JBRI
Journal of Business Research and Insights

ISSN 3051-4770 (Print) ISSN 3051-5491 (Online)

Journal of Business Research and Insights

VOLUME 10, ISSUE I
JUNE 2024

Faculty of Management Studies and Commerce
University of Sri Jayewardenepura
Sri Lanka

Journal of Business Research and Insights

Volume 10 Issue I, June 2024

ISSN (Print) 3051-4770

ISSN (Online) 3051-5491

Reprint and Permissions

jbri@sjp.ac.lk

JBRI Web Page: https://www.journals.sjp.ac.lk/JBRI

Web Administrator and Cover Page Designed by

Mr. Prabhasara Athurupane, Department of Information Technology, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Sri Lanka

Funded and Published by:

Faculty of Management Studies and Commerce
University of Sri Jayewardenepura
Nugegoda
Sri Lanka.
Tel: +94 112803343
Fax: +94112758800

Journal of Business Research and Insights

Volume 10 Issue I, June 2024

Contents

Editorial Note

Dear Readers, it is with immense pleasure that we present the 10th volume, Issue 01, of Journal of Business Research and Insights, a bi-annual publication by the Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Sri Lanka. This publication formerly known as Vidyodaya Journal of Management, retains its original name for volumes 01 through 09. We are grateful for the contributors, including authors, reviewers, editors, and all the supportive staff, for the commendable contributions.

Regarding the paper contributions to this successful publication, the first article addresses the interdependencies between the stock markets of Sri Lanka and Asian markets. The study uses the EGARCH (1,1) model and considers the period of 2015-2021. The article considers several countries, including India, China, Pakistan, and Japan. The findings show a notable break in December 2019 reflecting the shifts due to COVID-19.

The second article examines the intentions and social entrepreneurship among non-STEM university students' in Sri Lanka addressing a particularly timely and relevant topic. The findings present that under socio-economic constraints, prevailed in the country, those undergraduates are more likely to make self-benefiting choices, hence inclined towards self-employment motivation. They suggest considering the insights into developing the educational reforms in the country.

The third article explores the usefulness and ease of use of social media technology such as Facebook as a tool for continuous assessment at a State University, Sri Lanka. The findings indicate that while students found the technology useful, they were less likely to consider it easy to use. This research attempted to contribute to the debate on social media and education.

The fourth article investigates the determinants of profitability in Nepalese non-life companies during two specific periods. The study identified earnings per share and company size as key factors; thus, they suggest considering these findings in refining profitability strategies for non-life insurance firms in Nepal.

The fifth paper aims at the Northern Province of Sri Lanka, highlighting how third-party logistics and technology adaptation can enhance supply chain

robustness and maximize farmers' rewards. The results reveal positive impacts, suggesting new strategies for enhancing agricultural activities.

The sixth paper examines opportunities for women in upper management positions, addressing gender disparities in Sri Lankan companies. The paper highlights the impact of cultural and political influences as well as the lack of female role models on these disparities.

Paper number seven's focus is on another interesting feature of the Z generation's engagement in some selected Sri Lankan large scale apparel industries. The study used 364 employees from the Z generation and found significant positive impacts from both individual and organizational antecedents. Therefore, the results offer guidance for developing policies to enhance engagement among young employees in the sector.

The eighth paper explored whether financial risk tolerance influences the willingness of university students in Sri Lanka to invest in cryptocurrency. Following the theory of planned behavior, the study finds that attitudes, subjective norms, and perceived behavior control significantly influence the intention but not the financial tolerance. The insights from this research are important to policymakers, shedding light on the driving factors behind cryptocurrency investment behavior in emerging markets.

In conclusion, we invite you to enjoy reading and harness the knowledge shared and contribute to further research in the realm of business and management, thus broadening our understanding and insights within this dynamic field to ensure a better future.

Warm regards,

Co-Editors in Chief

Prof Nishani Wickramaarachchi

Dr Dinesha Siriwardhane

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Exploring Stock Market Interdependencies: Cross-Spillover Effects between Sri Lanka and Asian Markets

B M K S Balasuriya[a], P A N S Anuradha[b*]

a University of Helsinki, Finland

b University of Sri Jayewardenepura, Sri Lanka

To link to this article: http://doi.org/10.31357/jbri.v10i1.7549

ARTICLE INFO

***Article History**:*

Received 02 April 2024
Revised 07 June 2024
Accepted 13 June 2024

Keywords

Stock return spillover, Cross-Volatility Spillover, Asian stock markets, EGARCH model, Structural Breaks.

To cite this article: Balasuriya, B, M, , K, S., Anuradha P, A, N, S., (2024), Exploring Stock Market Interdependencies: Cross-Spillover Effects between Sri Lanka and Asian Markets,10:01, 01-25, DOI: 10.31357/jbri.v10i1.7549.

[*]Corresponding author. Tel: +94714414068
Email: anuradha@sjp.ac.lk
https://orcid.org/0000-0003-1105-455X
a) https://orcid.org/0009-0005-0265-8118

ABSTRACT

Sri Lanka holds a pivotal position in the Indian Ocean, fostering significant economic ties with South Asia, the Middle East, and Africa. This study examines the financial linkages and stock market behavior between Sri Lanka and key Asian economies (India, China, Pakistan, and Japan) from 2015 to 2021. Using daily stock prices from Bloomberg.com, the analysis employs the EGARCH (1,1) model to assess return and volatility spillovers. Results reveal negative return spillovers from India to Sri Lanka and cross-volatility spillovers from India, China, Pakistan, and Japan to Sri Lanka. Conversely, Sri Lanka exhibits negative return spillovers to India and Pakistan and cross-volatility spillovers to China and Japan. Sub-analysis identifies structural breaks in December 2019, indicating shifts in spillover dynamics pre- and post-Covid-19. These findings offer insights for investors, policymakers, fund managers, and governments to optimize investment strategies, formulate stable policies, and enhance portfolio diversification.

Background

Understanding the stock returns and volatility cross-spillover effect among countries is crucial in financial and economic studies. This phenomenon occurs when events in one country impact another country's economy, creating a ripple effect. Engle et al. (1990) describe how the equity market of one country can influence the behavior of another's market. While international financial markets are interconnected, there is no universal definition for their linkages (Perera & Wickramanayaka, 2012; Wang et al., 2005). The spillover effect is categorized into 'own' and 'cross' volatility spillover, each analyzed through hypotheses such as the meteor shower and heatwave hypotheses (Engle et al., 1990). This effect may manifest bidirectionally, unidirectionally, or not at all among equity markets (Hung, 2019). Various factors contribute to stock returns and volatility cross-spillover, including herding effects, trade linkages, financial ties, and asymmetry of information (Withanage & Jayasinghe, 2017; Banerjee & Guhathakurta, 2020). Regional and world shocks also play a significant role (Ng, 2000). Emerging economies like those in Asia have increasingly become focal points due to their growing importance and vulnerability to spillovers (Yarovaya et al., 2016).

The economies of China, India, Japan, and Pakistan hold significant sway in the global and Asian regions, ranking among the top in terms of Gross Domestic Product (GDP). Recent years have seen notable Foreign Direct Investment (FDI) flows from China and India into the Colombo Stock Exchange (CSE), underscoring the interconnectedness of these economies. Bilateral agreements between Sri Lanka and these nations also play a crucial role in trade dynamics and the country's Balance of Payments (BOP), influencing the performance of the CSE. However, the COVID-19 pandemic has disrupted global equity markets, including those of the aforementioned countries, impacting economic stability and potentially exacerbating poverty in developing nations. Recognizing the significance of these factors, it becomes imperative to analyze bidirectional stock returns and volatility spillover effects between these nations and the CSE. Understanding such dynamics aids investors in managing their portfolios and financial objectives, while also assisting policymakers in mitigating investment risks. To conduct this analysis, we employ the EGARCH (1,1) model, a method utilized by a few scholars in Sri Lanka and internationally, particularly in assessing stock returns and volatility spillovers. Furthermore, we investigate structural breaks, particularly focusing on the December 2019 period, coinciding with the onset of the COVID-19 pandemic. This examination provides valuable insights into the resilience and vulnerability of the CSE amidst global economic shocks. Despite this, research on the topic, particularly in Sri Lanka, remains limited (Gulzar et al., 2019; Lingaraja et al., 2020). Utilizing econometric models like EGARCH can provide insights into stock market behavior, yet their application in Sri Lanka is scarce (Thangamuthu et al., 2022). This study fills this gap by examining stock returns and volatility spillover effects between Sri Lanka and other Asian countries using the EGARCH model.

Selected countries including India, China, Pakistan, and Japan were chosen due to their significant economic ties with Sri Lanka (Central Bank of Sri Lanka, 2021). Additionally, the study investigates

structural breaks, especially related to the COVID-19 pandemic, which had substantial impacts on global equity markets (Thangamuthu et al., 2022). The study's objectives include providing valuable insights for investors, policymakers, and fund managers to make informed decisions regarding international portfolio diversification, policy formulation, and portfolio rebalancing. Ultimately, the findings aim to benefit international and local stakeholders involved in financial markets across the selected countries. The findings of this study hold substantial importance for Sri Lanka, offering valuable insights into investment strategies and risk management. By comprehensively understanding the interplay between international markets and the CSE, stakeholders can better navigate the complexities of global economic dynamics.

Following this introduction, the subsequent section will delve into the related literature and the development of hypotheses. Methodology, data analyses, and findings will then be sequentially presented. The final sections will consist of the conclusion, followed by a comprehensive discussion of the findings.

Literature review

The stock returns and volatility cross-spillover effect, as described by Withanage and Jayasinghe (2017), refers to the propagation of market fluctuations and economic shocks among countries due to interconnections and trade relationships. Extensive research has been conducted on this phenomenon, covering both developed and emerging markets. Engle & Ng (1993) found no cross-spillovers in foreign exchange markets between New York and Japan, contrasting with Hamao et al. (1990), who identified spillovers from New York and London to Tokyo. Koutmos and Booth (1995) discovered volatility transmission from New York to Tokyo and London, highlighting discrepancies in findings that may arise from different model specifications or sample periods, as noted by Karolyi (1995). Negative innovations in one market have been shown to increase volatility in subsequent markets more than positive innovations, as revealed by King & Wadhwani (1990).

In Europe, Fratzscher (2002) demonstrated increased market integration post-European Monetary Union, while Engle and Susmel (1993) found specific patterns of volatility in international markets. The dominance of the US stock market in global volatility spillovers was emphasized by Yang, Zhou, and Cheng (2019), while studies have also explored markets in Central and Eastern European (CEE) and Islamic stock indices. Volatility spillovers can result from asymmetric news impact (Campbell and Hentschel, 1992), as analyzed by Banerjee and Guhathakurta (2020) through network analysis. Additionally, studies have addressed volatility transmission during crises, such as financial contagion channels identified by Forbes & Rigobon (2002), and transmission during economic crises examined by Gregorio and Valdes (2001).

Ng (2000) analyzed return and volatility spillovers from Japan and the US to Pacific-Basin markets, attributing volatility spillovers to currency fluctuations, market liberalization, and trade size. Miyakoshi (2003) found US influence on returns and the Japanese influence on volatility in Asian equity markets. Wei et al. (1995) explored spillover effects between developed and emerging markets, concluding that emerging markets' openness doesn't determine their susceptibility. Wang et al., (2005) identified

stronger volatility spillovers than price spillovers between Greater China and developed markets, with bidirectional time-varying volatility interdependence. Hung (2019) observed strong spillovers from China to Southeast Asian markets, particularly during the sub-prime crisis. Panda and Nanda (2018) investigated return and volatility linkages among South American markets, finding strong connectivity among Argentina, Brazil, Chile, and Peru, while Venezuela exhibited the least connection.

Withanage and Jayasinghe (2017) explored volatility spillovers in South Asian stock markets, noting intraday volatility flow from Pakistan to Sri Lanka is stronger than from India. Kumar (2019) examined dynamic linkages among regional stock markets, reporting significant long-run co-integration between India and Pakistan and short-run bidirectional causality among India, Pakistan, and Sri Lanka. Yoshida (2011) studied volatility spillovers during financial crises, highlighting differences in linkages between crises and the direction of volatility causality. Kumar and Dhankar (2017) analyzed the impact of international financial instability on South Asian markets, finding significant short and long-run spillovers and high regional integration. Shahzad et al. (2016) investigated diversification potential across South Asian and European markets, identifying strong linkages among South Asian markets and between South Asian and US markets. Singhania and Prakash (2014) examined volatility cross-correlations in SAARC nations, rejecting the Efficient Market Hypothesis and indicating high integration with global markets.

Several studies have investigated the linkages between the CSE and other markets in the region. Jebran & Iqbal (2016) found bidirectional return spillover only between China and Japan, with unidirectional return transmission from Sri Lanka to India and China to Hong Kong, among others. They also observed bidirectional volatility flow between Hong Kong and Sri Lanka, China and Sri Lanka, and China and Japan. Wang et al., (2005) analyzed returns and spillovers from developed to emerging markets, discovering significant return spillovers from the US and Japan to Sri Lanka, with volatility spillovers, particularly from the US. Perera and Wickramanayake (2012) investigated financial integration among South Asian countries, finding bidirectional causality between them. In the Sri Lankan context, most studies are conducted by foreign scholars, and empirical models such EGARCH model is not fully tested for the local economy.

As delineated earlier, China, India, Japan, and Pakistan stand as formidable economies both globally and within the Asian region. These nations have notably invested in the CSE, with China and India emerging as key sources of Foreign Direct Investment (FDI) in recent years (2019-2021, Central Bank Sri Lanka, 2021). Consequently, fluctuations in the equity markets of these countries wield a discernible influence on the CSE. Bilateral agreements between Sri Lanka and these nations play a crucial role in managing the country's Balance of Payments (BOP) and trade dynamics, thereby impacting the equity market. Assessing bidirectional stock returns and volatility cross spillover effects between these nations aids investors in crafting their investment portfolios and financial objectives, offering manifold benefits to Sri Lanka as a nation.

Moreover, the Covid-19 pandemic has emerged as a global crisis, precipitating downturns in equity markets worldwide (Thangamuthu et al., 2022). Projections

indicate that this may exacerbate poverty in developing nations in the future (World Bank, 2024). Hence, while scrutinizing stock returns and volatility spillovers among these countries, it is imperative to examine whether structural breaks occurred in December 2019 due to the COVID-19 pandemic's onset.

The EGARCH model, widely utilized in research, offers a comprehensive framework for estimating the effects of market fluctuations, enabling analysis of both short and long-term relationships, and providing insights into the complexities of cross-spillover effects (Nelson and Foster, 1994). Initially, the Autoregressive Conditional Heteroscedasticity (ARCH) model, introduced by Engle (1982), aimed to analyze volatility swings in financial indices. Subsequent advancements included Bollerslev's VEC-GARCH model (1988) and extensions to ARMA models (Bollerslev, 1986; Engle & Kroner, 1995). Further developments such as the CCC-GARCH model (Bollerslev, 1990) and DCC model (Engle & Sheppard, 2001) addressed multivariate volatility. Methodologies expanded to include impulse response functions (IRFs) (Sims, 1980; Engle et al., 1990) and spillover indexes (Diebold & Yilmaz, 2012). Empirical models like GARCH, ARCH, and VAR have been extensively used to measure volatility. Research across developed and emerging markets has thoroughly explored these models in stock returns and volatility cross spillovers, emphasizing factors such as asymmetric news impact, market integration, and contagion during crises. The EGARCH (1,1) model is preferred in financial research due to its ability to capture asymmetric and leverage effects in volatility. Nelson (1991) introduced EGARCH, addressing asymmetric responses to shocks. Comparative studies, like Glosten et al. (1993), confirm EGARCH's superiority over GARCH and TGARCH in modeling volatility dynamics. Consequently, there remains a gap in applying new econometric models such as the EGARCH model in developing economies.

In this study, we employ the EGARCH (1,1) model (Nelson, 1991) to analyze stock returns and volatility cross-spillover effects. Additionally, we utilize dummy variables and interactive dummy variables to identify structural breaks occurring in December 2019. The utilization of the EGARCH (1,1) model in this context is noteworthy, as it has been scarcely employed by scholars in Sri Lanka and internationally to examine stock returns and volatility cross-spillover effects. Furthermore, there is limited evidence of its application in assessing structural breaks precipitated by the Covid-19 surge. Hence, the insights gleaned from this study hold significant relevance within the Sri Lankan context (Thangamuthu et al., 2022). Understanding the dynamics of these relationships and their impact on the CSE is essential for setting economic goals and policies in Sri Lanka. Analyzing return and volatility spillovers between Sri Lanka and other countries can offer valuable insights into the interconnectedness of regional markets and the transmission of financial shocks. Furthermore, it can provide policymakers and investors with crucial information about the risks and opportunities associated with cross-border investments and trade.

Development of Hypotheses

This study delves into the reciprocal dynamics of stock returns and cross-spillover effects between Sri Lanka and four

key nations: China, India, Pakistan, and Japan. China holds substantial sway over various economic facets of Sri Lanka, including foreign direct investments, direct investments, imports/exports, and debt, with a historical tie dating back to the Sino-Lanka Rubber Rice Pact of 1952. India's pivotal economic role in the region is emphasized, especially considering Sri Lanka's reliance on India for foreign direct investments, imports, and debt. The inception of trade linkages between India and Sri Lanka in 2000 through the India-Sri Lanka free trade agreement further solidified India's influence, making it a major source of foreign direct investment and dominating Sri Lanka's export earnings within the South Asian Free Trade Agreement (SAFTA). To substantiate the claim about significant FDI flows from China and India into the Colombo Stock Exchange (CSE), credible sources provide robust evidence. The Central Bank of Sri Lanka's Annual Report 2021 highlights that China and India are major FDI sources, particularly in infrastructure and manufacturing, indirectly influencing the CSE. UNCTAD's World Investment Report 2022 confirms substantial investments from these countries in infrastructure, energy, and industrial projects. The Sri Lanka Board of Investment (2022) (BOI) notes China as the largest investor, significantly contributing to the Colombo Port City and industrial parks, while India holds major stakes in retail, telecommunications, and manufacturing. The Asian Development Bank's South Asia Economic Report 2021 emphasizes the pivotal role of Chinese and Indian investments in Sri Lanka's economic landscape, impacting the CSE's performance and stability.

Similarly, Pakistan's significant trading partnership with Sri Lanka is examined, drawing from previous evidence of volatility transmission and co-integration. Japan's status as a major economic powerhouse significantly shapes Sri Lanka's economic landscape, particularly impacting foreign direct investments, direct investments in the Colombo Stock Exchange, imports, and debt. These inter-country partnerships and investments have profoundly affected various sectors in Sri Lanka, including trade, investment, infrastructure, and overall development. Thus, the study posits the following hypotheses to scrutinize the bidirectional relationships between the stock markets of these nations and Sri Lanka.

H_1: There is a stock return and cross-volatility spillover effect from China to Sri Lanka.

H_2: There is a stock return and cross-volatility spillover effect from Sri Lanka to China.

H_3: There is a stock returns and cross volatility spillover effect from India to Sri Lanka.

H_4: There is a stock return and cross-volatility spillover effect from Sri Lanka to India.

H_5: There is a stock returns and cross volatility spillover effect from Pakistan to Sri Lanka.

H_6: There is a stock return and cross-volatility spillover effect from Sri Lanka to Pakistan.

H_7: There is a stock return and cross-volatility spillover effect from Japan to Sri Lanka.

H_8: There is a stock return and cross-volatility spillover effect from Sri Lanka to Japan.

Align with sub-objectives the following hypotheses were tested to check the structural breaks between two periods of pre and post Covid-19 during December 2019,

from China, Shanghai Stock Exchange (SSE), India, Bombay Stock Exchange (BSE), Pakistan, Karachi Stock Exchange (KSE), and Japan, Tokyo Stock Exchange (TSE) to CSE.

H_9: Structural breaks in the CSE are influenced by COVID-19-related fluctuations in the SSE from December 2019.

H_{10}: Structural breaks in the CSE are influenced by COVID-19-related fluctuations in the BSE from December 2019.

H_{11}: Structural breaks in the CSE are influenced by COVID-19-related fluctuations in the KSE from December 2019.

H_{12}: Structural breaks in the CSE are influenced by COVID-19-related fluctuations in the TSE from December 2019.

Methodology

Our research adopts a positivist approach and employs quantitative methods to examine stock market behavior. We utilize the EGARCH (1,1) model alongside secondary data to analyze daily stock indices in Sri Lanka, China, India, Pakistan, and Japan spanning from January 2015 to July 2021, comprising 1746 observations for each market[1]. This model is chosen for its ability to capture the asymmetric impact of shocks on volatilities. Data analysis is facilitated by EViews 12 software. The data is sourced from Bloomberg.com, with selected indices including the All-Share Price Index (ASPI) for Sri Lanka, the Shanghai Stock Exchange Composite Index (SSE) for China, the S&P BSE Sensex Index for India, the Karachi Stock Exchange 100 (KSE 100) Index for Pakistan, and the Nikkei 225 Index for Japan. Daily returns are calculated using the natural logarithm of the price ratio (P_1-P_0) /P_0) (Kumar, 2019). The study explores structural breaks by dividing the period into pre-Covid-19 (June 2015 to December 2019) and post-Covid-19 (January 2020 to June 2021) sub-periods as a sub-analysis. For this analysis also EGARCH (1,1) model has been employed. The EGARCH (p,q) model introduced by Nelson (1991) is formulated as follows:

$$R_t = \alpha_0 + \sum_{i-1}^{r} \alpha_i R_{t-i} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots [1]$$

$$\varepsilon_t|\Omega_{t-1} \sim N(0, \sigma_t^2) \dots\dots\dots\dots\dots\dots\dots\dots\dots [2]$$

$$\log(\sigma_t^2) = a_0 + \sum_{i-1}^{q} a_i f(z_{t-i}) + \sum_{i-1}^{p} b_i \log(\sigma_{t-i}^2) \dots\dots\dots\dots\dots\dots\dots\dots [3]$$

$$f(z_{t-i}) = \theta\, z_{t-i} + [|z_{t-i}| - E(|z_{t-i}|)] \dots\dots\dots\dots\dots\dots\dots\dots [4]$$

$$E(|z_{t-i}|) = [\frac{2}{\pi}]^{0.5} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots [5]$$

$$\frac{\partial f_{(z_t)}}{\partial z_t} = \{1 + \theta, for\ z_t > 0\ and\ -1 + \theta, for\ z_t < 0\} \dots\dots\dots\dots\dots\dots\dots [6]$$

The conditional mean equation (eq. [1]) is modeled as an autoregressive process of order p (AR (p)), for all return series (Sri Lanka, India, China, Pakistan, and Japan return series) based on previous studies Bollerslev et.al (1988), Theodossiou and

[1] Included only the trading dates

Lee (1993), Wang et al., (2005) and Hamao et. al (1990). The lag order of the AR(p) process is determined using the ACF[2] and PACF[3] and AR (4) is selected for the Sri Lanka and India return series, while the first-order autoregressive process (AR (1)) is selected for China, Pakistan, and Japan return series.

The eq. [3] represents the conditional variance equation which represents the variance of ε_t and variance is dependent on its past values and the past values of a function of z_t ,where σ_t^2 is the conditional (time-varying) variance, and $z_{t,}$ is the standardized residual which is derived from $\frac{\varepsilon_t}{\sigma_t}$ conditional on Ω_{t-1} .The term ε_t is assumed to be normally distributed with a zero mean and variance (σ_t^2) . The term $b_i \log(\sigma_{t-i}^2)$ represents the conditional variance and GARCH term, while the term $a_i f(z_{t-i})$ represents the ARCH term. The θ part in eq. [4] is the EGARCH term that captures the leverage effect or asymmetric impact of shocks on volatilities. The persistence of volatility implied by eq. [5] and measured by the $\sum_{i-1}^{p} b_i$. If $\sum_{i-1}^{p} b_i < 1$ the unconditional variance is finite, and if $\sum_{i-1}^{p} b_i = 1$ it can be explained that unconditional variance does not exist (Wang, Gunasekara, and Power, 2005; Nelson, 1991, 1990a, 1990b). As per the eq. [6] the asymmetric impact on volatility can be determined. If θ is negative and statistically significant asymmetry effect exists with the data. This asymmetry in volatility transmission can be determined through the term $[|z_t| - E(|z_t|)]$ measures the size effect of a shock and θz_t measures the corresponding sign effect. If θ is negative a negative z_t tends to reinforce the size effect and positive z_t tends to partially offset the asymmetry effect or the leverage effect can be measured by the ratio $|\frac{-1+\theta}{1+\theta}|$ (Wang et al., 2005; Nelson,1991). The term $[\frac{2}{\pi}]^{0.5}$ is a constant employed to make sure that the integral under the curve of the normal distribution of the residuals from negative to positive infinity is equal to one (Wang et al., 2005; Nelson, 1991).

Return and Volatility Spillovers

First, the Univariate EGARCH (1,1) models were developed, with Sri Lanka as the dependent variable and the other countries as independent variables. The most recent squared residuals from the conditional mean-conditional variance formulation of the equity markets in India, China, Pakistan, and Japan were introduced as exogenous variables in the conditional variance equation for Sri Lanka (Wang et al., 2005; Nelson, 1991). The study focused on investigating the conditional mean equations and conditional variance equations of stock returns and volatility spillover effects from India, China, Pakistan, and Japan to Sri Lanka, aligning with hypotheses H_1, H_3, H_5, and H_7.

Conditional mean equations

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + \ldots\ldots + \alpha_{SRI,4}R_{SRI,t-4} + \beta_{SRI,1}R_{IND,t-1} + \varepsilon_{SRI,t} \ldots\ldots\ldots\ldots\ldots\ldots [7]$$

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + \cdots + \alpha_{SRI,4}R_{t-4} + \beta_{SRI,1}R_{CHI,t-1} + \varepsilon_{SRI,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots [8]$$

[2] Autocorrelation Function

[3] Partial Autocorrelation Function

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + \cdots + \alpha_{SRI,4}R_{SRI,t-4} + \beta_{SRI,1}R_{PAK,t-1} + \varepsilon_{SRI,t} \ldots\ldots\ldots\ldots [9]$$

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + \cdots + \alpha_{SRI,4}R_{SRI,t-4} + \beta_{SRI,1}R_{JAP,t-1} + \varepsilon_{SRI,t} \ldots\ldots\ldots\ldots [10]$$

Conditional variance equations

$$\log(\sigma^2_{SRI,t}) = a_{SRI,0} + a_{SRI,1}f(z_{SRI,t-1}) + b_{SRI,1}\log(\sigma^2_{SRI,t-1}) + c_{SRI,1}\log(U_{IND,t}) \ldots [11]$$

$$\log(\sigma^2_{SRI,t}) = a_{SRI,0} + a_{SRI,1}f(z_{SRI,t-1}) + b_{SRI,1}\log(\sigma^2_{SRI,t-1}) + c_{SRI,1}\,log(U_{CHI,t}) \ldots [12]$$

$$\log(\sigma^2_{SRI,t}) = a_{SRI,0} + a_{SRI,1}f(z_{SRI,t-1}) + b_{SRI,1}\log(\sigma^2_{SRI,t-1}) + c_{SRI,1}\log(U_{PAK,t}) \ldots [13]$$

$$\log(\sigma^2_{SRI,t}) = a_{SRI,0} + a_{SRI,1}f(z_{SRI,t-1}) + b_{SRI,1}\log(\sigma^2_{SRI,t-1}) + c_{SRI,1}\log(U_{JAP,t}) \ldots\ldots\ldots\ldots [14]$$

In the second step, Sri Lanka was considered as the independent variable, while India, China, Pakistan, and Japan were treated as the dependent variables. Univariate EGARCH (1,1) models were developed, incorporating the most recent squared residuals from the conditional mean-conditional variance formulation of the Sri Lankan equity market as exogenous variables in the conditional variance equations of India, China, Pakistan, and Japan. The conditional mean equations and conditional variance equations were developed to explore the stock returns and volatility spillover effects from Sri Lanka to India, China, Pakistan, and Japan, aligning with the hypotheses H_2, H_4, H_6, and H_8.

