.2108
MentalPrepws	396	.1196	1.39e-17	.1196	.1196
FintechUsage	396	.1641	0	.1641	.1641
OverallSent	396	.1116	0	.1116	.1116

Appendix 1 - Summary

. regress CFU DMO FHL FLL ERL MP OSF

Source	SS	df	MS	Number of obs	=	396
Model	52438.2167	6	8739.70278	F(6, 389)	=	45.54
Residual	74651.8717	389	191.907125	Prob > F	=	0.0000
				R-squared	=	0.4126
				Adj R-squared	=	0.4035
Total	127090.088	395	321.747059	Root MSE	=	13.853

CFU	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
DMO	-.0081109	.0722701	-0.11	0.911	-.1501998	.133978
FHL	.2531123	.0282535	8.96	0.000	.1975636	.3086611
FLL	.2791804	.0667096	4.19	0.000	.148024	.4103368
ERL	-.1997942	.0792661	-2.52	0.012	-.3556377	-.0439507
MP	.0418599	.0446301	0.94	0.349	-.0458864	.1296062
OSF	.2366506	.0310461	7.62	0.000	.1756115	.2976897
_cons	19.70019	6.699169	2.94	0.003	6.529083	32.8713

. summarize weighted_index unweighted_index

Variable	Obs	Mean	Std. dev.	Min	Max
weighted_i~x	396	-2.92e-10	.5870603	-2.248365	1.31744
unweighted~x	396	2.12e-11	.5782552	-2.093965	1.321746

Appendix 4 - Index values

Predictors of Financial Behavior: Using the Theory of Planned Behaviour

Tharshiga, P¹

The primary objective of the proposed study is to examine the predictors of financial behaviour in the Northern province of Sri Lanka. Previous studies' results have shown that these predictors are significantly associated with individual financial performance in managing personal finances. In Sri Lankan Context, this study also provides important statistical evidence pointing to a potential future aging population issue, further underscoring the study's relevance. The Theory of Planned Behavior (TPB) is used by the researcher for their financial context application. The relationship between attitude, subjective norm, perceived behavioural control and intention has been examined in relation to TPB framework, resulting in financial behaviour determinants. This research is therefore novel being the first one theoretically arguing for an expansion of the TPB model starting with financial knowledge in Northern Province, Sri Lanka. The TPB framework forms the foundation for investigating how financial knowledge influences financial behaviour through attitudes toward retirement, subjective norms, and perceived behavioural control, ultimately impacting intention. The researcher believed that the study will provide valuable insight to policymakers, academic groups, and practitioners. Additionally, by raising awareness about finance and retirement, the study is expected to offer meaningful contributions to society. The researchers also recommend that similar studies using these proxies should be conducted in other regions to expand the understanding of financial behavior.

Keywords: *Financial behaviour, Financial Knowledge, Retirement planning, Subjective Norms and Theory of planned behaviour*

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Introduction

Living in a world that is more financially driven rather than trade-driven emphasizes the importance of an individual's ability to manage financial affairs, which ultimately affects their quality of life. The knowledge and understanding a person has regarding financial matters can greatly facilitate day-to-day financial decision-making. Financial literacy can significantly contribute to this process. Financial resilience is based on prudent financial planning (FP) behaviour. Personal FP is crucial for maintaining a healthy financial situation and meeting future financial needs (Mahapatra et al., 2019). FP involves managing personal wealth to achieve economic satisfaction (Kapoor et al., 2014). Ideally, comprehensive FP should cover all six areas. They are Cash Flow Management, Investment Planning, Retirement Planning, Tax Planning, Insurance Planning and Estate Planning. However, the specific life stage of an individual, such as retirement, and life circumstances, such as job loss, may require focusing on particular areas. For instance, retirees may not be actively involved in tax planning, and a laid-off worker may not be able to engage in investment planning. Personal FP is a profound concept that theoretically reflects and practically safeguards individuals' financial resilience. It can be understood from two perspectives: academic and practical.

From an academic perspective, personal finance is multidisciplinary and it includes fields such as economics, family studies, finance, information technology, psychology and sociology according to Schuchart et al. (2007). There are theories in various disciplines that explain the behaviour of individuals concerning money and their management (Copur & Gutter, 2019). However, the theories used to analyse personal financial behaviour are usually imported rather than developed, a regular phenomenon witnessed in many new interdisciplinary areas (Murray & Evers, 1989) including personal finance (Lyons & Neelakantan, 2008). In the practice perspective, Palmer et al. (2009) stated that FP to address the uncertainty of the economic environment is required for everyone. Hanna and Lindamood (2010)

agreed that personal FP is enough to offer economic gains such as making wealth, avoiding any form of loss, and balanced consumption. But the reality is, that most people are not financially capable, skilled or knowledgeable enough to manage their finances (Chen & Volpe, 1998).

Over time, society is experiencing growing problems of high costs of living, and various financial problems, as financial issues are becoming increasingly complex over the years (Baker et al., 2023; Mahapatra et al., 2019). Personal financial literacy and financial management has been receiving attention globally where financial wellness is prioritized by persons. According to Birari and Patil (2014), one should cultivate and attain essential knowledge to be able to control one's spending and obtain adequate strategies to prevent financial issues. Several things could cause individuals to exhibit irrationality with their finances for instance, consumption, aggressive trading, lack of savings, and retirement. However, one of the main fundamental causes that drive such improper financial actions and, subsequently, many financial issues that people confront is undoubtedly the absence of financial literacy (Organization for Economic Cooperation and Development 2020). Based on the Organization for Economic Cooperation and Development (2013) financial literacy is defined as financial knowledge, skill, attitude, awareness, and behaviour necessary for making a sound financial decision and attaining sound financial health. In other words, financial literacy is defined as the capacity to apply knowledge and skills, to handle personal financial issues (Pailella, 2016; Tavares et al. , 2023). Interestingly, financial behaviour in people's everyday practices is intertwined with financial literacy. According to Tan et al. (2011), for personal FP, people must develop cognitive ability and financial literacy. Consequently, Ali et al. (2014) opine that financial literacy is an aspect that should receive serious consideration by individuals since it impacts their welfare. However, available literature shows that financial literacy does enhance the effectiveness of FP. In particular, those with low financial knowledge will find themselves indebted (Lusardi & Tufano, 2009) and will undoubtedly raise their financial risk (Gathergood. ,2012). Citizens and

consumers are equipped with enough information to be able to evaluate their situation and make sound decisions.

Scholars have employed some theories in FP and established varied factors influencing the same. The development of theories concerning the processes of FP is grounded in behavioural finance theory. These theories still hold significant relevance in FP studies (Asebedo, 2022; Overton, 2008). One of the most popular theories associated with behavioural finance is the TPB (Ajzen 1991). It has been applied in various studies to forecast and account for people's behaviour or lack of proper control over their actions (Ajzen 1985, 1991, 2002). Notable about the TPB is that it is based on the theory of reasoned action which posits that human behaviour is a function of the intention to do a certain behaviour, and the intention can be influenced by attitudes and perceived norms regarding the behaviour in question (Fishbein & Ajzen, 1975). According to the theory, Intention is the best predictor of an individual's behaviour, which in this case is analysed by attitude and social normative perceptions towards the behaviour of the individual in question (Montano & Kasprzyk, 2015). In addition, the experiences that people go through in their lifetime influence their handling of money and their decisions about it. As a result, financial literacy can be defined as the extent and confidence of an individual to effectively apply his/her financial knowledge on financial issues that he/she perceives to have control over, according to Huston (2010) and Lusardi & Mitchell (2014). In this regard, the theory can be used to analyze how the financial literacy process functions for each person. A number of studies have established a positive relationship between financial literacy and saving for retirement among working adults. According to Rasiah et al. (2022), individuals with such traits would likely control their credit card usage, pay their bills on time, stick to the budget, handle their financial affairs, and make rational decisions regarding credit card usage. However, many of working people and pre-retirees have poor financial literacy and FP and so they end up having worse standards of living during their retirement (Butt et al., 2018; Lusardi & Mitchell, 2017).

The ageing population in Sri Lanka is sharply on the rise and there are 771 million people who are 65 + years and above in the world which is nearly 10 percent of the world's population (United Nations, 2022). It is further estimated that by 2050, 703 million people will be aged 65 years and above, which will be 16% of the World's population-United Nations, 2022. This is because people are living longer due to medical progress as well as improvements in economic and social well-being that have led to longer durations of retirement (Bloom et al., 2015; Rasiah et al., 2022).

It takes years to gain an education and build up skills and knowledge to enter the job market, while after that one spends 30 to 40 years working and building their lives (Farrer & Shire, 2021). According to the study done by Kadoya & Khan, (2018), people at a relatively young age cared less about their financial status and retirement as they only began to think or worry about retirement planning at middle age. In addition, Froidevaux et al. (2016) pointed out that the successful transition from work to retirement and achieving reasonable retirement adjustment has become a major issue for working people aged 40 and above who are gradually entering the stage of becoming older workers. However, as the evidence suggests, in most cases, there must be a systematic approach to retirement planning (Klapper & Lusardi, 2020).

In Sri Lanka, the TPB has been utilized in various research areas such as medicine, marketing, and consumer applications. However, there is a lack of research on the application of TPB in personal finance. This study is the first to provide theoretical justification for its expansion to incorporate financial knowledge as the starting point of the original model. The results will also support the important role of TPB in examining how financial knowledge influences financial behaviour through attitudes toward retirement, subjective norms, perceived behavioural control, and intention. Thus, the problem of the study is “whether financial knowledge affects financial

behaviour through the attitudes toward retirement, subjective norms, perceived behavioural control, and intention.

Research Questions

The present study will attempt to analyze the following research questions;

- What is the effect of financial knowledge on financial behaviour, mediated by the attitude towards retirement?
- How does financial knowledge impact financial behaviour, with perceived behavioural control as the mediator?
- What is the effect of financial knowledge on financial behaviour, mediated by the attitude towards retirement and behavioural intention?
- How does financial knowledge impact financial behavior, mediated by perceived behavioral control and behavioral intention?
- what is the effect of financial knowledge on financial behaviour, mediated by subjective norms and behavioral intention?

Objectives of the Study

The objectives of the study are;

- To investigate how financial knowledge impacts financial behavior, with attitude toward retirement as the mediator.
- To investigate how financial knowledge impacts financial behavior, with perceived behavioural control as the mediator.
- To investigate how financial knowledge affects financial behavior through the mediating role of retirement attitude and behavioral intention.
- To investigate how financial knowledge affects financial behavior through the mediating role of perceived behavioral control and behavioral intention.
- To investigate how financial knowledge affects financial behavior, while considering the mediating effects of subjective norms and behavioral intention.

Literature Review

This study fell under the social sciences disciplinary area within Psychology (Ajzen & Fishbein, 1980). This is not very surprising since Psychology is the study of behaviour and the mind which is the subject under study (Potter, 1988). According to Ajzen and Fishbein (1980), it is logical to look for factors other than the attitude that may directly influence the behaviour or even interact with the attitude in the determination of behaviour (Ajzen & Fishbein, 1980). These contributions relate to attitude theory by making a clear distinction between attitude, intention and behavior. They regard intention as the most important determinant of actual behaviour, with attitude being a consequence of behaviour (Ajzen & Fishbein, 1980). The most commonly used model is the Theory of Reasoned Action (TRA) developed by Martin Fishbein in 1967. TRA comes from his earlier theoretical work on attitude called the Expectancy-value Theory (Ajzen & Fishbein, 1975). According to TRA, a person's likelihood of performing a specific behaviour depends on two fundamental antecedents: the behaviour and perceived social pressure to perform the behavior (Ajzen & Fishbein, 1980). These two constructs together define intention enabling the researcher to predict some actual behaviors. In general, the influence exerted by the attitude and subjective norm towards a particular behaviour is directly proportional to the individual's behaviour intention (Ajzen, 1991). TRA was then expanded by Ajzen in 1988 due to the shortcomings that Ajzen and Fishbein had discovered while using the TRA in their research. Their research revealed that the TRA postulated the notion of self-control as insufficient for real behavior (Ajzen, 1988; 1991). This assumption eliminated individuals who, as much as they would like to engage in a particular behaviour, might not be able to do so. The idea that the majority of behaviours are between the complete control and the lack of control at the other end is much more realistic (Godin et al. , 1992). To balance these observations, Ajzen (1991) introduced the third antecedent determinant of intention, which he called perceived behavioral control (PBC). It is

however important to note that while TRA and TPB are two different names, the TPB is basically an elaboration on the TRA (Sparks & Shepherd, 1992).

As with most major theories, the TRA and the TPB have been criticised on several levels. The first criticism is that both theories are deemed causal because the variables of attitude and intention are causal in nature. However, in empirical tests performed on the models, researchers use correlational designs, which show that variation in one variable leads to variation in another but does not show the direction of causality. Armitage and Conner (1998) discussed the TPB and reviewed multiple TPB-based studies to identify the breadth of empirical support for extending the TPB by adding six additional variables. These include belief salience, past behaviour/habit, perceived behavioural control versus self-efficacy, moral norms, self-identity and affective beliefs. In addition, TPB postulated that a person's behaviour is influenced by their behavioural intention which is a function of attitude to the behaviour, subjective norm and perceived control over the behaviour (Ajzen, 1991). Furthermore, self-identity was included in the expanded model of the TPB. The original framework of the TPB is as follows;

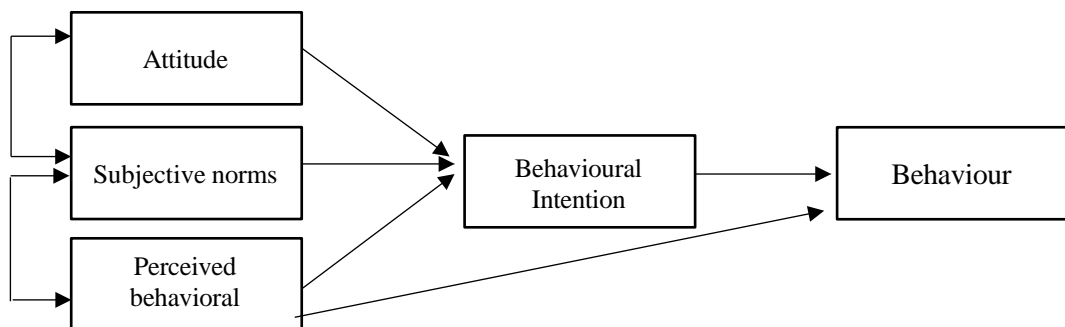


Figure 1: The Theory of Planned Behavior (Ajzen ,1991)

According to Ajzen (1991), attitude, perceived behavioural control and subjective norms can be able to predict one's intention to perform a particular behaviour. Perceived behaviour control when complemented with intention results in actual behaviour (Ajzen, 1991; Ogiemwonyi & Harun, 2021). Moreover, Ajzen et al.

(2011) argue that TPB can incorporate extra predictors if they fit essential requirements and can impact on motivational factors, behavioural intention, or behaviour. For instance, Ajzen et al. (2011) suggest that the level of knowledge can be a precursor to behaviour, which is not included in TPB's current set of predictors but can influence motivational variables. Likewise, previous research on personal finance literacy has found that personal financial knowledge can affect motivational conditions as well as financial behaviour (Ajzen et al., 2011 Rasiah et al., 2022). undefined She et al. (2024) and Mahfuzur (2021) proposed the revised model.

Research Methods

Research Design

The study proposed the use of an Explanatory Sequential Mixed Method research design. The quantitative phase will answer the research questions and test the null hypothesis for each question. Survey questionnaires are used to elicit data from households in the Northern Province. The second phase of the research therefore employs a qualitative methodology to gather detailed and thick data for investigating the phenomenon under study. This defines the present study as explanatory research as it aims to find out the actual reasons and offers a detailed explanation of a certain observed phenomenon. The findings will then be employed to test the extent to which the theoretical model is an accurate portrayal of the real-life organisational phenomenon in its context.

Proposed Sampling Framework

The required sample size for the lowest stratum has been calculated using Krejcie and Morgan's (1970) sample size table.

Table:

District	Jaffna	Kilinochchi	Mullaitivu	Mannar	Vavuniya	Total
No of Families	206,574	49,427	46,693	48,863	56,885	408,442
Lower income level families	78,444	24,755	6,445	22,905	30,773	163,322
Population	128,130	24,672	40,248	25,958	26,112	245,120
Sample size	384	379	381	379	379	1902

Based on the vital statistics of Northern province (2023), the information is summarized in the table for the quantitative study.

Further, the researcher proposed the following for the qualitative study;

The number of in-depth interviews is fifty

Conceptual Framework

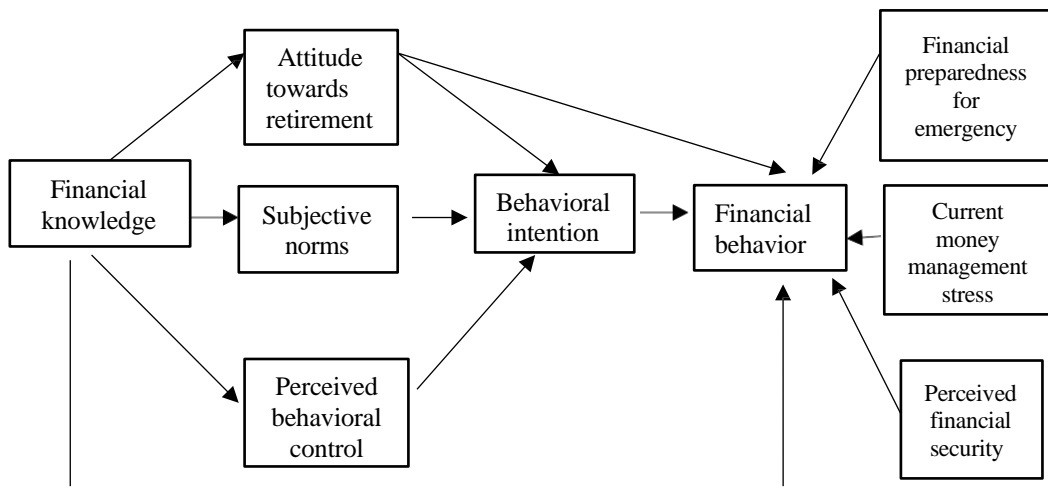


Figure 2: Conceptualization

Proposed Hypothesis

The following hypotheses are proposed for the study;

H₁: Financial knowledge has a significant impact on financial behaviour with the mediating role of Attitude toward retirement

H₂: Financial knowledge has a significant impact on financial behaviour with the mediating role of Attitude towards retirement and behaviour intention

H₃: Financial knowledge has a significant impact on financial behaviour with the mediating role of Perceived behaviour control and behaviour intention.

H₄: Financial knowledge has a significant impact on financial behaviour with the mediating role of subjective norms and behavioural intention.

Conclusion

The primary objective of the proposed study is to examine the predictors of financial behaviour in the Northern province of Sri Lanka. This study has not only contributed to knowledge but also has proposed a theoretical framework that shall assist other researchers in the financial behaviour context. According to the existing theory, financial Knowledge, attitude, retirement planning, perceived behavioural control and self-perceived subjective norms contribute to the actual financial behaviour of the individual. The present study suggests that the mediating effect of attitude, subjective norm, perceived behavioural control, and intention on financial knowledge influences financial behaviour. The researcher believed that the study will provide valuable insight to policymakers, academic groups, and practitioners. Additionally, by raising awareness about finance and retirement, the study is expected to offer meaningful contributions to society. However, the effect should be supported by quantitative evidence. However, since this is a concept paper there is no idea on data collection. Therefore, the structure of the study is derived from the previous literature on the given subject. Hence, it means that the generalization of the findings and application are not suitable. However, the study encourages this to be done in other provinces with the above-stated proxies or other proxies.

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Sensitivity of Green Finance to Environmental Sustainability

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This study investigates the impact of green finance on environmental sustainability across 136 countries spanning eight regions from 1960 to 2023. By employing robust regression models, including interaction terms to account for varying regional contexts, the research provides two key findings. First, green finance has a generally positive effect on environmental sustainability in the European Union and Western Europe, Eastern Europe and Central Asia, East Asia and the Pacific, North America, and South Asia. However, it shows a negative impact in Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa. Second, inflation moderates the effect of green finance on environmental sustainability, with its influence varying across different regions. This study contributes novel insights by revealing how green finance's effectiveness is contingent on regional economic conditions and inflationary pressures, offering a nuanced understanding of its role in promoting environmental sustainability globally.

Keyword - *Environmental sustainability, Green bond, Green finance, Inflation.*

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Introduction

Sustainable development advocates for a shift in social structure and mindset that accelerates economic growth by committing to reducing social injustice, extreme poverty, and inequality in society (Jelili Amuda, 2021). According to Ye et al. (2023), sustainable economic development is defined as economic growth with the protection of the environment and the promotion of human well-being as its main objectives. Within the growth narrative, there has been much discussion on the importance of economic expansion for lowering rates of poverty, increasing environmental sustainability, and reducing income inequality (Murshed, 2022). However, counterarguments have been made about how unsustainable economic expansion may eventually have a negative impact on the environment and society (Murshed, 2022). Furthermore, sustaining a stable rate of economic growth is critical because it increases the state's capacity to distribute public goods and raises the spending power of the relevant population. It is conceivable that in both situations, greater economic growth will raise the living standards of the affected populations (Murshed, 2022). Sustainable economic development might decrease future emissions and is associated with increasing urbanization, which leads to better fire-fighting and fuel fragmentation (Park et al., 2023). Therefore, there is a strong belief that the numerous macroeconomic challenges that arise during the development phases can ultimately be neutralized by attaining sustainable economic growth (Murshed, 2022). In this sense, one of the three main tenets of the 2030 Sustainable Development Goals (SDG) agenda established by the UN is the achievement of sustainable economic growth (Murshed, 2022). Consequently, the SDG agreement's signature has pushed global economies to discover pertinent avenues that would promote the sustainable expansion of the economy overall (Murshed, 2022).

Green finance has drawn a lot of attention in recent literature due to the growing number of international efforts being made to combat climate change. Significant

accomplishments by international organisations and national governments, the adoption of the Paris Climate Agreement and the United Nations Sustainable Development Goals demonstrate a renewed commitment to environmental sustainability. A joint project of the Global Environment Facility (GEF) and the Asian Development Bank (ADB) is climate change finance. The ADB's carbon market programs in Asia, ADB's technical support for the establishment of the China National Emission Trading System, and the GEF's support for China's green finance reform are notable initiatives in this regard (Tiwari et al., 2020). With the attention drawn to environmental sustainability, particularly the recent Intergovernmental Panel on Climate Change (IPCC) report on attaining carbon emissions that are net zero by 2050, governments and corporations have focused on attaining environmentally sustainable development (Tiwari et al., 2020). Countries are determined to achieve the green finance objective by funding renewable energy projects, eco-friendly constructions, forest restoration, and facilitating green corporate behavior.

Previous research indicates that green finance tends to impact the environment and sustainable development in various ways, such as impacting the stock and commodity markets (Naeem et al., 2022), lowering the ecological footprint (Khan et al., 2022), encouraging the production of blue hydrogen (Webb et al., 2023), improving corporate green innovation (Jia et al., 2023), and assisting businesses in making the transition to a greener business (Chi & Yang, 2023; Zhao et al., 2023), supporting high-quality energy development (Xu et al., 2023), fostering sustainable economic growth (Nenavath & Mishra, 2023), and influencing central bank mandates (Dikau & Volz, 2021).

From 2011 to 2019, Khan et al. (2022) examined the effects of green finance on ecological footprints in 26 Asian economies, demonstrating that green finance appeared to be environmentally friendly and decreased ecological footprints. From an Asian point of view, supporting the early stages of the scaling up of green hydrogen production would be the most economical use of green finance, particularly when the

investment environment might not accurately reflect medium- to longer-term prospects (Webb et al., 2023). The study conducted by Jia et al. (2023) investigated the impact of green finance reform on corporate green innovation in China between 2012 and 2020. The findings indicated a notable improvement in corporate green innovation subsequent to the implementation of green finance reform. From September 2010 to July 2021, Naeem et al. (2022) examined the return and volatility connectedness of the established US industry stock and commodity markets as well as the growing green asset market. They found that time-varying return and volatility connectedness had significant crisis jumps. In the green and commodity markets, asset volatility is more common than return volatility, and certain financial and economic uncertainty indicators indicate that the large-scale market volatility of commodities has positive effects. The role of green finance development in China's high-quality energy development (HED) was examined by Xu et al. (2023) between 2007 and 2013. Their findings indicated that the effect of green finance becomes more noticeable once it surpasses a threshold value and that its spatial spillover boundary is 1750 km. The government can use these findings as a guide to create more green finance policies that will lead to the development of high-quality energy. Nenavath and Mishra (2023) looked at how financial technology and green finance affected sustainable economic growth between 2010 and 2021. They found that green finance greatly influences the development of environmental quality protection, financial efficacy, and finance structure.

The impact of green finance on environmental sustainability is evident; however, research on this impact has primarily focused on developed countries. Additionally, the moderating role of national inflation on this impact has not been thoroughly addressed in existing studies. As inflation becomes a global issue, understanding how it affects the relationship between green finance and sustainable development is crucial. The lack of research on this factor creates a significant gap, particularly in developing and emerging regions where inflation rates tend to be higher and exert a

stronger influence on the economy and financial policies.

This study aims to identify and analyze the relationship between green finance and environmental sustainability across eight different regions of the world. These regions include the European Union and Western Europe, Eastern Europe and Central Asia, East Asia and the Pacific, Latin America and the Caribbean, the Middle East and North Africa, North America, South Asia, and Sub-Saharan Africa. The study will explore the influencing factors and specific characteristics of each region, providing tailored policy recommendations to enhance sustainable development.

Additionally, the research aims to uncover the moderating role of national inflation on the impact of green finance on environmental sustainability across these global regions. This will help offer more effective policy recommendations tailored to the economic conditions and inflationary situations of each region, contributing to a more comprehensive approach to sustainable development.

Literature Review

Green Finance and Environmental Sustainability

Green finance has significantly influenced environmental sensitivity by channeling investments towards projects and initiatives that prioritize ecological preservation and sustainability. By funding renewable energy projects, eco-friendly construction, and forest restoration, green finance helps reduce greenhouse gas emissions and promotes cleaner production methods (Zhang et al., 2024). This financial approach encourages businesses to innovate and adopt sustainable practices, thus lowering their ecological footprints. Additionally, green finance supports the development of green technologies, such as blue hydrogen and energy-efficient systems, which further enhance environmental protection efforts (Wei et al., 2024). Through these targeted investments, green finance not only mitigates the adverse effects of industrial activities on the environment but also fosters a culture of sustainability and environmental consciousness within the corporate sector and beyond. Therefore, we develop the following hypothesis 1:

H1: Green finance has a positive impact on environmental sustainability across different regions.

Green Finance, Inflation and Environmental Sustainability

Inflation, representing the rate at which the general level of prices for goods and services rises, can influence the effectiveness and efficiency of green finance initiatives in several ways (Lin & Wang, 2013). High inflation can erode the real value of financial investments, including those directed towards green projects. When inflation rates are high, the purchasing power of allocated funds diminishes, potentially reducing the scale and impact of green finance initiatives. This may result in fewer resources being available for renewable energy projects, eco-friendly constructions, and other sustainability-oriented investments, thereby hindering their effectiveness in achieving environmental goals (Zhao et al., 2024). Moreover, inflation can affect the cost structure of green technologies and sustainable practices. Rising costs of materials, labor, and other inputs due to inflation can increase the overall expenses of green projects, making them less economically viable. This can discourage both public and private sector investments in green finance, as the perceived financial returns may not justify the increased costs associated with inflationary pressures (Wang et al., 2019). On the other hand, inflation can impact consumer behavior and corporate strategies, which in turn affects environmental sustainability. During periods of high inflation, consumers may prioritize essential spending over eco-friendly products and services, leading to reduced demand for sustainable goods. Similarly, companies facing inflationary pressures might cut back on their sustainability initiatives to maintain profitability, thereby weakening the positive impact of green finance on environmental sustainability (Jia, 2022). Therefore, we develop hypothesis 2 as follows:

H2: Inflation moderates the impact of green finance on environmental sustainability across different regions.

Other Factors and Environmental Sustainability

Previous studies have shown that while green finance plays a crucial role in promoting sustainable practices and reducing environmental degradation, other determinants such as unemployment, trade openness, population, inflation, and FDI also significantly impact environmental sustainability (Gupta & Dutta, 2021; Oanh, Van, and Dinh, 2023; Hamid et al., 2020).

High levels of unemployment can have both direct and indirect effects on environmental sustainability. On one hand, unemployment may reduce the financial capacity of individuals and governments to invest in sustainable technologies and practices. On the other hand, high unemployment rates can lead to increased exploitation of natural resources as a means of livelihood, potentially causing environmental degradation (Oanh, Van, and Dinh, 2023; Gupta & Dutta, 2021; Salam & Xu, 2021).

The degree of trade openness influences environmental sustainability through various channels. Increased trade openness can lead to the transfer of environmentally friendly technologies and practices, promoting sustainability. However, it can also result in the "pollution haven" effect, where countries with lax environmental regulations attract polluting industries, thereby negatively impacting environmental sustainability (Oanh, Van, and Dinh, 2023; Salam & Xu, 2021).

Population growth exerts significant pressure on environmental resources. Higher population levels increase the demand for food, water, energy, and other resources, leading to greater environmental stress. Rapid urbanization associated with population growth can also result in habitat destruction, pollution, and increased waste generation, challenging efforts towards environmental sustainability (Oanh, Van, and Dinh, 2023). As discussed earlier, inflation affects the real value of investments in green projects and the cost structure of sustainable practices. High inflation can erode the purchasing power of funds allocated for environmental initiatives and increase the costs of

implementing green technologies, thereby reducing their effectiveness in promoting sustainability (Wang et al., 2019).

FDI can be a double-edged sword in the context of environmental sustainability. On one side, FDI brings in capital, technology, and expertise that can enhance environmental management and promote sustainable practices. On the other side, without stringent environmental regulations, FDI can lead to environmental degradation as multinational corporations may exploit natural resources unsustainably to maximize profits (Hamid et al., 2020).

Research Methods

Research Design

The study utilized an econometric technique known as panel data regression. In evaluating the effects of green finance and environmental sustainability, variables such as environmental sustainability (ES), green bond (GB), unemployment (UE), trade openness (TO), population (PP), inflation (INF), foreign direct investment (FDI) were included.

To test H1 and H2, we employ Model 1 and 2 as follows:

$$ES_{i,t} = \beta_0 + \beta_1 \times GB_{i,t} + \beta_2 \times UE_{i,t} + \beta_3 \times TO_{i,t} + \beta_4 \times PP_{i,t} + \beta_5 \times INF_{i,t} + \beta_6 \times FDI_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ES_{i,t} = \beta_0 + \beta_1 \times GB_{i,t} + \beta_2 \times UE_{i,t} + \beta_3 \times TO_{i,t} + \beta_4 \times PP_{i,t} + \beta_5 \times INF_{i,t} + \beta_6 \times FDI_{i,t} \\ + \beta_7 \times INF_{i,t} \times GB_{i,t} + \varepsilon_{i,t} \quad (2)$$

In Model 1, we regress the independent variables ($GB_{i,t}$) with the dependent variables ($ES_{i,t}$), incorporating control variables ($UE_{i,t}$, $TO_{i,t}$, $PP_{i,t}$, $INF_{i,t}$, $FDI_{i,t}$). In Model 2, we include interaction terms $INF_{i,t} \times GB_{i,t}$ in the regression.

Measuring Environmental Sustainability

We measure environmental sustainability ($ES_{i,t}$) as a dependent variable is followed by the method of (Sohag et al., 2019b). (Sohag et al., 2019b) define environmental sustainability as the efficient use of renewable resources after deducting the damage

caused by greenhouse gas emissions, natural resource exploitation, and other negative externalities. We obtain data from the World Bank. The data is then transformed using the natural logarithm to minimize errors.

$$ES_{i,t} = \ln (\text{Renewable resource use}_{i,t} - \text{Greenhouse gas emission}_{i,t} \\ - \text{Natural resource exploitation}_{i,t} \\ - \text{Other negative externalities}_{i,t})$$

Measuring Green Finance

We follow Cui et al. (2024) to use green bond issuances by country $[(GB)]_{(i,t)}$ as an independent variable to measure green finance, which is collected from Asian Development Bank.

Measuring Control Variables

We follow (Oanh, Van, and Dinh 2023) and (Hamid et al. 2020) to add control variables unemployment rate ($UE_{i,t}$), trade openness ($TO_{i,t}$), population ($PP_{i,t}$), inflation ($INF_{i,t}$), and foreign direct investment ($FDI_{i,t}$). Unemployment rate is measured by the number of unemployed people divided by a country's labor force. Trade openness is measured by the ratio of total import and export of goods and services by GDP. Population growth rate is measured by the annual population growth rate. Inflation rate is measured by the CPI rate of a country at a specific time (Oanh, Van, and Dinh 2023). We use (Hamid et al. 2020) to calculate yearly FDI inflows to nation i in year t . All data is collected from the World Bank.

Measuring the Moderating Variable

In this study, the Inflation variable is used as a moderating variable. The inflation rate (INF) is calculated based on the percentage change in the Consumer Price Index (CPI) using the following formula:

$$INF_{i,t} = \frac{CPI_{i,t} - CPI_{i,t-1}}{CPI_{i,t-1}} \times 100$$

Where:

- $INF_{i,t}$ is the inflation rate of country i in year t ;
 $CPI_{i,t}$ is the Consumer Price Index of country i in year t ;
 $CPI_{i,t-1}$ is the Consumer Price Index of country i in year $t - 1$.

Findings of the Study

Table 1 presents the descriptive statistics for the main variables in the model. The Environmental Sustainability (ES) variable, with 13,950 observations, has a mean of 23.64 and a standard deviation of 3.14, indicating a relatively narrow range of environmental sustainability scores across the sampled regions. The minimum and maximum values for ES are 15.30 and 32.24, respectively. Green bond (GB) data, with 17,024 observations, shows a mean value of 1.16 and a standard deviation of 2.09, with values ranging from 0 to a high of 99.43. This indicates a substantial variation in the issuance of green bonds among different regions.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ES	13,950	23.64	3.14	15.30	32.24
GB	13,950	1.16	2.09	0.00	99.43
UE	13,950	7.84	5.53	0.10	38.80
TO	13,950	76.73	56.10	0.02	863.20
PP	13,950	15.71	3.06	7.88	22.80
INF	13,950	44.23	281.63	(17.64)	11,749.64
FDI	13,950	19.10	3.50	2.30	28.77

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Baseline Regressions

Table 2 presents the Variance Inflation Factors (VIF) for the variables used in the study to assess multicollinearity. The VIF values for PP, FDI, TO, UE, GB, and INF are 2.29, 1.87, 1.32, 1.04, 1.02, and 1.01, respectively. The mean VIF is 1.42. These results indicate that multicollinearity is not a concern in this study, as all VIF values are well below the common threshold of 5. The relatively low VIF values suggest that the

explanatory variables are not highly correlated and can be reliably used in the regression analysis.

Table 2. VIF

Variable	VIF	1/VIF
PP	2.29	0.437254
FDI	1.87	0.535138
TO	1.32	0.757611
UE	1.04	0.960082
GB	1.02	0.985182
INF	1.01	0.995017
Mean VIF	1.42	

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Table 3 displays the Pearson correlation coefficients among the variables studied. GB positively correlate with ES, indicating that higher green bond issuance is associated with improved environmental sustainability. UE negatively correlates with ES, suggesting that higher unemployment rates are linked to lower environmental sustainability. TO negatively correlates with ES, indicating that greater trade openness is associated with lower environmental sustainability. PP strongly positively correlates with ES, showing that larger populations tend to be associated with better environmental sustainability outcomes. INF weakly negatively correlates with ES, implying a slight negative impact of inflation on environmental sustainability, though the correlation is very weak. FDI strongly positively correlates with ES, indicating that higher levels of FDI are significantly associated with improvements in environmental sustainability. These findings provide insights into the complex interplay of economic factors affecting environmental sustainability.

Table 3: Pearson Correlation

	ES	GB	UE	TO	PP	INF	FDI
ES	1.0000						
GB	0.1204	1.0000					
	0.0000						
UE	-0.1031	-0.0530	1.0000				
	0.0000	0.0000					
TO	-0.2129	-0.0117	0.1292	1.0000			
	0.0000	0.1271	0.0000				
PP	0.8292	0.0903	-0.1439	-0.4109	1.0000		
	0.0000	0.0000	0.0000	0.0000			
INF	-0.0155	0.0046	-0.0324	-0.0107	0.0065	1.0000	
	0.0571	0.5450	0.0000	0.1624	0.3996		
FDI	0.8461	0.1183	-0.0495	-0.1071	0.6377	-0.0442	1.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Table 4 presents the regression analysis results for Model 1, which examines the impact of green finance and other factors on Environmental Sustainability (ES) using Ordinary Least Squares (OLS), Fixed Effects Model (FEM), Random Effects Model (REM), and Generalized Least Squares (GLS). The GLS model is the most suitable model as suggested by both the Likelihood ratio and Hausman tests (Achim, 2017; Tabsh, 2015; Talukdar, 2012; Yusuf, 2003). We applied F-test, Breusch-Pagan test, Wooldridge test to ensure that the model does not have autocorrelation and serial correlation problems (Bahl et al., 2019). The coefficient of GB is positive and significant (0.0257***), indicating that increased issuance of green bonds is associated with improved environmental sustainability.

The coefficients for the control variables reveal various impacts on Environmental Sustainability (ES). UE has a positive and significant coefficient (0.0124***), suggesting that higher unemployment rates are associated with improved environmental sustainability, though this result is somewhat unexpected and may

warrant further scrutiny. TO shows a positive and significant effect (0.00108***), indicating that increased trade openness contributes to better environmental sustainability. PP exhibits a strong positive and significant coefficient (0.532***), demonstrating that larger populations are associated with enhanced environmental sustainability outcomes. INF has a positive and significant coefficient (0.000201***), suggesting a slight but meaningful positive impact on environmental sustainability. FDI also shows a strong positive and significant effect (0.495***), highlighting its substantial role in improving environmental sustainability. These results underscore the varying degrees to which these control variables influence environmental sustainability.

Table 4: Regression for Model 1

ES	OLS	FEM	REM	GLS
GB	0.0263***	0.0171***	0.0170***	0.0257***
	(5.77)	(4.82)	(4.74)	(6.48)
UE	0.00854***	-0.0196***	-0.0148***	0.0124***
	(4.51)	(-5.72)	(-4.49)	(9.40)
TO	0.00158***	0.00526***	0.00525***	0.00108***
	(6.97)	(17.12)	(17.35)	(5.79)
PP	0.530***	0.968***	0.857***	0.532***
	(105.44)	(72.32)	(74.20)	(139.20)
INF	0.0000719	0.000128**	0.000139***	0.000201***
	(1.60)	(3.29)	(3.56)	(6.39)
FDI	0.476***	0.353***	0.366***	0.495***
	(118.98)	(89.54)	(94.02)	(160.42)
_cons	5.739***	1.032***	2.591***	5.242***
	(77.14)	(5.37)	(14.92)	(102.65)
N	13,950	13,950	13,950	13,950

t statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Table 5 presents the regression results for Model 2, which incorporates the interaction term between inflation and green bonds (INF x GB) to examine the nuanced effects of green finance on environmental sustainability. In the GLS model, the coefficient for

GB remains positive and significant (0.0228***), reinforcing the finding that increased green bond issuance is positively associated with improved environmental sustainability. The interaction term (INF x GB) also shows a positive and significant coefficient (0.000449***), suggesting that the impact of green bonds on environmental sustainability is enhanced in the presence of higher inflation. This indicates a synergistic effect where inflation moderates the positive relationship between green bonds and environmental outcomes. For the control variables, UE maintains a significant positive effect, TO remains positively associated with ES, PP continues to have a strong positive impact, and FDI shows a significant positive relationship. In contrast, INF shows a negative and significant coefficient (-0.000221***), indicating a slight adverse effect on environmental sustainability, which contrasts with the positive correlation observed in Table 4. These results highlight the complex interplay between green finance, inflation, and environmental sustainability, emphasizing the importance of considering interaction effects in the analysis.

Table 5: Regression for Model 2

ES	OLS	FEM	REM	GLS
GB	0.0208***	0.0174***	0.0171***	0.0228***
	(4.54)	(4.88)	(4.77)	(5.72)
INF x GB	0.000510***	-0.0000881	-0.0000522	0.000449***
	(9.00)	(-1.05)	(-0.63)	(9.34)
UE	0.0102***	-0.0198***	-0.0149***	0.0133***
	(5.39)	(-5.78)	(-4.52)	(10.04)
TO	0.00155***	0.00526***	0.00525***	0.00116***
	(6.89)	(17.14)	(17.35)	(6.19)
PP	0.535***	0.968***	0.856***	0.535***
	(106.10)	(72.24)	(74.13)	(140.37)
INF	-0.000463***	0.000205*	0.000185*	-0.000221***
	(-6.22)	(2.47)	(2.25)	(-3.67)
FDI	0.475***	0.353***	0.366***	0.493***
	(118.84)	(89.52)	(94.03)	(159.67)
_cons	5.683***	1.044***	2.610***	5.216***
	(76.33)	(5.42)	(15.02)	(102.93)
N	13,950	13,950	13,950	13,950

t statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Table 6 displays the regression results for Model 2 across eight different regions, revealing that the correlation of GB with ES is notably varied across regions.

In region 1 (European Union and Western Europe), region 2 (Eastern Europe and Central Asia), region 3 (East Asia and Pacific), region 6 (North America) and region 7 (South Asia), GB exhibits a robust positive correlation with ES, indicating that green bonds significantly enhance environmental sustainability in these regions. In contrast, region 4 (Latin America and the Caribbean), region 5 (Middle East and North Africa) and region 8 (Sub-Saharan Africa) show negative correlations, suggesting that green finance may be less effective in these areas due to factors such as lower investment in green initiatives or less developed financial markets for green bonds.

For Inflation (INF), the correlation with ES is generally negative, reflecting the overall global trend seen in Table 5. However, in region 2 (Eastern Europe and Central Asia), region 4 (Latin America and the Caribbean), region 5 (Middle East and North Africa) and region 8 (Sub-Saharan Africa), inflation has a more substantial negative effect on ES compared to other regions, possibly due to higher inflation rates creating economic instability that undermines environmental policies.