Conditional mean equations

$$R_{IND,t} = \alpha_{IND,0} + \alpha_{IND,1}R_{IND,t-1} + \ldots\ldots + \alpha_{IND,4}R_{IND,t-4} + \beta_{IND,1}R_{SRI,t-1} + \varepsilon_{IND,t} \ldots\ldots\ldots\ldots [15]$$

$$R_{CHI,t} = \alpha_{CHI,0} + \alpha_{CHI,1}R_{CHI,t-1} + \beta_{CHI,1}R_{SRI,t-1} + \varepsilon_{CHI,t} \ldots\ldots\ldots\ldots [16]$$

$$R_{PAK,t} = \alpha_{PAK,0} + \alpha_{PAK,1}R_{PAK,t-1} + \beta_{PAK,1}R_{SRI,t-1} + \varepsilon_{PAK,t} \ldots\ldots\ldots\ldots [17]$$

$$R_{JAP,t} = \alpha_{JAP,0} + \alpha_{JAP,1}R_{JAP,t-1} + \beta_{JAP,1}R_{SRI,t-1} + \varepsilon_{JAP,t} \ldots\ldots\ldots\ldots [18]$$

Conditional variance equations

$$\log(\sigma^2_{IND,t}) = a_{IND,0} + a_{IND,1}f(z_{IND,t-1}) + b_{IND,1}\log(\sigma^2_{IND,t-1}) + c_{IND,1}\log(U_{SRI,t}) \ldots\ldots\ldots\ldots [19]$$

$$\log(\sigma^2_{CHI,t}) = a_{CHI,0} + a_{CHI,1}f(z_{CHI,t-1}) + b_{CHI,1}\log(\sigma^2_{CHI,t-1}) + c_{CHI,1}\log(U_{SRI,t}) \ldots\ldots\ldots\ldots [20]$$

$$\log(\sigma^2_{PAK,t}) = a_{PAK,0} + a_{PAK,1}f(z_{PAK,t-1}) + b_{PAK,1}\log(\sigma^2_{PAK,t-1}) + c_{PAK,1}\log(U_{SRI,t}) \ldots\ldots [21]$$

$$\log(\sigma^2_{JAP,t}) = a_{JAP,0} + a_{JAP,1}f(z_{JAP,t-1}) + b_{JAP,1}\log(\sigma^2_{JAP,t-1}) + c_{JAP,1}\log(U_{SRI,t}) \ldots [22]$$

The eq. [19-22] was used to determine the $U_{IND,}$ U_{CHI}, U_{PAK}, U_{JAP}, and U_{SRI} squared residuals of the EGARCH (1,1) and identify volatility spillovers. Return volatility spillovers were observed when passed information from India, China, Pakistan, and Japan had persistent effects on Sri Lanka, and vice versa, and volatility spillovers related to present information follow from

the dependent variable's equity market. Significant β_1 , β_2 , β_3 and, β_4 coefficients indicate return spillovers from independent variables to dependent variables. Significance c_1 coefficients indicate the existence of volatility spillovers from India, China, Pakistan, and Japan to Sri Lanka. A significant c_1 coupled with a negative θ implies that negative news in the India, China, Pakistan, and Japan equity markets have more impact on the Sri Lanka equity market (or other way) than positive information and asymmetric impact of volatility can be identified.

Structural Breaks on Covid-19 Surge

The study sought to examine potential structural breaks resulting from the COVID-19 surge in December 2019. The hypotheses H_9, H_{10}, H_{11}, and H_{12} are tested. To assess the structural breaks associated with each independent variable, the study incorporated one Dummy variable and four Interactive Dummy variables as described in eq. [23-26]. The Dummy variable, represented by D, distinguished between two periods: assigned value "1" from June 1, 2015, to December 30, and "0" from January 1, 2020, to June 1, 2021. By examining the significance of the β_1 and β_2 coefficients, the study evaluated the slope and the intercept differences, and β_2 coefficient explains the influence of SSE, BSE, KSE, and TSE on CSE structural break from December 2019.

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + .. + \alpha_{SRI,4}R_{SRI,t-4} + \alpha_{SRI,5}D_{SRI,5} + \beta_{SRI,1}R_{IND,t-1} + \beta_{SRI,2}D_{SRI,t} * R_{IND,t-1} + \varepsilon_{SRI,t} \quad [23]$$

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + .. + \alpha_{SRI,4}R_{SRI,t-4} + \alpha_{SRI,5}D_{SRI,5} + \beta_{SRI,1}R_{CHI,t-1} + \beta_{SRI,2}D_{SRI,t} * R_{CHI,t-1} + \varepsilon_{SRI,t} \quad [24]$$

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + .. + \alpha_{SRI,4}R_{SRI,t-4} + \alpha_{SRI,5}D_{SRI,5} + \beta_{SRI,1}R_{PAK,t-1} + \beta_{SRI,2}D_{SRI,t} * R_{PAK,t-1} + \varepsilon_{SRI,t} \quad [25]$$

$$R_{SRI,t} = \alpha_{SRI,0} + \alpha_{SRI,1}R_{SRI,t-1} + .. + \alpha_{SRI,4}R_{SRI,t-4} + \alpha_{SRI,5}D_{SRI,5} + \beta_{SRI,1}R_{JAP,t-1} + \beta_{SRI,2}D_{SRI,t} * R_{JAP,t-1} + \varepsilon_{SRI,t} \quad [26]$$

Data analysis and findings

The preliminary analysis assessed daily stock returns for five countries, exploring mean, coefficient of variation, standard deviation, skewness, and kurtosis (Appendix 1). All return series demonstrated highly leptokurtic distributions. The Jarque-Bera test rejected normal distribution assumptions. Robustness of the model checked through diagnostic tests of error autocorrelation, conditional heteroskedasticity, non-normality ARCH test, and time invariance CUSUM test to check for the structural breaks of CSE. Suitable mean equations were estimated using the ARMA process. The correlogram test aided lag selection for the ARMA mean equation. The AR (1) MA (1) model was chosen based on the least Akaike Information Criteria (AIC) and the highest adjusted R^2. The Augmented Dickey Fuller (ADF) test assessed return series stationarity and the results rejected the null hypothesis, suggesting stationary return series at analyzed levels. Breusch-Godfrey (BG) test

and heteroskedasticity test aligned and confirmed that there is no autocorrelation and ARCH test confirmed that data are not normal. The CUSUM test results confirmed that there are structural breaks in CSE after 2019 December.

The suitable ARCH model and lag order were determined using squared residual correlograms, with ARCH (2, 0) selected as the best model. It was found that the ARCH effect is available, and the suitable ARCH model has been estimated as ARCH (2,0). The study proceeded to estimate the GARCH (1,1) model and compared the suitability of ARCH and GARCH models using GARCH (1, 1) and ARCH (2, 0) models. The GARCH (1,1) model was found to be the best model according to the model selection criteria. The results of the GARCH (1,1) model showed that all residuals were statistically significant, and the ARCH LM test results proved that the GARCH (1, 1) model can mitigate heteroskedasticity. Since the GARCH (1,1) model is the best model according to the model selection criteria, Engle, and Ng (1993) test was conducted to check for sign and size bias to find whether asymmetry GARCH models can be used for the analysis. The EGARCH (1,1) model was found to be an adequate fit for the data. The study found evidence of sign and size bias in the daily stock returns volatility results for $\emptyset_0, \emptyset_1, \emptyset_2$ *and* $\emptyset_3$ coefficients and probabilities, indicating that positive and negative shocks have differing impacts on future volatility. A maximum likelihood test was conducted to determine the optimal lag order of the EGARCH model for analysis. The EGARCH (1,1) restricted model was utilized and compared with the EGARCH (1,2) and EGARCH (2,1) unrestricted models using R software, which aligns with previous research studies (Kumar & Dhankar, 2017; Dutta & Noor, 2017; Yoshida, 2011; Singhania & Prakash, 2014; Nelson and Foster, 1994; Bollerslev et al., 1988).

EGARCH (1, 1) Model Runs for each Return Series

Table 1: EGARCH (1, 1) Model Estimation

Parameter	Sri Lanka	India	China	Pakistan	Japan
Panel A: Conditional Mean Equation Coefficients					
α_0	0.0194 (0.1089)	0.0645* (0.0061)	0.1066* (0.0003)	0.0408 (0.1058)	0.0162 (0.692)
α_1	-0.7074* (0.0000)	-0.6474* (0.0000)	-0.2589* (0.0000)	-0.3491* (0.0000)	-0.1517* (0.0000)
α_2	-0.5162* (0.0000)	-0.3876* (0.0000)			
α_3	-0.3333* (0.0000)	-0.2599* (0.0000)			
α_4	-0.2040* (0.0000)	-0.1557* (0.0000)			
Panel B: Conditional Variance Equation Coefficients					
α_0	-0.0624* (0.0000)	-0.0241* (0.0000)	-0.0903* (0.0000)	0.0788* (0.0000)	0.2837* (0.0000)

a_1	0.1065* (0.0000)	0.0669* (0.0000)	0.2100* (0.0000)	0.3182* (0.0000)	0.5234* (0.0000)
b_1	1.0004* (0.0000)	0.9957* (0.0000)	0.9853* (0.0000)	0.9031* (0.0000)	0.7994* (0.0000)
θ	-0.0106* (0.0000)	0.0565* (0.0000)	-0.0152* (0.0000)	0.0069 (0.5455)	-0.0450* (0.0020)
Panel C: Standardized and Squared Standardized Residuals					
LB (6)	18.24* (0.0000)	38.10* (0.0000)	49.72* (0.0000)	59.16* (0.0000)	32.07* (0.0000)
LB (12)	23.98* (0.002)	45.68* (0.0000)	58.32* (0.0000)	74.81* (0.0000)	33.706* (0.0000)
LB^2 (6)	6.30 (0.391)	16.78** (0.0100)	12.19*** (0.058)	1.6821 (0.946)	1.4609 (0.962)
LB^2 (12)	20.19*** (0.064)	19.518*** (0.077)	16.30*** (0.178)	5.3322 (0.946)	9.0973 (0.695)
ARCH LM (Prob. Chi^2)	0.0836***	0.0567***	0.0621***	0.4838	0.9976
Panel D: Log Likelihood results					
Log Likelihood	-4095.62	-5029.67	-3978.43	-4586.99	-4710.05
Panel E: Wald Test Results					
Wald Test	84.80* (0.0000)	66.83* (0.0000)	74767.2* (0.0000)	6224.95* (0.0000)	3397.60* (0.0000)

α_0 *is the constant and* $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the first, second, third and fourth order moving average process specified for the mean equation. a_1, represents the ARCH effect θ represents or measures the leverage effect and b_1 represents volatility persistence. LB and LB^2 are L-Jung Box q statistics for the residuals and squared residuals. The null hypothesis of the Wald test is $a_1 = 0, b_1 = 0, \theta = 0$ and Log-likelihood test results were obtained through EGARCH analysis. p-values are provided in parenthesis []. * Represents significance at 1%, ** Represents significance at 5%, and *** Represents significance at 10% critical value respectively.

The study employed EGARCH (1,1) models and diagnostic tests, such as ACF, PACF, and L-Jung Box statistics, to analyze return series. Optimal lag orders were chosen based on AR (1) test: Sri Lanka (4), India (4), China (1), Pakistan (1), and Japan (1). Table 1 exhibits results for univariate EGARCH (1,1) models. In Table 1, Panel A, α_1 is significant in all return series. Additionally, α_2, α_3 and α_4 are significant for Sri Lanka and India. In Table 1, Panel B, a_1 (ARCH effect) and b_1 (volatility persistence) is significant across all return series. Volatility persistence is highest in Sri Lanka, followed by India, China, Pakistan, and Japan. For leverage effects and θ coefficients, Panel B shows a_1 and b_1 significance. Positive a_1 implies larger shocks raise volatility, while negative θ coefficients for Sri Lanka, China, and Japan indicate negative news amplifies volatility more than positive news. Positive θ coefficients for India and Pakistan imply good news offsets volatility more. Pakistan's θ is insignificant. Leverage effect ratios $\frac{|-1+\theta|}{1+\theta}$, calculated using θ values, reveal Japan's highest asymmetry (-1.09), China's second highest (-1.03), and Sri Lanka's (-

1.02), while India's is least (0.89), suggesting positive shocks offset volatility more.

Table 1, Panel C findings indicate that standardized residuals do not capture dependencies, whereas squared standardized residuals effectively capture all dependencies in the EGARCH (1,1) model. The ARCH LM test confirms successful mitigation of heteroskedasticity in all return series. Additionally, the Wald test demonstrates the significance of variables in the EGARCH (1,1) model fit.

Return and Volatility Spillover from Asian Stock markets to Sri Lanka

Table 2: EGARCH (1, 1) model Returns and Volatility Spillover results to Sri Lanka

Parameters	India (IND)	China (CHI)	Pakistan (PAK)	Japan (JAP)
Panel A: Return Spillover Coefficients				
α_0	0.0027* (0.0000)	0.0415** (0.0982)	0.0085 (0.5157)	0.0114 (0.3525)
α_1	-0.7032* (0.0000)	-0.4374* (0.0000)	-0.7165* (0.0000)	0.7106* (0.0000)
α_2	-0.5022* (0.0000)	-0.3162* (0.0000)	-0.5159* (0.0000)	-0.5074* (0.0000)
α_3	-0.3164* (0.0000)	-0.2483* (0.0000)	-0.3388* (0.0000)	-0.3279* (0.0000)
α_4	-0.1905* (0.0000)	-0.0938* (0.0000)	-0.2178* (0.0000)	-0.1978* (0.0000)
β_1 (From IND, CHI, PAK, JAP to SL)	-0.0125* (0.0450)	0.0139* (0.5034)	0.0109* (0.1679)	-0.0001* (0.9881)
Panel B: Volatility Spillover Coefficients				
a_0	-0.0593* (0.0000)	1.3019* (0.0000)	-0.0628* (0.0000)	-0.0605* (0.0000)
a_1	0.0994* (0.0000)	0.6253* (0.0000)	0.1096* (0.0000)	0.1014* (0.0000)
b_1	1.0004* (0.0000)	0.3256* (0.0000)	0.9992* (0.0000)	1.0004* (0.0000)
θ	-0.0213* (0.0000)	0.0105* (0.0000)	-0.0282* (0.0000)	-0.0178* (0.0000)
c_1 (From IND, CHI, PAK, JAP to SL)	-0.0164* (0.0000)	-0.0636* (0.0000)	0.0308* (0.0000)	-0.0120* (0.0000)
Panel C: Standardized and Squared Standardized Residuals				
LB (6)	16.677* (0.0000)	29.229* (0.0000)	9.39* (0.0000)	18.261* (0.0000)
LB (12)	21.103*	39.685*	24.297*	23.947*

	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LB^2 (6)	7.9766	6.711	8.0090	7.2475
	(0.348)	(0.237)	(0.299)	(0.240)
LB^2 (12)	20.36	80.82*	15.507	20.169
	(0.061)	(0.0000)	(0.212)	(0.064)

α_0 *is the constant and* $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the first, second, third and fourth order moving average process specified for the mean equation. a_1, represents the ARCH effect θ represents or measures leverage effect and b_1 represents volatility persistence. LB and LB^2 are L-Jung Box q statistics for the residuals and squared residuals. p-values are provided in parenthesis []. ***** Represents significance at 1%, ** Represents significance at 5%, and *** Represents significance at 10% critical value respectively.

In Table 2 analyzed null hypotheses H_1, H_3, H_5, H_7. Panel A, Table 2 presents results for the EGARCH (1,1) models and the significance of coefficients in the return spillover analysis. $\alpha_1, \alpha_2, \alpha_3$ and α_4 coefficients of Sri Lanka for India, China, Pakistan, and Japan are statistically significant. The statistical significance of return spillovers (β_1) is only observed from India, indicating it as a prominent source of shocks to Sri Lanka's CSE. Panel B reveals significant a_0, a_1 *and* b_1 coefficients, highlighting the impact of shocks from India, China, Pakistan, and Japan on CSE's volatility. Positive a_1 (ARCH) coefficient signifies the influence of market shocks, while significant b_1 (GARCH) coefficients (e.g., India: 1.0004, China: 0.3256, Pakistan: 0.9992, Japan: 1.0004) demonstrate past volatility's predictive power for CSE's future volatility, reflecting a high degree of persistence. The c_1 coefficient (volatility spillover) is statistically significant for India, China, Pakistan, and Japan, denoting significant volatility transmission to Sri Lanka at 5% significance level. Notably, the greatest volatility spillovers are from China, followed by Pakistan, India, and then Japan, in descending order of magnitude.

The θ values indicate a significant leverage effect calculated through $\frac{|-1+\theta|}{1+\theta}$, reflecting the stronger impact of negative news from India, China, Pakistan, and Japan on Sri Lanka's volatility compared to positive news. Notably, bad news from India, Pakistan, and Japan amplifies CSE volatility by 1.044, 1.058, and 1.036 times, while China mitigates volatility by 0.979 times, based on θ estimates. This demonstrates asymmetric volatility responses to news across these markets. In Panel C, while standardized residuals might not capture all linear and non-linear dependencies, squared standardized residuals effectively encompass all interdependencies. Both conditional mean and variance equations seem to account for interdependencies in all return series.

Return and Volatility Spillover from Sri Lanka to Stock Markets

Table 3 analyzed H_2, H_4, H_6, H_8 presents return and volatility spillovers, along with standardized residuals in Panels A, B, and C. Panel A's EGARCH (1,1) model reveals significant $\alpha_1, \alpha_2, \alpha_3$ and α_4 coefficients for India, and α_1 for China, Pakistan, and Japan at 5% level. Notably, β_1 indicates negative return spillovers to India and Pakistan, and positive spillovers to China and Japan, all significant at 5% levels. Therefore, return spillovers are present from Sri Lanka to India, China, Pakistan, and Japan.

Table 3: Returns and Volatility Spillovers from Sri Lanka

Parameters	India (IND)	China (CHI)	Pakistan (PAK)	Japan (JAP)
Panel A: Return Spillover Coefficients				
α_0	0.0448*	0.0537	-0.1184*	0.0123
	(0.0000)	(0.1308)	(0.0002)	(0.7334)
α_1	-0.6497*	-0.2550*	-0.3237*	-0.2235*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
α_2	-0.3935*	-	-	-
	(0.0000)			
α_3	-0.2608*	-	-	-
	(0.0000)			
α_4	-0.1560*	-	-	-
	(0.0000)			
β_1	-0.0532*	0.00435	-0.1224	-0.0769
(From SL to IND, CHI, PAK, and JAP)	(0.0026)	(0.0000)	(0.0000)	(0.0000)
Panel B: Volatility Spillover Coefficients				
a_0	-0.0293*	-0.0985*	0.0728*	0.3191*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
a_1	0.0672*	0.2179*	0.3802*	0.5316*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
b_1	0.9972*	0.9870*	0.8908*	0.7807*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
θ	0.5315*	-0.0284*	-0.0049	-0.0401*
	(0.0000)	(0.0001)	0.7147	0.0081
c_1	0.0008	0.0202*	0.0020	0.0183*
(From SL to IND, CHI, PAK, and JAP)	0.7148	0.0648	0.4262	0.0723
Panel C: Standardized and Squared Standardized Residuals				
LB	37.18*	46.357*	49.39*	27.39*
(6)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LB	45.045*	55.502*	66.771*	28.758*
(12)	(0.0000)	(0.0000)	(0.0000)	(0.0002)
LB^2	17.748*	12.984**	1.4821	2.294
(6)	(0.007)	(0.043)	(0.961)	(0.891)
LB^2	20.561	16.906	4.8911	9.2596
(12)	(0.057)	(0.153)	(0.962)	(0.681)

α_0 *is the constant and* $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the first, second, third and fourth order moving average process specified for the mean equation. a_1, represents the ARCH effect θ represents or measures leverage effect and b_1 represents volatility persistence. LB and LB^2 are L-Jung Box q statistics for the residuals and squared residuals. p-values are provided in parenthesis (). *Represents significance at 1%, ** Represents significance at 5%, and *** Represents significance at 10% critical value respectively.

In Panel B, Table 3, significant volatility spillover coefficients a_0, a_1 *and* b_1 are observed at 1%, 5%, and 10% levels. Positive a_1 (ARCH term) indicates that CSE shocks influence volatility in India, China, Pakistan, and Japan, and a positive relationship exists between CSE's past variance and the current variance of these countries. The $b_1$coefficient (GARCH term) is significant across all countries and significance levels, revealing that Sri Lanka's past volatility predicts future volatility in India, China, Pakistan, and Japan. Notably, $b_1$coefficients are close to 1 (e.g., India: 0.9972, China: 0.9870), indicating a high level of volatility persistence. The c_1 coefficient indicates no significant volatility spillover from Sri Lanka to India and Pakistan. There is weak evidence of volatility spillover to China and Japan, with higher magnitudes observed to China, followed by Japan. The θ values reveal that negative (positive) news from Sri Lanka's CSE increases volatility more for India, China, and Japan compared to positive (negative) news, indicating an asymmetric impact. Notably, the θ coefficient is insignificant for Pakistan, implying symmetric spillovers. In numerical terms, bad news from CSE impacts China and Japan 1.058 and 1.084 times more, respectively, than equivalent good news. Meanwhile, good news from CSE reduces India's volatility by 0.306 times compared to

the impact of bad news. In Panel C, while the standardized residuals fail to capture all linear and non-linear dependencies, the squared standardized residuals effectively capture all interdependencies, indicating that the conditional mean and variance equations encompass interdependencies across return series. Subsequently, the study proceeds to examine structural breaks in the CSE market for India, China, Pakistan, and Japan before and after December 2019, considering the COVID-19 pandemic.

Structural Break on Covid-19

Table 4, Panel A, presents EGARCH (1,1) model results with dummy and interactive dummy variables. Coefficients $\alpha_1, \alpha_2, \alpha_3, \alpha_4 and, \alpha_5$ are statistically significant at a 5% significance level. β_1 and β_2 are significant at these levels except for Japan. Since it was recognized structural breaks in CSE after December 2019 in the diagnostic checking, Table 5 shows that introduced dummy variables indicate slope and interactive dummy variables indicate intercept differences during two periods (Jun 2015 - Dec 2019, Jan 2020 - Jun 2021), explaining structural break of CSE influenced by Covid-19 related fluctuations in the SSE, BSE, KSE, and TSE from December 2019 (equations [29 to 36]). Hence, it is evident that structural breaks in CSE were influenced by India, China, Pakistan, and Japan due to the Dec 2019 COVID-19 surge.

Table 4: EGARCH (1, 1) Impact of Covid-19

Parameters	India (IND)	China (CHI)	Pakistan (PAK)	Japan (JAP)
Panel A: Conditional Mean Equation Coefficients				
α_0	0.1940* (0.0000)	0.2425* (0.0000)	0.1575* (0.0000)	0.2352* (0.0000)
α_1	-0.7008* (0.0000)	-0.70069* (0.0000)	-0.6930* (0.0000)	-0.6978* (0.0000)
α_2	-0.5075* (0.0000)	-0.4946* (0.0000)	-0.4840* (0.0000)	-0.4986* (0.0000)
α_3	-0.3257* (0.0000)	-0.3234* (0.0000)	-0.3175* (0.0000)	-0.3201* (0.0000)
α_4	-0.1956* (0.0000)	-0.1962* (0.0000)	-0.1926* (0.0000)	-0.1939* (0.0000)
α_5	-0.1837* (0.0000)	-0.2393* (0.0000)	-0.1633* (0.0000)	-0.2307* (0.0000)
β_1	0.0749** (0.0716)	-0.0281** (0.0543)	0.2881* 0.0000	-0.0084 0.8363
β_2	-0.1028** (0.0157)	0.0408* (0.0001)	-0.2136* (0.0000)	0.0129 (0.7532)
Panel B: Standardized and Squared Standardized Residuals				
LB (6)	15.379* (0.0000)	14.881* (0.0001)	13.268* (0.001)	13.679* (0.001)
LB (12)	21.215* (0.007)	21.148* (0.008)	18.693* (0.017)	20.38 (0.009)
LB^2 (6)	6.3091 (0.389)	7.226 (0.382)	11.744 (0.068)	7.2797 (0.296)

LB^2 (12)	19.127 (0.086)	20.828 (0.101)	19.977 (0.068)	19.564 (0.076)

α_0 *is the constant and* $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the first, second, third and fourth order moving average process specified for the mean equation. LB and LB^2 are L-Jung Box q statistics for the residuals and squared residuals. p-values are provided in parenthesis []. ***** Represents significance at 1%, ** Represents significance at 5%, and *** Represents significance at 10% critical value respectively and + Represents insignificance at 1%, ++ Represents insignificance at 5%, and +++ Represents insignificance at 10% and null hypothesis of uncorrelated returns of LB and LB^2 cannot be Rejected.

As per the results obtained for the equation [23] to [26] can be written as follows,

Period 1st June 2015- 30th Dec 2019

$$R_{SRI,t} = 0.194 - 0.7008R_{SRI,t-1} - 0.5075R_{SRI,t-2} - 0.3257R_{SRI,t-3} - 0.1956R_{SRI,t-4} - 0.1837D_{SRI,1} + 0.0749R_{IND,t-1} - 0.1028(D_{SRI,t} * R_{IND,t-1}) + \varepsilon_{SRI,t} \ldots\ldots [29]$$

$$R_{SRI,t} = 0.2425 - 0.7007R_{SRI,t-1} - 0.4946R_{SRI,t-2} - 0.3234R_{SRI,t-3} - 0.1962R_{SRI,t-4} - 0.2393D_{SRI,1} - 0.0281R_{CHI,t-1} + 0.0408(D_{SRI,t} * R_{CHI,t-1}) + \varepsilon_{SRI,t} \ldots\ldots [30]$$

$$R_{SRI,t} = 0.1575 - 0.6930R_{SRI,t-1} - 0.4840R_{SRI,t-2} - 0.3175R_{SRI,t-3} - 0.1926R_{SRI,t-4} - 0.1633D_{SRI,1} - 0.2881R_{PAK,t-1} - 0.2136(D_{SRI,t} * R_{PAK,t-1}) + \varepsilon_{SRI,t} \ldots\ldots [31]$$

$$R_{SRI,t} = 0.2352 - 0.6978R_{SRI,t-1} - 0.4986R_{SRI,t-2} - 0.3201R_{SRI,t-3} - 0.1939R_{SRI,t-4} - 0.2307D_{SRI,1} - 0.0084R_{JAP,t-1} + 0.0129(D_{SRI,t} * R_{JAP,t-1}) + \varepsilon_{SRI,t} \ldots\ldots [32]$$

Period 1st Jan 2020-1st June 2021

$$R_{SRI,t} = 0.194 - 0.7008R_{SRI,t-1} - 0.5075R_{SRI,t-2} - 0.3257R_{SRI,t-3} - 0.1956R_{SRI,t-4} + 0.0749R_{IND,t-1} + \varepsilon_{SRI,t} \ldots\ldots [33]$$

$$R_{SRI,t} = 0.2425 - 0.7007R_{SRI,t-1} - 0.4946R_{SRI,t-2} - 0.3234R_{SRI,t-3} - 0.1962R_{SRI,t-4} - 0.0281R_{CHI,t-1} + \varepsilon_{SRI,t} \ldots\ldots [34]$$

$$R_{SRI,t} = 0.1575 - 0.6930R_{SRI,t-1} - 0.4840R_{SRI,t-2} - 0.3175R_{SRI,t-3} - 0.1926R_{SRI,t-4} - 0.2881R_{PAK,t-1} + \varepsilon_{SRI,t} \ldots\ldots [35]$$

$$R_{SRI,t} = 0.2352 - 0.6978R_{SRI,t-1} - 0.4986R_{SRI,t-2} - 0.3201R_{SRI,t-3} - 0.1939R_{SRI,t-4} - 0.0084R_{JAP,t-1} + \varepsilon_{SRI,t} \ldots\ldots [36]$$

Table 5: Difference of Slope and Intercept in two periods

Panel A: 1st June 2015- 30th Dec 2019		
Country	**Slope**	**Intercept**
From India to Sri Lanka	0.0103	-0.0279
From China to Sri Lanka	0.0032	0.0127
From Pakistan to Sri Lanka	-0.0058	-0.5017
From Japan to Sri Lanka	0.0045	0.0045

Panel B: 1st Jan 2020-1st June 2021		
Country	**Slope**	**Intercept**
From India to Sri Lanka	0.1940	0.0749
From China to Sri Lanka	0.2425	-0.0281
From Pakistan to Sri Lanka	0.1575	-0.2881
From Japan to Sri Lanka	0.2352	-0.0084

Discussion

The research delved into examining the dynamics of stock returns and volatility transmission from Sri Lanka to China using EGARCH (1, 1) bidirectional analysis. As per the results indicated in Table 3, significant spillover effects of both stock returns and volatility from Sri Lanka to China, highlight the influence of Sri Lankan financial developments on Chinese markets. Notably, positive returns spillover was evident across all levels, while adverse news from Sri Lanka exacerbated volatility in China, aligning with previous findings by Huang et al. (2019) and Jebran & Iqbal (2016). Of particular interest was the divergence observed during the Asian Financial Crisis, where Sri Lanka exhibited sensitivity to negative Chinese news, contrary to the positive θ (0.0105) value suggesting that positive news attenuated cross-market volatility spillover, as noted by Hung (2019). This divergence might be attributed to variations in research focus, with some studies emphasizing crisis periods, potentially amplifying the impact of adverse Chinese news on the Colombo Stock Exchange.