The interaction term INF x GB reveals significant regional variations. In region 2 (Eastern Europe and Central Asia), region 4 (Latin America and the Caribbean), region 5 (Middle East and North Africa) and region 8 (Sub-Saharan Africa), the positive interaction suggests that green bonds have a positive impact on ES when inflation is high. This could indicate that in these regions, inflation drives more investment into green bonds as part of broader economic adjustments. Conversely, in region 1 (European Union and Western Europe), region 3 (East Asia and Pacific), region 6 (North America) and region 7 (South Asia), the interaction term is either insignificant

or negative, pointing to the complexity of how inflation and green finance interact in these regions, possibly due to less mature financial systems or different economic conditions affecting the impact of green finance.

Table 6. Regression for Model 2 Across Eight Regions

ES	Model 1	Model 2	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8
G B	0.0257 ***	0.0228 ***	0.0207 27***	0.1009 095**	0.0229 498**	- 0.0864 106***	- 0.2221 342***	0.0203 651**	0.0917 428**	- 0.0438 834**
	(6.48)	(5.72)	(3.87)	(3.26)	(3.35)	(4.03)	(7.38)	(2.07)	(2.73)	(2.52)
U E	0.0124 ***	0.0133 ***	0.0032 072ns	0.0047 196ns	0.0073 573ns	0.0035 797ns	- 0.0919 757***	- 0.0554 986**	0.0182 678**	0.0402 673***
	(9.40)	(10.04)	(0.71)	(1.52)	(1.11)	(0.84)	(22.38)	(3.13)	(2.91)	(14.44)
T O	0.0010 8***	0.0011 6***	0.0073 331***	- 0.0095 802***	- 0.0008 902**	0.0047 585***	0.0054 114***	0.0129 361**	0.0031 56ns	0.0021 301***
	(5.79)	(6.19)	(15.51)	(12.74)	(-2.45)	(8.75)	(10.26)	(3.38)	(1.92)	(3.67)
PP	0.532* **	0.535* **	0.7711 909***	0.6215 911***	0.4459 652***	0.5774 071***	0.8565 311***	0.8508 104***	0.6296 461***	0.7818 051***
	(139.2 0)	(140.3 7)	(48.00)	(42.58)	(33.87)	(55.67)	(38.91)	(16.12)	(32.88)	(71.01)
IN F	0.0002 01***	0.0002 21***	0.0011 386ns	- 0.0003 985***	0.0036 17ns	- 0.0016 16***	- 0.0032 779***	0.0125 462**	0.0014 9ns	- 0.0013 797***
	(6.39)	(-3.67)	(0.90)	(4.14)	(1.30)	(4.47)	(3.62)	(2.08)	(1.54)	(4.21)
F DI	0.495* **	0.493* **	0.3427 686***	0.4025 268***	0.5261 4***	0.5047 683***	0.2470 626***	0.4289 53***	0.3571 493***	0.2935 922***
	(160.4 2)	(159.6 7)	(32.39)	(34.46)	(47.83)	(59.63)	(24.87)	(16.75)	(31.45)	(41.94)
IN F x G B		0.0004 49***	- 0.0008 793ns	0.0005 312***	- 0.0025 355ns	0.0019 88***	0.0015 282***	- 0.0025 44ns	- 0.0094 74**	0.0014 425**
		(9.34)	(1.10)	(7.30)	(1.86)	(4.62)	(4.13)	(1.23)	(2.93)	(3.33)
_c on s	5.242* **	5.216* **	4.9608 39***	6.4426 12***	6.1592 15***	4.3740 17***	6.2075 ***	2.2985 85***	6.0286 65***	4.0819 76***
	(102.6 5)	(102.9 3)	(22.15)	(28.47)	(48.59)	(27.15)	(20.68)	(3.57)	(23.46)	(30.21)
N	13,950	13,950	1,700	1,367	1,984	2,413	1,193	247	591	2,577

t statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ES: Environmental Sustainability; GB: Green bond; UE: Unemployment; TO: Trade openness; PP: Population; INF: Inflation; FDI: Foreign direct investment

Region 1: European Union and Western Europe; Region 2: Eastern Europe and Central Asia; Region 3: East Asia and Pacific; Region 4: Latin America and Caribbean; Region 5: Middle East and North Africa; Region 6: North America; Region 7: South Asia; Region 8: Sub-Saharan Africa

Discussion and Recommendation

This study explores the impact of green finance on environmental sustainability (ES) across various regions, while considering the moderating role of inflation. The findings are summarized in Table 7 and reveal nuanced regional differences in the relationships between green finance, inflation, and ES. Firstly, green finance generally has a positive impact on ES, as supported by the results in region 1 (European Union and Western Europe), region 2 (Eastern Europe and Central Asia), region 3 (East Asia and Pacific), region 6 (North America) and region 7 (South Asia). This finding aligns with previous studies by Zhang et al. (2024) and Wei et al. (2024), which emphasized the role of green finance in enhancing environmental sustainability. However, the study found a negative impact in region 4 (Latin America and the Caribbean), region 5 (Middle East and North Africa) and region 8 (Sub-Saharan Africa). This divergence could be attributed to varying levels of green finance implementation, regional economic conditions, or institutional effectiveness in these areas.

Secondly, inflation moderates the impact of green finance on ES. This hypothesis is supported in regions 2 (Eastern Europe and Central Asia), 4 (Latin America and Caribbean), 5 (Middle East and North Africa), 7 (South Asia), and 8 (Sub-Saharan Africa), consistent with the work of Wang et al. (2019), Jia (2022), and Zhao et al. (2024). The moderation effect of inflation varies, indicating that its impact on the relationship between green finance and ES is not uniform across regions. The results generally align with previous studies, which suggest a positive relationship between green finance and ES. However, the negative correlations found in certain regions highlight that the impact of green finance is not universally beneficial and can be influenced by regional factors. The differing results for inflation's moderating role indicate that economic conditions and policies vary in their effectiveness across regions, reflecting the complex interplay between economic variables and environmental outcomes. Moreover, in regions 1 (European Union and Western

Europe), 3 (East Asia and Pacific), and 6 (North America), we did not find statistically significant evidence for the moderating role of inflation on the impact of green finance on environmental sustainability. There are several potential reasons for this. First, these regions generally have more stable and lower inflation rates compared to developing regions, which may reduce the variability in how inflation interacts with green finance. In such environments, green finance initiatives may be more insulated from short-term economic fluctuations, allowing their positive impacts on environmental sustainability to remain relatively consistent, irrespective of inflationary pressures. Second, these regions typically have well-established financial systems and stronger regulatory frameworks, which could diminish the influence of inflation on green finance. The maturity of these financial markets might allow green finance to operate more efficiently and effectively, without being heavily affected by inflationary dynamics. Lastly, the higher level of technological innovation and investments in clean energy in these regions could play a role in mitigating the effects of inflation. Green finance in these areas might be directed toward projects that are more resilient to economic pressures, such as those backed by government support or long-term policy commitments, which reduce the moderating influence of inflation.

Based on the discussion of the results above, we propose recommendations for different regions to enhance environmental sustainability. Specifically, for regions 1 (European Union and Western Europe), 2 (Eastern Europe and Central Asia), 3 (East Asia and Pacific), 6 (North America), and 7 (South Asia), which have seen positive contributions from green finance to environmental sustainability (ES), policymakers should continue to support and enhance green finance initiatives. Strengthening green finance frameworks in these regions will help maintain and potentially amplify these positive outcomes. In contrast, regions 4 (Latin America and Caribbean), 5 (Middle East and North Africa), and 8 (Sub-Saharan Africa) have experienced negative impacts from green finance. For these regions, it is essential to address underlying issues such as institutional weaknesses and inadequate implementation of green finance policies.

Adapting green finance strategies to fit local contexts and improving governance and regulatory frameworks could alleviate these adverse effects. Additionally, since inflation moderates the impact of green finance across various regions, policymakers must consider the economic context when designing and implementing green finance policies. Adjustments may be needed to account for inflationary pressures and their diverse impacts on different regions.

Based on the discussion of the results above, we propose recommendations for different regions to enhance environmental sustainability. Specifically, for regions 1 (European Union and Western Europe), 2 (Eastern Europe and Central Asia), 3 (East Asia and Pacific), 6 (North America), and 7 (South Asia), which have seen positive contributions from green finance to environmental sustainability (ES), policymakers should continue to support and enhance green finance initiatives. Strengthening green finance frameworks in these regions will help maintain and potentially amplify these positive outcomes. In contrast, regions 4 (Latin America and Caribbean), 5 (Middle East and North Africa), and 8 (Sub-Saharan Africa) have experienced negative impacts from green finance. For these regions, it is essential to address underlying issues such as institutional weaknesses and inadequate implementation of green finance policies. Adapting green finance strategies to fit local contexts and improving governance and regulatory frameworks could alleviate these adverse effects. Additionally, since inflation moderates the impact of green finance across various regions, policymakers must consider the economic context when designing and implementing green finance policies. Adjustments may be needed to account for inflationary pressures and their diverse impacts on different regions.

This study has several limitations, including reliance on aggregate data, which may obscure sector-specific dynamics. Future research should leverage more detailed and disaggregated data to better understand the relationships between green finance, inflation, and ES at more granular levels, such as sectoral or firm-specific analyses.

Conclusion

This study provides valuable insights into the relationship between green finance and environmental sustainability across various regions, as well as the moderating role of inflation in this dynamic. The findings indicate that green finance has a generally positive impact on environmental sustainability in regions 1 (European Union and Western Europe), 2 (Eastern Europe and Central Asia), 3 (East Asia and Pacific), 6 (North America), and 7 (South Asia). However, a notable exception exists in regions 4 (Latin America and the Caribbean), 5 (Middle East and North Africa), and 8 (Sub-Saharan Africa), where the relationship is found to be negative.

Additionally, the study confirms that inflation moderates the impact of green finance on environmental sustainability in regions 2 (Eastern Europe and Central Asia), 4 (Latin America and Caribbean), 5 (Middle East and North Africa), 7 (South Asia), and 8 (Sub-Saharan Africa). This suggests that the effectiveness of green finance initiatives is influenced by the prevailing economic conditions, with inflation potentially altering the expected benefits of these initiatives.

Table 7 summary the research’s results:

Table 7: Summary of Results

Hypothesis	Reference	Expected Sign	Result
H1: Green finance have a positive impact on environmental sustainability across different regions.	(Zhang et al., 2024; Wei et al., 2024)	+	Support in region 1, 2, 3, 6 and 7 Negative in region 4, 5 and 8
H2: Inflation moderates the impact of green finance on environmental sustainability across different regions.	(Wang et al., 2019; Jia, 2022; Zhao et al., 2024)	Moderate	Support in region 2, 4, 5, 7 and 8

The contrasting results highlight the complexity of the interplay between economic variables and environmental outcomes, emphasizing the need for region-specific

strategies to enhance the effectiveness of green finance. Policymakers should consider the unique economic contexts and challenges faced by each region when developing and implementing green finance initiatives.

The study contributes to the understanding of how green finance can be leveraged to promote environmental sustainability while also acknowledging the critical role that inflation plays in shaping these relationships. Further research is encouraged to explore these dynamics in greater depth, particularly in regions where the impact of green finance appears less beneficial.

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Navigating Challenges and Nurturing Executive Talent: A Qualitative Inquiry on Executive Education Leading to a New 360-Degree Model for MBA Curricula

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Amidst disruptions, innovations, and competition, businesses face increasing pressure to secure executives capable of managing these challenges and anticipating and proactively addressing new ones. This study aims to bridge the perceived gap between contemporary business challenges and skill demands with that of existing MBA programmes. More specifically, we focus on four key research questions: (i) What are the key challenges and complexities faced by modern businesses? (ii) What are the critical skills expected from business executives when tackling modern business challenges and complexities? (iii) How can executive education bridge skills gaps perceived by business executives? and (iv) How can business educators design better master's programmes relevant to local and global challenges and complexities? A qualitative research design was employed in collecting and analysing data. Primary data was collected through four roundtable discussions with key stakeholders, including managing directors, CEOs, past and current MBA students, and MBA educators and secondary data was collected by listening to expert business educators through the analysis of MBA-related documentation from top universities. Our findings confirm significant gaps between contemporary business challenges, skills, circumstances, and educational demands that are either unsupported or under-supported by current business education offerings. Utilising these insights, we propose a new "360-degree Model for Executive Education," using 4Is - insights, impact, ideation, and influence to progressively transform learners into strategic business partners initially and business innovators subsequently. The paper contributes by providing empirical evidence of gaps in current executive education, enriching both theoretical and practical knowledge. Additionally, by introducing a new executive education model, we guide business educators in developing curricula that effectively upskill and reskill individuals, ensuring their success in future-proofing personal and organisational outcomes.

Keywords - *Executive education, Management education, MBA programmes, Skill gap, Modern business challenges*

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Introduction

Future-proofing, amid innovations, disruptions, and competition, increasingly pressures businesses to secure talent not only capable of managing these challenges but also able to anticipate new ones and act proactively (D'Alessio, Avolio, & Charles, 2019). However, finding such talent or grooming the existing staff with such skills has also become increasingly challenging. Executive education, such as MBA programmes, has long been touted as the solution for bridging such skills gaps. Drawing on Nair & Saiz-Álvarez (2018), executive education can be defined as a way of training executives to become effective business leaders, managers and administrators by focusing on the essential skills and knowledge for managing resources, time and people. Executive education also appears to have evolved over time, including the increasing use of case studies and simulation games, focus on digital disruptions and data analytics, and emphasis on leadership skills. Yet, there are many naysayers towards executive education with arguments on their quality, effectiveness, and even purpose.

Business educators continuously face the challenge of balancing academic rigor with practical relevance, a task underscored by gaps between theoretical education and workplace skills (Schoemaker, 2008; Thyageshwaran et al., 2023; Nicholson & Cushman, 2000). This issue is compounded as technological advancements and shifts in global economic conditions necessitate rapid adaptation in executive education to prepare leaders for evolving business demands. According to Gentile (2008), there is a critical need to reshape management education to be both practical and aspirational, defining the exact profile of a business leader suited for 21st-century challenges. This includes addressing whether leaders should prioritize risk-taking for bottom-line results or focus on team spirit and organizational development to enhance stakeholder returns. Consequently, executive education programs must continuously evaluate and enhance their curricula to bridge the gap between academic theories and real-world applications effectively, ensuring they remain relevant and impactful in preparing executives for their roles.

Motivated by these gaps in executive education, this study aims to understand the key challenges faced by modern business executives, identify the skills necessary to overcome these challenges and explore potential interventions that executive education can offer to bridge these gaps. More specifically, our investigation attempts to answer 4 key questions: (i) What are the key challenges and complexities faced by modern businesses? (ii) What are the critical skills expected from business executives when tackling modern business challenges and complexities? (iii) How can executive education bridge skills gaps perceived by business executives? and (iv) How can business educators design (i.e., teaching, learning, and assessment) better masters' programmes that are relevant to both local and global challenges and complexities?

To meet the challenges faced by executive education and to produce future relevant professionals, we posit that executive educators should listen to each other's voices, particularly by focusing on innovative work done by some of the world-class executive education programmes. Moreover, business educators should also make an effort to regularly listen to business leaders and executive education students, past and present. This paper is based on a larger project conducted at the University of Kelaniya, where there is an ongoing effort to fully reimagine its MBA programme. We collect data by listening to the voices of expert business educators and analysing executive education-related secondary documentation and data published by world-class universities. We also conducted four round table discussions with critical stakeholders, including managing directors and chief executive officers, past MBA alumni, current MBA students, and MBA educators. Primary data collection was conducted using a semi-structured interview guide. Both primary and secondary data analysis employed a two-cycle coding method suggested by Saldaña (2015). The first cycle focused on identifying recurring themes, while the second cycle facilitated the recognition of patterns and answering the research questions.

Our findings highlight significant gaps between current MBA curricula and the practical needs of industry professionals. Identified challenges include a lack of global perspective and awareness of external influences, insufficient focus on global risks and

emergencies, and an inability to connect with overarching business goals. The findings also note difficulties in navigating digital transformation and governance issues. Additionally, our discussants emphasized essential skills for business executives, such as fostering entrepreneurial professionals, shaping futuristic leaders, enhancing strategic thinking, and developing data analytics, AI-driven, soft, and applied skills. The findings suggest executives can bridge these skill gaps by embracing digitalization, adapting to different cultures, utilizing management information systems, encouraging cross-functional collaboration, and fostering an advanced learning culture. These insights led to the proposed "360-degree Model for Executive Education," which addresses challenges, contextual requirements, and skills gaps through a cycle of 4Is - insights, impact, ideation, and influence. This model aims to transform executive learners into strategic business partners in their initial learning phase and business innovators in the subsequent phase.

Literature Review

Although the business environment is evolving due to technological advancements and innovative disruptions, professionals can still gain informal education through internal training, industry conferences, and independent research. However, this can sometimes lead to inefficiencies or a lack of knowledge about the best processes and practices. Therefore, well-structured executive education programs are crucial, as they provide professionals at various career stages with a research-driven curriculum in a formal setting (Berkeley Executive Education, 2024). It is evident that opportunities for continued learning after higher education are limited, yet the demand for corporate learning and development, including executive education that covers technical skills, CPD, and senior leadership programs, is substantial (Carrington Crisp, 2018). In terms of management education's prime objectives, scholars have identified several key goals. Preparing individuals to be outstanding managers and leaders, with knowledge in functional, declarative, procedural, and metacognitive aspects, has been highlighted as a primary aim of management education (Boyatzis et al., 2002). Additionally,

management education strives to produce "protein" graduates who can strengthen the connection between business and society (Thyageshwaran et al., 2023).

MBA as a Means of Executive Education

The Master of Business Administration (MBA) has long been considered a gateway to the executive suite, a concept that has been prevalent since Harvard Business School initiated its MBA program in 1908 (Kalan & Jones, 2010 as cited in Dakduk et al., 2016). Over the past century, numerous prestigious institutions worldwide have offered high-quality MBA programs (Sriram et al., 2020). The MBA degree is widely recognized as a top credential that provides individuals with a competitive edge in management, particularly due to the unique skills developed during their studies. It remains one of the most popular degrees among professionals globally (Baruch & Leeming, 2001, as cited in Dakduk, Malavé, Torres, Montesinos, & Michelena, 2016). According to Cao & Sakchutchawan (2011), organizations increasingly seek 'knowledge workers' who excel at complex, value-added tasks and continuously improve their skills and competencies (as cited in Dakduk et al., 2016). Business schools face the significant challenge of selecting candidates who can meet industry demands (Dakduk et al., 2016). Originally designed to produce conventional managers skilled in maintaining the status quo, the traditional MBA aimed to deliver 'more of the same, only better' (Kirby, 2007).

MBA graduates should possess a range of fundamental competencies, categorized into hard and soft management skills. As noted by Buhler (2005), Davis and Miller (1996), Mills (1994), Soehren (2001), Strebler (1997), and Tilley (1992), essential soft skills include interpersonal, problem-solving, teamwork, and oral communication abilities. Hard skills such as technical, numerical, computer, and textual communication are also crucial for business leaders and executives (as cited in Thyageshwaran et al., 2023). Deutschman (1991, as cited in D'Alessio, Avolio, & Charles, 2019) highlighted that many MBA holders lack creativity, people skills, teamwork aptitude, and the ability to communicate clearly and concisely – competencies highly sought after by corporate

recruiters. Additionally, Reinstein & Bayou (1997, as cited in D'Alessio et al., 2019) emphasized that businesses globally expect individuals capable of evaluating complex systems and information, detecting, predicting, advising, and recommending appropriate actions.

Challenges on Future-Proofing MBA Programmes

Executive education, increasingly dynamic and proactive, now bears the responsibility of equipping graduates with skills and capabilities for a constructive career (Thyageshwaran et al., 2023). However, future-proofing MBA programmes present several challenges. Gentile (2008) emphasizes that MBA curricula must adapt by integrating a broad spectrum of stakeholder perspectives, both internal and external, into business decision-making processes. The growing emphasis on business sustainability indicates a critical need for change, reflecting the transient nature of many companies and their potential adverse impacts on social and ecological systems. Moreover, while management education aims to impart intangible assets that maximize profits and optimize resource use for societal benefit, it must also offer tangible assets that provide a comprehensive learning experience. This dual focus challenges educators to continually evolve the curriculum to meet both immediate business needs and long-term societal goals.

Research Methods

The present study adopts an interpretivism paradigm as we attempt to unravel the challenges and a way forward for executive education by listing multiple voices that resonate with their experience (Collis & Hussey, 2013).

This study is a result of a much larger project at the University of Kelaniya aimed at completely reimagining its MBA programme. We gathered data by engaging with expert business educators and analysing secondary documentation and data from top-tier universities (refer to Table 1 for details). Additionally, we held four roundtable discussions with key stakeholders, including managing directors, CEOs, past MBA alumni, current MBA students, and MBA educators. Primary data was collected

through semi-structured interviews (Table 2 provides details related to the discussants). For data analysis, we employed a two-cycle coding method recommended by Saldaña (2015). The first cycle focused on identifying recurring themes, while the second cycle helped in recognising patterns and addressing the research questions.

Table 1: Documents Related to Expert Opinions

MBA Programme offering institution	Programme Details	Curriculum documents	Futuristic documents	Website	Student Testimonies
Harvard Business School	Full time / 02 years	✓	✓	✓	✓
Stanford Graduate Business in School	Full time / 02 years	✓	✓	✓	✓
Monash University	02 Years	✓		✓	
Indian Institute of Management, Calcutta	02 Years	✓		✓	
Indian Institute of Management, Bangalore	Full time/ 02 Years	✓		✓	
University Malaya	Full time - 1.5 - 2 Years	✓	✓	✓	
RMIT University	Part-time 2 years intensive	✓	✓	✓	✓
London Business School	2 Years	✓		✓	✓

Table 2: Details on Roundtable Discussants

	Details	Number of Participants
Roundtable 1	Managing directors and CEOs	8
Roundtable 2	Past MBA alumni	6
Roundtable 3	Current MBA students	7
Roundtable 4	MBA educators	6

Findings of the Study

We present our findings under 4 key themes.

Overarching Challenges Faced by Modern Business Executives

This section explores the key challenges faced by modern business executives in a dynamic environment. Table 3 presents the thematic analysis highlighting the

overarching challenges faced by modern business executives. They include a lack of understanding of the global perspective, limited focus on global risks and emergencies, inability to see the big picture, inability to connect with business goals effectively and struggle to navigate digital transformation.

Executives must grasp investor motivations and expectations and adapt to disruptions such as technological advances, geopolitical changes, and emergencies like climate and health crises. This global awareness aids in anticipating and minimizing external impacts and enhancing organizational resilience. Current geopolitical tensions and global instabilities further underscore the need for this awareness (World Economic Forum, 2024). Another significant challenge is the inadequate focus on 21st-century global risks and emergencies, including climate adaptation, extreme weather, governance disruptions, and geopolitical shifts. Executives must adopt a forward-looking approach and ensure organizational sustainability in the face of climate, health, and social emergencies. Additionally, the analysis reveals that executives often struggle with seeing the bigger picture. Many organizations focus on short-term goals, which can lead to hasty decisions and misalignment of team tasks with broader strategic objectives. There's a gap in understanding how daily operations align with evolving market needs.

Moreover, the ability to recognize potential synergies between different business units is often hindered by the tendency to work in silos. Additionally, executive meetings frequently overlook the broader impacts of decisions, failing to integrate a strategic approach that aligns actions with overarching business goals. Many companies struggle with misalignment between their primary objectives and management strategies, setting goals without understanding their fit within the overall business strategy. This disconnection can lead to decisions that do not accurately reflect the organization's true objectives, causing a gap between leadership directives and the goals of various strategic business units (SBUs). Another significant challenge is navigating digital transformation, which, despite its potential to positively impact

organizational performance, is often hindered by incompatible legacy systems, the lack of a clear digital strategy, and difficulties in integrating new digital tools with existing workflows. Additionally, finding skilled talent at the right cost to drive digital transformation remains a major hurdle, complicating the successful execution of digital initiatives. Governance continues to be identified as a critical global challenge for the 21st century (Suhari et al., 2024).

Table 3: Overarching Challenges

Challenge Areas	Exemplary Quote
Lack of understanding of the Global Perspective and External Influences	“Emphasizing the significance of understanding the mindset of investors and the global perspective in business.” “Discussing disruptors such as technological advancements, geopolitical changes, and emergencies (e.g., climate, health crises).” “Emphasizing the need for a global perspective, especially for businesses going international.” “Recognizing the impact of external factors on business and education.”
Less focus on the 21st Century's Global Risks and emergencies	“I did not see any subject that covers the tomorrow's global risks, which have become more challenging day by day.” “Climate adaptation failure” “Climate mitigation failure” “Extreme weather incidents” “Geopolitical risk. Understanding geopolitics is crucial as Sri Lanka is caught in between two geopolitical giants, pulling us in different directions.” “The next subject is technology disruption because, among global risks, technology disruption is one of the top seven.” “So, I would strongly recommend the climate emergency as a subject.” “Governance disruption. Because we believe that governance will be crucial for any business in the future.” “Three modules called emergencies: climate emergency health and social emergency, and economic emergency.” “In the climate emergency, we address supply chain disruption through the lens of health and social emergency.” “We focus on social emergency – not through CSR projects, but by emphasizing that a company’s responsibility is to ensure sustainable lifestyle for its employees. So, these are the three emergencies.” “The entire issue of climate emergency management & sustainability management is now a core course and not even elective.” “I would even call it climate emergency and sustainability”
Inability to see the big picture	“Sometimes, the teams are not moving further with details and miss the comprehensive approach we should follow.”

	<p>“There is a tendency towards focusing on short-term goals compared to long-term goals.</p> <p>“It is always imperative to consider our broader objectives rather than making immediate decisions for immediate needs.”</p> <p>“I have seen that some companies are struggling to align their day-to-day operations with their mission and vision.”</p> <p>“There is a notable difference in understanding how our business contributes to the evolving needs of the current market.”</p> <p>“We often overlook the synergies that can exist between businesses, especially because we focus too much on individual silos.”</p> <p>“Sometimes the policy meetings we hold rarely address how our actions affect the big picture”</p>
Inability to connect with the business goals effectively	<p>“I think most of the times people set goals without a clear understanding of how they align with the overall business objectives.”</p> <p>“There is a disconnection between the priorities of management and the priorities of the company.”</p> <p>“Decisions from the top often do not reflect the reality of what we need to achieve our business goals.”</p> <p>“There is a lack of alignment between management’s strategies and objectives of our unions.”</p> <p>“It often seems like the leadership team is out of touch with the core goals we’re trying to achieve”</p>
Struggling to navigate the digital transformation	<p>“it is quite observable that our legacy systems are sometimes not compatible with the new digital tools.”</p> <p>“We lack a clear digital approach which leads to confusions and inconsistencies across departments.”</p> <p>“Integrating new virtual approaches with our existing workflows has been harder than predicted.”</p> <p>“Most of the employees are resistant to change, making it hard to implement new digital initiatives.”</p> <p>“Finding professional talent to drive the digital transformation has been challenging”</p>
Governance	<p>“Governance becomes a crucial aspect, especially when you are building leaders.”</p>

Critical Skills Expected from Modern Business Executives

Table 4 outlines the *critical skills* that MBA programmes should urgently address. These findings suggest that entrepreneurship is the top most skill that fosters managers to positively impact both their organizations and economic growth (Gamede & Uleanya, 2019). Cultivating entrepreneurial professionals within an organization is challenging but vital for organizational development, necessitating skills in entrepreneurial thinking and management.

Our analysis of expert voices in business education has emphasized the importance of leadership in MBA curricula, highlighting its crucial role in shaping future leaders. Thematic analysis from round table discussions also suggests that MBA programs should focus on developing leaders equipped for tomorrow's challenges, emphasizing the need for futuristic leaders with effective leadership qualities across diverse industries. Additionally, curricula should aim to cultivate 'entrepreneurial leaders'—individuals who combine leadership skills with entrepreneurial spirit. Such leaders are essential for identifying unique national resources and promoting them globally while preserving local identity, underscoring the strategic role of leadership in global expansion.

Table 4: Critical Skills Expected

First Order Coding	Second Order Coding	Third Order Coding
“They are professionals, but they also have entrepreneurial thinking which is lacking right now.”	Entrepreneurial thinking	Entrepreneurial professional
“If I had a term, I would call it ‘entrepreneurial professional’ because he must be a professional person, but he has to have that entrepreneurial management skills”	Entrepreneurial management skills	
“We need to create entrepreneurs who can take our brands to the global market.”		
“Let us now focus on the entrepreneurship. I bring this up because I closely work with entrepreneurs and I understand the beauty of it.”		
“Recognizing the inadequacies of current entrepreneurship content.”		
“Seeking solutions to enhance entrepreneurship education.”		
“Discussing the importance of practical scenarios and engagement.”		
“You want people to be more organized, more systematic, respect time, and embrace other aspects of leadership.”	Leadership Development	Shaping leaders with

“Entrepreneurial leader”		tomorrow's
“We need to get leaders from different industries.”		needs
“You have to find strong good leaders with a good MBA.”		
“21st Century board leadership”		
“How are we building leaders who can take our businesses to the global market”	Strategic leadership for global expansion	
“Identifying Sri Lanka's unique resources, and how do we create leaders who can take them to the global market, not on their own, but through global joint ventures”		
“How does an MBA program shape tomorrow's leaders who can take Sri Lanka's resources to the global market.		
“I don't know whether they truly understand the meaning of strategic thinking, we need to provide practical knowledge on how to become a strategic thinker.”	Having a Strategic mindset	Strategic thinking
“The key skills I would expect are data skills”	Data skills	Data Analytics
“Analytical skills, being able to analyze data and identify trends -are crucial.”	Analytical skills	
“There is a growing demand for data analytic skills in industries and companies. Addressing the shortage of people with these skills is emphasized, along with the importance of proactive learning.”		
“All of us now have heard of artificial intelligence, but understanding how to apply AI in business is essential.”	Knowledge on AI	AI-driven skills
“Artificial intelligence for business and its application to business strategy.”	Applied AI	
“That person becomes the go-to-expert on supply chain management, artificial intelligence, or geopolitics”		
“The challenges of rapidly advancing AI and the need for continuous assessment and adaptation in education are highlighted. The example of changes in education pricing structure in Australia to encourage focus on STEM professions is discussed.”		

“An MBA holder should have a strong decision-making skill”	Decision making skills	Soft skills and applied skills
“The first thing that I felt was that an MBA holder must be a good communicator”	Communication skills	
“Communications skills are essential. While it is often considered as a soft skill, it also has some technical aspects as well, such as the ability to communicate effectively on both national and international levels.”		
“Personality development and soft skills training should be reserved for high potential individuals, typically through interventions like individual coaching.”	Personality skills	
“It is observed that many programs place greater emphasis on soft skills development than on technical skills.”	Soft skills vs technical skills	

Notably, the enthusiastic and intimate involvement of business executives is seen as crucial for strengthening the strategic thinking essential for successful strategic planning and implementation (Juma & Minja, 2016). The importance of strategic thinking was also emphasized in discussions from the current study. Additionally, possessing robust data and analytical skills is vital for analyzing current business scenarios. The significance of integrating AI into business operations was highlighted, stressing not only the knowledge of AI but also its application in business and considerations for the current higher education system. Lastly, the collected data underscored the importance of having good personality and communication skills, along with decision-making, technical, and soft skills, as essential competencies for business executives.

Bridge the Skill Gaps by Focusing on Contemporary Needs

Table 5 presents viewpoints on how to bridge perceived skill gaps, with most suggestions focusing on developing skills around *contemporary needs*. According to Sachdev & Murgai (2022), organizations can create new value chains by adopting digital approaches in business operations, enhancing customer experiences and revenue streams while increasing loyalty through product and service transformation. Thus, it is crucial to focus on digital transformation within the organization with HR's assistance to effectively implement digitalization. The thematic analysis also

highlighted the importance of integrating management information systems in decision-making processes. Additionally, it was found that a supportive cultural change within the organization is essential to enhance worker skills, as organizational culture significantly shapes employee behavior. Another critical theme identified was the encouragement of cross-functional collaboration, which is vital for fostering innovation, enhancing problem-solving capabilities, and driving organizational performance. Departments can integrate diverse perspectives and address complex challenges more productively by breaking down silos and promoting teamwork. As one discussant emphasized, "If departments can work together, we can integrate different perspectives to innovate and solve complex problems more easily". Such comments highlight the need for a collaborative approach that improves not only internal skills but also leverages collective expertise for more effective project outcomes.

Table 5: Bridging the Skill Gaps by Addressing Contemporary Needs

First order coding	Second Order Coding	Third Order Coding
<p>“The technology adaptation and digital transformation should be properly managed by the organization”</p> <p>“Digital transformation primarily involves economic or accounting investments”</p> <p>“We should focus on the digital transformation in HR because we lack expertise in this area.”</p> <p>“Be a person who understand digital transformation and contribute to it”</p> <p>“Expect to drive the organization’s culture, particularly in terms of professionalism”</p> <p>“To be capable of driving organizational cultural change as well”</p> <p>“No one is providing MIS, but what I need is management information to make decisions”</p> <p>“I think if departments work together, we can combine perspectives especially to innovate and solve complex problems more effectively”</p> <p>“Pooling ideas is the best practice for nurturing internal skills, as the expertise we gather will lead to more</p>	<p>productive project outcomes.”</p>	<p>Knowing about Digital Transformation</p> <p>Driving the organizational culture with professionalism</p> <p>Decision making through MIS Innovation and problem solving</p>

Digitalization

Cultural adaptation

Management
information systems
Encourage cross-
functional
collaboration

Can Business Educators Contribute to Designing a Curriculum Which Meets the Needs of Modern Business Executives

It is crucial that the MBA curricula are tailored to industry requirements to ensure seamless synergy between industry and academia (Thyageshwaran et al., 2023). Table 6 presents the viewpoints related to executive *educational demands* most desired by the roundtable participants. These insights emphasise important skill categories, such as core skills, which provide students with the foundational knowledge, skills, and competencies essential for executive education. Beyond addressing the challenges identified in Table 1 and the skills outlined in Table 2, developing core skills is a key proficiency. A focus on "picking things up on the run" underscores the importance of effective learning, including the ability to learn, unlearn, and relearn as necessary in the workplace, with academia supporting students in acquiring the necessary skills at the right time. Moreover, it is vital to cultivate students who not only have a basic understanding of the subjects in a particular MBA program but can also apply this knowledge effectively in business integration, thereby broadening their knowledge base. Once core skills are developed through effective learning strategies, it is crucial to provide avenues for their application, such as developing business case studies, business plans, and conducting business research. These methods help students apply the knowledge gained during the program to real-life scenarios. Additionally, the importance of having the right attitude, including strong ethics, professional conduct, and integrity, was also highlighted by the majority of the roundtable participants.

Table 6: Educational Demands on MBA Curricula

Academic Intervention	Strategies	Key Proficiencies
“Students should first develop the ability to learn and adapt quickly on the go” “We should include a subject at the beginning on how to learn, unlearn, and relearn” “There is another issue on how we instill the ability to ask the right questions.”	Pick things up on the run	Core skills

<p>“Summarizing insights from a panel discussion, highlighting the importance of entrepreneurial thinking, independent decision making and the ability to learn quickly.”</p>	<p>Gathering knowledge for business integration</p>
<p>“When someone is doing an MBA, it is not about how much you know, but how effectively you can apply your knowledge. That is what defines efficiency.”</p>	
<p>“Learn technical aspects from others and work as a team. They must think critically and have broad knowledge in those areas.”</p>	
<p>“An overview of financials and marketing provides a framework that helps managers integrate different business functions.”</p>	
<p>“Stressing the importance of adaptability and to continuously learn, unlearn, and relearn.”</p>	<p>Adaptability and Continuous Learning</p>
<p>“Thinking the need for a business plan with the ability to navigate uncertainties and disruptions.”</p>	
<p>“So, if we can get real case studies from both local and foreign contexts”</p>	<p>Develop a business study Application skills case</p>
<p>“When it comes to the case studies, students should present to a panel rather than just submit a written report.”</p>	
<p>“Current case studies need to be deeply analyzed and we must develop leaders across different fields, such as economic or accountancy.”</p>	
<p>“In case-based learning, we can make it compulsory for Sri Lankan students to analyze at least one local case.”</p>	
<p>“As this is a two-year program, students can start developing a business plan in their first year.”</p>	<p>Develop a business plan</p>
<p>“In the first year, students begin developing a business plan, and by the end of the second year they should submit a comprehensive plan covering finance, marketing, entrepreneurship, economics and more.”</p>	
<p>“It is important for the students to explore how to take a Sri Lankan brand global, which should be part of their business proposal”</p>	
<p>“Understanding the future challenges and risks and then having responses to them as part of the business plan.”</p>	

“The best-case study or project report could be pitched to relevant industries for potential investment or sale.”

“Acknowledging uncertainty in finding clear solutions and emphasizing the need for qualitative research.” Conduct business research

“There is a strong emphasis on the need for research in education. The discussion emphasizes the need for more search focused education, covering various research formats, methods, and the importance of aligning research with practical applications. It also highlights the need to teach students how to articulate and defend their cases.”

“The discussion emphasizes the need of simplifying academic language in research to make it more accessible. Using common language and terminology is suggested to bridge the gap between academic concepts and practical applications.”

“Acknowledging the complexity of the educational landscape and the challenge of synthesizing collected data.”

“Self-driven attitude appears to be a critical aspect.” Nurturing self Right attitudes

“Highlighting the importance of attitude and mindset in education.”

“Identifying challenges in cultivating the right attitude.”

“Discussing strategies to impart a proactive and positive mindset.”

The roundtable discussions also led to some useful suggestions as to how executive education should address both business and skills-related challenges. Table 7 outlines some of these key suggestions that focus on specifics related to teaching, learning, and assessment methods desired under executive education.

Table 7: Pedagogical Suggestions for Executive Education

Exemplary Quote	Curriculum Component
“Highlighting the importance of curriculum development while considering the future needs of 2025 and beyond.”	Curriculum Development with Industry and Business Dynamics
“Discussing the challenges and strategies for attracting the right candidates to the program.”	
“Introducing the concept of developing a learner profile to understand the skills and knowledge gained after completing the program.”	
“Exploring the connection between academic programs and industry needs.”	
“Discussing a benchmarking exercise comparing international and local MBA programs.”	

“Noting the emphasis on vocational, professional, and technical skills, and the debate on the balance between vocational and generalist approaches.”

“Expressing challenges in incorporating insights from discussions into curriculum development.”

“Discussing the complexity of developing a curriculum that balances technical and soft skills.”

“The discussion begins with considerations about offering educational programs as relatives or foundation courses. Different foundation programs are mentioned based on whether individuals come from an engineering or business background.”

Stepped approach to developing competencies

“The importance of collaboration with industry professionals is discussed. Bringing industry experts as guest lecturers to share their practical experiences is seen as valuable. However, the challenges of effectively utilizing industry participation in education are recognized.”

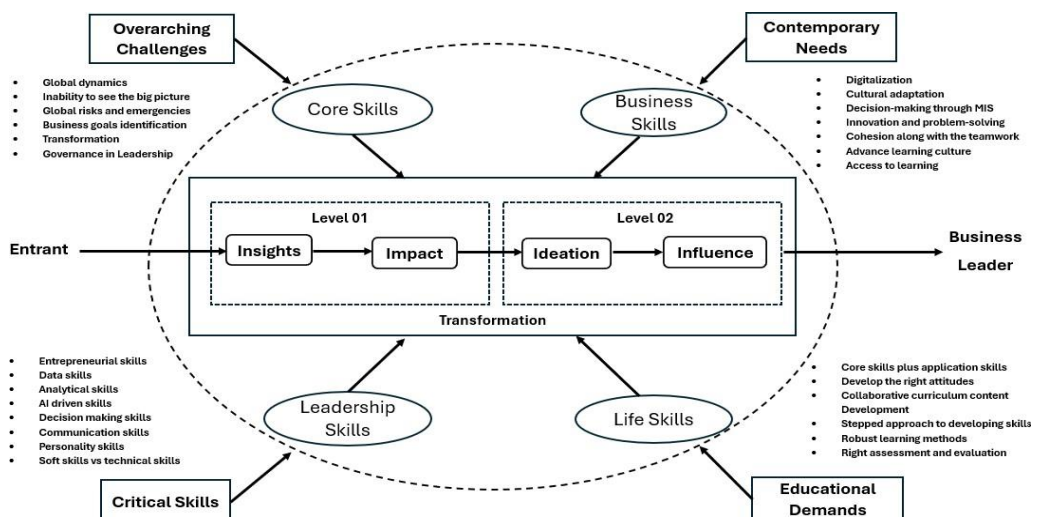
Learning modes

“The need for effective evaluation and assessment methods, including a focus on practical skills, is highlighted. The challenge of assessing the effort in group research projects is discussed.”

Evaluation and Assessment

Proposed 360-Degree Model for Executive Education

Drawing on our findings, we proposed a new model for executive education, particularly targeting 2-year MBA programmes. The proposed "360-degree Model for



Executive Education" addresses the findings related to the four research questions, i.e., overarching challenges, critical skills, contemporary needs, and educational demands placed on executive education through a process 4Is - Insights, Impact, Ideation, and Influence. This model aims to transform executive learners into strategic business partners in their initial learning phase and business innovators in the subsequent phase. Figure 1 presents our new 360-degree Model for Executive Education.

Fig 1: 360-Degree Model for Executive Education

Insights involve collecting and interpreting data on various aspects of the business and its environment to make informed decisions that foster business development and growth. MBA curricula need to be redesigned to equip students to decipher business dynamics both within and outside organizations. Such learning should encompass Core Skills, Business Skills, Leadership Skills, and Life Skills. Core Skills include fundamental competencies like analytical thinking, communication, and critical thinking, essential for effective decision-making and problem-solving (Davenport & Harris, 2007; Cummings & Worley, 2014; Ennis, 2011). Business Skills cover areas such as financial acumen, marketing management, and operations management, providing practical knowledge essential for navigating and excelling in the business environment. Leadership Skills emphasize strategic vision, emotional intelligence, and change management, crucial for inspiring and guiding teams, managing organizational changes, and adapting to evolving business landscapes (Kaplan & Norton, 2008; Goleman, 1995; Kotter, 1996). Lastly, Life Skills like time management, resilience, and networking are vital for balancing academic, professional, and personal responsibilities and building and maintaining professional relationships (Masten, 2001; Ibarra & Barbulescu, 2010). Once insights are gathered, students should integrate Core Skills, Business Skills, Leadership Skills, and Life Skills to support and enhance strategic business planning and implementation with **impact**. Such integration is effectively developed through capstone projects, which differ from other academic projects in scope, integration, and outcome focus. Capstone projects are comprehensive, requiring students to synthesize knowledge across multiple study areas

to address real-world problems or develop tangible solutions, such as a business plan or business research (Garrison & Vaughan, 2008). For example, a capstone project that involves developing a new business plan to either expand an existing business or launch a new one can significantly enhance students' skills for impactful behavior within an organizational context.