The analysis of stock returns and volatility spillover from India to Sri Lanka, utilizing EGARCH (1,1) bidirectional analysis, unveiled a significant negative spillover of stock returns and cross-volatility from India to Sri Lanka, supported by a negative θ value (-0.0213) (see Table 2). This indicates that adverse developments in India tended to escalate volatility within Sri Lanka's stock market. Interestingly, these findings diverged from those of Jebran & Iqbal (2016), potentially owing to disparities in the time frames scrutinized (2015-2021 in our study as opposed to 1999-2014 in theirs) and the evolving impact of India on Sri Lanka's economy in recent years.

The research examined the impact of stock returns and volatility spillover from Pakistan to Sri Lanka using EGARCH (1,1) bidirectional analysis. As indicated in Table 2 there is no significant stock returns spillover from Pakistan to Sri Lanka, although volatility spillover was evident. Notably, negative returns spillover was significant across all levels, with a positive θ value (0.5315), suggesting that positive news from Sri Lanka mitigated volatility stemming from India. Interestingly, there was no observed cross-volatility spillover, indicating that adverse news from Sri Lanka did not impact Pakistan. This contrasts with prior research, such as Jebran & Iqbal (2016), which found similar stock returns spillover but lacked evidence of cross-volatility spillover.

Furthermore, the study explored stock returns and volatility spillover effects from Sri Lanka to Pakistan using EGARCH (1, 1) bidirectional analysis. In Table 3, results revealed stock returns spillover from Sri Lanka to Pakistan, while volatility spillover was not observed. Negative returns spillover was significant at all levels, yet the volatility spillover coefficient lacked significance. The θ value (-0.0049) suggested symmetric volatility spillovers from Sri Lanka to Pakistan, indicating an equal influence of positive and negative spillovers. Additionally, findings from Perera and Wickramanayake (2012) regarding bidirectional causality among South Asian

nations were consistent with our results. Moreover, evidence of cross-volatility spillover (Withanage & Jayasinghe, 2017) and Granger causality (Sharma & Bodla, 2011) from India to Sri Lanka supported our findings, as did the confirmation of return and volatility spillovers from global and Asian markets to Sri Lanka by Gajurel and Chawla (2022), aligning with the outcomes of our study.

As per the Table 3, the study unveiled the absence of significant stock returns spillover from Japan to Sri Lanka, while noting a considerable volatility spillover. The volatility spillover coefficient for Japan remained significant across all levels, indicating that negative developments in Japan heightened volatility within the CSE. This finding stands in contrast to prior research by Jebran & Iqbal (2016), which similarly found no stock returns spillover from Sri Lanka to Sri Lanka, aligning with our results. However, unlike our findings, they did not identify cross-volatility spillover. This contributes significantly to enriching our comprehension of the cross-border dynamics between the stock markets of Sri Lanka and Japan.

Furthermore, as per Table 4, a sub-analysis delved into examining the effects of the COVID-19 pandemic on structural breaks among several stock exchanges including SSE, BSE, KSE, TSE, and the CSE. The study pinpointed structural breaks that occurred after 2019 December in CSE, and the slope differences emphasized that those structural breaks are affected by other stock exchanges. As a result, the null hypothesis proposing structural breaks in the CSE are not influenced by Covid-19 related fluctuations in the SSE, BSE, KSE, and TSE from December 2019 were rejected. This underscores the significant impact of the COVID-19 pandemic on reshaping the relationships and dynamics among these stock exchanges and the Colombo Stock Exchange.

Conclusion

The study's conclusions underscore notable discoveries regarding stock return and volatility interactions between Sri Lanka and various nations, alongside insights gleaned from the structural breaks analysis. Firstly, reciprocal volatility spillovers were observed between China and Sri Lanka, indicating a mutual influence on market volatility. Notably, positive developments from China were more effective in tempering volatility in the CSE than negative occurrences, whereas adverse events in the CSE exacerbated volatility in China. Secondly, negative stock return spillovers from India to Sri Lanka were detected, alongside cross-volatility spillovers, underscoring Sri Lanka's impact on India's market volatility. Interestingly, negative news from India had a stronger impact on CSE volatility compared to positive news, while positive developments from Sri Lanka aided in mitigating volatility in India more effectively than negative news. Thirdly, similar trends were observed in the relationship between Pakistan and Sri Lanka, with cross-volatility spillovers and negative stock return spillovers from Sri Lanka to Pakistan. Particularly, adverse events in Pakistan tended to heighten volatility in the CSE more than positive news, while market developments from Sri Lanka affected Pakistan's volatility similarly regardless of their nature. Moreover, cross-volatility spillovers were revealed between Japan and Sri Lanka, indicating a mutual sway on market volatility. Specifically, Japan's negative news had a more pronounced impact on CSE volatility

compared to positive news, while adverse occurrences in the CSE amplified volatility in Japan more than positive news. Lastly, the structural breaks analysis underscored significant disruptions from several stock exchanges (SSE, BSE, KSE, TSE) to the CSE during the pre- and post-COVID-19 surge in December 2019. This suggests that the COVID-19 pandemic exerted a notable influence on the relationships and dynamics between these stock exchanges and the CSE, underscoring the importance of factoring in external variables in market analysis and forecasting.

The study's findings suggest Sri Lanka should enhance bilateral financial monitoring, develop crisis management frameworks, utilize positive news, strengthen regional cooperation, diversify economic ties, incorporate external shocks into market analysis, invest in financial infrastructure, promote investor awareness, ensure domestic stability, and coordinate policies during global crises to stabilize its financial markets. Moreover, it identified structural breaks in the CSE from these countries during the COVID-19 surge, crucial for investors, policymakers, and fund managers in making portfolio decisions and formulating stable financial policies. Overall, the study benefits international and local investors, financial institutions, and governments by informing portfolio diversification and risk management strategies.

The study utilized the EGARCH model to explore stock returns and volatility spillovers among Sri Lanka, China, India, Pakistan, and Japan, a novel approach in domestic research. It also investigated the impact of the December 2019 COVID-19 surge on the Colombo Stock Exchange (CSE) from these countries, employing the EGARCH (1, 1) model, a rarity in local studies. Theoretical implications include the novelty of employing EGARCH for such analyses domestically. Practical implications are significant, as findings reveal stock returns and cross-volatility spillovers among the mentioned countries. The study determined leverage effect values, contributing to understanding how news affects market volatility. Future research should expand the geographic scope, use alternative models, conduct sector-specific and longitudinal studies, analyze market microstructure, incorporate macroeconomic variables, assess policy impacts, and investigate behavioral finance insights. These steps will deepen understanding of international financial linkages and improve volatility management strategies in the Sri Lankan stock market.

References

Asian Development Bank. (2021). *South Asia Economic Report 2021*. Asian Development Bank. Retrieved from https://www.adb.org/publications/south-asia-economic-report-2021, p. 78

Banerjee, S., & Guhathakurta, K. (2020). Change-point analysis in financial networks. *Stat*, *9*(1). https://doi.org/10.1002/sta4.269

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, *31*(3), 307–327

Bollerslev, T. (1990). Modelling the coherence in short-run nominal exchange rates: A multivariate generalized arch model. *The Review of Economics and Statistics*, *72*(3), 498. https://doi.org/10.2307/2109358.

Bollerslev, T., Engle, R. F., & Wooldridge, J. M. (1988). A capital asset pricing model with time-varying covariances.

Journal of Political Economy, *96*(1), 116–131. https://www.jstor.org/stable/1830713

Campbell, J. Y., & Hentschel, L. (1992). No news is good news. *Journal of Financial Economics*, *31*(3), 281–318. https://doi.org/10.1016/0304-405x(92)90037-x.

Central Bank of Sri Lanka. (2021). *Annual Report 2021*. Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk, p. 120

Central Bank of Sri Lanka. (2020). *Annual Report 2020*. Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk, p. 302

Central Bank of Sri Lanka. (2019). *Annual Report 2019*. Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk, p. 298

Central Bank of Sir Lanka. (2022). *Financial sector performance and system stability.* Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk /sites/ default/ files/cbslweb_documents/publications/annual_report/2021/en/12_Chapter_08.pdf, p.259-265

Central Bank of Sri Lanka. (2021). *Financial sector performance and system stability.* Central Bank of Sri Lanka. Retrieved from https://.cbsl.gov.lk/sites/ default/ files/cbslweb_documents/publications/annual_report/2020/en/12_Chapter_08.pdf, p.218-229

Central Bank of Sri Lanka. (2020). *Financial sector performance and system stability.*Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk/sites /default/files/cbslweb_documents/publications/annual_report/2019/en/12_Chapter_08.pdf, p.302-314

Central Bank of Sri Lanka. (2019). *Financial sector performance and system stability.*Central Bank of Sri Lanka. Retrieved from https://www.cbsl.gov.lk/sites /default/files/cbslweb_documents/publications/annual_report/2019/en/12_Chapter_08.pdf, p.298-302

Diebold, F. X., & Yilmaz, K. (2012). Better to give than to receive: Predictive directional measurement of volatility spillovers. *International Journal of Forecasting*, *28*(1), 57–66. https://doi.org/10.1016/j.ijforecast.2011.02.006

Dutta, A., & Hasib Noor, M. (2017). Oil and non-energy commodity markets: An empirical analysis of volatility spillovers and hedging effectiveness. *Cogent Economics & Finance*, *5*(1). https://doi.org/10.1080/23322039.2017.1324555

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, *50*(4), 987–1007. https://doi.org/10.2307/1912773

Engle, R. F., Ito, T., & Lin, W.-L. (1990). Meteor showers or heat waves? heteroskedastic intra-daily volatility in the foreign exchange market. *Econometrica*, *58*(3), 525–542. https://doi.org/10.2307/2938189

Engle, R. F., & Ng, V. K. (1993). Measuring and testing the impact of news on volatility. *The Journal of Finance*, *48*(5), 1749–1778. https://doi.org/10.1111/j.1540626 1.%201993.tb05127.x.

Engle, R. F., Ng, V. K., & Rothschild, M. (1990). Asset pricing with a factor-arch covariance structure. *Journal of*

Econometrics, *45*(1-2), 213–237. https://doi.org/10.1016/0304-4076(90)90099-f

Engle, R. F., & Susmel, R. (1993). Common volatility in international equity markets. *Journal of Business & Economic Statistics*, *11*(2), 167–176. https://doi.org/10.1080/07350015.1993.10509945

Engle, R. F., & Kroner, K. F. (1995). Multivariate simultaneous generalized ARCH. *Econometric Theory*, *11*(1), 122–150. https://doi.org/10.1017/s026646660000 9063

Engle, R., & Kozicki, S. (1990). Testing for common features. https://doi.org/ 10.3386/t0091

Engle, R. F. (2000). Dynamic conditional correlation - A simple class of multivariate GARCH models. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.236998

Forbes, K. J., & Rigobon, R. (2002). No contagion, only interdependence: Measuring stock market co-movements. *The Journal of Finance*, *57*(5), 2223–2261. https://doi.org/10.1111/0022-1082.00494

Fratzscher, M. (2002). Financial market integration in Europe: on the effects of EMU on stock markets. International Journal of Finance & Economics, 7(3), 165–193. https://doi.org/10.1002/ijfe.187

Gajurel, D., & Chawla, A. (2022). International information spillovers and asymmetric volatility in South Asian stock markets. *Journal of Risk and Financial Management*, *15*(10), 471. https://doi.org/10.3390/jrfm15100471

Glosten, L. R., Jagannathan, R., & Runkle, D. E. (1993). On the relation between the expected value and the volatility of the nominal excess return on stocks. *The Journal of Finance*, *48*(5), 1779–1801. https://doi.org/10.1111/j.1540-6261.1993.tb05128.x

Gregorio, J., & Valdés, R. O. (2001). Crisis transmission: Evidence from the debt, Tequila, and Asian flu crises. *International Financial Contagion*, 99–127. https://doi.org/10.1007/978-1-4757-3314-3_5

Gulzar, S., Mujtaba Kayani, G., Xiaofeng, H., Ayub, U., & Rafique, A. (2019). Financial cointegration and spillover effect of global financial crisis: a study of emerging Asian financial markets. *Economic Research-Ekonomska Istraživanja*, *32*(1), 187–218. https://doi.org/10.1080/1331677x.2018.1550001

Hamao, Y., Masulis, R. W., & Ng, V. (1990). Correlations in price changes and volatility across international stock markets. *The Review of Financial Studies*, *3*(2), 281–307. https://www.jstor.org/stable/2962024.

Huang, Y., Song, J., & Liow, K. H. (2019). Relationship between the United States housing and stock markets: Some evidence from wavelet analysis. *The North American Journal of Economics and Finance*, *50*, 101033.https://doi.org/10.1016/j.najef.2019.101033

Hung, N. T. (2019). Return and volatility spillover across equity markets between China and Southeast Asian countries. *Journal of Economics, Finance, and Administrative Science*, *24*(47), 66–81. https://doi.org/10.1108/jefas-10-2018-0106

Jebran, K., & Iqbal, A. (2016). Examining volatility spillover between Asian countries' stock markets. *China Finance and Economic Review*, *4*(1). https://doi.org/ 10.1186/s40589-016-0031-1

Karolyi, G. A. (1995). A multivariate GARCH model of international transmissions of stock returns and volatility: The case of the United States and Canada. *Journal of Business & Economic Statistics*, *13*(1), 11. https://doi.org/10.2307/1392517

King, M. A., & Wadhwani, S. (1990). Transmission of volatility between stock markets. *Review of Financial Studies*, *3*(1), 5–33. https://doi.org/10.1093/rfs/3.1.5

Koutmos, G., & Booth, G. Geoffrey. (1995). Asymmetric volatility transmission in international stock markets. *Journal of International Money and Finance*, *14*(6), 747–762. https://doi.org/10.1016/0261-5606(95)00031-3

Kumar, R. (2019). Does trade interdependency lead linkages between stock markets? A case of South Asian countries. *International Journal of Emerging Markets*, *15*(3), 490–506. https://doi.org/10.1108/ijoem-08-2018-0446

Kumar, R., & Dhankar, R. S. (2017). Financial instability, integration, and volatility of emerging South Asian stock markets. *South Asian Journal of Business Studies*, *6*(2), 177–190. https://doi.org/10.1108/sajbs-07-2016-0059

Lingaraja, K., Mohan, C. J. B., Selvam, M., Raja, M., & Kathiravan, C. (2020, March 12). Exchange rate volatility and causality effect of Sri Lanka (LKR) with Asian emerging countries currency against USD. Papers.ssrn.com. https://ssrn. com/abstract=3553262

Miyakoshi, T. (2003). Spillovers of stock return volatility to Asian equity markets from Japan and the US. *Journal of International Financial Markets, Institutions and Money*, *13*(4), 383–399. https://doi.org/10.1016/s1042-4431(03)00015-5

Nelson, D. B. (1991). Conditional heteroskedasticity in asset returns: A new approach. *Econometrica*, *59*(2), 347-370. https://doi.org/10.2307/2938260

Nelson, D. B., & Foster, D. P. (1994). Asymptotic filtering theory for univariate arch models. *Econometrica*, *62*(1), 1. https://doi.org/10.2307/2951474

Ng, A. (2000). Volatility spillover effects from Japan and the US to the Pacific–Basin. *Journal of International Money and Finance*, *19*(2), 207–233. https://doi. org/10.1016/s0261-5606(00)00006-1

Panda, A. K., & Nanda, S. (2018). A GARCH modelling of volatility and M-GARCH approach of stock market linkages of North America. *Global Business Review*, *19*(6), 1538–1553. https://doi.org/10.1177/0972150918793554

Perera, A., & Wickramanayake, J. (2012). Financial integration in selected South Asian countries. *South Asian Journal of Global Business Research*, *1*(2), 210–237. https://doi.org/10.1108/20454451211252741

Sri Lanka Board of Investment. (2022). *Investment guide 2022*. Board of Investment of Sri Lanka. Retrieved from https://investsrilanka.com/investment-guide-2022, p. 30.

Shahzad, S. J. H., Kanwal, M., Ahmed, T., & Ur Rehman, M. (2016). Relationship between developed, European and South Asian stock markets: a multivariate analysis. *South Asian Journal of Global Business Research*, *5*(3), 385–

402.https://doi.org/ 10.1108/sajgbr-01-2015-0002

Sharma, G. D., & Bodla, B. S. (2011). Inter-linkages among stock markets of South Asia. *Papers.ssrn.com.* https://doi.org/ssrn.com/abstract=1964922.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica*, *48*(1), 1. https://doi.org/10.2307/1912017

Singhania, M., & Prakash, S. (2014). Volatility and cross correlations of stock markets in SAARC nations. *South Asian Journal of Global Business Research*, *3*(2), 154–169. https://doi.org/10.1108/sajgbr-04-2012-0056

Thangamuthu, M., Maheshwari, S., & Naik, D. R. (2022). Volatility spillover effects during pre-and-post COVID-19 outbreak on Indian market from the USA, China, Japan, Germany, and Australia. *Journal of Risk and Financial Management*, *15*(9), 378. https://doi.org/10.3390/jrfm15090378

Theodossiou, P., & Lee, U. (1993). Mean and volatility spillovers across major national stock markets: Further empirical evidence. *Journal of Financial Research*, *16*(4), 337–350. https://doi.org/10.1111/j.1475-6803.1993.tb00152.x

United Nations Conference on Trade and Development. (2022). *World Investment Report 2022: International tax reforms and sustainable investment*. United Nations. Retrieved from https://unctad.org/webflyer/world-investment-report-2022, p. 45.

Wang, Y., Abeyratna, G. & Power, D. (2005). *Return and Volatility Spillovers from Developed to Emerging Capital Markets: The Case of South Asia.* https://doi.org/www.nzfc.ac.nz/archives/2005/papers/Gunasekarage.pdf.

Wei, K. C. J., Liu, Y. J., & Yang, C. C. (1995). Volatility and price change spillover effects across the developed and emerging markets. *Pacific-Basin Finance Journa*l, 3, 113-136

Withanage, Y., & Jayasinghe, P. (2017). Volatility spillovers between south Asian stock markets: evidence from Sri Lanka, India, and Pakistan. *Sri Lanka Journal of Economic Research*, *5*(1), 79. https://doi.org/10.4038/sljer.v5i1.59

World Bank. (2024, May 9). *East Asia and the Pacific: Outperforming Yet Underachieving*.

World Bank Blogs. https://blogs.worldbank.org/en/eastasiapacific/east-asia-and-the-pacific--outperforming--yet-underachieving

Yang, Z., Zhou, Y., & Cheng, X. (2019). Systemic risk in global volatility spillover networks: Evidence from option-implied volatility indices. *Journal of Futures Markets*, *40*(3), 392–409. https://doi.org/10.1002/fut.22078

Yarovaya, L., Brzeszczyński, J., & Lau, C. K. M. (2016). Volatility spillovers across stock index futures in Asian markets: Evidence from range volatility estimators. *Finance Research Letters*, *17*, 158–166. https://doi.org/10.1016/j.frl.2016.03.005

Yoshida, Y. (2011). An Empirical examination of export variety: Regional heterogeneity within a nation. *The World Economy*, *34*(4), 602–622. https://doi.org/ 10.1111 /j.1467-9701.2010.01327.x

Appendix 1: Descriptive Statistics

Panel A: **Descriptive Statistics for daily returns**

Country	Mean	Median	Maximum	Minimum	STD.	Skw.	Kurtosis	CV
Sri Lanka	-0.0138	0.0000	37.3384	-33.3397	4.3098	0.2370	25.9014	-311.74
India	-0.0125	-0.0590	43.6574	-43.3954	6.5267	0.1575	19.3828	-520.22
China	-0.0036	-0.0272	33.8550	-36.0225	3.0345	-0.0351	52.0499	-849.54
Pakistan	-0.0212	-0.0221	32.4749	-29.4943	4.4874	0.1958	20.7259	-211.53
Japan	-0.0144	-0.0334	35.1809	-33.5618	4.8024	0.1436	25.6579	-332.74

Panel B: Jarque- Bera test results

Country	Sri Lanka	India	China	Pakistan	Japan
Test Results	38127.94	19510.58	174829.00	22843.43	37311.64
Prob.	[0.0000] *	[0.0000]*	[0.0000]*	[0.0000]*	[0.0000]*

Panel C: L-Jung Box q- Statistics

Country	Sri Lanka	India	China	Pakistan	Japan
LB (6)	369.22	373.53	127.64	436.19	309.91
Prob.	[0.0000] *	[0.0000]*	[0.0000]*	[0.0000]*	[0.0000]*
LB^2 (6)	334.14	340.94	284.47	412.25	349.61
Prob.	[0.0000] *	[0.0000]*	[0.0000]*	[0.0000]*	[0.0000]*
LB (12)	370.75	387.00	138.61	572.80	313.80
Prob.	[0.0000] *	[0.0000]*	[0.0000]*	[0.0000]*	[0.0000]*
LB^2(12)	456.26	384.74	284.60	625.39	378.93
Prob.	[0.0000] *	[0.0000]*	[0.0000]*	[0.0000]*	[0.0000]*

Panel D: ARCH (12) LM Test

Country	Sri Lanka	India	China	Pakistan	Japan
Test Results	119.80	69.15	55.28	164.30	106.43
Prob.	[0.0000] *	[0.0000] *	[0.0000] *	[0.0000] *	[0.0000] *

Panel E: Nonparametric Cross-correlation of daily stock exchange market returns

Country	SRI	IND	CHI	PAK	JAP
Sri Lanka	1	0.0122	0.0282	0.0263	-0.0152
India		1	-0.0174	-0.1190	-0.0229
China			1	-0.0306	0.0512
Pakistan				1	-0.0139
Japan					1

*Represents significance at 1%, ** Represents significance at 5%, and *** Represents significance at 10% critical values respectively, CV-Coefficient of variation, STD-Standard Deviation, Skw-Skewness, p-values are provided in parenthesis [], ARCH (LM) test Null Hypothesis is ARCH effects are not present in the first twelve lags. SRI-Sri Lanka, IND-India, CHI-China, PAK-Pakistan, and JAP-Japan.

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Social Enterprise Intention of Non-STEM University Students: Experimental Evidence

D.I.J. Samaranayake [a*], S. Maheswaran [b] and A. Mithursan [c]

a,c Department of Management Studies, Faculty of Management, University of Peradeniya, Sri Lanka

b Department of Operations Management, Faculty of Management, University of Peradeniya, Sri Lanka.

To link to this article: https://doi.org/10.31357/jbri.v10i1.7550

ARTICLE INFO

***Article History**:*

Received 15 May 2024
Revised 13 June 2024
Accepted 02 July 2024

Keywords

Choice experiment, financial constraints, social-enterprise intention, pro-sociality.

To cite this article: Samaranayake D.I.J., Maheswaran. S., Mithursan. A., (2024), Social Enterprise Intention of Non-STEM University Students: Experimental Evidence, 10:01, 26-46, DOI:10.31357/jbri.v10i1.7550

[*]Corresponding author. Tel: +447861743532
Email: dijs@mgt.pdn.ac.lk
https://orcid.org/0000-0002-1300-4524
b) https://orcid.org/0009-0001-9646-2423
c) https://orcid.org/0009-0009-2423-4729

ABSTRACT

The concept of social enterprise is an imperative facet of modern entrepreneurship that emphasizes the potential for businesses to generate profits while promoting societal well-being. However, this dual objective presents a significant challenge for entrepreneurs as it demands a strong commitment to social responsibility. Our study aimed to investigate the emerging trend of anti-social decisions made by young people in response to complex socio-economic constraints. The inquiry involved a series of classroom experiment conducted on 240 undergraduates in a hypothetical environment. The experiments presented the participants with opportunities to make prosocial or anti-social decisions regarding their occupational choices under four different socio-economic conditions and also in a structured coordination game. The results suggest that prospective employees may be more likely to make choices that benefit themselves, rather than others, when faced with difficult social and economic situations. However, those who opt to be self-employed expressed the highest prosocial motivation, indicating a strong desire to contribute to society. It is important to take these findings into account when creating educational policies and adjusting economic policies, such as tax policies. We need to encourage and educate young people in Sri Lanka to develop and express their desire to create positive social change, by promoting pro-social values and behaviors.

Introduction

There has been a long-standing debate surrounding the concept of "social" and "sociality" in the context of social enterprise discourse. This discourse views entrepreneurship as a means of benefiting society rather than solely maximizing profits (Tan et al, 2005; Steyeart and Hjorth, 2006; Farias et al., 2022). Social enterprise is considered an altruistic form of capitalism that places value on human activities beyond just financial gain (Tan et al., 2005; Roberts and Woods, 2005). It operates based on both social and economic forces and generates both social and economic outcomes (Hjorth, 2013). While the terms social and economic are intertwined, they also limit each other. In the history of Europe, we can see a growing "economization of social" that is dominated by the extensive social security system and the Scandinavian welfare state model. This model is financed by higher taxes, transparency, and mutuality. Therefore, social is a crucial part of economics in social enterprise discourse, but it is still largely unclear how this came to be. The existing literature on this topic is also inconsistent in how and why it occurs.

We need to analyze the inclination of undergraduates towards social entrepreneurship and how it links to their financial aspirations. Many universities encourage their students to become socially responsible entrepreneurs; hence, it is crucial to investigate how entrepreneurial intentions can generate both financial and social returns (Germak and Robinson, 2014), especially in developing economies like Sri Lanka. However, the ongoing economic crisis in Sri Lanka has put financial pressure on communities, which could lead young people to resort to anti-social ventures to improve their financial status. This could result in the opposite outcome of what we expect, which is more pro-social behaviour from youth. We aim to understand how young people respond to financial constraints and whether they are more inclined to choose anti-social occupations over social entrepreneurship. Thus, this research investigates how socio-economic hardships influence university students' interest in social entrepreneurship, particularly if financial pressures lead them towards prioritizing personal gain over social good.

Literature Review

Social Entrepreneurship (SE) is both a concept and a practice that requires a thorough understanding, as it encompasses various definitions and sources. SE is focused on creating a positive social impact by addressing a specific societal issue. According to Germak and Robinson (2014), it involves entrepreneurs from traditional business or public/non-profit sectors establishing sustainable enterprises that aim to generate both financial and social returns. This is often referred to as the "double bottom-line," and the literature further explores SE in terms of environmental returns. The field of SE has attracted significant interest from researchers, and the existing body of literature on SE is shaped by two main perspectives or schools of thought.

The first school of thought, known as the 'earned income strategies' approach, was developed by North Americans to address social problems that were not being adequately addressed by market forces. This approach emphasizes the creation of sustainable business models that can generate income while also addressing social issues. Some notable scholars who

have contributed to this school of thought include Dees (2001), Boschee and McClurg (2003), Weerawardena, et al. (2010), and Medine and Minto-Coy (2023). The second school of thought on SE focuses on social transformative initiatives conveyed by the non-profit sector. This approach views SE as a means of effecting change and emphasizes the role of individuals in the creation of new organizations to address social problems. Some prominent scholars who have contributed to this school of thought include Fowler (2000), Alvord et al. (2004), and Medine and Minto-Coy (2023).

In both of these schools of thought, individuals in third-sector organizations combine resources innovatively to offer better services. Studies on youth entrepreneurship explore the characteristics of young entrepreneurs, such as how demographic profiles, education, or ethnicity positively influence young people to become self-employed. Some notable researchers in this area include Athayde (2009), Kourilsky and Walstad (1998), and Lin et al. (2023). Despite the attention given to youth entrepreneurship in the literature, less is known about how young people demonstrate SE intention in crisis settings. This is an important area of inquiry, as young people may have unique insights and approaches that can help address social problems in times of crisis.