While insights and impacts are designed to develop a strategic business partner at Level 1 of their MBA, Level 2 aims to produce a business innovator. This transformation is expected to occur first through ideation and then through influential action. **Ideation** involves executive students engaging in systematic investigation and creative brainstorming to identify strategic gaps in businesses. **Influence**, on the other hand, entails acting on these gaps through comprehensive business research that leads to innovative business solutions. Within this second level, skills acquired are expected to be different to those of level 1. Where, core skills include the ability to see the big picture through rigorous academic and practical approaches while leveraging technology and innovation to meet business goals and enhance stakeholder value. Business skills involve dissecting complex business challenges into actionable parts and formulating strategic plans that align with organisational goals, considering the interests of various stakeholders and diverse timelines. Leadership skills encompass expertise in valuing diversity, fostering a teamwork-oriented environment, promoting success in others, and leading with authenticity, integrity, empathy, and accountability. Life skills focus on adopting a growth mindset along with a commitment to continuous learning and well-being, transforming challenges into opportunities for both personal and professional development.

Our new model for executive education thus suggests that by focusing on the 4Is - insights, impact, ideation, and influence, executive educators can address both challenges faced by executives in the modern business world and their skills deficiencies, as well as make executive education once again efficient and effective in its delivery.

Conclusion

This study aimed to understand the key challenges faced by modern business executives, identify the necessary skills to overcome these challenges and explore how executive education can bridge these gaps. Four key themes emerged out of our findings:

Overarching Challenges: Modern executives face critical challenges in navigating the complexities of today's dynamic environment. Key issues include a lack of global perspective, insufficient focus on global risks like climate change and geopolitical tensions, and difficulties in digital transformation due to legacy systems and unclear strategies.

Critical Skills: Essential skills for executives include a strong foundation in commerce and entrepreneurship, entrepreneurial thinking, leadership development, strategic thinking, and data skills. Additionally, strong personality traits, communication skills, decision-making abilities, and a blend of technical and soft skills are vital.

Contemporary Needs: Strategies to bridge skill gaps include embracing digital transformation and fostering a collaborative, learning-oriented culture. Integrating management information systems in decision-making, adapting organisational culture to enhance skill development, and promoting cross-functional collaboration are also crucial

Educational Demands: MBA programs should align their curriculum with industry needs to ensure relevance to both local and global challenges. The curriculum should focus on developing core skills, fostering a capacity for learning, unlearning, and relearning, and providing practical application opportunities. Cultivating the right attitude is emphasised as critical.

Using insights from the four research questions, we developed a new model for executive education, which we call the "360-degree Model for Executive Education." This model employs insights, impact, ideation, and influence in a progressive manner

to transform executive learners into strategic business partners in their initial learning phase and business innovators in subsequent phases.

Our findings contribute to both theory and practice. We produce empirical evidence to corroborate anecdotal evidence on the gaps between current executive education programs and what is desired. We also provide business educators not only with an intimate understanding of challenges and skills gaps related to executive education but also present a new model for them to develop new executive education curricula. Finally, aspiring educators may also benefit from our findings and the proposed model when selecting suitable education avenues that may better upskill and reskill them in future-proofing both personal and organizational success.

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Business Simulation Games in Innovation Management: A Systematic Literature Review

De Silva, T.R.¹, Yatigammana K²., and Jeners, N.³

The use of business simulation games in organizational change and capacity building has grown significantly. Yet, a thorough understanding of how empirical studies on business simulation games contribute to innovation management remains elusive. To address this need, a systematic review was conducted, encompassing articles published between 2003 and 2023. A meticulous selection process yielded 23 empirical studies, employing the PRISMA model to shed light on the role of simulation games in innovation management. Through the synthesis of the gathered outcomes, it was conclusively established that simulation games serve to enhance requisite skills, instigate positive behavioural transformations, and validate the design process of simulation games. The research predominantly relied on experimental studies and Design-Based Research methods to substantiate these claims. Nevertheless, it is imperative to note that future investigations should establish wider generalizability of these findings and facilitate the creation of simulation games that closely mirror the innovation processes inherent within organizations. This study is significant as it is the first systematic review in this area. It enhances our understanding of the development of simulation games over the last twenty years and outlines directions for future research.

Keywords: *Business Simulation Games, Game Designing, Innovation Management, Skill Development, Systematic Literature Review*

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Introduction

The fast-paced and ever-changing business landscape demands that companies abandon the notion of maintaining the status quo and instead constantly strive to innovate and evolve. Today's businesses must stay ahead of the competition by embracing change and pursuing fresh ideas. The emergence of globally applicable trends and the digital age have created opportunities for businesses to differentiate themselves. With the increasing use of technology and new-age business models, traditional business models are being rapidly disrupted, fundamentally changing the way customers interact with businesses. In this dynamic environment, to stay competitive, established businesses must continually innovate and evolve to meet the changing needs and expectations of their customers. Organisations that embrace innovation are investing in developing new products, services, processes, novel use of technology, novel approaches to management and leadership, and novel business models (Akunyumu, 2020) to achieve a competitive advantage.

To maintain a competitive edge, established businesses must continuously innovate and adapt to meet the changing needs and expectations of their customers. According to Hanson (2007), innovation involves generating ideas, developing those ideas, and diffusing the resulting concepts. Additionally, Kumar et al., (2019) state that invention is the conceptualization of an idea, while innovation involves applying the idea to create economic value or gain a competitive advantage.

Nonetheless, it is crucial to recognize that a competitive advantage for an organization cannot be achieved through a singular act of innovation alone. The attainment of a competitive edge requires a sustained and concerted effort, to continuously produce innovation (Mirrow et al., 2008). This focused and ongoing endeavour is known as innovation management. D'Alvano and Hidalgo (2012) emphasize that mastery of all key areas is essential for efficiently and consistently developing successful new products and services. These key areas encompass various aspects, including innovation strategy, project management, leadership and

organizational culture, human resources, external relations, organizational design, innovation processes, performance measures, marketing, resources, knowledge and intellectual property management, and technology (Igartua, 2010).

Alternatively, Dankbaar (2003) presents two distinct yet complementary approaches to innovation management. Firstly, it involves creating the necessary conditions to foster human creativity, encompassing strategic commitment and context management. Secondly, innovation management can be viewed as a process that promotes the application of knowledge. Thus, it encompasses both the creation of an environment conducive to innovation and the effective utilization of existing knowledge.

Simulations serve as representations or imitations of real-world systems, processes, or events using models. They offer a simplified or virtual version of the original system, enabling insights, predictions, and hypothesis testing. Simulations find applications in various fields such as science, engineering, business, and training, facilitating the understanding and analysis of complex phenomena.

The primary purpose of simulations is to observe and assess how a system behaves under different conditions, scenarios, and over time (Javahernia and Sunmola, 2017). By manipulating variables and parameters, simulations enable researchers, engineers, and decision-makers to study the consequences of their actions without the need for real-world experimentation or implementation. They are valuable tools for testing policies, exploring varying parameters, evaluating alternate designs, and simulating contingency scenarios (Lyons et al., 2011). Simulations offer higher-order learnings and insights, optimizing processes, enhancing decision-making, and improving the understanding of complex systems (Marriot et al., 2015; Prensky, 2013).

Series games (SG) represent a fusion of learning simulations and entertainment games like board games or video games. In an experimental study on using video games to teach supply chain management, Liu (2017) found that series games had a more positive impact compared to a PowerPoint slide-based learning environment.

It provided participants with a comprehensive understanding of logistics, increased their interest in the field, and even influenced their inclination to pursue further education or work in the logistics industry. Mohsen et al. (2017) also highlight the value of series games, as they develop essential skills such as data analysis, strategic planning, decision-making, problem-solving, and teamwork. These games offer valuable experiences in strategic decision-making and implementation.

To enhance an organization's capability in managing innovation processes, experiential learning interventions are frequently employed. Various types of experiences, including case studies, role plays, outdoor activities, and simulations, are utilized. Simulations provide learners with a guided environment that closely resembles real-world contexts. Studies indicate that learners highly value simulation-based experiential learning and perceive it more positively than lectures and case discussions (Mohsen et al., 2019). Through simulation-based activities, learners engage in dynamic knowledge acquisition and witness an increase in their work-related self-efficacy (Feinstein et al., 2002; Douglas-Lenders, 2007). Such activities enable active information processing within an immersive environment, facilitating skill development and deeper levels of learning, particularly within work-related contexts (Feinstein, 2002; Sitzmann, 2011). Simulation-based learning, combined with cognitive search and interpersonal information sharing, plays a crucial role in business model innovation, allowing individuals to create and manage knowledge and foster innovation through the recombination of existing knowledge (De Toma & Gnioni, 2019).

In light of these considerations, this study aims to conduct a comprehensive examination of previously published academic work, establishing the contextual relevance of simulation games in the innovation management space. The subsequent sections of this article will delve into the study's process, present the findings, outline the conclusions, and propose recommendations for future research agendas.

Objectives of the Study

Embarking on a meticulous examination using the PRISMA method, this comprehensive literature review delves into the pivotal role of business simulation games in innovation management. Through a meticulous analysis of research themes, methodologies, applied analyses, outcomes, and contextual factors, this study aims to unravel the intricacies of this dynamic field. By surveying the literature spanning the past two decades, our objective is to construct a robust framework and unearth potential avenues for future research, unravelling the true potential of business simulation games in driving innovation. This scholarly endeavour serves as a valuable contribution to the existing literature, offering profound insights into the intricate interplay between triggers or outcomes and the realm of international ethnic entrepreneurship within the dynamic context of business simulation games. Furthermore, it sheds light on the underlying theoretical framework, research methods, theoretical approach, and the geographical scope encompassing both home and host countries explored in these insightful studies. Our research questions will serve as guiding beacons on this academic expedition:

1. What are the key disciplinary areas in innovation management where business simulation games are used?
2. What are the purposes and methodologies employed in business simulation games within innovation management? More specifically, is there an emerging trend?
3. What are the key theories or theoretical frameworks utilized in business simulation games?
4. What are the key findings from studies on the use of business simulation games in innovation management?
5. What are the implications for future research arising from these studies?

Methodology

A systematic literature review, a robust methodology known for its comprehensive exploration and synthesis of existing research, formed the cornerstone of this study. Embracing the esteemed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, our methodology ensured a meticulous and replicable approach, minimizing bias and bolstering the credibility of our findings (Tranfield et al., 2003).

At the heart of our methodology lay a well-defined research question or objective, serving as our North Star throughout the review process (Page et al., 2021). To cast the widest net, this study meticulously crafted a comprehensive and systematic search strategy, scouring electronic databases, academic journals, conference proceedings, and other relevant sources. Employing predefined search terms and inclusion/exclusion criteria, this study maintained consistency and transparency in study selection (Page et al., 2021; Hanao-Garcia & Montoya, 2023).

Every study identified in our search underwent a rigorous screening process, meticulously scrutinized against predefined eligibility criteria. This ensured that only high-quality and relevant studies were included in our review, maintaining the integrity and rigor of our findings (Page et al., 2021; Hanao-Garcia & Montoya, 2023).

Next, this study embarked on the critical task of data extraction. Armed with a predefined template, this study extracted pertinent details from the selected studies, encompassing study design, sample characteristics, research methods, key findings, and other essential information (Page et al., 2021; Hanao-Garcia & Montoya, 2023). With the extracted data in hand, this study embarked on a synthesis journey. Delving into the research themes, research methods, applied analyses, outcomes, and contextual factors of the included studies, this study sought to create a cohesive narrative that illuminated the landscape of our field of inquiry. Through this

synthesis, this study aimed to unearth patterns, insights, and potential avenues for future research, enriching our understanding of the subject matter at hand.

Search Terms

In achieving the objectives of this article, the terms of the study were based on the following inclusion & exclusion criteria for the search. The criteria were developed to keep the focus on the role of simulation games in the context of application in innovation management in an organizational context.

Table1

Inclusion and Exclusion Criteria

INCLUSION	EXCLUSION
Business simulation games, simulation games, serious games Innovation management, innovativeness management Studies on management development in companies and post graduate levels.	Simulations in Entrepreneur Development Innovation of game development, innovation in the education process, innovation of graduate level studies that are not used with a purpose of managerial competent development.
Peer reviewed articles, conference papers that are uniquely in line with the study.	Books, Case studies, Conference papers that are not uniquely inline.

The inclusion of conference papers in research remains a topic of vigorous debate within the academic community. Detractors argue that conference papers lack the rigorous peer review and validation typically associated with journal publications, raising concerns about their reliability and credibility (Paez, 2019; Mahood et al., 2014). However, proponents argue that including conference papers can enhance the

comprehensiveness of a study, mitigate publication bias, and provide a current snapshot of the research landscape (Mahood et al., 2014).

While conference papers may not undergo the same level of scrutiny as peer-reviewed journal articles, they can offer valuable insights and contribute to a more comprehensive understanding of a specific body of evidence (Paez, 2019). In cases where conclusive evidence is lacking, the inclusion of conference papers can help fill knowledge gaps and provide a broader perspective on the topic at hand.

In this study, the researcher made a deliberate decision to adjust the inclusion and exclusion criteria to accommodate interesting and relevant conference papers that were closely aligned with the research topic and supported by sufficient references. This adjustment was made with the intention of enriching the study by incorporating diverse perspectives and the most up-to-date insights available.

Information Sources and Search Strategy

Google Scholar, renowned as the world’s most comprehensive academic and scientific database (Ilhan-nas et al., 2011), served as the primary source of information for this study. The data extraction was based on keywords such as “business simulation games,” “simulation games,” “serious games,” and “innovation management.” These search criteria were applied in the “anywhere” field of the articles. The combination of “innovation management” and “simulation games” yielded 612 journal articles, while the combination of “innovation management” and “serious games” resulted in 502 journal articles. After identifying and removing 37 duplicate articles, a total of 1,077 journal articles remained for further assessment. The subsequent stage involved a closer examination of “the abstracts using predefined inclusion and exclusion criteria. In cases where a decision could not be reached based on the abstract alone, the entire article was reviewed. This meticulous iteration led to the shortlisting of 23 journal articles that met the criteria for inclusion in this systematic literature review.

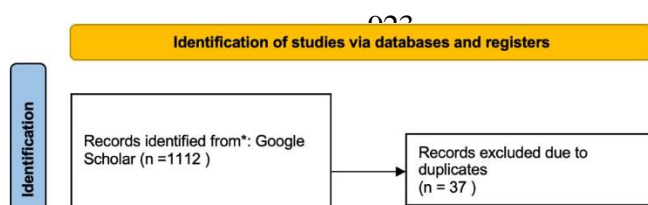


Figure 1

Prisma Model

The selected articles were then subjected to a three-part data retrieval process. The first part involved gathering general information about the articles, such as the year of publication, publisher, number of citations, location, and author information. In the second part, the focus areas, methodology, and method of analysis employed in the studies were extracted. The third part focused on capturing key findings, limitations, and future directions identified in the articles. MS Excel was utilized to record and organize the retrieved data, while MS Excel, NVivo, and ChatGPT were employed for subsequent analysis.

Findings

General Characteristics of the Journal Articles

As the initial stage of the synthesis, this study carried out an analysis of publications by year, analysis of the greatest number of citations, geographical origins of the articles and the interest of the publishers.

Publications by Year

Upon analyzing the number of publications by year (see Figure B), it was surprising to observe a complete absence of articles between 2003 and 2009 that met the study’s scope and selection criteria. However, there was a notable increase in publications in subsequent years. The peak year of publication was 2019, with five articles meeting the criteria, followed by four articles in 2021. This distribution of publications over time highlights the growing interest and attention given to the subject of the study in recent years.

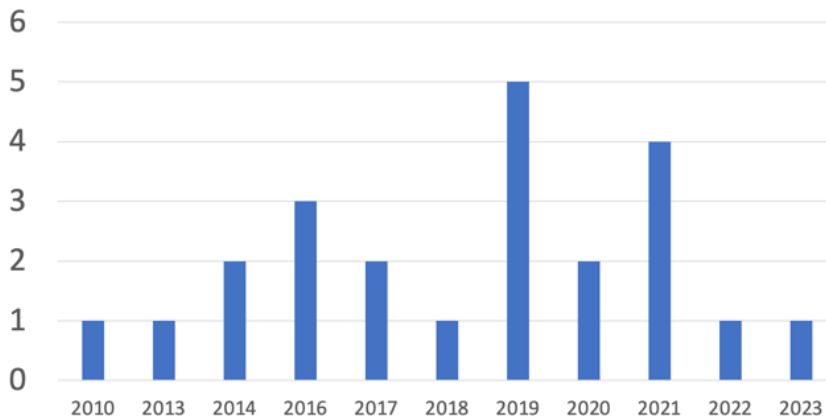


Figure B

Publications by Year

Most Number of Citations

Table 1 presents the top ten publications with the highest number of citations in the sample. These ten publications collectively contribute to 96.01% of the total citations. Notably, the article titled “Simulation-based learning in nurse education: a systematic review” by Cant & Cooper (2010) stands out with a remarkable 555 citations, accounting for 43.7% of the total citations in the sample. This prominence

can be attributed to the fact that it is the only systematic literature review included in the sample, which likely explains its higher citation count. Another interesting observation is that, apart from Cant & Cooper (2010)'s article, all the other publications in the top ten list were published within the last six years. This suggests a recent surge in interest and research activity in the field, as reflected by the citation patterns.

Table 2

Citation Data Analysis

AUTHORS	PUBLICATION NAME	NO OF CITATIONS	PERCENTAGE
Cant et al. (2010)	Simulation-based learning in nurse education: systematic review	555	43.70%
Gatti et al. (2019)	Education for sustainable development through business simulation games: An exploratory study of sustainability gamification and its effects on students' learning outcomes	174	13.70%
Geithner& Menzel (2016)	Effectiveness of Learning Through Experience and Reflection in a Project Management Simulation	116	9.13%
Lovelece et al.(2016)	I Do and I Understand: Assessing the Utility of Web-Based Management Simulations to Develop Critical Thinking Skills	113	8.90%
Chang et al. (2020)	From experiencing to critical thinking: a contextual game-based learning approach to improving nursing students' performance in Electrocardiogram training	65	5.12%
Costin et al. (2018)	Using Simulation to Develop Entrepreneurial Skills and Mind-Set: An Exploratory Case Study	62	4.88%
Klapztein & Cipolla (2016)	From Game Design to Service Design: A Framework to Gamify Services	50	3.94%
Lopez et al (2021)	Serious games in management education: An acceptance analysis	41	3.23%
Salvini (2022)	Enhancing digital transformation towards virtual supply chains: a simulation game for Dutch floriculture	27	2.13%
Javahernia & Sunmola (2017)	A simulation approach to innovation deployment readiness assessment in manufacturing	17	1.34%

Geographical Analysis of the Origins of the Articles

Table 2 provides an overview of the country of origin for each article in the sample. The data reveals that Germany and the Netherlands have the highest number of articles, with each country contributing the most with four publications. Following closely behind are Finland and the UK, with two articles each. Notably, it is worth highlighting that out of the 23 articles included in the sample, a significant majority

of 20 articles originate from European countries. This observation raises an interesting point for further exploration and comparison with similar studies to better understand this phenomenon. Comparing these findings with comparable research can shed light on the factors contributing to the higher concentration of articles from Europe in the field of business simulation games and innovation management.