To understand the motivations that drive young people to engage in SE, it is essential to delve into the intersection of their social and economic objectives. This involves examining how they seek to address social issues while also considering the economic sustainability and impact of their ventures. Hockerts et al. (2010) proposes two methods for addressing social and economic objectives: either a retreat towards the philanthropic core or a partial abandonment of social objectives in favor of a business-oriented approach. However, this paper argues that social and economic goals are interconnected in a crisis setting. The "social" in SE is an integral part of economics, premised on the interaction and embeddedness of social and economic factors. The purpose of this paper is to examine the intention of SE through the lens of the embedded relation between social and economic factors from the perspective of potential SE. Furthermore, the desire for social change is seen as an outcome of the efforts of multiple SE actors—not just social entrepreneurs and enterprises, but also their beneficiaries (Dey and Steyaert, 2018). Therefore, pro-social behavior forms the foundation of SE research, and it requires examine the prosocial behaviour of young generations both conceptually and empirically. The study of SE intention is built upon understanding pro-social behavior, which involves examining the ways in which younger generations engage in positive and beneficial behaviors.

Pro-sociality is a term that refers to the willingness and intention of individuals to benefit others or society as a whole. This concept encompasses a wide range of behaviors that are considered good citizenship and extra-role behaviors. These behaviors can include volunteering, donating to charity, and helping others without expecting anything in return. According to research conducted by Brief and Motowidlo in 1986, as well as more recent studies by Baruch et al. (2004) and Bolino and Grant (2016), individuals who exhibit pro-social behavior tend to demonstrate a strong desire to achieve success in their careers. However, this does not mean that they are willing to sacrifice the well-being of others for their own success. On the contrary, they are often motivated to

help others, as they understand that their success is not mutually exclusive to the success of those around them. Recent research by Monyei et al. (2022) has also highlighted the importance of pro-social behavior in the workplace. They found that employees who exhibit pro-social behavior are more likely to be seen as valuable team members, which can lead to greater job satisfaction and career success.

Furthermore, Boundenghan et al. in 2012 studied both pro-organizational and pro-individual behavior and found that an individual's level of affectivity and commitment to their chosen career can have a significant impact on their pro-social behavior. In other words, individuals who are passionate about their careers and feel a strong sense of commitment to their organization are more likely to exhibit pro-social behavior. Overall, the research suggests that pro-social behavior is not only beneficial to others and society as a whole, but it can also lead to greater career success and personal fulfillment.

Accordingly, pro-sociality has a close connection with the SE based on motivation and commitment. Banuri and Keefer (2012) conducted an experiment to investigate the difference between the pro-social behavior of employees in non-caring government and non-caring non-government organizations. Their findings revealed that the subjects associated with public sector institutions exhibited significantly more pro-social behavior than those from non-governmental organizations. This was verified by another phase of their experiment with a different subject pool (Banuri and Keefer, 2016). In addition, the outcomes from the new subject pool implied that workers with greater pro-social motivation applied higher real effort in tasks, and high pay attracts less pro-socially motivated subjects. Apart from that, Kimbrough and Vostroknutov (2016) observed that the pro-social behavior of individuals was driven by social norms rather than individual preferences. Exploring the presence of human capital that can generate financial and social returns for the economy through social entrepreneurship is crucial, particularly in developing economies (Germak and Robinson, 2014). Surprisingly, there is a dearth of research on community-based methods to evaluate the preparedness of potential social entrepreneurs or young individuals to establish and manage social enterprises in Sri Lanka.

We aim for this study to be one of the pioneering efforts to utilize laboratory experiments in order to observe the impact of individual morality, pro-social behavior, and socioeconomic status on the inclination to initiate social enterprises in Sri Lanka. The multifaceted crisis in the Sri Lankan economy today and its socio-economic pressures could necessitate the involvement of highly motivated and dedicated entrepreneurs in establishing and promoting social enterprises. In particular, Sri Lankan youth, who are yet to enter the workforce, need to possess specific attitudes, pro-sociality, and intentions to become social entrepreneurs. This becomes even more critical when promoting social enterprises in response to ongoing economic crises, as socio-economic constraints may hinder the development of pro-sociality and intentions aimed at promoting societal well-being. Therefore, it is interesting to observe how young people respond to potential financial constraints by being presented with opportunities to choose anti-social occupations for income generation. Growing labour force participation in the informal and shadow economic activities can be considered as prospects for anti-social

occupations (Chandrasiri, 2008; Samaranayake and Dayaratne-Banda, 2015; Samaranayake, 2017).

We focused on two key constraints observable in a typical job market: the 'income-expenditure gap' relative to the average compensation (also known as financial constraints), and 'qualifications/skills mismatch' relative to employees' expectations. Our approach followed the model developed by Akerlof and Kranton (2000), incorporating psychological and sociological factors of identity and their influence on economic choices. It was developed by the inclusion of psychological and sociological factors of identity and the way it determines economic choices.

$$U_j = U_j(a_j, a_{-j}, I_j) \quad \textbf{(}\text{Equation 1)}$$

When the utility depends on both a person's identity (I_j) and their actions (a_j) as well as others' actions (a_{-j}), their identity is determined by various factors.

$$I_j = I_{(j}(a_j, a_{-j}; C_{j,}\varepsilon_{j,}\, P) \quad \text{(Equation 2)}$$

The concept of a person's identity is based on their assigned social categories (C_j), their individual characteristics (ε_j), and the expectations denoted as "P". The "P" represents the degree to which a person's individual characteristics (ε_j) align with the ideal of their assigned social categories (C_j). These factors are expected to influence people's satisfaction and economic gains, as higher utility leads to greater satisfaction and economic benefits. Our experiment is designed based on utility models and their interactive nature, taking into account the constraints resulting from satisfactory states in occupation and intentions regarding tax evasion and participation in the shadow economy.

Research Methodology

The study conducted a rigorous and detailed examination of two anti-social behaviors, specifically tax evasion and earning from the shadow economy. The research methodology utilized a sequence of carefully designed choice experiments to provide a comprehensive understanding of the implications of these behaviors. Additionally, the study incorporated a recurring choice to optimize either individual or societal well-being, which allowed for a nuanced assessment of the impact of these behaviors on the larger society. A detailed description of the experimental designs and analytical strategies are given in the sections below. Overall, this study provides a detailed and insightful analysis of the complex relationship between these behaviors and their effects on social enterprise intention.

Experimental Design: Baseline and the Treatments

Research in social sciences is modeling the behavior of most diverse entity; the human beings. People's choices are diverse and are in different structures along with their behavior and it creates differences in economic outcomes. Further, it was recognized that the peoples' identity impacts on differences in choices and economic outcomes (Akerlof and Kranton, 2000). This study focuses how the respondent's identity; a person's sense of self architects their choices along with given determinants when considering anti-social behaviours.

Concerning the utility model developed by Akerlof and Kranton (2000), this study uses

two distinctive criteria; "*the job satisfaction*" and "*the enrollment in shadow economy*" in modeling the degree of interlink in between the prosociality and the undergraduate's motivation to engage in an occupation after the graduation. Accordingly, the utility model for "*the job satisfaction*" is developed through featuring the elements of j's identity (I_j) as follows,

(1) Assigned Social Category (C_j): The occupation j's assigned to provide the service.
(2) Own given characteristics (ε_j): The degree of educational/professional qualifications, skills/talents, experience and preference j's belongs to.
(3) Prescription (P): The difference between (C_j) and (ε_j).

Similarly, the utility model for "*the enrollment in shadow economy*" is developed through featuring the elements of j's identity (I_j) as follows,

(1) Assigned Social Category (C_j): The level of income (income category) j's assigned by the occupation he/she recently involved.
(2) Own given characteristics (ε_j): The degree of j's expenditure in different activities.
(3) Prescription (P): The difference between (C_j) and (ε_j).

Then these two utility models may converge and designs a payoff matrix with hypothesized outcomes belongs to the subject j along with his/her choices made. The designed game may launch in a laboratory in order to obtain the results out of the choice architectures designed over the base matrixes featuring the elements of j's identity (I_j) as above. Thus, the study used following baseline and treatments to be tested through four rounds in each laboratory session.

Round A [Baseline]: $C_j = \varepsilon_j$ in the both utility models
(Qualifications/skills matched + income>expenditure)

Round B [Treatment 1]: $C_j \neq \varepsilon_j$ in the first utility model
(Qualifications/skills mismatched + income>expenditure)

Round C [Treatment 2]: $C_j \neq \varepsilon_j$ in the second utility model
(Qualifications/skills matched + income<expenditure)

Round D [Treatment 3]: $C_j \neq \varepsilon_j$ in the both utility models
(Qualifications/skills mismatched + income<expenditure)

Experimental Design: Hypotheses

The experiment aims to predict the possible outcomes of a game based on two psychological dimensions - "SATISFACTION" and "ENROLLMENT". These dimensions reflect the cognitive features of an individual in the game (let's recall j^{th} individual). "SATISFACTION" refers to the level of satisfaction that two cognitive players in the game experience based on the social category assigned to them. On the other hand, "ENROLLMENT" includes two options - the cognitive decision of the subject to either enroll in the shadow economy or not. In this game, the participants make their own decisions and receive cognitive payoffs based on their

choices. The diagram below demonstrates the hypothetical strategic outcomes of the game.

Figure 1: The hypothesized outcome matrix

S (I) \ S (II)	Y	N
Y	0,0	0,1
N	1,0	**1,1**

Source: Authors' Preparation

In this experiment, respondents' satisfaction status is represented by S(I) and S(II) based on their assigned Social Category (C_j) and their own given characteristics (ε_j) respectively. The alternative activities provided in the experiment mostly have the features of a shadow economic activity. It is assumed that the respondents are aware of the repercussions and damages caused by the shadow economy before making their selections. The hypothesized outcome is represented by a binary numbering system that indicates whether the respondents enrolled (1) or did not enroll (0) in the alternative activities. If the respondent is satisfied with both satisfactory terms, then they will not be able to enroll in alternative activities. Conversely, an individual who is not satisfied with both dimensions of 'SATISFACTION' tends to enroll in alternative activities.

The proposed framework underwent rigorous validation through the use of a pre-designed game in a highly controlled laboratory experiment. Our sample size of 240 respondents was randomly selected from the undergraduate population of the Faculty of Arts and the Faculty of Management at the esteemed University of Peradeniya, Sri Lanka. The majority of psychological and behavioral studies use student samples because students are typically seen as more uniform than representative samples (Druckman and Kam, 2011; Hanel and Vione, 2016). To further confirm this homogeneity, we made sure to randomly select subjects from a group of non-STEM students who have completed mandatory courses in their curriculum, gaining essential knowledge about the Sri Lankan Economy, Employment, and Entrepreneurship. To create a cross-platform computing environment, the experiment was conducted in eight equally facilitated sessions, each with thirty respondents in the computer laboratory. The game was expertly designed with sequential sessions using "Node.js" and "Visual Studio Code," two open-source software applications. The researcher provided clear instructions and payoffs to the respondents during gameplay. The results were analyzed using both descriptive and econometric tools, expertly interpreting the findings.

Analytical Strategy: Payoff Matrix

The experiment is conducted using a payoff matrix, which determines the decision of the respondents in each session. Each session involves 30 respondents and is organized according to the method described. The payoff matrix determines the scores given in each session. This matrix is based on the response of the respondent to the final question of each round of the session. The experiment consists of four rounds, and the final question of each round asks whether the respondent can engage in alternative activities or not. The scores are given separately for three main clusters (A, B and C), where ten respondents are placed under

each cluster in a single experimental session. If a respondent decides to "ENROLL," the individual is given marks in descending order along with the number of respondents who made the same decision. A higher number of respondents who choose "ENROLL" at the end of each session may lower the points given to each respondent. On the other hand, if a respondent chooses "NOT ENROLL," the individual is given marks in ascending order along with the number of respondents who made the same decision. The higher the number of respondents who choose "NOT ENROLL" at the end of each session, the higher the points given for each respondent.

Table 1: Payoff Matrix

Out of all ten players		Your Earnings/Cost in each round (in points)			
		If you take "E"		If you take "NE"	
Enroll (E)	Not Enroll (NE)	**E (Numbers)**	**E (Your Points)**	**NE (Numbers)**	**NE (Your Points)**
0	10	0	**-**	10	**100**
1	9	1	**100**	9	**90**
2	8	2	**90**	8	**80**
3	7	3	**80**	7	**70**
4	6	4	**70**	6	**60**
5	5	5	**60**	5	**50**
6	4	6	**50**	4	**40**
7	3	7	**40**	3	**30**
8	2	8	**30**	2	**20**
9	1	9	**20**	1	**10**
10	0	10	**10**	0	**-**

Source: The authors.

This matrix intends to explain the decision-making behavior which can optimize the societal wellbeing. Once all respondents able to enroll in alternative activities that may embed higher chance to generate more shadow economic activities. Lower the "ENROLL" might lower the intensity of generating shadow economic activities. On the other hand, if all respondents prefer "NOT ENROLL" in alternative activities, then could lower the intensity of having shadow economic activities. Lower the "NOT ENROLL" might higher chance to generate more shadow economic activities. Therefore, as we compare the individual gains and social impact, the best option for an individual is to choose "ENROLL" given that lower number of competitors may go with same choice. Once we consider the social gains, the best option is "NOT ENROLL" which could provide the same score for each individual irrespective of the number of respondents/competitors who prefer the same choice.

Analytical Strategy: The Binary Logistic Model

The proposed computer application for the laboratory experiment consists of four equally important rounds and each round represent a different situation based on the given satisfactory status depending on the qualifications/experience related to the job

and the level of income embed to the job provide at the hypothetical setup. The final question of each round let respondent to choose whether they enroll in alternative activities or not. The questions prior to the final question at each round and some important data out of the respondent profile can be identified as impactful factors for the respondents' decision. Such intuition can be verified throughout the review of literature in the second chapter.

Therefore, a regression analysis can be performed as the sample collected in a randomize technique to observe the nature of impacts from the indicators mentioned across the four rounds separately. Then the regression analysis could focus a binary dependent variable which given two options for the respondents at the end of each round. As a result of the nature of the dependent component in the experimental data, this study preferred having a "Binary Logistic Model (BLM)" to regress the data (Hosmer and Lemeshow, 2000). Therefore, the following BLM define the model used in the study to analyses the collected data from 240 respondents over eight experimental sessions.

$$ln\ ln\ \frac{P}{(1-P)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots + \beta_n X_n + \varepsilon \qquad \text{(Equation 3)}$$

According to the regression provided above, the dependent component expresses the log of the odd ratio. Here the odd ratio $P/(1-P)$ represent the probability of respondents prefer to enroll in alternative activities when compared to the probability of the respondents who do not prefer to enroll. Then the β_0 represent the constant of the model where as $\beta_1 X_1 + \beta_2 X_2 \ldots . + \beta_n X_n$ represent the causal variables and their coefficients derive from the experiment. The ε represent the error component for the unobserved factors affecting the odd ratio. The following table describes all the causal variables used in the model.

The computer application for the laboratory experiment consists of four equally important rounds. Each round represents a different situation based on the given satisfactory status, depending on the job qualifications/experience and the level of income offered at the hypothetical setup. The final question of each round lets respondents choose whether to enroll in alternative activities or not. The questions before the final question at each round, along with some important data from the respondent profile, can be identified as impactful factors for the respondents' decision. Such intuition can be verified by reviewing the literature in the second chapter.

To observe the nature of impacts from the indicators mentioned across the four rounds separately, a regression analysis can be performed as the sample is collected in a randomized technique. Then, the regression analysis could focus on a binary dependent variable, which gives two options for the respondents at the end of each round. As a result of the dependent component's nature in the experimental data, this study preferred having a "Binary Logistic Model (BLM)" to regress the data. Therefore, the following BLM defines the model used in the study to analyze the collected data from 240 respondents over eight experimental sessions.

$$\frac{P}{(1-P)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots + \beta_n X_n + \varepsilon \qquad \text{(Equation 3)}$$

According to the regression provided above, the dependent component expresses the log of the odd ratio. Here the odd ratio $P/(1-P)$ represent the probability of respondents preferring to enroll in alternative activities when compared to the probability of the respondents who do not prefer to enroll. Then β_0 represents the constant of the model whereas $\beta_1 X_1 + \beta_2 X_2 \ldots . + \beta_n X_n$ represent the causal variables and their coefficients derived from the experiment. The ε represents the error component for the unobserved factors affecting the odd ratio. The following table describes all the causal variables used in the model.

Results and Discussion

The laboratory experiment was conducted in eight sessions, with thirty respondents per session. Each session consisted of four rounds, and each round presented a different hypothetical situation that considered the assigned characteristics and given characteristics of each respondent. The experimental outcome was analyzed across four different aspects. The first step was to perform a descriptive analysis of the experimental data obtained. Then, the scores obtained by each cluster at four different rounds were analyzed using the developed payoff matrix. The third procedure used the Binary Logistic Model (BLM) to observe the impact of explanatory factors on the respondents' decision to "ENROLL" or "NOT ENROLL" in alternative activities across all four rounds. Finally, the experiment's last step used the Structural Equation Modeling with appropriate path analysis to identify the factors that describe the shadow economy out of the explanatory factors given at each round.

4.1. Descriptive Analysis of the Experimental Data

Based on the descriptive analysis, the most important findings are summarized for each round.

- *The pressure created through $C_j \neq \varepsilon_j$ reduces the respondent's satisfaction with the occupation assigned (see APPENDIX I).*

The respondents were given few options to assess the nature of impact from the $C_j \neq \varepsilon_j$ to the satisfactory status of the officially assigned job. According to the analysis, the majority of respondents were satisfied with the officially assigned jobs having very few who are not satisfied at the initial round. This round provided a situation that matches the assigned social category (C_j) and the own given characteristics (ε_j). Then the second round consisted of signals for severe underemployment based on the respondents' qualifications and experience. Therefore, the assigned social category (C_j) and the own given characteristics (ε_j) do not perfectly match. Somehow, according to results, the respondents' satisfaction was marginally reduced with very few more respondents who did not satisfy with the job assigned. Then, the third round creates the imbalance between C_j and ε_j based on the gap between the income and expenditure levels of individuals. This made a significant impact on the respondents' decision and increased the number of respondents who are in-between and not satisfy with the officially assigned job. This means the 'income-expenditure gap' is more responsive and influential than the mismatch in 'qualifications/skills' on the utility models introduced by Akerlof and Kranton (2000).

This led respondents to prefer anti-social occupations. Further, the fourth round created significant pressure on the respondents with imperfections among both the income-expenditure status and the job-related experience and the qualification. It made the majority of respondents who were in-between at the third round not to satisfy with the officially assigned job. This highlights how a person's sense of self would be modified by the interaction and embeddedness of social and economic factors (Hockerts et al., 2010), and this, in turn, can impact the decisions they make regarding their careers.

- *The burden of income-driven underemployment stimulates respondents to improve their engagement in the shadow economy (see APPENDIX II and APPENDIX III).*

The descriptive analysis used several dimensions to investigate the possibilities of respondents' engagement in the shadow economic activities. Accordingly, the respondents' preferences on taxation were used as one of the key determinants. Because the definitions given for shadow economy are given an important position itself to the taxes assigned to economic activities. If any activity functioned without paying official taxes assigned, it might recognize as a part of the shadow economy. Once the respondents were questioned on their intention to pay taxes for the officially assigned job, the most significant change across the preferences was given at the third round of the experiment. The most of respondents who prefer to pay taxes at the initial and second round was change their minds and did not prefer to pay taxes in the third round. So, this round consisted of signals for underemployment upon the imbalance between C_j and ε_j based on the gap between the income and expenditure levels of individuals as described in the utility models by Akerlof and Kranton (2000).

On the other hand, the respondents were given to express their preference for paying taxes for the alternative activities they can engage in. According to the comparison, the greatest number of respondents who were not preferred to pay taxes for alternative activities reported from the third round of the experiment. Therefore, this had proven that the burden of income driven underemployment stimulates respondents to improve their engagement in the shadow economic activities. These findings would significantly enhance the current body of knowledge concerning the expansion of labor force participation in informal and shadow economic activities. This is particularly in consideration of works by Chandrasiri (2008), Samaranayake and Dayaratne Banda (2015), and Samaranayake (2017), and the subsequent structural relationship developed by Samaranayake (2017) that elucidates potential causal links between underemployment and engagement in the shadow economy.

The Payoff Matrix Analysis

This matrix intends to explain the decision-making behavior which can optimize societal wellbeing (*Table 2*). Once all the respondents are able to enroll in alternative activities, which may embed a higher chance to generate more shadow economic activities. Lower the "ENROLL" might lower the intensity of generating shadow economic activities. On the other hand, if all respondents prefer "NOT ENROLL" in alternative activities, they could lower the intensity of shadow economic activities.

Table 2. Estimated Respondents' Preferences in Average

Round	Cluster	Preference	Value	Approx.	Score/Points
1	A-Private	ENROLL	8.875	9.0	20
		NOT ENROLL	1.125	1.0	10
	B-Public	ENROLL	9.625	9.5	15
		NOT ENROLL	0.375	0.5	05
	C-Self	**ENROLL**	**8.5**	**8.5**	**25**
		NOT ENROLL	**1.5**	**1.5**	**15**
	Total	ENROLL	9.0	9.0	20
		NOT ENROLL	1.0	1.0	10
2	A-Private	ENROLL	8.625	8.5	25
		NOT ENROLL	1.375	1.5	15
	B-Public	**ENROLL**	**8.25**	**8.0**	**30**
		NOT ENROLL	**1.75**	**2.0**	**20**
	C-Self	ENROLL	8.875	9.0	20
		NOT ENROLL	1.125	1.0	10
	Total	ENROLL	8.58	8.5	25
		NOT ENROLL	1.42	1.5	15
3	**A-Private**	**ENROLL**	**8.5**	**8.5**	**25**
		NOT ENROLL	**1.5**	**1.5**	**15**
	B-Public	ENROLL	8.75	9.0	20
		NOT ENROLL	1.25	1.0	10
	C-Self	**ENROLL**	**8.375**	**8.5**	**25**
		NOT ENROLL	**1.625**	**1.5**	**15**
	Total	ENROLL	8.54	8.5	25
		NOT ENROLL	1.46	1.5	15
4	A-Private	ENROLL	8.75	9.0	20
		NOT ENROLL	1.25	1.0	10
	B-Public	ENROLL	8.75	9.0	20
		NOT ENROLL	1.25	1.0	10
	C-Self	**ENROLL**	**8.625**	**8.5**	**25**
		NOT ENROLL	**1.375**	**1.5**	**15**
	Total	ENROLL	8.71	8.5	25
		NOT ENROLL	1.29	1.5	15

Source: The authors.

Once we consider the responses by total participants irrespective of clustered provided, the greatest number of respondents prefer "ENROLL" in the first round, which is 90 percent, and given only 20 and 10 scores for respondents who "ENROLL" and "NOT ENROLL" respectively. Then the other three rounds consist of a similar outcome, 85 percent for "ENROLL" according to the approximate value and given 25 and 15 scores accordingly. Further, the exact values estimated for the other three rounds exhibit a slight improvement in respondents' choices to prefer "ENROLL" at the final round. This explains how the respondents make their decision in favor to engage in alternative activities and later concerns to reduce the degree of enrollment in alternative activities at the second and third rounds. Once they identify the situational pressure having lower satisfaction and issues in the relative income, the decision reverse back among a few respondents and considered enroll in alternative activities back again. Somehow the changes among respondents' decisions are highly marginal

and the majority maintained their choice, "ENROLL" across each round.

Therefore, this majority concern provided very low scores for the respondents according to the matrix. Further, it revealed that the majority of respondents from the sample are motivated for private gains rather than express any interest in societal gains. This indicates a lack of prosocial motivation among the respondents, despite the emphasis in literature on the significance of having the intention to contribute to society (Boundenghan et al., 2012; Germak and Robinson, 2014; Banuri and Keefer, 2016), particularly when a profession aims to align with a prosocial mission. However, the self-employed cluster appeared to be the occupational cluster which earned the highest score at three rounds in the experiment. It revealed that the respondents who are assigned to the self-employed cluster are the group of people with the least intention to enroll in alternative activities available. This experiment lets exactly half of the respondents in the sample to get aware of shadow economic activities. Therefore, the usual expectation is to observe more individuals not to enroll in alternative activities once they recognize them as the shadow economy. Though the outcome of the comparison provided a result confront to the expected outcome. The majority of respondents who prefer to enroll in the alternative activities are from the cluster who aware of the shadow economy at all four rounds. In overall, these observations would suggest the possibility in prosocial motivation driven by individual preferences, and which looks exceeds the influence by social norms in contrasts to the experimental findings of Kimbrough and Vostroknutov (2016).

The BLM Analysis

As a result of the nature of the dependent component in the experimental data, this study preferred having a "Binary Logistic Model (BLM)" to regress the data (see Appendix IV). Therefore, the following BLM defines the model used in the study to analyze the collected data from 240 respondents over eight experimental sessions. According to the results, all four BLMs ran across four different rounds are statistically significant according to the Omnibus Test of Model Coefficients and the Hosmer & Lemeshow (HL) Test. Then the BLM regressed at the first round was recognized as the most fitted model according to the Pseudo r-squared measures. Then, the regressed models for each round provided the following equations to describe the association between the term and the response.

Round 1:

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = \beta_{4(1)}\,Ambition\,(1) + \beta_{5(2)}Occupation(2) - \beta_{9\,(1)}R_{Q6}(1) - \beta_{9(2)}R_{Q6}(2) + \varepsilon$$

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = 4.184^{***} + 1.868^{*} - 2.095^{***} - 1.655^{*}$$

Round 2:

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = \beta_{4(1)}\,Ambition\,(1) - \beta_{9\,(1)}R_{Q6}(1) - \beta_{9(2)}R_{Q6}(2) + \beta_{11(1)}Assigned\_j\,(1) + \varepsilon$$

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = 2.246^{*} - 3.086^{***} - 3.295^{***} + 1.668^{**}$$

Round 3:

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = \beta_{4(1)}\ Ambition\ (1) + \beta_7\ R\_Q4\ (2) - \beta_{9\,(1)}R_{Q6}(1) - \beta_{9(2)}R_{Q6}(2) + \beta_{10}\ Awareness + \varepsilon$$

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = 2.250^{*} + 1.502^{**} - 3.376^{***} - 2.397^{***} + 0.805^{*}$$

Round 4:

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = \beta_{4(1)}\ Ambition\ (1) + \beta_{4(3)}Ambition\ (3) - \beta_{9\,(1)}R_{Q6}(1) + \varepsilon$$

$$ln\ ln\left[\frac{Enroll}{Not\ Enroll}\right] = 3.111^{***} + 0.988^{*} - 2.328^{***}$$

According to the results given at all four rounds, there were two common significances among the responses given. Those are $Ambition\ (1)$ and $R_{Q6}(1)$ given in all four models. According to the magnitude and the sign of estimated coefficients for $Ambition\ (1)$, the respondents who assumed that their ambition is low than the average compared to the others generate a significant positive impact towards the enrollment in alternative activities when compared to the respondents who assumed that their ambition is the worst and the lowest. Based on these observations, it seems likely that people are motivated to behave in a helpful and cooperative manner based on their personal preferences. This motivation appears to be stronger than the influence of societal expectations, which differs from the results of the study conducted by Kimbrough and Vostroknutov in 2016. Also, according to the magnitude and its sign of $R_{Q6}(1)$ provided that the individuals who do prefer to enroll in alternative activities once no taxes embedded are more likely impact the final decision to enroll in alternative activities when compared to the respondents who prefer in between the decision.

In addition to that, there are some other responses such as preferred occupation, assigned job, the respondent's concern in paying taxes for the officially assigned job, and the awareness of the shadow economy and significant at different BLMs across the four rounds. Accordingly, this analysis can outline the nature of impact from the selected responses towards the decision to enroll in alternative activities and its impact and characteristics on architect the shadow economy throughout the choices made by respondents. Therefore, we are making a valuable contribution to the existing body of knowledge regarding the social entrepreneurial intentions of the youth in Sri Lanka and the role of pro-sociality and internal beliefs in decision-making within the context of socio-economic challenges. We emphasize the significance of conducting thorough investigations into the intrinsic motivations and underlying reasons for the motivational crowding out effects. This approach complements the existing research interests (Athayde, 2009; Kourilsky and Walstad, 1998; Lin et al., 2023) and allows us to understand how and why young individuals choose to pursue self-employment in social ventures.

Further, our results suggest that prospective employees representing the younger generation with potential to be social entrepreneurs, are more likely to make

choices that benefit themselves, rather than others, when faced with difficult social and economic situations. However, those who opt to be self-employed expressed the highest prosocial motivation, indicating a strong desire to contribute to society.

Implications and Conclusions

Upon conducting a descriptive analysis of the experimental data, two important outcomes were observed. The first outcome revealed that respondents' satisfaction with their assigned occupation decreased due to the pressure created by the dynamics in their job characteristics. This could be attributed to the fact that the mismatch in job characteristics were challenging and demanding, resulting in increased stress levels among the respondents. The second outcome was that respondents who were underemployed and driven by income were more likely to engage in the shadow economy. This is concerning, as it suggests that individuals who are unable to secure stable employment tend to resort to anti-social choices as a means of survival.

Both outcomes are concerning because they suggest that new employees may be more likely to make choices that benefit themselves, rather than others, when faced with difficult social and economic situations. Further, the analysis using the Binary Logistic Model shows that the respondents who believed that their ambition was lower than the average compared to others were more likely to enroll in alternative activities. It is crucial to consider these factors carefully in our educational policy, especially during times of crisis. The average citizen faces multifaceted challenges, particularly during times of crisis, and it is important to motivate and educate Sri Lankan youth to expand and express their social enterprise intentions, through naturing prosocial motives and practices. This requires strong curricula which could influence the behaviour and morality of undergraduates. Definitely, this will be a clash between rationality and morality of youth, who wish to be social entrepreneurs in future, yet we expect a win for the morality. This will not only help to reduce the engagement in anti-social economic activities such as the incidence of shadow economy but also create a more inclusive and sustainable economic system that benefits all.

The topic at hand is the available options for public policy. In this regard, an important finding has emerged from the Binary Logistic Model that can provide valuable insight into economic policy at the border. The results suggest that individuals who engage in alternative activities tend to participate in economic activities that are not officially taxed. Furthermore, the path analysis reveals that the most significant indicator of the shadow economy is a respondent's willingness to participate in alternative activities, particularly when there are no taxes to pay. These findings highlight the importance of addressing underemployment to reduce participation in the shadow economy.

It is recommended to consider income-driven underemployment carefully, as it can help reduce participation in the shadow economy. Additionally, it is suggested to introduce progressive tax policies instead of regressive ones to discourage individuals from engaging in shadow economic activities. Regressive tax schemes can create adverse incentives and widen the gap between an employee's expenses and income, ultimately leading individuals to make antisocial choices instead of prosocial ones. On the other hand, progressive taxes

target the proportion of income received by employees and discourage unnecessary participation in alternative activities. This underscores the importance of creating a comfortable environment for nascent employees by enriching their moral education and adjusting aggregate economic policies such as tax policies. If we want to promote social entrepreneurial intention among the youth, it is essential to adjust our economic policies accordingly.

After conducting a thorough analysis of the outcome matrix, the results show that the majority of respondents from the sample were motivated by private gains rather than expressing interest in societal gains. This suggests that individuals prioritize personal benefits over the well-being of the community. However, there is hope to be found in the experiment as the self-employed cluster emerged as the occupational cluster that earned the highest score in all three rounds. The findings indicate that respondents who are assigned to the self-employed cluster have the lowest intention to enroll in alternative activities available, which is a positive development for promoting social enterprise intention. The data shows that those who opt to be self-employed expressed the highest prosocial motivation. This is promising as it suggests that people who are preferred to be self-employed in the sample have a strong desire to contribute to society.

Therefore, in overall, results are concerning because they suggest that prospective employees may be more likely to make choices that benefit themselves, rather than others, when faced with difficult social and economic situations. It's important to take these findings into account when creating educational policies and adjusting economic policies, such as tax policies. We need to encourage and educate young people in Sri Lanka to develop and express their desire to create positive social change, by promoting pro-social values and behaviors.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

D. I. J. Samaranayake and A. Mithursan are the Lab experimenters, primarily involved in experiment methodologies, data collection, analysis and draft the manuscript. S. Maheswaran is the literature reviewer and co-writer, focusing on literature, and finalizing the manuscript with significant changes.

References

Akerlof, G. A. and Kranton, R. E. (2000). Economics and Identity. *The Quarterly Journal of Economics*, 115(3), 715-753. https://doi.org/10.1162/003355300554881

Alvord, S. H., Brown, L. D., and Letts, C. W. (2004). Social Entrepreneurship and Societal Transformation: An Exploratory Study. *The Journal of Applied Behavioral Science*, 40(3), 260-282. https://doi.org/10.1177/0021886304266847

Athayde, R. (2009). Measuring Enterprise Potential in Young People. *Entrepreneurship Theory and Practice*, 33(2), 481-500. https://doi.org/10.1111/j.1540-6520.2009.00300.x

Banuri, S. and Keefer, P. (2012). Prosocial behavior where we least expect it? The selection and socialization of intrinsically-motivated government

(tax!) officials. *World Bank Working Paper*, Development Economics Research Group, World Bank, Washington, DC. https://pdfs.semanticscholar.org/f0a1/f32324f8bbef462e9f2144133ac41 9bcd49e.pdf.

Banuri, S. and Keefer, P. (2016). Pro-social motivation, effort and the call to public service. *European Economic Review*, 83, 139-164. https://doi.org/10.1016/j.euro ecorev.2015.10.011.

Boundenghan, M., Desrumaux, P., Léoni, V. and Nicolas, C. (2012). Predicting prosocial behavior in the workplace: Links with organizational justice, commitment, affectivity, and personality. *Revue internationale de psychologie sociale*, 25, 13-38. https://www.cairn.info/revue--2012-3-page-13.htm.

Boschee, J. and McClurg, J. (2003). Toward a Better Understanding of Social Entrepreneurship: Some Important Distinctions. *Social Enterprise Alliance*. http://www.se-alliance.org/better_understa nding.pdf.

Brief, A. P. and Motowidlo, S. J. (1986). Prosocial Organizational Behavior. *Academy of Management Review*, 11, 710-725. https://doi.org/10.2307/258391

Baruch, Y., O'Creevy, M.F., Hind, P. and Vigoda-Gadot, E. (2004). Prosocial Behaviour and Job Performance: Does the Need for Control and Need for Achievement Make a Difference? *Social Behaviour and Personality*, 32(4), 399-412. https://doi.org/10.2224/sbp.2004.32.4.399

Bolino, M.C. and Grant, A.M. (2016). The Bright Side of Being Prosocial at Work, and the Dark Side, Too: A Review and Agenda for Research on Other-Oriented Motives, Behavior, and Impact in Organizations. *The Academy of Management Annals*. http://dx.doi.org/10.1080/19416520.2016.1153260.

Chandrasiri, S. (2008). The labor market in Sri Lanka with special reference to the informal economy. *Sri Lankan Economic Journal*, 9(1), 113-141.

Dees, J.G. (2001). The Meaning of "Social Entrepreneurship". *Draft Paper*. http://www.fuqua.duke.edu /centers/case/documents/dees_SE.pdf

Dey, P. and Steyaert, S. (2018). *Social Entrepreneurship: An Affirmative Critique*, Cheltenham, UK: Edward Elgar Publishing.

Druckman J.N. and Kam C.D. (2011). Students as Experimental Participants: A Defense of the "Narrow Data Base." In: Druckman, J. N, Green, D. P, Kuklinski, J. H, Lupia A. [ed.]. *Cambridge Handbook of Experimental Political Science*. New York: CUP, 41–57.

Farias, C., Fernandez, P., Hjorth., D and Holt, R. (2022). *Organizational Entrepreneurship, Politics and the Political*, Routledge.

Fowler, A. (2000). NGDOs as a Moment in History: Beyond Aid to Social Entrepreneurship or Civic Innovation? *Third World Quarterly*, 21(4), 637–654. http://www.jstor.org/stable/3993370

Germak, A. J., and Robinson, J. A. (2014). Exploring the Motivation of Nascent Social Entrepreneurs. *Journal of Social Entrepreneurship*, 5(1), 5–21. https://doi.org/10.1080/19420676.2013.820781

Hanel P. H. and Vione K. C. (2016). Do Student Samples Provide an Accurate Estimate of the General Public? *PLoS One*. 11(12):e0168354. doi: 10.1371/journal.pone.0168354.

Hjorth, D. (2013). Public Entrepreneurship: Desiring Social Change, Creating Sociality. *Entrepreneurship & Regional Development*, 25(1-2), 34-51. https://doi.org/10.1080/08985626 .2012.746883

Hockerts, K., Mair, J., and Robinson, J. (Eds.) (2010). *Values and Opportunities in Social Entrepreneurship*. Palgrave Macmillan.

Hosmer, D.W., and Lemeshow, S. (2000). *Applied logistic regression*. 2nd ed., John Wiley & Sons, Inc., New York.

Kimbrough, E. O. and Vostroknutov, A. (2016). Norms Make Preferences Social. *Journal of the European Economic Association*, 14(3), 608-638. http://dx.doi.org/10.2139/ssrn.2267135

Kourilsky M. L., and Walstad W. B. (1998). Entrepreneurship and female youth: Knowledge, attitudes, gender differences, and educational practices. *Journal of Business Venturing*, 13(1), 77–88. https://doi.org/10.1016/S0883-9026(97)00032-3

Lin, J., Qin, J., Lyons, T. & Sekiguchi, T., (2023). Planning and evaluating youth entrepreneurship education programs in schools: A systematic literature review. *Entrepreneurship Education*, *6*(1), 25-44. http://dx.doi.org/10.1007/s41959-023-00092-4

Medine, A., and Minto-Coy, I. (2023). *Social entrepreneurship strategies and social sector sustainability: A Caribbean context*, Springer Nature. http://dx.doi.org/10.1007/978-3-03118533-5_8

Monyei, F. E., Igwe, A. A., Onyeanu, E. O., Kelvin-Iloafu, L. E., and Ukpere, W. I. (2022). The impact of pro-social behaviours on workplace performance and sustainability of university administration. *Sustainability*, *14*(14): 8853. https://doi.org/10.3390/su14148853

Roberts, D., & Woods, C. (2005). Changing the world on a shoestring: The concept of social entrepreneurship, *University of Auckland Business Review*, 45–51. https://dhriiti.com/wp-content/uploads/2017/11/Changing-the-world-on-a-shoestring_The-concept-of-Social-Entreprene urship.pdf

Samaranayake, D. I. J., & Dayarathna-Banda, O. G. (2015). Unemployment, Official Economy and the Dimension of the Shadow Economy; an Empirical Analysis for Sri Lanka Using SEM Approach. *Sri Lanka Journal of Economic Research*, 3(1), 113-153. https://doi.org/10.4038/sljer.v3i1.86

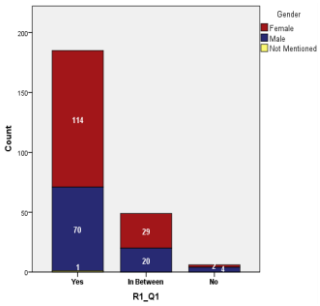
Samaranayake, D.I.J. (2017). Reflects the hidden: Measuring Sri Lankan Shadow Economy. *Asian Economic and Financial Review*. 7(7), 656-676. https://doi.org/10.18488/journal.aefr.2017.77. 656.676

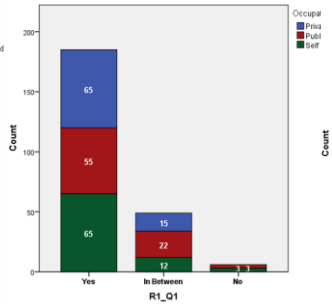
Steyeart, C. & Hjorth, D. (2006). *Entrepreneurship as a Social Change*, Edward Elgar Publishing.

Tan, W. L., Williams, J. N., and Tan, T. M. (2005). Defining the 'Social' in 'Social Entrepreneurship': Altruism and Entrepreneurship. *International Entrepreneurship and Management Journal*. 1(3), 353-365. https://doi.org/10.1007/s11365-0052600-x

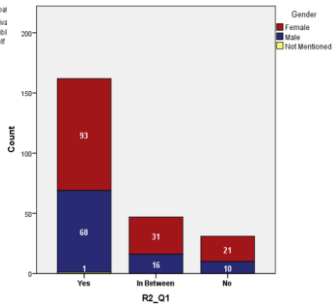
Weerawardena, J., McDonald, R.E., Mort, G.S. (2010). Sustainability of nonprofit organizations: An empirical investigation. *Journal of World Business*, 45(4), 346–356. https://doi.org/10.1016/j.jwb.2009.08.004

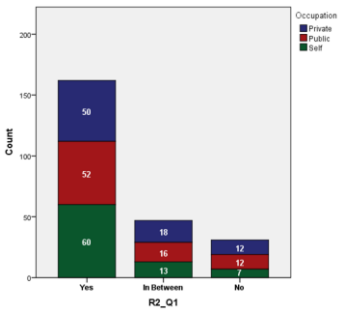
Appendixes



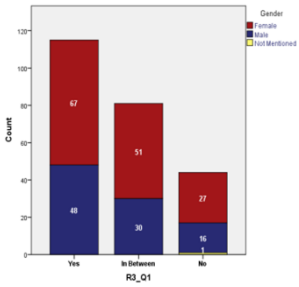


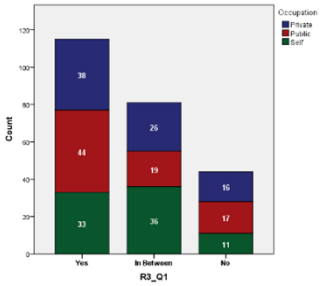
Round 1



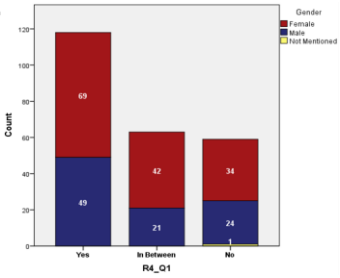


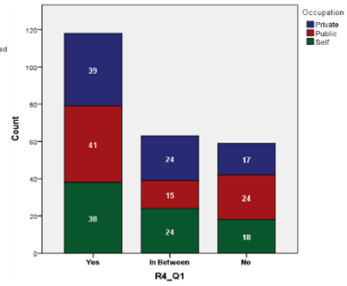
Round 2





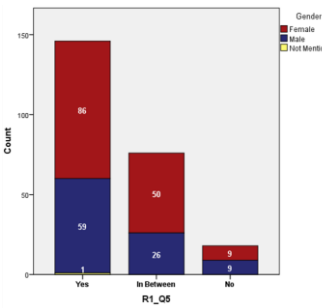
Round 3

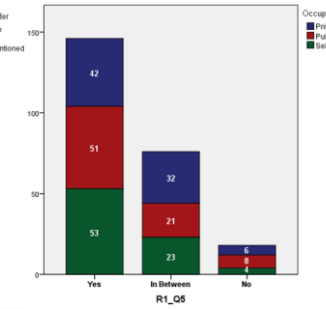




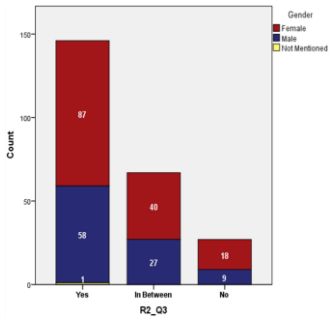
Round 4

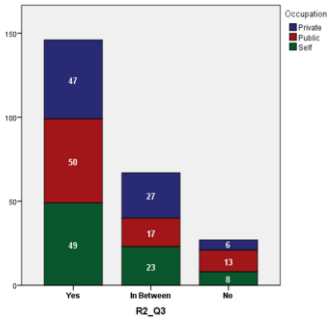
Appendix I. Satisfaction of the Respondents on the Occupations *(Source: The authors)*



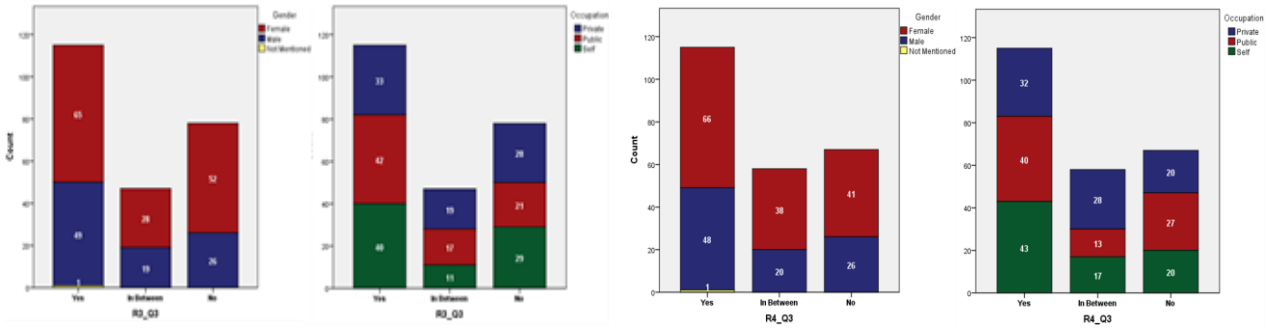


Round 1



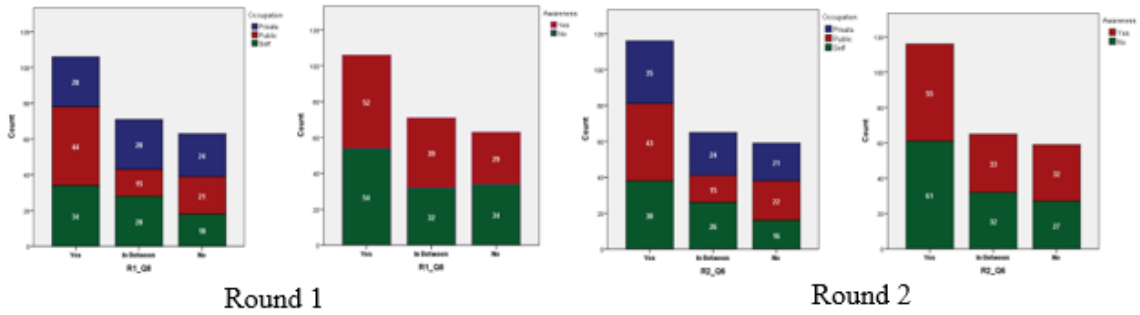


Round 2

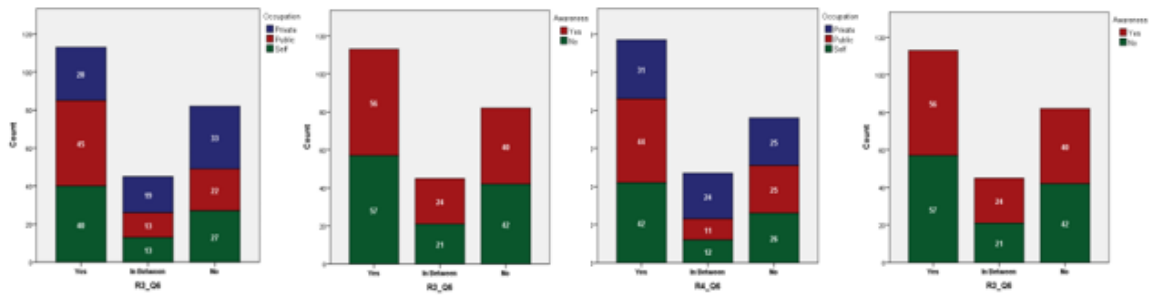


Round 3 Round 4

Appendix II. Respondents' Willingness to Pay Tax on the Official Job *(Source: The authors)*



Round 1 Round 2



Round 3 Round 4

Appendix IV. Respondents' Willingness to Pay Tax for Alt. Activities *(Source: The authors)*

The Variable	Description	Type of Data	No. of Categories	Round
Gender	Whether Male, Female or Not Mentioned	Nominal	3	Profile
Outfit	The outfit preference of the respondent	Ordinal	4	Profile
Model	The task preference of the respondents at the working place.	Nominal	4	Profile
Ambition	The ambition of the respondents in average when compared to others.	Ordinal	4	Profile
Occupation	The preferred occupation.	Nominal	3	Profile
R_Q1(R1_Q 1)	The satisfactory status of the respondent on the job.	Ordinal	3	1
R_Q2(R1_Q 3)	The satisfactory status of the respondent on the income.	Ordinal	3	1
R_Q3 (R2,3,4_Q1)	Whether the respondent prefer stay in the job or not.	Ordinal	3	2,3,4
R_Q4(R1_Q 5/R2,3,4 Q3)	Respondents' willingness to pay taxes embed to their official job.	Ordinal	3	1,2,3,4
R_Q5(R1_Q 8/R2,3,4_Q6)	Respondents' willingness to pay taxes for alternative activities.	Ordinal	3	1,2,3,4
R_Q6(R1_Q 9/R2,3,4_Q7)	Respondents' willingness to engage in alternative activities once no taxes to pay.	Ordinal	3	1,2,3,4
Awareness	Whether the respondent aware of shadow economy or not.	Nominal	2	Cluster
Assigned_j	The hypothetical job provided for the respondent.	Nominal	3	Cluster

Appendix IV. Description of the causal variables used in the BLM *(Source: The authors)*

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Exploring Perceived Usefulness and Ease of Use of Facebook as a Tool for Continuous Assessment in a Sri Lankan State University

Mufeeda Irshad[a]

a University of Sri Jayewardenepura, Sri Lanka

To link to this article: https://doi.org/10.31357/jbri.v10i1.7551

ARTICLE INFO

***Article History**:*

Received 12 October 2023
Revised 03 December 2023
Accepted 06 December 2023

Keyword

Continuous assessment, Facebook, Perceived usefulness, Perceived ease of use, Second language development

To cite this article: Mufeeda Irshad (2024) Exploring Perceived Usefulness and Ease of Use of Facebook as a Tool for Continuous Assessment in a Sri Lankan State University ,10-01,47-62, DOI:10.31357/jbri.v10i1.7551

Corresponding author. Tel: +94772916335.
Email: mufeedairshad@sjp.ac.lk ;
https://orcid.org/0000-0002-3409-4768

ABSTRACT

This study aimed to explore how a group of English as a second language students (ESL) of a Management Faculty at a state university in Sri Lanka perceived the usefulness and ease of use of Facebook (FB) as a tool for Continuous Assessment (CA). It was imperative to assess students' perceptions regarding the implementation of FB for CA, as it represents a novel concept within the institute where this study took place. The study involved 257 participants, 191 females and 66 males. Data were collected through two open-ended questions, and the measurement scales developed and validated by Davis (1989) were used to analyze the usefulness and ease of use of FB. Findings indicate that most of the participants perceive FB as a useful tool for CA. As for its ease of use, only a few participants commented. The study's conclusion suggests that while FB has potential as a tool for CA, improvements are necessary regarding its ease of use. This study contributes to the current debate on the use of social media platforms as tools for CA, in higher educational contexts.

Introduction

Facilitating tertiary-level students who have previously studied in a medium of instruction other than English the space to think and write in English is a useful part of second language development. This article reports on a study that delved into the perspectives of English as a second language (ESL) students of a Management Faculty at a state university in Sri Lanka, whose native language and medium of instruction at school is either Sinhala or Tamil, on using a social media platform for continuous assessment with the goal of developing their language skills, specifically writing. However, more than two decades of teaching experience have revealed that students are often hesitant when it comes to writing, most likely due to the inherently complex and iterative nature of the writing process.

Students'' reluctance to engage in writing despite its importance raises a crucial question: How can language educators motivate students to participate in writing activities? In response to this question, it was decided to try out an alternative approach to develop students' writing skills by taking advantage of students' interest in technology. Of the social networking sites, for language learning, research indicates that Facebook emerges as the predominant social networking site of choice, followed by YouTube, WhatsApp, Twitter, Telegram, and Edmodo (Tan & Yunus, 2023). Thus, Facebook (FB) was selected as a platform (see below as to why FB was selected) to conduct one of the continuous assessments (CA). The primary goal of conducting a CA over homework, classwork, or any other assignment was to align with the exam-oriented mindset of the students. The tasks were designed to foster a holistic approach to writing (details of which are given below), and marks were awarded as an incentive for the process and not just the final outcome.

The Use of FB for Language Learning

Although FB is primarily known as a social networking platform, it is steadily gaining recognition as a credible e-learning platform (Kasperski & Blau, 2020). Devi et al (2019) argue that FB facilitates the improvement of human interaction and communication in a real context using asynchronous and synchronous methods. Awidi et al's (2019) findings endorse further the potential of FB as a technology enriched learning environment that promotes collaborative learning among students extending beyond traditional classrooms. Integrating FB in educational and instructional contexts hold promise as it also fosters student engagement and provides students with a meaningful learning experience (Qassrawi & Al Karasneh, 2023).

Research has also revealed that FB can be used as an alternative to learning management systems (LMS) offered by universities in language teaching (Ulla & Perales, 2021). It is reported that, unlike traditional LMS, FB's pedagogical affordances are easily accessed and facilitate collaborative learning and engagement among students and faculty (Al-Rahmi, Othman, & Yusuf, 2015; Chugh & Ruhi, 2018). FB can also be used as an extension of classroom interaction to attract and encourage introverted students to participate in learning activities (Al-Rahmi et al., 2015)

This study contributes to the evolving

landscape of technology enhanced ESL learning in Sri Lanka and aims to enhance students' ESL skills, specifically writing skills by leveraging their interest in FB, providing an alternative to traditional assessment methods and aligning with their exam-oriented mindset. The use of FB for CA represents a new approach within the scope of this study. This study introduces an innovative pedagogical approach for continuous assessment. This unconventional use of FB for continuous assessment contributes to the existing scholarship on incorporating technology to address the challenges in ESL.

Research Questions

This study set out to find out the perceived usefulness and ease of use of this unconventional approach shedding light on the use of FB for continuous assessment within the Sri Lankan ESL classroom of a state university in Sri Lanka. The following research questions were addressed:

1. Do ESL students perceive the adoption of FB as a useful tool for CA?
2. Do ESL students perceive the adoption of FB for CA as easy to use (free of mental and physical efforts)?

The sections that follow will cover the review of relevant literature, the method employed to collect and analyze data, the results obtained, a discussion of the results, and conclusions drawn with implications.

Literature Review

Methods Used to Teach ESL at the Tertiary Level

With the increasing demand for graduates proficient in the English language due to new job opportunities created as a result of the open market policy embraced by the government of Sri Lanka (Perera, 2001), the communicative language teaching approach (CLT) was adopted to address this need and align with the global trends, in the late 1980s (Mosback, 1990; National Institute of Education, 1999; cf. Perera, 2001). CLT continues to form the basis of English as a foreign/second language education in Sri Lanka and many other countries worldwide.

Even though the extensive use of the Internet and the advent of Web 2.0 technologies have significantly changed the field of education, with educators increasingly incorporating them into their teaching and learning methodologies (Yucedal, 2023), in the context of this study, technology is still being used as a mode of delivery, only. Studies have shown that Web 2.0 applications provide opportunities for active, collaborative, and participatory learning experiences that can enhance students' critical thinking, knowledge sharing, and engagement, leading to more effective and meaningful learning outcomes (Schulz et al., 2015). However, these technologies are yet to be integrated into English language classrooms.

Continuous Assessment in ESL

Assessment is an indispensable component of the educational process that is vital to promote learning and is a measurement of learning outcomes. The typical assessment test items that are being

used in the field of ESL are traditional discrete test items, such as true/false, short answer questions, short composition, fill in the blanks with the given clues, letter writing, and rearranging words to make sentences, and fill in forms with information (Shiksha, 2020). Generally, both traditional pen and paper and online modes are used to administer the assessments. Even the International English Language Testing System (IELTS) uses discrete test items to test the skills of reading, writing, and listening. This has been the practice over the years.