Table 3

Country Wise Breakdown

GEOGRAPHICAL AREA	COUNTRY	NO OF ARTICLES
Europe	Germany	3
Europe	Netherlands	3
Europe	Finland	2
Europe	UK	2
Europe	Australia	1
Europe	Bulgaria	1
Europe	Ireland	1
Europe	Israel	1
Europe	Italy	1
Europe	Norway	1
Europe	Spain	1
Europe	Switzerland	1
Europe	Taiwan	1
Europe	Turkey	1
Middle East	UAE	1
North America	USA	1
South America	Brazil	1

Table 4

Geo Area of Origin

GEOGRAPHICAL AREA	NO OF ARTICLES
EUROPE	20
MIDDLE EAST	1
NORTH AMERICA	1
SOUTH AMERICA	1

927

Discipline Focus of the Studies (Research Question 1)

Based on the analysis of the application discipline, the aim was to gain a deeper understanding of the publications. A total of seven publications focused on the use of simulation as an intervention tool. Interestingly, two of these publications specifically targeted the nursing discipline, indicating its relevance and importance in that field. The discipline of Education was also well-represented with four publications, suggesting a growing interest in utilizing simulation in educational settings. Additionally, nursing appeared in four publications, either as a core discipline or as a secondary focus. These findings highlight the significance of simulation in both nursing and education, indicating its potential for enhancing learning experiences and improving outcomes in these domains. (Refer table 04)

Table 5

Discipline focus of the studies

Citation	Core focused Discipline	Secondary Focused discipline
Rauch et al. (2017)	Digital Innovation	Path dependent decision making, Risk propensity

Lovelece et al.(2016)	Education	Critical Thinking and problem solving
Costin et al. (2018)	Education	Business management
Lopez et al (2021)	Education	Behavioral intention
Millar et al.(2019)	Education	Learnability
Lo et al. (2013)	Game Design	Industry 4.0
Geithner& Menzel (2016)	Game Design	Project Management
Klapztein & Cipolla (2016)	Game Design	Service
Jaaska et al. (2021)	Game Design	Sustainability
Fink e al. (2014)	Higher Education	Experience and Learning methods
Petersen (et al. 2019)	Manufacturing	Produciton technique
Chang et al. (2020)	Nursing	Critical Thinking and problem solving
Georgieva-Tsaneva et al. (2021)	Nursing	Clinical Reasoning
Feldman et al. (2014)	Service Innovation	idea assessment
Alantug et al. (2019)	Simulation as an intervention tool	Nursing
Cant & Cooper (2010)	Simulation as an intervention tool	Nursing

Gatti et al. (2019)	Simulation as an intervention tool	Sustainability
Schönbohm et al. (2021)	Simulation as an intervention tool	Decision Making
Roukouni et al. (2019)	Simulation as an intervention tool	Innovation
Javahernia & Sunmola (2017)	Simulation as an intervention tool	Manufacturing
Harris et al (2023)	Simulation as an intervention tool	Energy
Salvini (2022)	Supply Chain Management	Virtualisation
Jager et al. (2020)	Urban planning	Socail Complexity Thinking

Analysis of Purpose and ethodology (Research Question 02)

Through a meticulous examination of the abstracts of each paper, the key purposes of the studies were extracted and categorized based on their codes, as presented in Table 6. Among the 23 studies analyzed, it was found that 14 studies aimed to utilize Simulation Games as a method to enhance skills in various domains. Additionally, 4 studies specifically focused on investigating the potential of simulation games in driving behavioral changes to support innovation management initiatives. Notably, 3 studies delved into the game-designing process itself to facilitate and enhance innovation management practices. These findings highlight the diverse range of purposes and approaches adopted by researchers in exploring the role of simulation games in the context of innovation management.

Table 6

Analysis of the Purpose of the Studies

PURPOSE	QTY
Assess Effectiveness on Skill Development	14
Behavior change	4
Game designing process	3
Assess Effeiciveness on enhancing innovation process quality	1
Systematic Understanding	1

Research Methods Analysis

An analysis of the research methods employed in the studies within the sample uncovers a noteworthy shift towards more practice-oriented approaches rather than traditional empirical methods. Among the included studies, nearly half of them (11 out of 23) adopted an experimental research design. Additionally, four studies utilized Design-Based Research methodology, which emphasizes iterative design processes in real-world settings. Interestingly, three studies employed Action Research Designs, focusing on collaborative problem-solving and learning within specific organizational contexts. It is worth mentioning that one study employed a combination of Action Research Design and Quasi Experiment to gain a more comprehensive understanding of the phenomenon under investigation. These findings highlight the diverse and innovative approaches employed by researchers to explore the role of simulation games in innovation management, embracing a more practice-oriented and contextualized perspective.

Table 7

Analysis of Methodologies Used

METHODOLOGY	QTY
Experiment	12
Design Based Research	4
Action Research Design	3
Descriptive Study	1
Action Research Design/ Quasi Experiment	1
Literature review, Case analysis and interviews	1
Quantitative	1

Linking Purpose and Methodology

In the analysis of the patterns, there are three specific patterns that the study intends to focus. Firstly, the studies that focus on establishing the effectiveness of simulation in skill development have mainly used the Experimental approach (09 out of 14). Secondly, the studies with the purpose of designing a simulation game have used Design-Based Research and Action Based Research as a method. All the studies focused on behaviour changes have been done within the last 5 years which means a shift of focus from skills to behaviour changes to enhance innovation management efforts (Refer Table 8).

Table 8

Patterns between Purpose and Methods

Citation	Purpose	Type
Feldman et al. (2014)	Assess Effeiciveness on enhancing innovation process quality	Experiment
Lovelece et al.(2016)	Assess Effeiciveness on Skill Development	Experiment
Chang et al. (2020)	Assess Effeiciveness on Skill Development	Experiment
Jager et al. (2020)	Assess Effeiciveness on Skill Development	Experiment
Rauch et al. (2017)	Assess Effeiciveness on Skill Development	Experiment
Georgieva-Tsaneva et al. (2021)	Assess Effeiciveness on Skill Development	Quantitative
Millar et al. (2019)	Assess Effeiciveness on Skill Development	Action Research

		Design
Alantug et al. (2019)	Assess Effeiciveness on Skill Development	Descriptive Study
Petersen et al. (2019)	Assess Effeiciveness on Skill Development	Experiment
Costin et al. (2018)	Assess Effeiciveness on Skill Development	Experiment
Gatti et al. (2019)	Assess Effeiciveness on Skill Development	Experiment
Salvini (2022)	Assess Effeiciveness on Skill Development	Design Based Research
Geithner& Menzel (2016)	Assess Effeiciveness on Skill Development	Design Based Research
Fink et al. (2014)	Assess Effeiciveness on Skill Development	Experiment
Harris et. al. (2023)	Assess Effeiciveness on Skill Development	Experiment
Schönbohm et al. (2021)	Behavior change	Action Research Design/ Quasi Experiment
Roukouni et al. (2019)	Behavior change	Literature review, Case analysis and interviews
Javahernia & Sunmola (2017)	Behavior change	Experiment

Lopez et al. (2021)	Behavior change	Experiment
Lo et al. (2013)	Game designing process	Design Based Case
Klapztein & Cipolla (2016)	Game designing process	Action Research Design
Jaaska et al. (2021)	Game designing process	Design Based Research
Cant & Cooper (2010)	Systematic Understanding	System Literature Review

Analysis of Theories Used (Research Question 3)

Upon analyzing the theories used in the reviewed studies, it became evident that a wide range of theories were employed. However, only a few theories were found to be used more than once. The two most frequently utilized theories were the Adult Learning Theory and the Action Design Research model. It is worth noting that the diverse array of theories utilized reflects the multidisciplinary nature of the field and the need for a comprehensive theoretical framework to address the complexities of the research topics.

Table 9

Analysis of Theories Used

Authors	Theory
Alantug et al. (2019)	Adult Learning Theory

Cant & Cooper (2010)	Prisma
Chang et al. (2020)	Intrinsic Motivation, Critical Thinking
Costin et al. (2018)	None
Feldman et al. (2014)	Big Five Personalithy Taxonomy. And Openness To Experience
Fink e al. (2014)	Flow
Gatti et al. (2019)	Action And Experiential Learning Method
Geithner& Menzel (2016)	Adult Learning Theory
Georgieva-Tsaneva et al. (2021)	None
Harris et al. (2023)	None
Jaaska et al. (2021)	Adult Learning Theory And ADR Model
Jager et al. (2020)	Complex Systems Theory, Agent Based Modelling
Javahernia & Sunmola (2017)	Sequential Decision Process Framework
Klapztein & Cipolla (2016)	Action Design Research
Lo et al. (2013)	Activity Theory Based Model For Serious Game
Lopez et al. (2021)	Cognitive-Affective-Norma- Tive Model
Lovelece et al.(2016)	Bandura's Social Learning Theory
Millar et al.(2019)	Tsr-> Learnability
Petersen et al. (2019)	Dynamic Process Model
Rauch et al. (2017)	Path Dependent Decision Making
Roukouni et al. (2019)	Triadic Game Design (TGD) Philosophy
Salvini (2022)	Systematic Barriers To Virtualisation
Schönbohm et al (2021)	Generic Framework For A Strategic Crisis Response Formulation Process

Analysis of contribution (Research Question 04)

In order to assess the contribution of each of the articles included in the study an analysis of key findings, future recommendations and keyword categorization was carried out.

Analysis of Keywords

This study focused on identifying patterns among keywords (n=101). There were three duplicates. As the variety of words is too vast, a coding-based analysis was done to find patterns among the keywords. Based on the author's discretion the following coding table (Table 10) was developed.

Table 10

Keyword Coding

CODE	MEANING	EXAMPLE
Application Focus	Any reference to an industry, function or specific application.	Diversity, Online training, medical education etc.
Business Simulaton Game	Any refence about the business simulation game	Business games, serious games, Lego Series play etc.
Game Design	Any reference to the design elements of a game	User engagement, Game experience
Method	Any reference to research method	Experiment, Design Based Research
Process	Any reference to the application process	Literature review, Readiness assessment

	of the game in the study	
Theory	Any reference to a theory, concept or model	Big Five personality trait, Critical thinking.

Based on the above the frequency of the keywords in each of the codes is shown below.

Table 11

Frequency of Keyword Codes

CODE	QTY
Application Focus	49
Business Simulaton Game	18
Process	14
Theory	9
Method	7
Design	4

Analysis of Key Findings

In analyzing the findings of each of the articles all the key findings of this study were extracted and analyzed. As there was a vast number of overlapping findings were found a code-based categorisation was carried out. Based on the coding summary as shown in Table 11, eleven studies found that simulation games can be used to enhance skills and 7 studies found that simulation games can be used to change the attitudes and beliefs of participants.

Table 12

Coding of findings

CODE	QYT	AUTHORS
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Developes skills	11	Alantug et al. (2019), Cant & Cooper (2010), Chang et al. (2020), Costin et al. (2018), Fink e al. (2014), Geithner& Menzel (2016), Harris et al, (2023), Jager et al. (2020), Petersen (et al. 2019), Rauch et al. (2017), Salvini (2022)
Changes attitudes/ beliefs	8	Alantug et al. (2019), Cant & Cooper (2010), Chang et al. (2020), Gatti et al. (2019), Jager et al. (2020), Lopez et al (2021), Rauch et al. (2017), Schönbohm et al (2021)
Simulations are better	7	Alantug et al. (2019), Chang et al. (2020), Geithner & Menzel (2016), Jaaska et al. (2021), Javahernia & Sunmola (2017), Lopez et al. (2021), Millar et al. (2019)
Improves readiness for deployment	4	Alantug et al. (2019), Javahernia & Sunmola (2017) , Lovelece et al.(2016), Rauch et al. (2017)
Change in the behaviors	4	Harris et al. (2023), Lopez et al. (2021)
Theory focus	3	Salvini et al. (2023)
Improves openness	1	Feldman et al. (2014)

Apart from the above key findings, there are a few significant findings listed in the manuscripts. Games designed with flow theory in mind, requiring high concentration, stress management, and teamwork, can be effective in influencing expertise, attitudes, and engagement. (Salvini et al. 2023). Collaboration in serious games can lead to more successful outcomes, particularly in terms of social equity among participants.(Jager & Yamu, 2020), Positive emotions and the opinions of influential individuals contribute to the acceptance and perception of serious games as high-performance methods for learning.(Lopez et al., 2021), Digital innovation influences path-dependent decision-makers to select options beyond those of past decisions, increasing risk propensity and perceiving digital innovation as an opportunity. (Rauch et al., 2017). Serious games and game-based learning can address barriers to learning, such as lack of focus, limited understanding, and lack

of cooperation, enhancing digital transformation and virtualization efforts (Salvini et al., 2022).

Discussion and future research direction (Research question 05)

The discussion on the role of simulations in innovation management has revealed two key clusters of findings: the assessment of the effectiveness of simulations as an intervention method and the design of simulation games. Throughout the conversation, it became apparent that Lego series games had a significant impact, as they were repeatedly mentioned in various studies. This suggests that Lego series games have gained recognition and have been widely utilized in the field.

Another notable finding is the predominant use of experimental and action or design research methods across the reviewed studies. These methodological approaches indicate a focus on empirical investigation and practical application of simulations in real-world contexts. This aligns with the nature of simulation-based research, which often involves active participation and experiential learning.

Interestingly, a larger number of studies in the reviewed literature focused on the nursing discipline. This raises the question of why nursing has received more attention in the context of simulation research compared to other related fields. Further exploration is warranted to understand the specific factors driving this trend and to identify potential gaps in research within other disciplines.

However, it is noteworthy that there was a lack of representation of key innovation-related disciplines, such as ideation, experimentation, design thinking, and innovation diffusion. Additionally, there was a dearth of studies focusing on product innovation, process innovation, management innovation, and business model innovation. These areas are crucial for understanding and advancing innovation practices in various industries.

Conclusions

Future Research Direction

Longitudinal Studies

In order to ensure a comprehensive understanding of the long-term impact of simulation games on innovation management, future research should emphasise assessing their sustained influence over time. While numerous studies have focused on the immediate effects of simulation games, there is a distinct need to investigate their lasting implications for organizational innovation performance. Conducting longitudinal studies can provide valuable insights into the enduring effects of simulation games and offer a deeper understanding of their contributions to innovation capabilities and outcomes (Lopez et al. 2017, Roukouni, 2019)

Larger Number of Participants in Study Samples

Expanding the sample size in future research is critical to obtain more comprehensive and generalizable insights into the utilization of simulations to enhance behaviors and provide support for innovation management. By increasing the sample size, researchers can collect data from a broader range of participants and organizations, leading to a more thorough understanding of the effects of simulations on behavior change. A larger sample will enable researchers to examine various contextual factors that may impact the effectiveness of simulations (Giethner & Menzel, 2016; Millar, et al., 2016) , including organizational culture, leadership styles, and individual characteristics. Additionally, conducting longitudinal studies with extended follow-up periods will yield valuable information on the long-term impact of simulations on behavior change and innovation outcomes. Furthermore, conducting subgroup analyses based on participant characteristics, such as job roles or experience levels, will illuminate any differential effects and allow for the

customization of simulation interventions for specific target groups. By addressing the limitations associated with small samples, future research with larger sample sizes will provide more robust evidence on the effectiveness and underlying mechanisms of using simulations to enhance behaviors and support innovation management, thereby enabling more informed decision-making in organizational contexts.

Simulations with Participants with a Wider Demographical Context

To enhance the generalizability of findings, it is crucial for future research to explore the use of simulation games in diverse cultural and organizational contexts. Cross-cultural studies, in particular, can shed light on the cultural factors that may influence the effectiveness of simulation games and uncover insights into their adaptability across different regions. Likewise, cross-industry studies can examine the transferability of simulation game approaches to various sectors and explore the unique challenges and opportunities for innovation management in different industries. Especially, there is a dire need for studies that are outside the European region.

Beyond “Deployment Readiness” to Innovation Readiness

Enhancing innovation readiness through simulations is a critical area that warrants further exploration and research. Expanding the scope of studies with larger sample sizes can provide a more comprehensive understanding of the effectiveness of simulations in enhancing innovation readiness. By including a diverse range of participants from various organizational settings, researchers can examine the impact of simulations on different aspects of innovation readiness, such as organizational culture, leadership, and employee mindset. Longitudinal studies with extended follow-up periods can help assess the sustained effects of simulation interventions on innovation readiness over time. Additionally, subgroup analyses

based on participant characteristics, such as job roles or experience levels, can offer insights into the differential effects of simulations on different individuals or groups. By advancing our knowledge in this area, organizations can better leverage simulations to cultivate a culture of innovation, enhance employee readiness, and foster a more innovative and adaptive organizational environment.

Simulations at the Heart of the Innovation Process

While simulation games have been studied as standalone approaches, there is a pressing need to investigate their integration with other innovation management practices. Future research could delve into how simulation games can complement and enhance existing strategies, processes, and tools in innovation management. This entails exploring the synergies between simulation games and methods such as design thinking, lean startup, and open innovation, and uncovering how they can be combined to foster a more comprehensive and effective approach to innovation.

Establish Design Principles, Benchmarks and Protocols

To advance the rigor and comparability of research in this field, future studies should focus on developing standardized evaluation frameworks and measures for assessing the effectiveness of simulation games in innovation management. This entails identifying key performance indicators, creating validated assessment tools, and establishing benchmarks for evaluating the impact of simulation games on innovation outcomes. Such frameworks will enable researchers and practitioners to systematically measure and compare the effectiveness of different simulation game interventions, facilitating more robust and evidence-based decision-making.

Emerging Technologies

With the rapid advancement of technology, it is imperative for future research to explore the incorporation of emerging technologies, such as virtual reality, augmented reality, and artificial intelligence, into simulation games for innovation management. Investigating how these technologies can enhance the immersive and interactive nature of simulation games, facilitate real-time feedback and decision-making, and create more realistic and engaging experiences will open new avenues for research and practice in this area.

Role of Learning Design and Facilitation

Another area that warrants further attention is the role of facilitation and learning design within simulation games for innovation management. Future research could delve into the impact of different facilitation styles, the utilization of expert guidance, and the design of feedback mechanisms within simulation games. Understanding how these factors influence participant engagement, learning outcomes, and the transfer of skills and knowledge to real-world innovation contexts will contribute to the effective design and implementation of simulation games.

By addressing these future research directions, the field of simulation games in innovation management can advance significantly. These endeavors will contribute to a deeper understanding of the long-term impact, cross-cultural and cross-industry applicability, integration with other innovation management practices, development of evaluation frameworks and measures, incorporation of emerging technologies, and the role of facilitation and learning design within simulation games. Ultimately, this will foster more effective utilization of simulation games for innovation management and drive organizational success in an increasingly dynamic and competitive business landscape.

Significance

The significance of this study lies in its systematic examination of business simulation games in the context of innovation management, a critical yet underexplored area in the literature. By synthesizing research from the past two decades, this study identifies the ways in which simulation games contribute to skill development, behavior change, and enhanced innovation readiness in organizations. The findings highlight the potential of simulations to influence organizational culture, leadership, and employee mindset, thereby fostering a more adaptive and innovative environment. Furthermore, the study outlines future research directions, including the integration of emerging technologies and the development of standardized evaluation frameworks. By advancing knowledge in this field, the study offers valuable insights for both researchers and practitioners, providing evidence to support the use of simulations in improving innovation processes and outcomes across various organizational settings.

Limitations

While this systematic literature review provides valuable insights into the use of simulations in innovation management, there are several limitations that should be considered. Firstly, the study relied solely on Google Scholar as the primary source of information. While Google Scholar is a comprehensive database, it may not capture all relevant studies, as it excludes certain academic journals and non-English publications. Thus, there is a possibility that some relevant articles might have been missed, potentially leading to a biased representation of the literature.

Another limitation is the relatively low number of properly cited articles. This could impact the reliability and generalizability of the findings, as articles with fewer citations may have received less attention and scrutiny from the research

community. Future studies should strive to include a broader range of highly cited articles to ensure a more comprehensive analysis.

Additionally, most of the included studies had small sample sizes, which may limit the generalizability of the findings. Small samples can introduce sampling biases and reduce the statistical power of the analysis. To overcome this limitation, future research should aim for larger and more diverse samples to enhance the external validity of the findings.

Furthermore, the predominance of experimental and design-based research methods in the included studies may limit the generalizability of the findings to real-world innovation management contexts. These research designs often involve controlled settings and may not fully capture the complexities and nuances of actual organizational settings. Future studies should consider incorporating more diverse research methods, such as qualitative approaches and field studies, to provide a richer understanding of the practical implications of using simulations in innovation management.

Lastly, it is important to acknowledge the potential influence of the author's inexperience in conducting systematic literature reviews. Although efforts were made to follow established guidelines and methodologies, the author's lack of expertise in the field may have influenced the selection and interpretation of studies. To mitigate this limitation, future studies could involve a team of experienced researchers to enhance the rigor and reliability of the review process.

Overall, while this study contributes valuable insights, it is important to consider these limitations when interpreting the findings and to encourage further research that addresses these gaps for a more comprehensive understanding of the topic.

Final Conclusions

In conclusion, this article highlights the significant role that simulations can play in enhancing innovation management capabilities. The findings of the study confirm

the growing interest in this area, with a focus on practice-oriented perspectives and contemporary research designs. The analysis reveals a clear trend towards embracing more contemporary approaches in studying the effectiveness of simulations. However, it is important to acknowledge the existence of a larger gap in the literature and the challenges of generalizability and external validity.

Given the accelerating pace of innovation, the article underscores the crucial role that business simulation games can play in addressing the evolving needs of organizations. By providing immersive and interactive experiences, simulations offer a powerful tool for developing and honing the skills necessary for effective innovation management. Moving forward, further research and advancements in the field of simulations and innovation management are needed to bridge the existing gaps and fully leverage the potential of simulations in driving organizational success in an increasingly dynamic and competitive landscape.

Overall, this article contributes valuable insights and sets the stage for further exploration and advancement in the use of simulations for innovation management.

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Corporate Sustainability Goal Setting of Indian Companies: An analysis of NIFTY 250 Companies

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To embrace CSR in its entirety, businesses must understand it as a multilayered concept with four interrelated and often overlapping dimensions, namely, economic, legal, ethical, and philanthropic. Publishing of sustainability information and data into the mainstream report brings it to the attention of investors and shareholders and allows a wider, more sustainable conception of value to foster. As ESG and sustainability gain paramount importance globally, Indian enterprises are increasingly recognizing the importance of corporate sustainability goal setting, complying and revising those goals and their contribution to global SDGs, as a potential to drive positive impact, enhance transparency and foster value creation.

The aim of this study is to investigate the degree to which businesses include environmental and social goals in their sustainability reports. This paper examines the status of sustainability targets set by Indian companies. Specifically, the trends of environment-related and social goals are analyzed by comparing the period of setting each goal over the five years from 2019 to 2023. The report also analyzes the status of Indian companies' commitment to the Sustainable Development Goals (SDGs) and their responses to each of the 17 goals from 2020 to 2023. The analysis shows that companies do set their sustainability targets for specific years, such as 2030, but the frequency of target revision is not as frequent as in ordinary medium-term management plans. While the setting of long-term targets was influenced by industry in terms of environment-related targets, there were few industry-specific characteristics in terms of social-related targets. The construction industry companies showed a high rate of disclosure and a long period for setting both environment and social-related targets. Since the United Nations approved the SDGs in 2015, Indian companies have been trying to more proactively reflect the SDGs in their business management, and the number of companies disclosing their commitment to the SDGs has been increasing. However, the priority has been placed on activities related to manufacturing and consumer responsibility, which are close to their core business, and on activities related to global warming. Through these studies, this paper attempts to contribute to the existing research on the status of setting sustainability goals by presenting evidence, especially in relation to corporate plans.