Integrating FB for Continuous Assessment

In the context of this study, discrete point tests were administered to test the progress of the students prior to the technological era. With Generation Z entering the university, the strategies of learning and assessing had to be changed. One such change was the introduction of FB for CA. Research shows that students exhibit a high level of engagement when utilizing FB virtual learning communities (Yilmaz & Yilmaz, 2023). Additionally, researchers have identified that FB can be important in aiding students to prepare for assessments (Pickering & Bickerdike, 2017). Using FB as a host site to incorporate assessment has also been reported to have positive student feedback (McCarthy, 2013). Manca and Ranieri (2016) have reported the affordances of using FB as an online learning platform and an assessment tool. Research also indicates that the formal integration of FB in courses has enhanced communication between peers on tasks and assignments (Baran, 2010). These findings establish that FB could serve as a robust pedagogical approach for 21st-century higher education (Selwyn, 2009). Thus, FB for CA was introduced to promote ESL learning, specifically writing in a holistic manner in the context of this study.

This approach was grounded in the core principle of language learning, the Complex Dynamic Systems Theory (CDST), which suggests that motivated and engaged students are more likely to actively participate in the learning process (see *The Theoretical Principles That Informed the Intervention for more on CDST).*

The FB for CA intervention was designed on the principles of CDST. CDST stipulates that cognitive and environmental factors play a vital role in language development and recognizes the non-linear trajectories of this process over time (Godwin-Jones, 2018). According to this theory, language learning is a dynamic and progressive experience that occurs through meaningful interactions, allowing students to create meaning for themselves. As Larsen-Freeman (2018) suggests, language emerges dynamically as students notice and adapt to frequently occurring patterns in regular contexts of use. This process is described as “repetition, reuse, and re-purposing of language chunks” (Ellis, 2017; cf. Godwin-Jones, 2018, p. 11).

The theory also emphasizes the importance of considering the complexity of individual students and the language development process when interpreting language development results (Dörnyei, 2017). It is worth noting that the principles of CDST and its applications indicate that findings from one language learning context or individual students may not necessarily apply to other contexts or students. The underlying assumption was

that by incorporating FB for CA and utilizing the features of FB, such as authentic language use, interactive communication, collaborative learning, multimodal learning, and technology integration, students would be motivated to indulge in ESL writing.

One of the rationales for adopting FB for CA is rooted in the significant influence of the Internet and Web 2.0 technology on today's students. With its vast reach and user-friendly interface, FB has become a vital part of generation Z (Low & Wong, 2023) who spend a great deal of time on online platforms. In Sri Lanka too, in March 2023, there were approximately eight million FB users in the country, representing a substantial 37.5% of the total population. Among these users, 26.2% were between 18 to 24 years old (napoleancat.com), aligning with the age group of students in the context of this study. This underscores the prevalence of FB engagement among young individuals, making the adoption of innovative approaches such as FB for CA relevant for ESL development.

Moreover, students exhibit diverse learning preferences, including visual, auditory, read-and-write, and kinaesthetic (Fleming & Mills, 1992). Approximately 50-70 % of students have multiple learning styles or multimodal preferences. Being able to access materials that are in their preferred modality alone is not sufficient to achieve the learning outcomes. Successful learning depends on being motivated to learn. Thus, by using FB for CA, it is hoped that diverse learning styles could also be accommodated. FB for CA was also aimed at familiarizing students with the potential of using social networking strategies by introducing them to simple information-sharing and categorizing techniques, as most corporate communication strategies currently follow various social networking systems to streamline their activities (e.g.: WhatsApp, Facebook, Twitter, and Viber). Such strategies are used in a multitude of business communications-related tasks such as team planning, marketing and advertising, and CSR projects.

Finally, FB was chosen over other platforms because of the familiarity of the ESL teachers in the context of this study, who predominantly use FB over other social networking sites (most of them don't even have an Instagram or Twitter accounts). Since it is the teachers who have to implement the assessments, opting for a platform they are most familiar with was considered practical.

Research Gap

While previous research has extensively examined FB's potential as a language learning tool (Barrot, 2018), research has not yet provided much insight into students' perspectives on the integration of FB for CA, not only within the Sri Lankan context but also in language learning contexts worldwide. The focus of this study is therefore to gain a comprehensive understanding of how tertiary-level students perceive the integration of FB for CA. Do they perceive it as a useful tool? Do they perceive it as easy to use? These inquiries are essential for the development of pedagogically meaningful CA activities using the FB platform. It is hoped that this research will contribute to the expanding body of knowledge on the use of FB for CA in higher educational contexts.

Perceived Usefulness (PU) and Perceived Ease of Use (PEoU) of Facebook for Continuous Assessment

Research has also shown that institutional authorities have conflicting opinions on the use of technology in academic and professional settings (Tour, 2015). Studies (Roblyer, McDaniel, Webb, Herman, & Witty, 2010) have found that educators are reluctant to incorporate FB into their teaching, which could be due to inexperience with social media platforms and apprehension about integrating their professional and personal lives when using them for pedagogical reasons (Anderson & Williams, 2011). With authorities and educators showing apprehension, students may also have questions about the pedagogical relevance of using social media platforms for learning and assessment. They may be unsure about the educational benefits of incorporating FB or may be concerned about the potential distractions or lack of academic rigour associated with these platforms. Thus, it was considered vital to explore the students' perspective with regard to the usefulness and ease of use of FB for CA.

According to Davis's (1989) Model of Technology Acceptance (TAM), PU and PEoU are key factors in determining users' acceptance of technology. PU is defined as "the degree to which an individual believes that using a particular system would enhance his/ her job performance" (Davis, 1989, p. 320) while PEoU refers to "the degree to which an individual believes that using a particular system would be free of physical and mental efforts" (Davis, 1989, p. 320). This study defines PU as "the degree to which a studnet believes using FB for CA". PEoU is defined as the "degree to which a student believes that using FB for CA would be easy (free of physical and mental efforts)."

Methods

This study sought to examine the views of a group of tertiary-level students on the perceived usefulness (PU) and perceived ease of use (PEoU) of FB for CA.

The Intervention Process, Challenges Encountered, and Action Taken

The intervention involved the setting up of a Social Media Group Page that was accessible to all students. This was done using the Social Media site, FB, and the name given to the FB group page was MARC English. The coordinator of the ESL course (in the context of this study) functioned as the page administrator. The students were given the URL to MARC English and asked to join. Once the students joined MARC English, they were given three tasks in the form of short assignments and asked to upload their answers in no more than 50 to 75 words on the group page as a status update. Detailed guidance for completing the assignments appeared on the MARC English group wall. The students were also given instructions to start each submission with the (hashtag)#BCUActivity*#G** and #CPM*** (*Activity number, **student's group number, ***Student's CPM number. Each student was also asked to search for four of their classmates' submissions using the classmates' designated Hashtags and to comment on them in no more than 20 words with the (hashtag) #G** and #RN*** (*student's group number, *** Student's Registration Number). Commenting on submissions was mandatory. Students were instructed

not to leave any space between the words or numbers after each '#'(hashtag) when submitting their task and commenting on their classmates' submissions.

The teachers in charge gave feedback to the students of their respective groups by searching within the group page using the above hashtags. Marks were awarded for each student's submission as well as for the four comments made on the submissions of her/his classmates based on an evaluation criterion developed by the course coordinator.

During the implementation of FB for CA, several challenges were encountered, including the presence of fake profiles, students not adhering to instructions, and copying of others' answers. To address the issue of fake profiles, strict participant verification guidelines were implemented, profiles were monitored, and suspected fake accounts were removed. To address the issue of students not adhering to instructions, the importance of following instructions was clearly communicated to the students, reminders were given by the coordinator and the teacher, and the consequences for non-compliance were established. To prevent copying of others' answers, separate groups/pages were created, guidelines were enforced, and appropriate measures were taken.

Data Collection

At the conclusion of the intervention, students' perceptions of PU and PEoU of FB for CA were assessed using two open-ended questions. The questions asked were 'Do you perceive FB for CA as a useful tool?' and 'Is FB easy to use for CA? Students were also asked to provide reasons for their answers. These questions aimed to gather qualitative data regarding students' perceptions of the usefulness and ease of use of Facebook for continuous assessment.

The two questions and instructions for students were translated into Sinhala and Tamil to enable them to respond in their preferred language. This was done to encourage the participants to provide the most comprehensive responses possible. Participants were given the assurance that their data would only be used for research purposes (Huba & Freed, 2000). Data were collected through a Google Form. The link to the google form was emailed to all the first year management students at the respective state university. However, only a total of 257 students (191 females, 66 males) between the ages of 20 and 22 responded. ***The answers written by respondents are reported as it is, without any changes, to keep the original flavour of the responses.***

The Analytical Technique Adopted

The data obtained from the two open-ended questions were analysed using descriptive statistics and content analysis to identify the patterns that emerged. For quantitative analysis, using SPSS 16.0, the written responses that the participants had submitted were first converted into a matrix where the rows were units of analysis (the participants who were assigned numbers 1, 2, 3……) and the columns were the variables (the responses that emerged), and the cells were the values for each unit of analysis on each variable (Bernard, 1996, p. 10). The absence of a response was assigned a "0" and the presence of a response was assigned the code "1".

The content analysis of the texts involved

a multiple-stage process. The 257 written texts obtained from the participants were first quantified. Before quantifying the data, the parts of the response that were written in Sinhala and Tamil were translated into English by the researcher. The participants' responses were then transcribed exactly as they had written them using double spacing with a wide margin and given identification numbers. The data were analyzed using the measurement scale devised and verified by Davis (1989) to determine the students' PU and PEoU. The data gathered were analyzed in light of the research questions based on these two definitions. Thirty-nine respondent items were created after carefully assessing the semantic content for each construct.

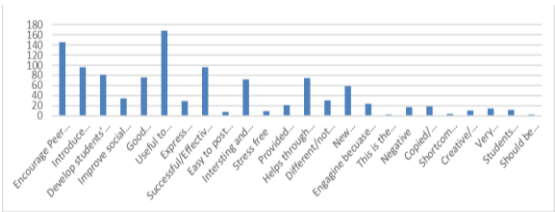


Figure 1: Students' Responses

Source: Author

On further analysis, those responses that best matched the definitions of the two constructs were retained, resulting in Eleven (PU-Positive), two (PU-negative), one (PU-Neither Positive nor Negative), and three (PEoU) items.

Results and Discussion

Results

This study's finding reveal that students' perceived FB to be a useful tool for CA. Specifically, the perceived usefulness (PU) of FB had the highest frequency of mentions, with a mean of 50.2% (SD=.501), while perceived ease of use (PEoU) had a mean of 5.4% (SD=.227).

Within the PU responses, the most frequently mentioned variable was **the ability to develop English language skills** accounting for 76.3 % of responses (Mean = .76, SD = 0.426). On the contrary, **improving of technology skills** was the least mentioned (7.8%, Mean= .08, SD=.27). As for perceived ease of use (PEoU) of Facebook for continuous assessment, **the ability to use Facebook at one's own pace** had the highest frequency of mentions at 5.4% (Mean =.05, SD = .227). In comparison, responses such as **ease of use** (4.7%, Mean= .05, SD=.211) and **the ability to use the platform without stress** (3.5%, Mean = .04, SD =.184), had lower frequencies of mentions. Table 1 below presents the frequency, percentage, means, and standard deviation of the positive comments of perceived usefulness and perceived ease of use of Facebook for continuous assessment.

A small percentage of participants negatively perceived the usefulness of FB for CA. The most frequently mentioned negative response was that **the task should be done more professionally** (0.8%, Mean = .01, SD = .88). The mean rating for this response was very low, indicating that it was not a significant concern for most students. An issue raised by 8.9% of students pertained to plagiarism (Mean = .09, SD 0.286). Specifically, 23 students mentioned instances of copying from the Internet or their peers, reflecting a comparatively higher level of concern.

A small percentage of students (1.6%) did not express a negative or positive stance

on the perceived usefulness of FB for CA.

Positive Comments					
Perceived Usefulness (PU)	**Themes**	**Frequency**	**Percent**	**Means**	**SD**
	Helped improve technology skills	20	7.8	.08	.268
	Could express ideas creatively	38	14.8	.15	.356
	Engage with interesting content	64	24.9	.25	.433
	Different/Not traditional/New experience	82	31.9	.32	.467
	Interactive/Engaging	101	39.3	.39	.489
	The task introduced students to social networking as a learning tool	104	40.5	.40	.492
	Successful/Effective method	129	50.2	.50	.501
	Students read, check, and give their opinions about what their peers have written	148	57.6	.58	.495
	Useful to develop English language skills	196	76.3	.76	.426
Perceived Ease of Use (PEoU	**Themes**	**Frequency**	**Percent**	**Means**	**SD**
	Stress-free	9	3.5	.04	.184
	Easy to use	12	4.7	.05	.211
	Can do at own pace	14	5.4	.05	.227

Table 1: Frequency, percentage, means, and standard deviation for PU (positive comments) and PEoU (Positive Comments) of FB for CA

Source: Author

However, these students stated that whatever shortcomings of Facebook as a learning tool could be rectified, suggesting that there may be potential to address these challenges and improve the effectiveness of using FB for CA. The mean rating for this theme was 0.02 (SD= .124), indicating that these comments were not strongly held. Table 2 below presents the frequency, percentage, means, and standard deviation of the negative and neither negative nor positive comments of perceived usefulness of use of Facebook for continuous assessment.

Table 2: Frequency, percentage, mean, and standard deviation for PU of FB for CA (negative comments and neither negative nor positive comments)

Perceived Usefulness (PU) (Negative Comments)	**Themes**	**Frequency**	**Percentage**	**Means**	**SD**
	Should be done in a more professional way	2	.8	.01	.088
	Students copied from the internet and their peers	23	8.9	.09	.286
PU (Neither Positive nor Negative)	Shortcomings can be rectified	4	1.6	.02	.124

Source: Author

Discussion

This study attempted to find answers to two questions with the aim of exploring the potential of FB for CA in the context of this study. The first question was if students perceive the adoption of FB as useful for CA. The participants generally expressed positive opinions about the usefulness of FB for CA.

The participants appreciated the flexibility and convenience FB offered. How it

enabled them to work on assignments anytime and anywhere before the deadline. They also said that it reduced stress and motivated them to improve their work. The opportunity to read their peers' answers and comments was also seen as beneficial in developing their ESL skills and social knowledge. Previous research has similarly highlighted the usefulness of FB as an assessment tool (Pickering & Bickerdike, 2017; Manca & Ranieri, 2016). The positive perceptions of FB as an effective and engaging tool for CA align with the growing tendency to incorporate technology into the formal learning process (Yilmaz & Yilmaz, 2023). Researchers Chugh & Ruhi (2018) have observed that Facebook can be an engaging and interactive platform that can motivate students and facilitate practical language learning. The findings of this study also show that FB can support student interaction, collaboration, and engagement and facilitate communication and information sharing.

Some of the negative comments raised were that some students copied answers from the internet or their peers, leading to duplication of ideas. There were also comments about the possibility of users handing over their accounts and passwords to third parties to complete the assignments, leading to questions about academic integrity. The low percentage of negative comments indicates that FB may still have potential as a tool for CA. However, it is important to address the issues raised and implement measures to ensure that the task is conducted more professionally. Additionally, addressing the issue of students copying from the internet and their peers will help to ensure that the learning process is fair and effective.

The findings highlight the importance of considering both the advantages and potential drawbacks of using social media platforms, in general, and FB, in particular, for CA. As for participants' perceived ease of use of FB for CA, the results indicate that although they appreciated the convenience and flexibility of using it, they still had to exert mental and physical effort to complete their assignments. FB, used as a tool for CA, requires students to read, comprehend, analyze and create responses. Nonetheless, students reported that using FB as a tool was less stressful than traditional classroom-based assignments. Previous studies have also noted that using social media as a pedagogical tool requires student effort. Al-Rahmi et al. (2015) stated that even though students perceived FB as a useful tool, they still had to invest mental effort in reading and comprehending the content. The results also indicate that there were no significant gender differences in the perceptions of the participants. Even though more males than females felt that FB was useful for developing their ESL skills, the difference is not significant. This indicates that both female and male students perceive FB for CA as useful. In addition, it is an indication that the students in this context of study use social media regardless of their gender.

Conclusion

The results of the study provide valuable insights into the perceptions of participants towards the adoption of FB for CA. This study reiterates the findings of Selwyn (2009) and Chugh & Ruhi (2018) that FB could be considered useful for ESL development, especially writing

skills and continuous assessment. The study concludes that while FB has potential as a tool for CA, improvements are necessary regarding its ease of use.

The findings have implications for educators and policymakers. Educators should not hesitate to use FB for CA, as FB can provide a new and engaging experience for students. It can also help improve their writing and technology skills and equip them with essential skills for thriving in the digital era. Educators should consider redesigning continuous assessments that align with students' technological preferences. This could include technology integrated collaborative assessment, continuous feedback loops, and interactive assessment formats. Educators should also explore social media platforms such as FB to promote a shift towards technology enhanced language learning and assessment and incorporate them into the ESL curriculum. FB also promotes student engagement and motivation. Educators could leverage social media platforms such as FB for the creation of inclusive learning environment and assessments which cater to students with different learning styles. As for policymakers, they should consider endorsing FB as a valuable tool in ESL education by acknowledging its potential for ESL learning by taking steps to conduct professional development programs to enhance educators' digital literacy and knowledge of various social media tools since some educators are not very familiar with certain social media platforms.

However, it is also important to address the concerns raised by a small percentage of participants that the FB tasks assigned to the students should have been done in a more professional way. To address this, guidelines and best practices can be provided to ensure that the use of FB for CA is perceived as more professional. Another concern raised by some participants was that students may have copied from the internet or their peers. To address this, plagiarism detection software can be incorporated, or clear guidelines on the importance of creating original work be given. Some participants expressed concerns about the ease of use of FB for CA. To address this, the assessments should be simple (not complicated), practical, and stress-free. This will encourage increased utilization of social media platforms such as FB for educational purposes, especially by those who may be hesitant due to concerns about the ease of use. Even though a small percentage of the participants raised concerns with regard to FB for CA, the majority of the participants perceived FB for CA to be useful. Therefore, it is recommended to continue using social platforms such as FB for continuous assessment and as a learning tool despite the concerns raised by a small percentage of participants.

The study has several limitations. The limitations of this study include the sample size and the fact that the study was conducted in one institution only, which may limit the generalizability of the findings. Additionally, the study was conducted during a specific period, and the findings may not be applicable to different time periods or contexts. The study is also limited to PU and PEoU of FB as a tool for CA and did not evaluate its effectiveness in improving learning outcomes.

Future research should focus on investigating the efficacy of as a language

learning tool and its long-term impact on ESL development. In addition, future studies should examine the potential of FB to facilitate language development in populations with limited access to technology and educational resources. Moreover, studies with larger sample sizes and different populations should be carried out to validate the findings of this study.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

References

Al-Rahmi, W., Othman, M. S., & Yusuf, L. M. (2015). The role of social media for collaborative learning to improve academic performance of students and researchers in Malaysian higher education. *The International Review of Research in Open and Distributed Learning*, *16*(4). https://doi.org/10.19173/irrodl.v16i4.2326

Anderson, L. L. L., & Williams, L. (2011). The use of new technologies in the French curriculum: A national survey. *The French Review*, 764-781.

http://doi:10.1353/tfr.2011.0153.

Awidi, I. T., Paynter, M., & Vujosevic, T. (2019). Facebook group in the learning design of a higher education course: An analysis of factors influencing positive learning experience for students. *Computers & Education*, *129*, 106-121. https://doi.org/10.1016/j.compedu.2018.10.018

Baran, B. (2010). Facebook as a formal instructional environment. *British Journal of Educational Technology*, 41(6), 146-149. https://doi.org/10.1111/j.1467-8535.2010.01115.x

Barrot, J. S. (2018). Facebook as a learning environment for language teaching and learning: A critical analysis of the literature from 2010 to 2017. Journal of computer assisted learning, 34(6), 863-875. https://doi.org/10.1111/jcal.12295

Bernard, H. R. (1996). Qualitative Data, Quantitative Analysis. *CAM Journal*, *8*(1), 9–11. https://doi.org/10.1177/1525822X960080010401

Chugh, R., & Ruhi, U. (2018). Social media in higher education: A literature review of Facebook. *Education and Information Technologies*, *23*, 605-616. https://doi.org/10.1007/s10639-017-9621-2

Dainik S. (2020). *Prathomik Shomaponi Porikkhar Proshno Kathamo o Nombor Banton. 2 June 2020*. Retrieved from, www.dainikshiksha.com/190156/

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340. https://doi.org/10.2307/249008

Devi, K. S., Gouthami, E., & Lakshmi, V. V. (2019). Role of social media in teaching–learning process. *Journal of Emerging Technologies and Innovative Research*, *6*(1), 96-103.

Dörnyei, Z. (2017). Conceptualizing

learner characteristics in a complex, dynamic world. In L. Ortega & Z.-H. Han (Eds.), *Complexity theory and language development: In celebration of Diane Larsen-Freeman* (pp. 79–96). Amsterdam, Netherlands: John Benjamins. https://doi.org/10.1075/lllt.48.05dor

Ellis, N. C. (2017). Cognition, corpora, and computing: Triangulating research in usage-based language learning. *Language Learning*, 67(S1), 40–65.

https://doi.org/10.1111/lang.12215

Fleming, N. D., & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To improve the academy*, *11*(1), 137-155. https://doi.org/10.1002/j.2334-4822.1992.tb00213.x

Godwin-Jones, R. (2018). Chasing the butterfly effect: Informal language learning online as a complex system. Language Learning & Technology, 22(2), 8–27. https://doi.org/10125/44643

Huba, M. E., & Freed, J. E. (2000). Learner centered assessment on college campuses: Shifting the focus from teaching to learning. *Community College Journal of Research and Practice*, *24*(9), 759-766.

Kasperski, R., & Blau, I. (2023). Social capital in high-schools: teacher-student relationships within an online social network and their association with in-class interactions and learning. *Interactive Learning Environments*, *31*(2), 955-971.

Larsen-Freeman, D. (2018). Looking ahead: Future directions in, and future research into, second language acquisition. *Foreign Language Annals*, 51, 55–72. https://doi.org/10.1111/flan.12314

Low, W. W., & Wong, K. S. (2023). The status quo of Facebook usage among young generations in civil engineering education. *International Journal of Construction Management*, *23*(9), 1471-1483. http://doi: 10.1080/15623599.2021.1976453

Manca, S., & Ranieri, M. (2016). Facebook and the others. Potentials and obstacles of social media for teaching in higher education. *Computers & Education*, *95*, 216-230. https://doi.org/10.1016/j.compedu.2016.01.012

McCarthy, J. (2013). Learning in Facebook: First year tertiary student reflections from 2008 to 2011. *Australasian Journal of Educational Technology*, *29*(3). https://doi.org/10.14742/ajet.373

Mosback, G (1990). National syllabus and textbook design on communicative principles- English Every Day‘. ELT Journal, 44(1), 18-24.

National Institute of Education, (1999). English Language Syllabus for Grade 9. Maharagama: National Institution of Education

Perera, M. (2001). The role of classroom interaction in second language acquisition in Sri Lanka Unpublished doctoral dissertation, Faculty of Education, University of Wollongong. http://ro.uow.edu.au/theses/1805.

Pickering, J. D., & Bickerdike, S. R. (2017). Medical students use of

Facebook to support preparation for anatomy assessments. *Anatomical sciences education*, *10*(3), 205-214. https://doi.org/10.1002/ase.1663

Qassrawi, R. M., & Al Karasneh, S. M. (2023). Benefits of Facebook usage (as a web 2.0 application) in Foreign Language instruction in higher education: A Meta-analysis study. *Cogent Arts & Humanities*, *10*(1). https://doi.org/10.1080/23311983.2023.2185447

Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. *The Internet and higher education*, *13*(3), 134-140. https://doi.org/10.1016/j.iheduc.2010.03.002

Schulz, R., Isabwe, G. M., & Reichert, F. (2015, September). Investigating teachers motivation to use ICT tools in higher education. In *2015 Internet Technologies and Applications (ITA)* (pp. 62-67). IEEE. https://doi: 10.1109/ITechA.2015.7317371.

Selwyn, N. (2009). Faceworking: exploring students' education-related use of Facebook. *Learning, media and technology*, *34*(2), 157-174. https://doi.org/10.1080/17439880902923622

Tan, S. Y., & Md Yunus, M. (2023). Sustaining English Language Education with Social Networking Sites (SNSs): A Systematic Review. *Sustainability*, *15*(7), 5710.

Tour, E. (2015). Digital mindsets: Teachers' technology use in personal life and teaching. *Language Learning & Technology*, 19(3), 124–139. http://dx.doi.org/10125/44437

Ulla, M. B., & Perales, W. F. (2021). Facebook as an integrated online learning support application during the COVID19 pandemic: Thai university students' experiences and perspectives. *Heliyon*, *7*(11). https://doi.org/10.1016/j.heliyon.2021.e08317

Yılmaz, F. G. K., & Yılmaz, R. (2023). Exploring the role of sociability, sense of community and course satisfaction on students' engagement in flipped classroom supported by facebook groups. *Journal of computers in education*, *10*(1), 135-162. https://doi.org/10.1007/s40692-022-00226-y

Yucedal, H. M. (2023). Integration of web 2.0 tools in EFL classes: Barriers and solutions. *Amazonia Investiga*, *12*(63), 109-122. https://doi.org/10.34069/AI/2023.63.03.10

Appendix:

Comments Made by ESL Students

Examples of positive comments

- According to my view, I think this is a very best way to do our assignment without more stress. When I was doing bcu assignments, it provided me some motivation to do it better rather than doing traditional written assignments. Therefore, I think English communication unit achieved their objectives through our improvement of English language and social media skills.
- I think this facebook assignments are very useful to develop our language skills and we also improved our social knowledge.
- I recommend Mark English as a good English improving method. We can develop our English knowledge. We can see our friends' assignments also. I think it's really interesting.
- I think it is a good way of doing assignments. It is very flexible since we can complete it anytime (before the deadline), any place with our convenience. We could read our peer answers and comments letting us to learn different viewpoints. I really enjoyed those Facebook assignments.
- Yes. I do agree with that. We were able to read others answers and to learn the language. And also Marc English's comments helped us a lot to identify our defects. Therefore, I thoroughly agree with that Marc English has been able to achieve its objectives.

Examples of negative comments

- It is not wrong to use facebook for learning the way you are.
- But this has to do with facebook accounts that have never been used by facebook users. It can be somehow a burden to them and can hinder their education.
- I don't see facebook as a suitable platform to submit assignments. People with privacy concerns are forced to open a Facebook account to do these assignments.
- And also, because the answers of other students are visible. It is very much difficult for those who upload their assignments late, we have to make sure that our answers are not similar.
- There are possibilities for users to handover their accounts and passwords to third parties and get their work done.
- Being able to work on social media is very important these days, I believe that was the motive of this assignment and it has been somewhat achieved.

Some comments made were both positive and negative

- Yes. This method is very attractive way to do assignments. students can do assignments without getting stress. Fb is effective way for this type of assignments and we can do them freely and this is a new experience for all of us...we enjoy this method a lot. I think we improve our english knowledge through this assignments...this is the change that we need to have with the support of

technology..Of course marc english achieved the goal..But some students got others ideas to do their assignments...on the other hand students read their friends' posts and improve their english skills too. There are some failures in this method. But I think marc english can slove these issues and develop in the future..Finally I should say that I enjoy this method a lot.well done.

- According to my point of view it's not a very fruitful program hence mostly members used to duplicate the same idea which was given by prier students therefor it's not an effective way to evaluate performance of the students but it helps to improve our typing skills and make us more familiar with the social media since it's a new concept for us and also it helps to build good fellowship via social media and really helps to find new friends.