Keywords- *Corporate sustainability, Management planning, Numerical targets, Sustainable development goals*

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Introduction

To embrace CSR in its entirety, businesses must understand it as a multilayered concept with four interrelated and often overlapping dimensions, namely, economic, legal, ethical, and philanthropic. The ‘Social Performance Model’ introduced by Carroll in 1979, suggests that the responsibility of business encompasses not only basic and necessary responsibilities such as economic and legal, but also ethical which goes beyond the regular activities and philanthropic acts which are, although voluntary, are desired by the society. ‘Stakeholder Theory’ which is much relevant today, propounded by Edward Freeman in the 1980s is an alternative approach to CSR. The theory premises that a corporation is in a network of relationships and hence corporate strategies should be designed so as to satisfy the demands of all stakeholders which includes shareholders, employees, customers, suppliers, competitors, government and even the wider community (Freeman, 1994).

In addition to firm’s CSR activities, the global backdrop of sustainable development, as governed by the Sustainable Development Goals (SDGs) of the United Nations, has further impacted how firms perceive their role in society in addition to the national CSR duties. The SDGs created in 2015 as an international call to action to eradicate poverty, safeguard the environment, and guarantee that everyone lives in peace and prosperity by the year 2030 (UNDP, 2015), give a thorough framework to direct efforts toward global development.

Businesses also adhere to these CSR practices because of several benefits that accrue to them in the long run. Like improving the reputation of the firm, build trust, brand image and acceptability among people. All these benefits further result in competitive advantages and improvement in profit margins in the long- term.

In recent years, there has been an active movement to encourage companies to set more substantial sustainability management goals. In particular, the Science Based Target (SBT) encourages companies to set targets based on scientific evidence in

order to achieve the 2°C target set in the Paris Agreement in 2015. The Sustainable Development Goals (SDGs), also adopted by the United Nations in 2015, set development goals for the year 2030, aiming for the ideal state of human, global, and social prosperity. The SDG Compass also includes an outside-in approach to goal-setting based on external consensus as a way to link these goals to corporate sustainability activities.

All of the companies adopt an approach of setting corporate sustainability goals based on the standards required by society as a whole and the planet as a whole (Biermann and Kim, 2020). The goal is to move from organization-centered goal setting to goals based on ecological resilience (Bjørn, Lloyd, & Matthews, 2021), providing a framework for implementing goal setting that prioritizes scientific evidence and social consensus rather than internal organizational logic. However, these goal-setting approaches have not caught on with many companies, especially those that often refer to these frameworks as concepts but have not reached the stage of actually setting numerical goals (Bjørn, Lloyd, & Matthews, 2021).

Thus, the issue of goal setting in sustainability management has become an important research topic both academically and practically. However, compared to technical and engineering research on goal setting that emphasizes scientific evidence, there has not been much research on sustainability goal setting in the field of business administration. Traditionally, the issue of goal setting in business administration has been positioned as a tool of management control system (MCS) or a process of strategy formulation. As special issues on MCS for sustainability and the environment have been compiled frequently in recent years (Ali et al. 2022; Alakkas et al. 2023), it is expected to become an important research topic in the field of management studies in the future.

The presence of CSR committees positively influences the contribution of business to SDG's (Daniel-Vasconcellos et al., 2022 and Sekarlangit & Wardhari, 2021). It

is quite evident that just financial information about the company is not adequate to assess the business and predict its future competitiveness along with the risk, non-financial information is the key issue (Guitart & Palomo, 2021). So, the importance of aligning corporate sustainability strategy with the overall business strategy cannot be undermined (Petrescu et al., 2020) as financial indicators alone are not sufficient to predict the evolution of business competitiveness and anticipate risks, although in many cases even listed companies do not prepare sustainability reports (Farooq et al., 2021).

In response, this study will identify the status of sustainability goal-setting by Indian firms. Specifically, the trends of environmental and social goals are analyzed over the five years from 2019 to 2023. The study also examines the status of SDGs compliance over the four years from 2020 to 2023 and analyzes the relationship between the status of compliance and goal setting.

The remainder of the study is organized as follows. Section 1 throws light on some of the important studies related to sustainability, especially in Indian context. Section 2 talks about the objectives of the study. Section 3 is research methodology. Section 4 discusses the results and findings, section 5 is conclusion followed by limitations and implications for future research.

Literature Review

The concept of Corporate Social Responsibility is not new. But, in recent decades it has evolved itself from just a philanthropic activity to a strategic commitment on the part of an organization.

The United Nations Industrial Development Organization described CSR as a —management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders. Organizations spending on CSR initiatives are trying to give back to the society, while at the same time making profits.

CSR now reflects the social expectations of firms, and is a crucial component of the corporate strategy all over the world (Carroll & Shabana, 2010). India being an emerging economy is an attractive destination for foreign capital, and thereby it gives rise to the importance of assessing the degree and extent of ESG performance in India. Most of the dominating research in CSR focused on developed economies, Adegbite et al. (2019) in UK; Bruna et al. (2022) in Europe; Gao et al. (2023) in China. With the aim of filling this gap in the existing body of literature, the present study is an attempt to add to the existing literature on emerging economies. CSR in India has a unique environment. Businesses in India have a long history of giving back to the neighborhoods in which they operate, in addition to their primary interest in maximizing profits (Muthuri, Moon, & Idemudia, 2012). Some of India's most significant reporting provisions take a broader role and incorporate environmental and social sustainability goals. For CSR in India, year 2013 acted as a turning point, where Companies act was changed to introduce section 135. Purpose of this section is to ask companies to establish a CSR committee of the board, develop CSR policies and spend 2% of profits in immediately preceding three financial years on CSR programs. In addition to this the global backdrop of sustainable development, as governed by the Sustainable Development Goals (SDGs) of the United Nations, has further impacted how firms perceive their role in society in addition to the national CSR duties.

The SDGs and the worldwide commitment to them had an impact on India's contemporary concept of CSR, which led to the development of a distinctive CSR environment. Previous Studies show how Indian firms contribute to sustainable development.

Premlata and Agarwal A. (2013), studied the CSR initiatives of selected Indian companies and found that most of them are trying to improve their environmental and social performances by adopting various measures, the prominent ones being a code of conduct related to CSR initiatives, social audit, and environmental

certification. The study also found that the key challenge in CSR implementation is collaboration and coordination between the Government and corporate sector and suggested ways to achieve them. A detailed study on the challenges of CSR in India was done by Kumar N. (2014). The study found that there was a need to spread awareness among the general public and the corporates should adopt a comprehensive approach toward CSR for effective results. Shyam R. (2016), analysed the challenges faced by the Indian corporates in the field of CSR interventions and found challenges like transparency, visibility, and lack of community interest to be the focus areas.

Saxena (2016) studied various issues and challenges associated with CSR. The history of CSR in India before 1900 and after 1900 till the present was reviewed by the author. Currently, Indian companies work on the stakeholder model of CSR. The stakeholder model came into existence during the 1900s and is still continuing. It works on a triple bottom line i.e., people, planet and profit. Today, demands of customers, investors, Government, and labour unions are considered to be key drivers of CSR. Issues like transparency, narrow perspective, lack of consensus, lack of infrastructure, and visibility are considered to be the main challenges to CSR. Creating awareness among the general public is the need of the hour for an effective CSR implementation by various corporate houses.

Studies done by Maji & Lohia, 2023; Ahmad et al., 2021; Sassen et al., 2016; Chelawat and Trivedi, 2016 investigated the impact of ESG performance on profitability in Indian emerging markets and concluded that ESG performance positively influences corporate profitability. A study done by Kalia and Aggarwal (2022) assessed the impact of ESG performance on FP and reported that ESG performance has a positive impact on FP in advanced economies but an adverse influence on emerging economies. Likewise, Jyoti and Khanna (2021), Wasiuzzaman et al. (2022), and Agarwal et al. (2023) documented the negative impact of ESG performance on FP

Prieto-Carrón et al. (2016) aimed at incorporating new insights into the CSR study. They talked about the impacts of CSR initiatives, the relationship between business and poverty, issues of power & participation in CSR, and governance-related dimensions of CSR. They are of the view that currently only one side view of CSR is being studied, and various sensitive questions related to CSR are ignored.

The study had in fact suggested that both pros and cons of CSR initiatives have to be taken into account, especially in developing countries, so more collaborative studies on CSR need to be done to develop better impact assessment methodologies. SDG's provide a clear roadmap for company's sustainability, serve as a benchmark for assessing company's progress towards sustainability and accordingly set and revise their internal targets. According to a study published by the Global Compact and Accenture (2018), 87% of business leaders believe that the SDGs offer an opportunity to rethink their approach to sustainable value creation and 89% say that a commitment to sustainability translates into real impact in their sector. This further highlights the need for integrating 2030 agenda into corporate strategy. (García Navarro & Granda Revilla, 2020). Still there have been researches which highlight the fact that commitment of many organizations to the 2030 agenda is just superficial, suggesting a process of "SDG-washing" (Heras-Saizarbitoria et al., 2022).

In 2020, Biermann and Kim (2020) presented an acceptable limit for environmental restoration by the Earth's ecosystems in their concept of PB, and these ideas have had a significant impact on the SDGs. The relationship between corporate performance and PB has been clarified by Antonini and Larrinaga (2017) and others, and these ideas have been adopted in reports by the Global Reporting Initiative and the World Business Council for Sustainable Development, and are influencing the efforts of companies.

While these technological developments are undoubtedly important findings in linking the environment and the economy, many studies have shown that

technologically superior indicators are not always adopted by companies (e.g., Matejko & Sommer, 2021), and the discussion in the management domain need to be joined with the following. One of these is the discussion of setting sustainability goals.

The argument has recently been applied to the field of sustainability. Dragomir, Dumitru, & Perevoznic (2023) positioned the goal-setting function as one of the tools that make up MCS and developed an argument for sustainability goal-setting based on previous studies in the field.

In addition, *Business, Strategy and the Environment* has published a series of articles on setting sustainability goals and is becoming established as a field. Almici (2023) analyzes the integration of sustainability information into compensation design. He found that 33% of companies reflected sustainability goals in their compensation systems, that these were mainly companies in industries with a high environmental impact, that these goals were mainly short-term goals, and that social goals were more reflected in the design than environmental goals. Bjørn, Lloyd, and Matthews, (2021) analyze whether sustainability goal setting is organization-centric or environmentally acceptable (resilience-centric). Most companies in their analysis of companies remained organization-centered in their goal setting, and only a few companies were observed to exhibit a qualitative process.

However, all of the studies are based on descriptive statistical analysis, and since this is a field in its budding stage both practically and academically, the description of the current state of corporate practice is considered to be an important contribution at this stage. Under these circumstances, this study analyzes the status of sustainability goals set by Indian companies in relation to their long-term goals and their responses to the SDGs.

Objectives of the Study

1. To analyze the target setting period for environment related and social related items of select Indian companies.
2. To analyze the revision status of environmental and social goals of the companies, along with their compliance with SDG's.
3. To examine the variation of target setting period and revision status between manufacturing and non-manufacturing firms.

Research Methods

As per the objectives of the study, secondary data has been used to analyze the period for setting sustainability goals for Indian companies. The information is taken from CSR- related reports, as well as the annual reports of the companies from 2019 till 2023.

The study analyzes the sustainable practices of large and mid-cap companies, so the companies listed in NIFTY Large Midcap 250 index are chosen for the purpose of this study. This index reflects the performance of a portfolio of 100 large cap and 150 midcap companies listed on NSE. Aggregate weights of large cap and mid cap stocks is 50% each, thereby giving a good representation of the companies with good market capitalization. The sample population is selected, considering the fact, that if successful companies do not fulfill CSR requirements, then smaller companies cannot be expected to be CSR compliant. Moreover, big companies are more under regulatory scrutiny, so they have greater motivation to observe statutory compliance (Smith, 2013). From the population of 250 companies, a sample of specific companies is taken based on random sampling. This gives every company an equal chance of being selected thus giving a better chance of representation to each company. Random number generator in excel is used to do this.

The target setting period for environment related and social related items are examined and the longest target year for each of the listed environmental related and social related items are extracted. The survey period is five years from 2019 to 2023.

The "year in which the report was issued - 1 " is subtracted from the "year for which the target was set", gives the period for which the company's target was set for that year. For example, if a report issued in FY2022 sets a greenhouse gas control target for FY2030, sets 9 years as target period for setting the company's 2022 environmental/social target. $[2030-(2022-1)= 9 \text{ years}]$.

Descriptive statistics is used to provide basic information about the variables in the data set as well as to highlight the potential relationships between variables

For further analysis, the sample is further broken down into manufacturing and non-manufacturing firms. Stratified sampling is used and accordingly samples drawn from each sub group. Since they are independent groups so Wilcoxon rank sum test is used to compare the statistical difference between the two groups.

More detailed analysis is done by classifying the firms into 11 categories: electricity and gas, materials, machinery, food, transportation equipment, pharmaceuticals, telecommunications, other manufacturing, finance, services, and construction, to analyze trends in goal setting.

Findings and Discussion

Target Setting Period

In this section, the changes in the period over which NIFTY LargeMidcap 250 Index firms set sustainability targets will be analyzed. First, the status and period of setting environmental targets are analyzed, and then the status and period of setting social targets, followed by an analysis of the trends in sustainability target setting by dividing the sample into manufacturing and non-manufacturing firms.

As of 2019, 121 companies (48.4% of all NIFTY Large Midcap 250 Index companies) had set numerical targets for environmental items, and in the following three years, the number increased 1.46 times, with 176 companies disclosing their targets. Compared to social targets, it is relatively easier to manage activities with

numerical targets and to be familiar with the use of such targets, which is why companies have been proactive in setting targets.

In contrast, as for social targets, 43 companies, or 17.2% of the NIFTY Large Midcap 250 Index companies, had set numerical targets for social-related items as of 2019, and these targets increased 3.42 times over the following three years, with 147 companies disclosing their targets. However, in recent years, an increasing number of companies have set and disclosed numerical targets for social goals as well as environmental goals, and the number of companies disclosing numerical targets for social goals has increased to a level similar to that for environment-related goals. In the following sections, the status of target setting in more detail for both environmental and social targets will be analyzed.

Period for Setting Environmental Targets

As shown in Table 1, the number of Indian companies setting numerical environmental targets has increased by 45.4% between 2019 and 2022, but the average period for setting targets has been declining consistently. The number of companies that have set 2025 targets has remained almost unchanged. Further in terms of variation it is witnessed that the environmental targets show a declining variation indicating that the firms have been more consistent in their timeline for setting environmental goals.

Table 2 compares the revision status of environmental targets of Indian companies. The top four rows compare the increase or decrease in the target setting period compared to the previous year's target, and the bottom two rows compare the increase or decrease from 2019, the first year of the tabulation. The shaded cells indicate the number of firms that did not change their target setting during the period, while the cells to the right of these cells include firms that extended their target setting period. Table 2 shows that, on average, 15.8% of companies that have disclosed their goals for two or more years in a row have extended their

environmental goals each year, and more than half of the companies that have set goals for the past five years in a row have extended their goals.

Table 1: Environmental Target Setting Periods for Indian Companies

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	121 (48.4%)	14.08	13.13	12	0	37	0.52	-1.49	67 (55.3%)
2020	141 (56.4%)	11.75	11.93	4	0	38	0.98	-0.62	67 (47.6%)
2021	154 (61.6%)	11.02	11.35	4	0	39	1.28	0.12	65 (42.3%)
2022	176 (70.4%)	8.95	10.15	5	0	35	1.83	2.02	66 (37.5%)
2023	54 (21.6%)	8.82	9.83	6	1	36	2.16	3.21	20 (37.1%)

Table 2: Revision of Environmental Targets of Indian Companies

2019 - 2020	No. of revisions	1	1	3	4	9	13	29	30									N= 103
	No. of companies	92	3	1	2	2	1	1	1									
2020 - 2021	No. of revisions	1	1	4	9	12	13	14	24	29								N= 114
	No. of companies	90	2	2	1	1	1	2	2	3								
2021 - 2022	No. of revisions	1	1	3	4	9	19	29	31									N= 130
	No. of companies	112	3	1	2	5	2	4	1									
	No. of revisions	1	1	1	2	4	29	31										N= 41

2022 - 2023	No. of companies	34	1	1	1	1	2	1							
2019 - 2023	No. of revisions	4	1	1	6	11	21	26	27	28					N=32
	No. of companies	14	1	3	4	2	1	5	1	1					
2019 - 2022	No. of revisions	3	2	1	1	2	5	7	11	12	22	27	28	29	N=100
	No. of companies	56	1	3	1	7	1	14	3	2	2	8	1	1	

Period for Setting Social Goals

Regarding the status of setting social targets for Indian companies, as shown in Table 3, the number of companies setting numerical targets increased by 3.42 times between 2019 and 2022. Although the percentage of companies that have set targets is smaller than in Table 1, the trend toward setting quantitative targets for social items has been increasing over the past few years, although the average target-setting period has increased or decreased.

Looking at Table 4, a tendency for companies to extend their social goals can be read. As in Table 2, the top four rows compare the increase or decrease in the target setting period with the previous year, and the bottom two rows compare the increase or decrease from 2019, the first year of tabulation, respectively. The shaded cells indicate the number of firms whose target setting did not change during the period, while the cells to the right of these cells indicate the period of the revised target. Table 4 shows that, on average, 16.1% of the companies that have disclosed their targets for two consecutive years have extended their social targets each year. Compared to Table 2, however, in most cases, the extension period is less than 10 years, and these extensions do not appear to be far outside the normal revision cycle.

Table 3: Status of Indian Companies' Social Goal Setting Periods

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	43 (17.2%)	4.13	5.69	2	0	32	3.41	12.70	18 (41.8%)
2020	70 (28.0%)	3.91	3.76	3	0	33	4.44	26.95	40 (57.1%)
2021	122 (48.8%)	4.44	2.50	4	1	19	2.99	12.21	70 (57.4%)
2022	147 (58.8%)	5.14	3.03	5	1	20	2.44	8.73	79 (53.7%)
2023	43 (17.2%)	4.87	3.43	6	1	21	2.46	9.93	27 (62.7%)

Impact of Manufacturing and Non-manufacturing Industries on the Duration of Environmental and Social Goals

The status of setting environmental and social targets is analyzed by dividing the sample into manufacturing (N=151) and non-manufacturing (N=99) industries based on the major categories of the NIFTY industry classification. First, regarding environmental targets, a comparison of Tables 5 and 6 shows that a larger percentage of manufacturing firms disclosed numerical targets than non-manufacturing firms, indicating that they are proactively setting environment-related numerical targets. However, non-manufacturing firms tended to set longer target periods than manufacturing firms, and Wilcoxon rank sum tests indicated that manufacturing firms set significantly shorter target periods than non-manufacturing firms in 2023 ($p < 0.05$), 2022 ($p < 0.01$), and 2021 ($p < 0.01$). The results indicated that.

Table 4: Revision of Social Goals of Indian Companies

2019-2020	No. of revisions				-1	1	1	2	4	7								N=33
	No. of companies				27	1	1	1	2	1								
2020-2021	No. of revisions				-1	1	1	2	3	4								N=55
	No. of companies				45	1	4	2	1	2								

2021-2022	No. of revisions				-1	1	9	29									N=97
	No. of companies				92	2	2	1									
2022-2023	No. of revisions				-1	3	1	6	9								N=36
	No. of companies				29	3	2	1	1								
2019-2023	No. of revisions				-4	3	2	1	0	6	26						N=9
	No. of companies				2	1	1	2	1	1	1						
2019-2022	No. of revisions				-3	1	0	1	2	3	5	6	7	27			N=33
	No. of companies				16	2	3	2	4	1	1	1	2	1			

The rightmost column shows the number of companies that have set 2025 targets and the percentage of companies that have set 2025 targets among those that have set numerical targets. Nearly half of the companies in the manufacturing industry set their environmental targets for the target period for the year 2025, which is a good time frame.

Next, regarding social goals, a less pronounced trend could not be read when comparing Tables 7 and 8. Although the number of firms setting numerical targets for social items increased for both manufacturing and non-manufacturing firms, there was no significant difference between the two. Based on the Wilcoxon rank-sum test for the period for which goals were set (results omitted), there was no significant difference between the manufacturing and non-manufacturing firms for each year. Similarly, there was no significant difference in the percentage of firms setting 2025 targets. As in the case of environmental targets, nearly half of both manufacturing and non-manufacturing firms had set a target for the year 2025, which is a good time frame.