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Antecedents of Profitability of Non-Life Insurance Companies: Nepalese Perspective

Dhruba Lal Pandey[a], Nischal Risal[b*], Bhupindra Jung Basnet [c]

a Central Department of Management, Tribhuvan University, Kirtipur, Kathmandu, Nepal

b & c Nepal Commerce Campus, Tribhuvan University, New Baneshwor, Kathmandu, Nepal

To link to this article: https://doi.org/10.31357/jbri.v10i1.7552

ARTICLE INFO

***Article History**:*

Received 04 January 2024
Revised 06 June 2024
Accepted 12 June 2024

Keywords

Return on Assets, Firm Size, EPS, PER, Claim Paid

To cite this article: Dhruba Lal Pandey, Nischal Risal, Bhupindra Jung Basnet. (2024). Antecedents of Profitability of Non-Life Insurance Companies: Nepalese Perspective. , 10:01,63- 75, DOI:10.31357/jbri.v10i1.7552

[*]Corresponding author. Tel: + 977-9851246 679.Email: nischalrisal@gmail.com
https://orcid.org//0000-0002-8193-4096
a) https://orcid.org/0000-0002-1323-7758
c) https://orcid.org/0009-0004-5806-539X

ABSTRACT

Current study aims to investigate the determinants that has impacted on non-life insurance companies' profitability in Nepalese scenario. Four industries were selected as sample purposively. The data from 2011/12 to 2020/21 AD have been incorporated. The study has chosen to use a descriptive and correlational research design. The firm size, price earnings ratio, earnings per share, and claim paid are the predictors and profitability proxied by ROA was the predicted variable. The study found that the most prominent determinants for profitability in non-life insurance companies are EPS and company size. The PE ratio and claims paid have been found as less prioritized factors of the predicted variable.

Introduction

The strong insurance companies support economic growth by boosting the nation's capacity to take on risk and supplying long-term funding for infrastructure development. The insurance companies are essential in both developed as well as developing countries to promote economic expansion, to effective allocation of the resources, to lower the transaction costs, to increase the liquidity, to make investment economics of scale easier, and to spread financial losses (Sah & Magar, 2021). The major detrimental factors of profitability for insurance industries are financial leverage and size in the context of Nepal (Bhattarai, 2020). In all sorts of nations, the insurance companies are a significant player of financial service sector, helping to promote economic expansion, effective resource allocation, lower transaction costs, increase liquidity, enable parsimonies of gauge in investment, and distribute financial losses (Sah & Magar, 2021). A large number of policy surrender is due to mistrust over the financial sustainability of insurer is the poor case of liquidity stress that an insurer can encounter (Kamau & Njeru, 2016). Insurance companies are in the same line of banking institutions by minimizing risk through pooling (Daare, 2016). The liquidity risk refers to a risk of inadequate convertible resources to pay expenditures created from different sources such as; policies, potentiality of losses (Kamau & Njeru, 2016). As a results, financial institutions are channelizing financial resources and transfer resources and transfer risk from one monetary element to another monetary elements for assisting in agreement and trade (Saeed & Khurram, 2015). The liquidity, capital structure, macroeconomic indicators, and other firm-specific features of the insurance industry have been used in the study of Zubairi (2013). The firm's sales are positively correlated with market portfolio. The degree of operating leverage is embedded in the intrinsic business risk and a significant portion of cross-sectional variation in the excess return in dollar is explained by the intrinsic business risk and the degree of financial leverage (Abid & Mseddi, 2004). The management of liquidity and liquid assets focuses on cash inflows and outflows. It also focuses on a trade-off between liquidity versus investment of surplus cash in order to improve the profitability (Kontus & Mihanovic, 2019).

Ahmadinia et al., (2012) stated that the choosing appropriate ratio evaluating advantages and disadvantages of debt ratio while maintaining same level of assets and investment goals based on static trade-off theory. The debt to equity ratio is determined by weighing the costs and benefits of various debt levels. Naveed et al., (2011) argued that the performance and transfer of risk of financial intermediaries have influenced to economic growth. However, a systematic risk may be created by their insolvency which affect adversely to the entire economy. If the premium received are low, the profit might be low that will not be able to cover even fixed interest charges. (Naveed et al., 2010). In the absence of financial intermediaries such as insurance companies, the world would be unstable therefore Abhor (2008) confirmed the increase of insurance companies exponentially across the world. The companies which are managing debt resources are able to maintain high level of financial leverage. The performance of firm depends on the capacity of insurers' in acquiring and allocating the resources in various conducts for creating a competitive edge (Iswatia & Anshoria, 2007).

Empirical research suggested that firm level factors like company size, premium growth, risky nature of the firm, and macro-economic factors such as gross domestic products, exchange rate and lending ratio determines the financial performance, capital structure, and level of leverage of the firms (Amidu, 2007; Abhor, 2008). However, static trade-off theory suggests that bigger organizations have less chances of insolvency so they can manage debt financing. Amidu (2007) supported to this nation assuming that the diversified nature of larger firms hinders to be insolvent. An excellent performance indicates how effectively and efficiently management use the resources of the company, which benefits the entire economy of the nation (Naser & Mokhtar, 2004). According to Mseddi and Abid (2004) concluded that the financial leverage has a significant impact on a company's value. This means that as the various levels of leverage of American businesses increase, so does the company's worth, which is evident given the advantages of debt as capital. Eljelly (2004) discovered that the relationship between liquidity and profitability is more evident in firms with high current ratios and longer cash conversion cycles. The study found that the cash conversion cycle or the cash gap is of more essential measure of liquidity than current ratio that affects the profitability at the industry level. The size variable has significant impact on profitability at the industry level. Chen and Wong (2004) presented that more investment is possible only through money available for investment and return on investment which is coined as motivation, in order to stay strong in the face of increasing demand for claim payments, insurance companies have understood in recent years that they must develop appropriate working capital management practices (Abid & Mseddi, 2004).

In practice every developed and developing state, the insurance market would be a significant player in the financial sector. It fosters investment, distributes financial losses, reduces transaction costs, allocates resources efficiently, increases economic growth, and creates liquidity (Das et al., 2003). Financial performance focuses on factors directly related to the financial performance presented through financial report. A firm's results are measured in different aspects such as; productivity, profitability and market premium (Walker, 2001). Lastly, as the company's solvency is ultimately linked to profitability and liquidity, a more thorough evaluation of the typology should take into account all three facets; profitability, liquidity, and solvency. In order to illustrate the association between the variables in the study, different multidimensional pattern of relationship between firm performance and its detrimental factors were developed (Ostroff & Schmitt, 1993). Based on the given literature backdrops, the study aimed over the detrimental factors of performance of non-life insurance companies in Nepal.

Literature Review

Rejda (2007) stated the principles that had included the elements of a legal contract, insurable interest, highest level of good faith, assignment and nomination, premium and return of premium as the foundation of life insurance contract. Non-life insurance is a social tool that offers monetary compensation for the consequences of bad luck (Hansell, 1999). Non-life insurance is important since it offers better investment opportunities and financial security, as noted by Feyen et al., (2011). Non-life insurance

also improves policyholders' quality of life by relieving them of fear, uncertainty, and anxiety. Naveed et al., (2011) shown that economic growth is negatively affected by the effectiveness and risk transfer of financial intermediaries, while inability of intermediaries to provide solvency could lead to a systemic crisis with negative effects on the entire economy. Chen and Wong (2004) claimed that accessibility of funds and new investment depend on the high profit margin. Kozak (2011); Brown and Henderson (2007); Al-Shami (2013) and Swiss Re (2008) have undertaken the study in determining the profitability of non-life insurance companies. Similarly, Wright and Smith (1992) have undertaken research to determinet the factors affecting the profitability of non-life insurance companies. Most of studies considered total assets to represent the firm size (Omondi & Muturi, 2013).

The influential factor for the profitability is considered to the firm size because they can be positioned in the market, can operated in economies of scale, and earn higher profit (Flamini et al., 2015). The insurer's main sources of liquidity included net premium income, investment income, and asset liquidation (Chen & Wong, 2004). In insurance business, liquidity and profitability showed positive relationship (Naveed et al., 2011) while the negative connotation was found between liquidity and profitability (Chen & Wong, 2004). Malik (2011) revealed a significant association between growth rate and profitability measures. Though, the vintage of the company was not found as the significant predictor of profitability. According to Talat and Asghar (2013), non-life insurers' performance was adversely correlated with risk and leverage, while profitability was favorably connected with size, investment, past year performance, and age of the business. Leverage, liquidity, size, and competency of management index have been demonstrated by Almajali et al., (2012) to have a beneficial influence on the performance of financial institutions. Razak et al., (2021) concluded that the performance of the insurer was inversely correlated with leverage. Alharbi (2019) shown the beneficial correlation between profitability, efficiency, and human capital. Charumathi (2012) demonstrated how the size and liquidity of non-general insurance businesses were impacted by the financial activities' profitability. Yuvaraj and Abate (2013) concluded that the capital, the size, the ratio of growth in liquidity, and the leverage were the primary factors for profitability in insurance sector of Ethiopia. Pierce et al., (2013) revealed that the operating leverage was considered as an important factor for profitability although an insurance company's financial leverage and liquidity had an adverse relationship with it. Joseph et al., (2013) found a positive relationship among the insurance company's profit and its gross written premiums. Daniel and Tilahun (2012) found that the ratio of loss (claim) was inversely correlated with profitability.

Mirie and Cyrus (2014) concluded that the performance of any company is determined by the earning assets and investment yield. Arif and Showket (2015) revealed that the liquidity risk, size, and volume of capital were the significant predictors of financial performance of non-life insurance companies in India. However, the financial performance is adversely related to management, solvency, and underwriting risks. Moro and Anderioni (2014) concluded that the reinsurance had no effect on the financial performance of insurers. Berhe and Kaur (2017) found that size, capital

adequacy, liquidity ratio, leverage, and GDP growth rate were the important factors of profitability of insurers. The market share, inflation rate, leverage ratio, and loss ratio were not the good predictor of profitability in the context of insurance business. Risal (2018) found that the level of employee engagement in the insurers determines the profitability of the company irrespective of other factors.

Almajali (2018) recommended that the financial performance mostly depends on the insurers' assets. Maria and Ghiorghe (2019) concluded that insurance companies as the component of financial system enhances the economic growth and stability. Thus, the analysis of financial performance is suitable in the macroeconomic context. The leverage, size, growth of gross written premiums, underwriting risk, risk retention ratio, and claim paids are considered as the detrimental factors of financial performance in Romania insurance sector. Hamal (2020) concluded that the increase in leverage would decrease the profitability of insurers in Nepal. Bhattarai (2020) revealed that the profitability in Nepalese insurance market was influenced by the size and the leverage. Sah and Magar (2021) demonstrated that return on assets was positively impacted by firm size. Pandey and Risal (2021) concluded that knowledge of the fundamental dynamics of customer preferences, service providers, acceptability, and health insurance product pricing were essential for the successful implementation of health insurance coverage in Nepal. Risal et al., (2022) revealed that insurance companies had played a significant role as a component of financial system for the development of socio-economic sector of the country. Isayas (2022) concluded that the profitability of banks was positively impacted by size, liquidity, asset tangibility, capital adequacy, leverage, and real GDP growth rate.

Hypotheses

H1: There is a positive association between firm size and return on assets.

H2: There is a positive association between the earnings per share and return on assets.

H3: There is a positive association between the price earnings ratio and return on assets.

H4: There is a positive association between claim paid and return on assets.

Research Methodology

The study had adopted explanatory and correlational research design. Insurance Authority of Nepal (NIA) (2022) had reported 14 non-life insurance companies listed in Nepal. The four non-life insurance companies were purposefully chosen as the sample of the study using purposive sampling method. The four non-life insurance firms were chosen based on the profit earned and expansion of branch i.e. business expansion. The data were collected from the annual reports. The data was obtained from the annual reports (2011/12 to 2020/21) for 10 years. Descriptive and inferential statistics were used in the study to analyze the data using SPSS. Ratio analysis, a financial tool, had also been applied. The correlation and regression analysis were used to assess the relationship and impact of independent variables on dependent variable.

Model Specifications

$$ROA = a + B_1FS_1 + B_2PER_2 + B_3EPS_3 + B_4CP_4 + e$$

Table 1: Literature Matrix

Authors	Major Findings
Malik (2011)	The ratio of leverage, solvency margin and inflation found negative relationship with profitability.
Almajali et al., (2012)	The leverage, liquidity and insurance premium had positive effect on the performance.
Lee & Lee (2012)	The underwriting, ROA, line of business concentration, ROI, and liquidity ratio were the significant predictors of financial performance.
Charumathi (2012)	Liquidity, scale, and leverage are the major predictor of financial activities in non-general insurance businesses' profitability.
Daniel & Tilahun (2012)	Profitability had a negative relationship with the ratio of loss (claim) and leverage. The main indicators of Ethiopian insurance performance were size, claim ratio, leverage ratio, and tangibility.
Talat & Asghar (2013)	The leverage and earrings were negatively related with performance of non-life insurers.
Yuvaraj & Abate (2013)	The two most significant variables influencing the profitability were; ratios of leverage and liquidity in Ethopia.
Pierce et al., (2013)	The insurers profitability was negatively impacted by operating costs, financial leverage, and firm size and positively impacted by operating leverage.
Mirieand & Cyrus (2014)	Financial performance is determined by the earning assets and investment yield.
Moro & Anderioni (2014)	The performance had not been leveraged by the insurance.
Arif & Showket (2015)	Financial performance of non-life insurers in India was positively influenced by liquidity risk and negatively correlated with solvency risk.
Rajiben (2016)	The result had shown the insignificant impact of ROA on profitability.
Berhe & Kaur (2017)	Profitability is mostly determined by the liquidity ratio.
Almajali (2018)	Financial performance is led by increase in company assets.
Maria & Ghiorghe (2019)	The profitability is determined by the leverage, size, growth in gross written premiums, underwriting risk, risk retention ratio, and claims paid in Romanian insurers.
Alharbi (2019)	Human capital performance is the important factor of profitability.
Hamal (2020)	Liquidity increment is the major predictor of Profitability in Nepalese non-life insurance business.
Bhattarai (2020)	The primary factors influencing profitability in insurance businesses in Nepal were their size and level of financial leverage.
Sah & Magar (2021)	Return on assets is determined by the firm size.
Razak et al., (2021)	Insurer's performance is adversely related to leverage in the financial sector.
Isayas (2022)	Bank profitability was positively impacted by leverage, real GDP growth rate, capital adequacy, asset tangibility, firm size, and liquidity ratio. Banks' profitability was negatively impacted by the firm age and the inflation rate.

Source: Previous Review of Literatures

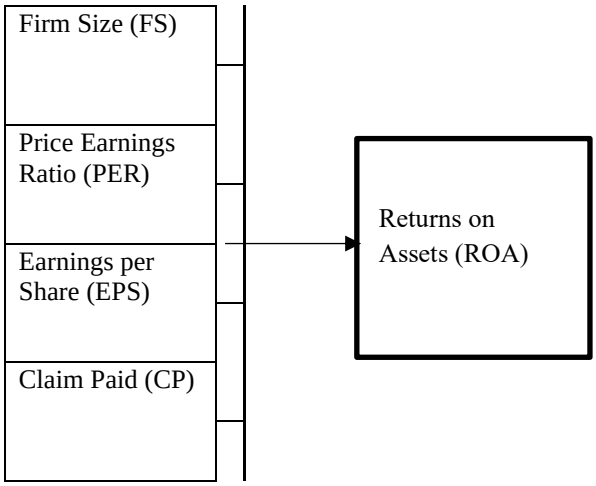


Figure 1: Conceptual Framework

Source: Almajali et al., (2012); Danial & Tilahun (2012); Talat & Asghar (2013);Pierce et al., (2013); Maria & Ghiorghe (2019); Bhattarai (2020); Sah & Magar (2021); and Isayas (2022).

Results

Descriptive Analysis

Table 2 shows that the high deviation is found in terms of firm's size in non-life insurance companies in Nepal. It indicated non-uniformity in their business. The price-earning ratio's value ranged from negative to highly positive, suggesting that it is not just a useful indicator for assessing the performance of non-life insurers in Nepal. Similar findings are obtained with earnings per share, which ranged from negative to positive. It had indicated that the non-life insurers did not act in unison. The claims paid is not found uniform in the study.

Table 2: Current Assessment of Variables used in the Study

Variables	Min.	Max.	Mean	SD
FS	366.31	14835.70	2234.87	2397.86
PER	-3.63	71.96	20.71	16.58
EPS	-54.26	106.39	38.32	24.84
CP	79.17	4378.26	789.70	862.17
ROA	-7.14	23.98	8.45	5.86

Source: Annual Reports of Sampled Insurers

Correlation Analysis

The association between return on assets and price earnings ratio, claim paid, business size, and earnings per share are investigated using the Bivariate Pearson's Correlation analysis.

Table 3: Correlation Matrix (ROA)

Variables	Ln_EPS	Ln_CP	Ln_FS	PER	ROA
Ln_EPS	1				
Ln_CP	-0.133	1			
P-value	0.419				
Ln_FS	-0.053	.717**	1		
P-value	0.750	0.000			
PER	-0.264	.581**	.451**	1	
P-value	0.104	0.000	0.003		
ROA	.681**	-0.142	-0.226	-0.111	1
P-value	0.000	0.382	0.162	0.496	

***. Coefficient is significant at 1 percentage level of significance (2-tailed).*

Source: SPSS Output

The association between return on assets and price earnings ratio, claim paid, size, and earning per share is shown in Table 3. With a magnitude of 0.681, a significant positive and substantial link between earnings per share and return on assets is found in the study. The return on assets is negatively correlated with the claim paid, business size, and price earnings ratio, with respective magnitudes of 0.142, 0.226, 0.111, and 0.079. There is no discernible association between return on assets and claims paid, size, and price earnings ratio.

Regression Analysis

The impact of price earnings ratio, size, claim paid, and earnings per share on return on assets is examined using multiple linear regression analysis.

Model Specifications.

$$ROA = \alpha + \beta 1FS + \beta 2PER + \beta 3EPS + \beta 5CP + \mu$$

Table 4: Impact Analysis of PER, EPS, CP, and FS on ROA.

R	R Square	Adjusted R Square	SE of the Estimate	F	P-value
.767	.588	.511	3.75	7.611	.000

Model		Coefficient	t-value	
1	(Constant)	18.592	1.059	.298
	PER	.001	.023	.982
	EPS	7.646	5.715	.000
	CP	1.328	1.305	.201
	FS	-2.753	-2.097	.044

Source: SPSS Output

Table 4 depicts that the return on asset had been explained by 58.80 percent by earnings per share, price earnings ratio, claim paid and firm size. The adjusted R-square for the model is 0.511 with the standard error of estimate of 3.75. The F-statistic of 7.611 is significant at 5 percent level of significance indicated the fitness of the model. The beta coefficient of price earnings ratio is 0.001 which indicates no effect on return on assets. Likewise, having 7.646 beta coefficient, the

earnings per share have strongest effect on return of assets. The analysis indicated that one unit increase in earnings per share would lead to 7.646 unit increase in return on assets. The beta coefficient of claim paid is 1.328 indicates that one unit increase in claim paid would lead to 1.328 unit increase in return on assets. The firm size has beta coefficient of -2.753 means that one unit increase in firm size would lead to 2.753 unit decrease in return on assets. The corresponding p-value of earnings per share and firm size are 0.000 and 0.044 respectively. Thus, earning per share and firm size have significant impact on return on assets.

Table 5: Test of Hypothesis

Hypotheses	Decision
H1: There is a positive association between company size and return on assets.	Accept
H2: There is a positive association between earnings per share and return on assets.	Accept
H3: There is a positive association between price earnings ratio and return on assets.	Reject
H4: There is a positive association between claim paid and return on assets.	Reject

Source: SPSS Output and Data Analysis Results

Discussions and Conclusions

Return on assets and earnings per share are positively correlated. This finding is similar to the study findings of Almajali (2018); Berhe and Kaur (2017); and Maria and Ghiorghe (2019). The results is contradicted to the findings of Rajiben's (2016). Moreover, strong relationship was found between return on assets and earnings per share. This result is in line with the study findings of Malik (2011). Likewise, negative relationship was discovered among return on assets and the claims paid, size, and price earnings ratio. The results align with the findings of Razak et al., (2021). Moreover, there is no substantial correlation between return on assets and claim paid, business size, or price earnings ratio. This conclusion is corroborated by Malik's (2011) findings. This discovery, however, conflicts with the findings of Almajali et al., (2012) as well as Talat and Asghar (2013). According to Lee and Lee (2012), business size found to be the important factors for predicting profitability. As a result, this result conflicts with the conclusions of this investigation. Similarly, low correlation was found between return on assets and claims paid, size, and price earnings ratio. The results are in the vein of Daniel and Tilahun (2012) findings. Thus, given the facts, it is evident that earnings per share and company size are the two major determinants of the profitability of Nepalese non-life insurers.

Implications

Earning per share and firm size had significant impact of return on assets. For Nepalese non-life insurers to remain profitable and continous growth, the optimization in earnings per share and size is must, which would be the major implication for policy makers in Nepal. Since, the price-earnings ratio is not found as a good detrimental factor of profitability, insurers need not to consider price earnings ratio while taking decision. Thus, the policy level authority and managers of non-life insurers should concern on this subject matter. It follows that cutting back on operating costs is essential to increase the profitability of Nepalese non-life insurers. Study in the similar area can be undertaken changing the population or taking more data

base so that the study finding can further be robustly tested and more concretely generalized.

References

Abhor, R. (2008). Comparative bank efficiency across selects ASEAN countries. *ASEAN Economic Bulletin*, *18*(3), 289-304.

Abid, F., & Mseddi, S. (2004). The impact of operating and financial leverages and intrinsic business risk on firm value. *SSRN Electronic Journal*, 1-16. https://doi.org/10.2139/ssrn.942029

Abid, D., & Mseddi, D. (2004). Factors affecting the profitability of Insurance Companies in Albania. *European Journal of Multidisciplinary Studies*, *1*(1), 352-360.

Ahmadinia, H., Afrasiabishani, J., & Hesami, E. (2012). A comprehensive review on capital structure theories. *The Romanian Economic Journal*, *15*(45), 3-26.

Alharbi, M.F. (2019). National health insurance system for universal health coverage: Prospect and challenges in Saudi Arabia. *International Journal of Community Medicine and Public Health*, *6*(11), 5006-5012.

Almajali, T. (2018). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance, 4* (2), 91-112.

Almajali, A.Y., Alamro, S.A., & Al-Soub, Y.Z. (2012). Factors affecting the financial performance of Jordanian insurance companies listed at Amman Stock Exchange. *Journal of Management Research, 4* (2). https://doi.org/10.5296/jmr.v4i2.1482

Al-Shami, H.A. (2013). *Universiti Utara Malaysian Electronic Theses and Dissertation*.Tratto il Giomo, 13. https://etd.uum.edu.

Amidu, M. (2007). Determinants of capital structure of banks in Ghana: An empirical approach. *Baltic Journal of Management, 2* (1), 288-300. https://doi.org/10.1108/17465260710720255

Arif,A., & Showket, A. (2015). Relationship between financial risk and financial performance: An insight of Indian insurance industry. *International Journal of Science and Research, 4* (11), 1424-1433.

Berhe, B., & Kaur, X. Y. (2017). A study on the performance of insurance companies in Ethiopia. *International Journal of Marketing, Financial Services & Management Research*, *2*(7), 138-150.

Bhattarai, B. P. (2020). Factors influencing profitability of insurance companies in Nepal. *International Journal of Management*, *11*(9), 8-14.

Brown, J.H., & Henderson, J.W. (2007). Building relationship through integrity. *Brown and Brown, Inc., Annual Report.* https://chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://investor.bbinsurance.com/static-files/7d027edc-38d1-4211-98ff-89e042de87d1

Charumathi, B. (2012). *On the determinants of profitability of Indian life insurers: An empirical study*. Proceedings of the

World Congress on Engineering, 1, WCE 2012, July4-6. London.

Chen, L., & Wong, R. (2004). Leverage, investment and firm growth. *Journal of Financial Economics, 40*(1), 3-29. https://doi.org/10.1016/0304-405X(95)00842-3

Daare, W. J. (2016). Determinants of non-life insurance companies' profitability: An empirical study in India. *International Journal of Innovative Research and Advanced Studies*, *3*(13), 6-11. https://researchgate.net/publication/318115984

Daniel, M., & Tilahun, A. (2012). Firm specific factors that determine insurance company performance in Ethopia. *European Scientific Journal, 9* (10).

Das, T., Davies, A., & Podpiera, M. J. (2003). Performance determinants of general insurers in Pakistan. *Actual Problems of Economics*, *12*(138), 181-192.

Eljelly, A. (2004). Liquidity-profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Management, 14* (2),48-61. https://doi.org/10.1108/10569210480000179

Feyen, E., Lester, R., and Rocha, R. (2011). What drives the development of the insurance sector? Empirical analysis based on panel of developed and developing countries. *Policy Research Working Paper*, 5572, World Bank.

Flamini, V., McDonald, C.A., Schumacher, L. (2015). The determinants of commercial bank profitability in Sub-Saharan Africa. *IMF Working Papers, 9* (15). https://doi.org/10.5089/9781451871623.001

Hamal, J. B. (2020). Factors affecting profitability of Nepalese non-life insurance companies. *Journal of Nepalese Business Studies*, *13*(1), 23-35.

Hansell, D.S. (1999). *Introduction to insurance*.https://books.google.com.np/books/2GlRPwAACAAJ&redir_esc=y

Isayas, Y. N. (2022). Determinants of banks' profitability: Empirical evidence from banks in Ethiopia. *Cogent Economics & Finance*, *10*(1), 20-33.

Iswatia, T. A., & Anshoria, J. (2007). Determinants of insurance companies' profitability Analysis of insurance sector in Ethiopia. *International Journal of Research in Finance and Marketing*, *7*(4), 124-137.

Joseph, O.A., Frank, G.S., & Richard, F.M. (2013). The financial performance of life insurance companies in Ghana. *The Journal of Risk Finance*, 14(3), 286-302.

Kamau, F., & Njeru, A. (2016). Effect of liquidity risk on financial performance ofinsurance companies listed at the Nairobi securities exchange. *International Journal of Science and Research*, *5*(10), 867-872.https://doi.org/10.21275/ART20162288

Kontus, E., & Mihanovic, D. (2019). Management of liquidity and liquid assets in small and medium-sized enterprises. *Economic Research*, *32* (1), 3253-3271.

https://doi.org/10.1080/1331677X.2019.1660198

Kozak, M. (2011). Strategic approach to intellectual capital development in regions. *International Journal of Learning and Intellectual Capital*, *8*, 76-93.

Lee, H.H., & Lee, C.Y. (2012). An analysis of reinsurance and firm performance: Evidence from the Taiwan property-liability insurance industry. *The Geneva Papers*, *37*, 467-484. https://gpp.2012.9.pdf

Malik, H. (2011). Determinants of insurance companies' profitability: An analysis of insurance sector of Pakistan. *Academic Research International, 1* (3), 315-321.

Maria, U., & Ghiorghe, X. (2019). The effect of foreign entry and ownership structure on the Philippine domestic banking market. *Journal of Banking and Finance*, *27*(12), 2323-2345.

Mirie, Z. A., & Cyrus, A. A. (2014). The Performance Evaluation of Life Insurance Companies of Pakistan. *Journal of Managerial Sciences*, *1*(3), 52- 74.

Moro, O., & Anderioni, L. (2014). Non-life insurance economic performances: An empirical investigation. *Journal of Economics and Management*, *18*, 160-177.

Mseddi, R., & Abid, T. (2004). Efficiency of American life insurance companies using DEA approach. *ELK Asia Pacific Journal of Finance and Risk Management*, *7*(4), 23-46.

Naser, H., & Mokhtar, E. (2004). A comprehensive review on capital structure theories. *The Romanian Economic Journal*, *15*(45), 3-26.

Naveed, K. D., Gatsi, J. G., Gadzo, S. G., & Akoto, R. K. (2010). Degree of financial and operating leverage and profitability of insurance firms in Ghana. *International Business and Management*, *7*(2), 57-65.

Naveed, R. T., Zulfqar, B. V., & Ahmad, V. (2011). Financial development, growth, and the distribution of income. *Journal of Political Economy*, *98* (5), 1076- 1107.

Nepal Insurance Authority (2024). *Reports.* https:// https://nia.gov.np Omondi, T., & Muturi, V. (2013). Does insurance promote economic growth? Evidence from OECD countries. *The Journal of Risk and Insurance*, *67* (4), 489-506.

Ostroff, C., & Schmitt, N. (1993). Configuration of organizational effectiveness and efficiency. *Academy of Management Journal*, *36* (6), 1345-1361. https://efaidnbmnnnibpcajpcglclefindmkaj/276942673.pdf

Pandey, D.L., & Risal, N. (2021). Government health insurance services, its effectiveness and Covid-19 impact assessment in Nepalese perspectives. *Pravaha Journal*, *27* (1), 31-42.