Table 5: Status of Environmental Targets set by Indian Companies (Manufacturing, N=151)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	80 (52.9%)	4.13	5.69	2	0	32	3.41	12.70	49 (61.2%)
2020	92 (61.0%)	3.91	3.76	3	0	33	4.44	26.95	49 (53.2%)
2021	108 (71.5%)	4.44	2.50	4	1	19	2.99	12.21	53 (49.0%)
2022	120 (79.4%)	5.14	3.03	5	1	20	2.44	8.73	55 (45.8%)
2023	40 (26.4%)	4.87	3.43	6	1	21	2.46	9.93	17 (42.5%)

Table 6: Status of Environmental Targets set by Indian Companies (Non-manufacturing, N=99)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	41 (41.4%)	4.13	5.69	2	0	32	3.41	12.70	18 (43.9%)
2020	49 (49.4%)	3.91	3.76	3	0	33	4.44	26.95	18 (36.7%)
2021	46 (46.4%)	4.44	2.50	4	1	19	2.99	12.21	12 (26.1%)
2022	57 (57.6%)	5.14	3.03	5	1	20	2.44	8.73	12 (21.0%)
2023	13 (13.1%)	4.87	3.43	6	1	21	2.46	9.93	3 (23.1%)

Table 7: Status of Social Goals set by Indian companies (Manufacturing, N=151)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	28 (18.5%)	4.13	5.69	2	0	32	3.41	12.70	10 (35.7%)

2020	41 (27.1%)	3.91	3.76	3	0	33	4.44	26.95	19 (46.3%)
2021	76 (50.3%)	4.44	2.50	4	1	19	2.99	12.21	42 (55.2%)
2022	97 (64.3%)	5.14	3.03	5	1	20	2.44	8.73	53 (54.7%)
2023	29 (19.3%)	4.87	3.43	6	1	21	2.46	9.93	18 (62.1%)

Table 8: Status of Social Goals set by Indian companies (Non-manufacturing, N=99)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	15 (15.1%)	4.13	5.69	2	0	32	3.41	12.70	8 (53.3%)
2020	29 (29.2%)	3.91	3.76	3	0	33	4.44	26.95	21 (72.4%)
2021	47 (47.4%)	4.44	2.50	4	1	19	2.99	12.21	28 (59.5%)
2022	50 (50.6%)	5.14	3.03	5	1	20	2.44	8.73	27 (54.0%)
2023	14 (14.1%)	4.87	3.43	6	1	21	2.46	9.93	9 (64.3%)

Industry Type for the Period of Setting Environmental and Social Goals

Next, the classification of industries as manufacturing and non-manufacturing firms in (3) are analyzed in more detail, and industries are classified into 11 categories: electricity and gas, materials, machinery, food, transportation equipment, pharmaceuticals, telecommunications, other manufacturing, finance, services, and construction, to analyze trends in goal setting. Table 9 shows descriptive statistics on the status of setting environmental targets for these 11 industries. Companies in the construction industry tended to set the longest-term goals, averaging 25.80 years, which is about twice as long as the average goal period of companies in the food industry, which is the next longest. At the same time, the disclosure ratio was 66.7%, the second highest after transportation equipment, indicating that they tend to actively set long-term targets.

Similar to construction and food, companies in transportation equipment, finance, machinery, and services tended to set longer-term goals. The disclosure rate was high in the construction, transportation equipment, and machinery industries, but low in the food, finance, and services industries. Thus, the length of time required to set targets and the level of willingness to disclose were not uniform across industries.

Table 10 shows descriptive statistics on the status of setting social targets for these 11 industries. Companies in the construction industry tended to set the longest-term goals, with an average of 7.24 years. At the same time, the disclosure rate was 46.7%, the highest after Electricity & Gas and Transportation Equipment, indicating that they actively disclose information. However, while there were some differences in the disclosure rates for social targets among the other industries, there were no significant differences in the target periods.

Table 9: Environmental Targets set by Industry in 2019-2023 (N=1, 155)

	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis
Electricity & Gas	13 (52.0%)	8.23	4.8	11	0	14	-0.38	-1.6
Raw materials	123 (54.7%)	6.46	8.76	3	-1	35	2.21	3.73
Machinery	162 (66.1%)	9.26	10.49	5	-1	35	1.45	0.79
Food	24 (36.9%)	13.00	14.46	4	-1	35	0.55	-1.64
Transportation equipment	34 (68.0%)	12.18	14.33	4	-1	34	0.69	-1.51
Pharmaceuticals	25 (55.6%)	4.36	3.25	4	1	13	1.61	1.59
Telecommunications	34 (52.3%)	5.38	6.16	4	-1	32	2.46	7.63

Other Manufacturing	15 (50.0%)	6.67	5.74	5	0	13	0.01	-2.01
Financial Services	41 (39.0%)	12.15	12.17	5	0	35	0.87	-0.81
Service	80 (35.6%)	9.89	11.48	4	0	35	1.26	-0.06
Construction	30 (66.7%)	25.80	12.6	32	4	38	-0.9	-1.03

Table 10: Social Goals set by Industry in 2019-2023 (N=1, 155)

	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis
Electricity & Gas	13 (52.0%)	2.54	1.05	2	1	4	0.11	-1.39
Raw materials	84 (37.3%)	2.94	2.26	3	0	12	1.78	4.49
Machinery	83 (33.9%)	3.46	4.21	2	-1	20	2.54	6.27
Food	19 (29.2%)	4.05	2.88	4	0	11	0.57	-0.47
Transportation equipment	24 (48.0%)	4.92	4.06	3	1	14	1.21	-0.21
Pharmaceuticals	13 (28.9%)	2.38	1.12	2	0	4	-0.39	-0.55
Telecommunications	21 (32.3%)	2.62	2.71	2	-1	9	0.94	-0.13
Other Manufacturing	9 (30.0%)	2.89	1.45	3	0	5	-0.48	-0.66
Financial Services	38 (36.2%)	2.58	1.29	3	0	5	-0.1	-0.81
Service	58 (25.8%)	2.97	2.45	3	0	13	2.12	6.03
Construction	21 (46.7%)	7.24	8.35	5	1	32	2.26	3.86

Status of Target Setting by Companies Responding to the SDGs

SDG's being articulated as a strategic tool for company's decision making, necessitates the need to align them with corporate strategy. In response to this the

commitment of Indian companies to the SDG's is analyzed. The number of companies issuing CSR-related reports has been on the increase for nearly 20 years. Among them, the number of SDG-compliant companies has been increasing steadily since 2020, and in 2022, one out of every four companies disclosing CSR reports mentioned the SDGs in their reports (Table 11).

Status of Indian Companies' Commitment to the SDGs

Table 12 shows the percentage of companies mentioning the SDGs that are committed to each of the 17 targets, based on 2022 disclosure data.

Looking at the characteristics of the 17 goals, "Goal 12: Responsible consumption and production " was mentioned most frequently (99 companies) as an individual goal because it is the most clearly linked to corporate business activities. This was followed by "Goal 13: Take concrete measures to address climate change" (91 companies), which was mentioned frequently as an SDG goal, indicating that climate change is of particular interest to companies among social issues. In addition, "Goal 8: Work for job satisfaction and economic growth" (89 companies), "Goal 3: Health and well-being for all" (87 companies), and "Goal 5: Achieve gender equality" (80 companies), which relate to working conditions and human rights both within the company and through the supply chain, were also addressed.

Impact of Commitments to the SDGs on the Timeframe for Setting Environmental and Social Goals

Finally, the sample is divided into SDG-compliant and non-SDG-compliant firms and the status of setting environmental and social goals for each group is compared. Here, a subsample of firms that were SDG compliant in 2022 (62 firms, or 24.9%) and firms that were not SDG compliant (188 firms, or 75.1%) is set up. First, a comparison of the percentage of companies that have set numerical targets for environmental goals (Tables 13 and 14) shows that the average percentage of companies that are SDG-compliant is about 20% higher than that of companies that are not SDG-compliant, as compared to 2019. Although there is no statistically

significant difference in the Wilcoxon rank-sum test of the target-setting period (results omitted), SDG-compliant companies tend to set targets for a longer period. Next, a comparison of the percentage of companies that have set numerical targets for social goals (Tables 15 and 16) shows that the average percentage of companies that have responded to the SDGs is about 35% higher than that of companies that have not responded to the SDGs since 2019. The difference is particularly large from 2022 onwards, suggesting that socially oriented companies are also aligning with the global platform of SDG's. Although the Wilcoxon rank-sum test of the timeframe for setting goals showed no statistically significant difference (results omitted), SDG-compliant companies tended to set goals for shorter timeframes.

Table 11: Status of Indian companies' Response to the SDGs

Year of report disclosure	2020	2021	2022	2023
Number of companies that respond to SDGs	7	61	169	31

Table 12: Status of Companies' Response to the 17 SDGs

Goal 1: End poverty	21.1%
Goal 2: Zero hunger	23.0%
Goal 3: Health and well-being for all	54.0%
Goal 4: Quality Education for everyone	39.8%
Goal 5: Achieve Gender equality	49.7%
Goal 6: Bring safe water and toilets to everyone	37.9%
Goal 7: Energy to Everyone and clean	44.7%
goal 8: Job satisfaction and economic growth	55.3%
Goal 9: Build a foundation for Industry and technological innovation	52.2%
Goal 10: Eliminate Inequality between people and countries	31.1%
Goal 11: Creating a city where people can continue to live	45.3%
Goal 12: Responsibility to create Responsibility to use	61.5%
Goal 13: Concrete measures to address climate change	56.5%

Goal 14: Protect the richness of the ocean	30.4%
Goal 15: Protect the richness of the land	43.5%
Goal 16: Bring Peace and Justice to All	33.5%
Goal 17: Achieve Your Goals in Partnership	36.0%

Table 13: Status of environmental targets set by Indian companies (SDGs-compliant companies, N=62)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	37 (59.7%)	10.39	10.16	7	2	37	1.82	1.99	20 (54.0%)
2020	39 (62.9%)	9.57	9.94	6	1	36	1.79	2	19 (48.8%)
2021	47 (75.9%)	12.21	12.47	5	2	40	1.19	-0.35	24 (51.0%)
2022	53 (85.4%)	13.46	13.65	4	1	39	0.79	-1.26	24 (45.2%)
2023	17 (27.5%)	18.2	15.33	13	1	38	0.06	-2.02	6 (35.2%)

Table 14: Status of Environmental targets set by Indian companies (non-SDGs-compliant companies, N=188)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	85 (45.2%)	9.57	9.74	7	2	37	2.28	3.69	47 (55.2%)
2020	102 (54.3%)	10.1	10.28	6	1	36	1.81	1.91	47 (46.1%)
2021	107 (56.9%)	11.94	10.9	5	1	35	1.3	0.28	42 (39.2%)
2022	123 (65.5%)	12.45	11.15	9	1	34	1.06	-0.29	42 (34.2%)

2023	37 (19.6%)	13.67	11.99	13	2	33	0.72	-1.1	13 (35.2%)
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Table 15: Status of Social Goals set by Indian Companies (SDGs-compliant companies, N=62)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	14 (22.5%)	6.33	1.72	7	3	8	-1.06	-0.48	8 (57.1%)
2020	18 (29.0%)	5.94	1.84	6	2	11	0.56	2.03	11(61.1%)
2021	36 (58.0%)	5.09	1.57	5	2	10	1.36	3.67	24 (66.7%)
2022	47 (75.9%)	4.71	2.63	4	2	14	2.27	5.11	29 (61.7%)
2023	16 (25.9%)	3.43	1.55	3	1	8	1.61	2.84	12 (75.0%)

Table 16: Status of social goals set by Indian companies (non-SDGs-compliant companies, N=188)

Fiscal year	No. of companies	Average	S.D.	Median	Minimum value	Maximum value	Skewness	Kurtosis	2025 Target companies
2019	31 (16.5%)	5.67	3.97	5	2	22	2.45	7.83	10 (32.3%)
2020	51 (27.2%)	6.21	3.35	6	2	21	2.34	7.13	28 (54.9%)
2021	86 (45.7%)	5.58	2.81	5	2	20	2.82	9.9	46 (53.5%)
2022	100 (53.1%)	5	4.2	4	1	34	4.39	24.37	50 (50.0%)
2023	27 (14.3%)	6.08	6.87	3	2	33	2.63	6.89	14 (56.0%)

In this paper, the status of goal-setting by Indian companies in terms of the circumstances under which they set sustainability goals, for environment-related and social-related items, respectively were analyzed. First, the existence of numerical targets was looked for in CSR reports, and among these, the items that set the

longest-term targets were extracted, and the length of these targets over the period from 2019 to 2023 was compared. The following trends in the setting of sustainability targets by Indian companies were revealed.

First, the number of companies setting numerical targets for environmental related goals has been increasing, showing their commitment towards improved and consensus-based methodology of target setting like SBT's. Starting from year 2019 about half of the companies that had set environmental goals had activity targets with year 2025 as the deadline. As we move on to next years, majority of companies are setting shorter term targets. In a way, that's a positive sign because SBT's advocate short term goal setting as a better way to reduce/combat environmental concerns. Most of the companies continued to plan their sustainability activities for a breakthrough year such as 2025.

During the period from 2019 to 2023, about half of the companies revised their goal-setting periods. Although the number of companies revising their long-term goals is not very frequent, as only about 10-20% of companies revise their long-term goals each year. With carbon taxes more and more on the horizon and companies needing to either pay them or invest to avoid them, companies reporting to CDP are trying to make some form of adjustment to their environmental goals. Most companies that revised their targets seem to implement improved methodologies, especially adopting SBTI's, which resulted in adjusted baselines.

Next, regarding the status of target setting for social-related items, in 2019, less than 20% of the companies registered in the NIFTY Large Midcap 250 Index had set numerical targets, but over the next three years, the number more than tripled, and the number of companies setting numerical targets for social-related items also suddenly increased. Similar to the situation with the setting of targets for environment-related items, the majority of these companies set activity targets targeting 2025, but the pace of revision over the period from 2019 to 2023 was

slower than that for environment-related targets. Many companies still set only short-term targets, and only a few set very long-term targets. As a result, there was not much change in the distribution of target-setting periods between 2019 and 2023. In response to these environment- and social-related targets, some industry-specific characteristics were also observed. First, manufacturing companies were more likely than non-manufacturing companies to disclose numerical environmental targets for environment-related items, but non-manufacturing companies were significantly longer than manufacturing companies in setting long-term targets for environment-related items. By industry, companies in the construction category in particular tended to set the longest-term goals and were more proactive in disclosing numerical targets.

On the other hand, there were no significant differences between manufacturing and non-manufacturing companies in terms of the percentage of companies disclosing numerical targets and the length of time for which long-term targets have been set. As in the case of environment-related targets, companies in the construction category tended to disclose numerical targets more aggressively and set longer-term targets than companies in other industries, but there were no significant differences among other industries.

In addition to clarifying the status of Indian companies' commitments to the SDGs, this paper also analyzes whether these commitments have an impact on the status of companies' setting of long-term goals. As of 2022, 161 of the companies listed on the National Stock Exchange had indicated their commitment to the SDGs. In addition, when the status of commitment to each of the 17 goals as of 2022 was examined, many companies showed commitment to Goals 8, 12, and 13, which are highly relevant to the company's core business. However, the study did not find a relationship between the status of these commitments and the status of corporate sustainability goals.

Conclusions

Thus, through this study, it was shown that, first, First, the number of companies setting numerical targets for environmental related goals has been increasing, showing their commitment towards improved and consensus-based methodology of target setting like SBT's. Compared to medium-term management plans, which are usually related to business activities, sustainability-related targets are often set for a convenient fiscal year, and the survey results suggest that the targets are not revised regularly. Therefore, although a certain degree of consideration is given to these goals as activity targets, their substantiality as management controls remains open to question.

During the period from 2019 to 2023, about half of the companies revised their goal-setting periods. Although the number of companies revising their long-term goals is not very frequent, as only about 10-20% of companies revise their long-term goals each year. With carbon taxes more and more on the horizon and companies needing to either pay them or invest to avoid them, companies reporting to CDP are trying to make some form of adjustment to their environmental goals. Most companies that revised their targets seem to implement improved methodologies, especially adopting SBTI's, which resulted in adjusted baselines.

Second, for social-related items, companies indicated that they are developing medium-term sustainable management centered on 2025 targets. Compared to environment-related items, items related to human rights and labor environment are often less suited to quantitative management, and as of 2019, only a limited number of companies had set numerical targets. In terms of future projections and ideal social visions, it was also indicated that activity targets were set over a relatively short period for social aspects that are relatively difficult to envision.

Fourth, the impact of industry on the setting of sustainability goals and compliance with SDG's was presented. Companies in the construction, transportation

equipment, and machinery industries have long target periods and have high disclosure rates, while companies in the finance, food, and service industries have low disclosure rates. It is often suggested in sustainability research that industry-specific differences influence corporate practices. These are often noted to influence the willingness of companies to disclose information through the process of legitimization. Previous studies have verified that the business contribution to the achievement of the 2030 agenda is partial, and sometimes as a legal requirement (DasGupta et al., 2022) or as a self-regulatory mechanism (Gerged & Almonaster, 2021). So the type of industry in which the firm operates (Lee & Hess, 2022), very much influences their initiatives to one or other SDG's (Matteucci, 2020), but not entirely. On an average Goal 12 and 13 pertaining to 'responsible production and consumption' and 'biodiversity engagement' has been mentioned most frequently. Results are in confirmation with the previous studies done by Adler et al., (2017) and Bohnett et al., (2022), where the SDG that has been analyzed the most with the business strategy is SDG 13.

Incorporating corporate sustainability goals into corporate strategy and their regular revision provides competitive advantage and creates sustainable and shared value for the organization, thereby building reputation and brand value of the organization.

This study analyzed the status of setting sustainability goals in two main categories: environmental and social. As a background to the practice of setting such goals, more consensus-oriented and science-oriented approaches to setting sustainability goals are required, such as the outside-in approach shown in the SBT and SDG Compass, while engineering analysis and technology development in the Journal of Cleaner Production are also being promoted. For prospects, it is necessary to develop an analysis of the determinants of goal setting.

Limitations and Future Research Implications

The study uses only descriptive statistics to summarize the characteristics of the data set. Inferential statistics would provide better conclusions and help to make

predictions about the sample. Given the present study is based on a sample of 250 companies, it would be valuable to conduct future research using a larger sample to better reflect the scenario of sustainability goal setting and also compliance with SDG's.

The work can be further extended by analyzing the effect of environmental, social and governance factors on the financial performance of the companies. Considering the fact that some studies do suggest that social or environmental commitment of the company are merely tools to improve their image, it would be worthwhile to study the extent to which the socially responsible actions of firms actually contribute to achievement of one or more SDG's. Insights from this study can be used by companies to implement measures to address environmental and social issues.

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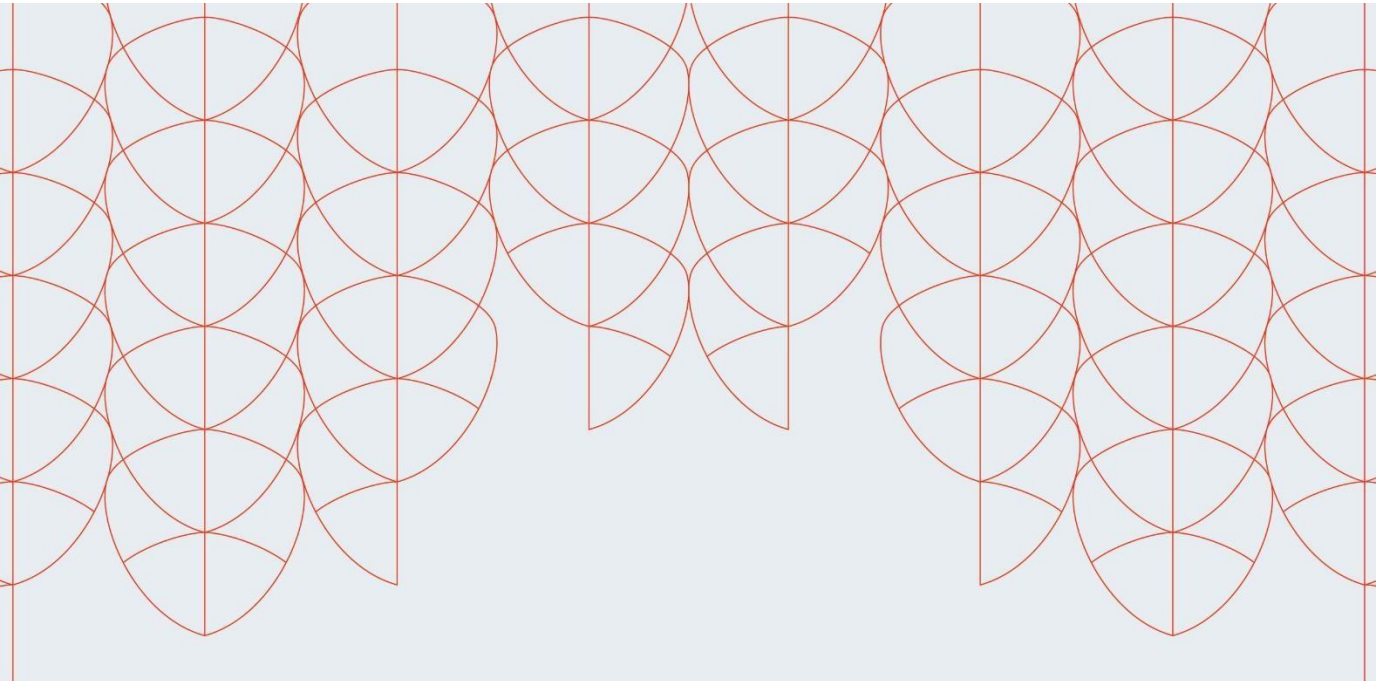
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