Pierce, J.S., Weston, H., Levy, R.G., & McMahon, D.J. (2013*). Insurance Practices and Coverage in Liability Defense.* Faculty Publication. https://readingroom.law.gsu.edu/faculty_pub/3128

Rajiben, V. (2016). Financial intermediation and economic performance: Historical

evidence from five industrialized countries. *Journal of Money, Credit and Banking*, *30* (4), 657-678.

Razak, S.H.A., Shawtari, F.A., & Elsalem, B.A. (2021). Ownership type, business model, market structure, and the performance of Takaful and conventional insurance companies in Malaysis. *Cogent Economics and Finance*, *9* (1), 1888436.

Rejda, G.E. (2007). *Principles of Risk Management and Insurance*. https://amazon.com/10th/dp/0321414934

Risal, N. (2018). Employees commitment and organizational performance: An empirical evidence from life insurance companies in Kathmandu, Nepal. *International Journal of Creative Research Thoughts*, *6* (1), 73-103.

Risal, N., Karki, B., & Sharma, A. (2022). Life insurance policy holders and their perception of life insurance services in Kathmandu, Nepal. Empirical Economics Letters, *21* (4). https://eel.my100megs.com

Saeed, V., & Khurram, R. (2015). Factors influencing the financial performance of non-life insurance companies of Pakistan. *International Journal of Empirical Finance, Research Academy of Social Sciences*, *4* (6), 354-361.

Sah, L. K., & Magar, M. R. (2021). Factors affecting the profitability of Nepalese insurance companies. *Nepalese Journal of Insurance and Social Security*, *4*(1), 87-99.

Swiss Re (2008). *Annual Report.* https://SwissRe_AR08.pdf

Talat, A., Asghar,M.J.K.A.(2013). Performance determinants of general insurers in

Pakistan. *Actual Problems of Economics*, *12* (138).https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2007534

Walker, D. C. (2001). *Exploring the Human Capital Contribution to Productivity, Profitability and the Market Evaluation of the Firm.* Webster University

Wright, R., & Smith, E. (1992). Why is automobile insurance in Philadelphia so damn expensive? *American Economic Review*, *82* (4), 756-772.

Yuvaraj, S., & Abate, G. (2013). A study on the financial performance of insurance companies in Ethopia. *International Journal of Marketing, Financial Services and Management Research*, *2* (7), 138-150.

Zubairi, J. B. (2013). Insurance and its business in Nepal. *Journal of Nepalese Business Studies*, *7*(1), 70-79.

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Evaluating the Impact of Technological Adaptation in Third-Party Logistics on Farming Household Sustainability: The Mediating Role of Supply Chain Robustness

Gopikrishna Selvananthan[a]

a Phoenix Institute of Professional Studies (Pvt) Ltd, Sri Lanka

To link to this article: https://doi.org/10.31357/jbri.v10i1.7553

ARTICLE INFO

***Article History**:*

Received 06 December 2023
Revised 04 February 2024
Accepted 05 April 2024

Keywords

Agriculture, Reward, Supply chain, Third-Party Logistics, Technology Adaption

To cite this article: Gopikrishna Selvananthan (2024), Evaluating the Impact of Technological Adaptation in Third-Party Logistics on Farming Household Sustainability: The Mediating Role of Supply Chain Robustness , 10: 01,76-105, DOI:10.31357/jbri.v10i1.7553

Corresponding author. Tel: +94 779148739.
Email: gopikrishnaselvananthan@gmail.com
https://orcid.org/0000-0002-6599-3598

ABSTRACT

Agriculture is recognized as a key determinant in the economic vitality of Sri Lanka. The prominent challenges faced by farmers include the pervasiveness of middlemen, insufficient storage infrastructure, substandard transportation between supply chain participants, and inadequate mechanization within the agricultural sector. This research primarily investigates the influence of Third-Party Logistics – including warehousing, distribution, and order fulfillment – on optimizing farmers' rewards, a process moderated by technology adaptation and mediated by supply chain robustness. The principal objective of this study is to explore and scrutinize the impact of logistics and its constituents on the optimization of compensations and additional benefits for farmers, which can be achieved by enhancing the supply chain through technological adaptation. To meet this objective, the researcher adopted a pragmatic philosophical position coupled with a deductive methodology. The research was conducted among farmers in the Northern Province of Sri Lanka. A sample of 180 farming households was chosen through a stratified simple random sampling technique that encompassed all Districts within the Province. An explanatory mixed method was employed as the methodological preference for the study, supplemented by a cross-sectional approach under the time horizon. The study's findings revealed that Third-Party Logistics positively impact reward maximization, and further demonstrated the moderating and mediating effects of technology adaptation and supply chain resilience. In conclusion, the paper presents recommended strategies, which include advancements in logistical practices and the implementation of updated technological solutions within agriculture. These recommendations could be adopted by farmers to maximize the monetary and non-monetary benefits.

Introduction

In line with the study findings of Ragu-Nathan and Rao (2006), a supply chain represents the interconnected processes between an organization and its suppliers that deliver products to end-users. The supply chain involves various components and functions, contributing to the transformation and delivery of products or services from their origin to the consumer. Effective supply chain management has significantly fostered economic growth across different sectors (Min, 2015; Agrawal, 2017).

Key supply chain practices, emphasized by Zhou and Benton (2007) and Hugos (2024), encompass strategies such as enhancing inventory velocity, applying lean logistics principles, proficiently managing supply chains, and incorporating Third-Party Logistics (3PL). Tan (2002) underscores the importance of maintaining rapid inventory turnover for cash flow, which entails minimizing warehouse product levels. Lean logistics prioritizes the elimination of non-value-added activities, fostering a "pull" process rather than a "push" approach, as highlighted by Squire et al. (2006).

In line with the study findings of Carter and Rogers (2008), and Serdarasan (2013), the third-party logistics (3PL) industry plays a crucial role in shaping various aspects of the supply chain. It influences critical processes including managing supplier performance, diversifying the supplier base, compressing cycle times, segmenting the supply chain, and implementing advanced supply chain technology. 3PLs contribute significantly to evaluating and overseeing supplier performance by offering transparent insights into key performance indicators such as on-time deliveries, product quality, and responsiveness. They facilitate supplier base diversification, providing companies with flexibility and varied options through engagements with multiple suppliers. In transportation and logistics, 3PLs contribute to cycle time compression by optimizing routes, reducing lead times, and ensuring timely deliveries. Their adept management of transportation and order fulfillment processes expedites the overall supply chain cycle. Additionally, 3PLs demonstrate proficiency in handling specific supply chain segments, such as warehousing and order fulfillment, allowing companies to focus on core competencies while ensuring optimization and avoiding resource misallocation. Furthermore, 3PLs invest significantly in cutting-edge technologies, including Warehouse Management Systems, order tracking systems, and advanced analytics tools. This commitment to technological advancement positions 3PLs as valuable partners for companies aiming to align with contemporary best practices, thereby enhancing overall efficiency, effectiveness, and competitiveness in supply chain management.

According to Sakalasooriya (2021), Sri Lanka, endowed with abundant resources across its coastal, intermediate, and central regions, boasts several industries that have been operational for thousands of years. Agriculture, in particular, plays a pivotal role in the country's economy. As a developing nation, Sri Lanka produces a variety of fruits and vegetables and leads in cultivating commodities like rice, coconut, tea, onion, potatoes, chilies, sugar cane, and rubber, which are significant revenue sources (Weerakkody & Mawalagedera, 2020). Agricultural operations encompass the production and distribution of farm supplies, storage of produced supplies, the transformation of raw materials into finished products, and the final distribution of

commodities (Department of Census and Statistics [DCS], 2017; DCS, 2019). Despite ongoing industrialization and tertiarization in recent decades, agriculture remains a cornerstone of economic development in Sri Lanka, being a significant part of the historic Silk Route (Udara et al., 2022). Approximately 31.8% of the population is engaged in agriculture, which includes both animal husbandry and crop cultivation, contributing to 18% of the nation's GDP (Panabokke, 2018). The livelihood of a large portion of the Sri Lankan population is directly or indirectly linked to agriculture (Udara et al., 2022). Following the study findings of Govinnage and Sachitra (2019), the global integration of consumer markets, local Sri Lankan farmers stand to benefit significantly from the international demand for agricultural products. This optimistic outlook persists, notwithstanding initial concerns about the potential adverse effects of globalization on the agricultural sector. By seizing these global opportunities, Sri Lankan farmers can not only mitigate potential challenges but also harness the expansive market potential, thereby contributing positively to the country's economic growth through the export of agricultural goods.

During the early 19th century, interest in supply chain management grew in Sri Lanka, primarily driven by trends in organizational consolidation at the farm input, processor, and supermarket levels, new agricultural regulations implemented by the government, enhanced management systems and food safety protocols, heightened market competition, and increased global trade (Lancsar & Louviere, 2006). While Sri Lanka has a robust level of agricultural production, it struggles with marketing (Dharmaratne, 2014). Notably, the Northern Province contributes more than 5% of the country's overall yield and engages in various agricultural activities, such as horticulture and cereal production (Kirshanth & Sivakumar, 2018; Canfora, 2016). As discussed by Dharmaratne there has been a noticeable rise in sharecropping relationships between private dealers and farmers. However, despite high farm output, the region faces significant challenges, primarily due to the lack of joint planning and collaborative strategies for value growth. According to Morgan and Murdoch (2010), farmers from the Northern Province typically engage in an unstable agricultural supply chain and struggle to mitigate associated risks due to a limited understanding of the underlying problems. This situation is compounded by an ineffective supply chain, resulting in difficulties both during post-harvest storage and the delivery of goods to consumers. The agricultural supply chain across Sri Lanka, particularly in the Northern Province, faces numerous challenges. Issues include small to medium farmer fragmentation, lack of scale economies, low levels of processing or value addition, and impacts from fluctuating external factors such as weather, crop seed quality, and cultivation methods (Marambe et al., 2017; Srinivasa et al., 2016). Furthermore, the region's supply chain is characterized by long lead times, indicating a lack of flexibility in crop production to adapt to rapidly changing external conditions.

The study, through empirical findings, has discerned five primary challenges confronting farmers in the Northern Province concerning supply chain practices. Farmers are often forced into distress sales of their produce, mainly onions, due to an absence of organized marketing. Traders and middlemen often exploit farmers, buying goods at a marginal price and selling

them at a significantly higher margin (Munasinghe et al., 2010). After harvesting, crops like onions and tomatoes lose weight and quality if not stored properly, leading to economic losses for farmers. Farmers turning to third-party warehouse providers face further inefficiencies (Boundeth et al., 2012). Especially in areas like Killinochi and Mannar, the remote location of farmers inhibits their access to main markets. Consequently, farmers are forced to sell produce locally at marginal prices. The third-party transport providers' services are often inadequate due to underdeveloped road systems (Jayatissa et al., 2012). Furthermore, high labor costs and a reluctance to use modern technology, such as automatic weeders and milking machines, negatively impact potential profits, especially in potato farming. Farmers usually resort to conventional machinery (Tekana & Oladele, 2011).

Evidence supporting these problems is substantial. For instance, Munasinghe et al. (2010), highlight that Northern Province farmers lack market information, resulting in knowledge gaps. Overproduction and poor storage facilities led to high crop spoilage during the Maha season in 2017 and 2018, causing significant financial losses. Moreover, the government's efforts to introduce supply chain concepts in agriculture have been largely unsuccessful, with less than 5% usage of support applications like Govi Mithuru in the Northern Province (Dharmasena, 2010). Farmers' reluctance towards advanced mechanization and preference for traditional farming practices has been further confirmed by a government poll (Nishanthan et al., 2013). Alarmingly, suicide rates among farmers have increased due to economic distress, with an estimated 15 attempts per 100,000 farmers (Knipe et al., 2017). This distress is often linked to the inability to obtain fair returns on their yield, mostly due to middlemen's exploitation. In response to the identified problems, this study aims to analyze the impact of Third-Party Logistics and its components on maximizing the rewards and benefits for farmers. The focus is on enhancing the supply chain through the adaptation of technological advancements, which could potentially improve the returns for farmers.

Furthermore, the rest of the paper is structured as below: the literature review provides a comprehensive examination of various concepts and theories related to supply chain, supply chain competencies, agriculture, and agricultural supply chain, as well as a detailed evaluation of the study's identified variables. Subsequently, the paper delves into the research design/philosophy and examines the proposed hypothesis. The focus then shifts to data analysis, which includes goodness of fit measurements for quantitative data, demographic analysis, variable analysis, and hypothesis testing. This is followed by a discussion section, where the paper's objectives and hypotheses are explored in depth. The paper concludes with recommendations and potential future implications of the study.

Review of Literature

Managing the agricultural supply chain is key to maximizing rewards, and modern technology can enhance this process (Lezoche et al., 2020). Supply chain competencies serve as a framework to identify influential elements, with various theories analyzing these competencies differently (Halldorsson et al., 2007). While the literature has examined agricultural supply chain elements and supporting theories, it lacks insights into the

relationship between these elements, reward maximization, and technology adaptation. Therefore, a methodical examination of agricultural supply chain competencies, reward maximization, and technological adaptation is necessary to comprehend their interrelationship.

An Overview of Supply Chain Management

Stevenson and Spring (2007) and Mentzer et al. (2001) described the supply chain as a network extending from a company's suppliers to the end user, detailing how products or services are transferred. Supply chain management, according to Jacobs et al. (2011), involves managing the flow of goods and services, and streamlining related activities to maximize customer value and secure a competitive advantage. This process includes diverse activities such as information system integration, coordination planning, and control activities (Larson & Rogers, 1998). David et al. (2004) stated supply chain management is integral to "make or buy" decisions, controlling each step of raw material transformation to product distribution. This management introduces predictability, enabling entities to respond positively to dynamic demand.

Supply chain competencies are skills and knowledge that enhance performance, including capacity planning, demand management, and logistics warehousing (Sheehan et al., 2014). Van Hoek et al. (2002) highlighted labor as a key competency, while Carr and Smeltzer (2000) underlined purchasing skills. The logistics framework, encompassing operational and planning processes, is crucial for supply chain effectiveness (Closs & Mollenkopf, 2004). These competencies help the supply chain respond to challenges and improve efficiency (Carr et al., 2000; Gammelgaard & Larson, 2001). Subsequently, the paper delves into an in-depth evaluation of the agricultural industry and the related supply chain.

Sri Lanka is recognized as a leading global nation with 7% of its GDP reliant on agriculture and related sectors (Central Bank of Sri Lanka [CBSL], 2019). Its primary agricultural activity focuses on rice production, with the main cultivation seasons being Maha and Yala. Another significant crop is tea, primarily grown in the central highlands, which contributes to the country's foreign exchange. In addition to rice and tea, Sri Lanka also produces vegetables, fruits, and oilseeds. Over 25% of the country's workforce is employed in the agricultural sector (Samansiri & Wanigasundera, 2019). Despite being a fertile tropical land capable of cultivating a wide variety of crops, Sri Lanka faces significant challenges in agricultural productivity and profitability. According to Kumar and Parikh (2017), there has been limited adaptation of mechanized farming due to government changes and new rules. The agricultural industry operates largely independently, with the majority of support coming from the government and minimal participation from private entities. This lack of investment has restricted the industry's growth compared to other sectors in the country. There are numerous issues affecting the agricultural industry, which is a livelihood for millions of people. The author identifies overlooked problems that are not commonly discussed in media and urban circles. After careful analysis, it is clear that the primary cause of these issues is the supply chain components associated with agriculture.

Li et al. (2006) described agricultural supply chain management as a rapid process involving the movement of goods from

production to end-users. This process encompasses post-consumption and pre-production activities in the agri-food industry and is viewed as a dynamic method of planning the agri-food supply chain. It helps reduce challenges faced by agri-food supply chain members and maximizes profits. The performance of agri-food supply chain management is determined by food quality and safety (Akkerman et al., 2010). Chan et al. (2006) suggested the evaluation of supply chain performance can be based on product performance, process efficiency, and the quality of services rendered. Bogataj et al. (2005) emphasized the stability of the agri-food supply chain, identifying key factors influencing the hygiene and quality of perishable products in the supply chain. The quality, safety, and freshness of these perishable goods are maintained through proper storage, thermal facilities, appropriate information systems, and suitable operational modes during logistics (Manning et al., 2006). Trienekens and Zuurbier (2008) highlighted the necessity for government departments to ensure the quality and safety of agricultural food products by implementing effective legislation and regulations. However, crop production in Sri Lanka is notably low due to the lack of technological adaptation among farmers. A study conducted in the Northern Province reveals inefficiencies in inventory handling, capacity planning, mechanization, packaging, and crop control (De Silva et al., 2019). These challenges primarily stem from the farmers' poor technological adaptation. Implementing production protocols and integrating information technology into the agri-food supply chain, especially in logistics, can enhance efficiency and effectiveness. The agricultural supply chain in the context of Sri Lanka is provided in *Figure 1* below. The paper evaluates the substantial impact of Third-Party Logistics [TPL] on the agricultural supply chain. It further reviews various literature on the importance of TPL for agriculture and its role in promoting sustainability.

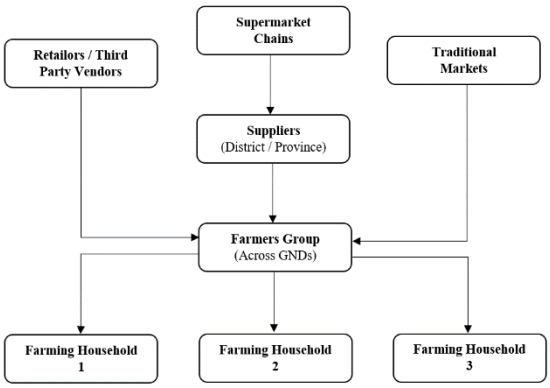


Figure 1: Traditional Agriculture Supply Chain Northern Sri Lanka

Source: (Developed by the Author)

Third-Party Logistics

According to Skjoett-Larsen (2000), Third-Party Logistics (TPL) evolved from transportation companies extending their services to customers. It involves outsourcing transport and logistics activities which are neither consignors nor consignees, including services like warehousing, distribution, and order fulfillment. TPL, introduced during the 1980s transport industry deregulations, has rapidly advanced with technological progression (Lumsden, 2003). Although not common in the agricultural industry in the early 21st century, many agricultural firms in Sri Lanka now deem TPL crucial. The firms scarcely outsource warehousing, distribution, and order fulfillment to TPL providers, but adopting such practices could enhance productivity efficiency (Samansiri & Wanigasundera, 2019). Ballou (2010) suggested that farmers adopting TPL can

benefit from economies of scope and scale, reducing costs and enhancing net value. The impact depends on the type of logistic provider involved. Agrawal (2017) highlighted that TPL providers introduce essential skills into the supply chain, such as high coordination ability and pooling of reliable partners, leading to more efficient inter-firm goods flow. Outsourcing to third parties reduces capital investments and associated financial risks. Well-established warehousing and distribution systems require significant capital investment; outsourcing these activities can substantially reduce capital expenditure, stabilizing revenue (Samansiri & Wanigasundera, 2019).

Adhikarinayake (2015) described warehousing as a process carried out by specialized agencies for commercial gain. It involves technical personnel who guard and manage goods, abiding by laws and public authority supervision. Warehousing encompasses the storage, transport, handling, and distribution of inputs, finished goods, and commodities (Jacob et al., 2014). Sundaram (2014) associated subsistence farming and below-subsistence levels with the lack of, or defective, warehousing. This leads to agricultural produce loss during transit, with wastage and spillover between production and customer reaching, accounting for 5%-10% losses (Donahaye et al., 2016). Standard warehousing can motivate farmers to sell their products when market prices are optimal (Adigal & Singh, 2015). Technological advancements in warehousing enable perishable goods storage, helping farmers obtain better prices (Gupta, 2010). Warehousing and storage played a crucial role in the success of the green revolution in many agricultural nations. In the context of agriculture, warehousing is pivotal. Similar to transportation, storage is a core economic function. There's typically a time lag between production and consumption; during this period, commodities are stored by the producer, middleman, or consumer (Bowersox, 2018). In Sri Lanka, commodities are often stored by producers who lack sufficient storage systems (Wasala et al., 2014). TPL providers can offer warehousing services, carrying excess produce forward to future consumers (Kulkarni, 2012). Given the seasonal nature of agricultural production and year-round consumption, warehousing becomes essential in TPL and agriculture (Ashenbaum et al., 2015). Warehousing significantly affects the flow of goods from producers to consumers. It strengthens the supply chain, preventing food waste and shortages due to inadequate transport and storage (Wasala et al., 2014). Appropriate storage facilities prevent loss and increase supply chain efficiency (Jacob et al., 2014). Warehousing stabilizes prices by equating supply and demand, preventing distress in sales when prices are at their lowest post-harvest (Ashenbaum et al., 2015). It also reduces transportation pressure during peak post-harvest demand and prevents damage during handling and storage (Donahaye et al., 2016). Effective warehouse management can consequently improve supply chain efficiency and enhance farmer satisfaction by facilitating the implementation of more lucrative pricing strategies.

Korgaonker (1990) defined distribution as a process that moves goods from the supplier to the manufacturer and finally to the point of sale, involving activities such as customer service, shipping, warehousing, inventory control, private truck fleet operation, packaging, receiving, materials handling, and plant, warehousing, and store planning. It also includes the integration of

information (Cilliers & Nagel, 1994). Goh and Ang (2000) highlighted distribution as an essential part of the supply chain management cycle, with profit margins being determined by the speed at which raw materials are converted into end goods and reach customers (Lynch, 2002). According to Bloomen and Petrov (2012), in the agricultural industry, distribution falls into two main categories: commercial and physical distribution. Commercial distribution focuses on sales and returns on investments, often involving third-party individuals in the Agri supply chain process (Millen & Sohal, 2010). Physical distribution includes a variety of activities from the supply of finished goods to the consumers, to ensuring efficiency through proper handling of distribution components like transportation, logistics, packaging, and inventory control (Lynch, 2002). As articulated by Sohail et al. (2008), the overarching objective of distribution is to ensure the timely and appropriate delivery of raw materials and components, whether in partial or fully finished form, to their designated destinations, and in optimal condition. Proper channel selection, including the most efficient route planning and transportation mode selection, is crucial. From obtaining raw materials like livestock feed, seeds, pesticides, fertilizers, and agri-chemical packing materials to delivering end products, distribution plays a crucial role. Any reduction in distribution standards impacts agricultural crop production due to improper storage and packaging of finished goods, leading to spoilage or damage of produce (Stank et al., 2003; Razzaque & Sheng, 2014).

Order fulfillment, according to Christopher (2000), is a continuous process that starts with the customer and ends with delivering the finished goods. It's considered a cycle time that begins from the point of order receipt to delivering the ordered goods. It's a complex process encompassing various tasks, resources, and agents, involving sales commitment, credit checking, manufacturing, logistics, accounts receivables, and relationships with external suppliers (Lee & Billington, 2001). The order fulfillment process primarily encompasses order management, manufacturing, and distribution. It aims to deliver products of the required quality to fulfill customer orders at the right time and place and maintain robustness to handle uncertain conditions resulting from internal and external environmental variations (Malone, 2000). Effective order fulfillment can enhance the efficiency of the Agri supply chain network within a firm, as suggested by Perini and Susi (2004). It includes receiving the order from the sales point through the downstream in the supply chain, managing inventory and lead time, receiving materials for manufacturing from suppliers, and maintaining stability in the supply network during the manufacturing process. Material and capacity availability should be handled efficiently to ensure an effective supply chain function.

Robustness of Supply Chain

Robustness in supply chains refers to the ability to resist changes without altering the initial stable configuration (Barabasi & Albert, 1999). Hendricks and Singhal (2005) explained that supply chains are embedded in a dynamic environment exposed to disruptions such as natural disasters, economic recessions, unexpected accidents, and terrorist attacks. Disruptions can initially affect certain individuals within the network but can gradually propagate and potentially amplify, causing a substantial

impact on interconnected entities (Lee et al., 1997). Thadakamalla et al. (2004) argued that disruptions lead to a breakdown of normal operations, and a small breakdown can result in a catastrophic failure, slowing the flow of goods, services, and information, thereby causing higher costs or drops in sales. According to Lee et al. (1997), a robust supply chain retains its stability and withstands shocks instead of adjusting to them. Disruptions in agriculture primarily occur through inefficient Third-Party Logistics linked to the firms (Klau & Weiskircher, 2005). Robustness is a process that requires anticipation of change before its occurrence (Hendricks & Singhal, 2005). Mondal et al. (2014) stated that robustness is a property that allows a system to function despite internal and external disruptions. Discussion of robustness in supply chain management should consider the systems involved in the network, the functions of each entity, and the perturbations. Wagner and Bode (2006) asserted that supply chain robustness should focus on strengthening the network by avoiding risks related to demand, supply, or catastrophic events. The main vulnerabilities in the supply chain include customer dependence, supplier dependence, increased uncertainty, reduced transparency and visibility, and supplier concentrations. Prioritizing robustness can mitigate associated operational and supply chain risks, thereby strengthening productivity and improving satisfaction levels in the agriculture industry (Stricker & Lanza, 2014). Zhang and Wang (2011) emphasized that supply chain partners contribute significantly to supply chain success. Different strategies should be followed to strengthen the supply chain, with Third-Party Logistics (TPL) acting as a key determinant. Modernizing storage and transportation facilities to meet dynamic market demands is essential for enhancing overall operations. According to Tang et al. (2016), implementing an assembly line procedure within the Agribusiness can increase productivity. The assembly line practice, when implemented by entities in the supply chain, can enhance packaging, inventory handling, and order handling, ultimately developing the robustness of the supply chain.

Reward Maximization

Herzberg (1982) described a reward as recognition for an individual's services, efforts, or achievements, which can be either monetary or non-monetary. Monetary rewards involve financial incentives, while non-monetary rewards involve non-cash compensation. Huirne et al. (1988) suggested that rewards for farmers primarily come from production, financial incentives, and job satisfaction. The efficiency of the supply chain significantly influences these rewards, establishing a proportional relationship between supply chain efficiency and earned rewards. Production, as defined by Varley and Tolley (2000), is an organized sequence of activities that transform resources into finished products, such as goods and services, following market demands. This production process can be categorized into primary, secondary, and tertiary production. Brush (1992) suggested the factors of production usually consist of land, labor, capital, and enterprise. These economic resources are scarce compared to their demand, making them key determinants of the rewards earned by farmers. According to Esham and Usami (2005), an efficient warehousing system improves supply chain sustainability, consequently enhancing rewards earned by matching market demands promptly. This

stability improves supplier-manufacturer relationships, allowing farmers to obtain raw materials at a reasonable market value, reducing production costs, and building farmer confidence by minimizing wastage through effective warehousing (Esham et al., 2006). Monetary rewards, mainly in the form of financial incentives, motivate individuals to meet targets (Vermillion et al., 1995). Revenue, earned from business activities, is a major form of monetary reward for farmers (Little & Watts, 2008). Factors influencing revenue include marketing strategy, technology, automation, and the ability to leverage consumers' digital footprints (Wijayaratna, 2010). Revenue can be categorized as either operating or non-operating, with the former arising from core business activities and the latter from secondary activities. Supply chain strength is also linked to demand forecasting accuracy, reducing overproduction loss, and maximizing financial rewards for farmers (Stones, 2005). Effective distribution, including inventory control, warehousing, and shipping, contributes to supply chain strength and increases farmers' monetary rewards by reducing wastage and related costs (Esham & Usami, 2005). Coughenour and Swanson (2010) posited that job satisfaction, where an employee feels motivated, content, and satisfied with their job, is also a type of reward. This satisfaction impacts supply chain efficiency in agricultural production (Flores & Sarandon, 2004). Key factors determining job satisfaction for farmers include compensation or ROI, respect, recognition, and the challenges faced (Moro et al., 2008). Stable and strong supply chains center the entire agricultural supply chain on the farmers, increasing their bargaining power and reducing the influence of middlemen (Moro et al., 2008). This stability leads to self-actualization and self-esteem among farmers, ultimately increasing their financial satisfaction by improving ROI (Willock et al., 2009).

Technological Adaptation in Agri Supply Chain in Northern Sri Lanka

According to Ekanayake et al. (2018), technological adaptation, particularly in supply chain management and Third-Party Logistics, has a significant impact on farming. Such technology can increase profitability, production, and satisfaction among farmers (Karippacheril et al., 2013; Ackerley et al., 2010). Among numerous technological advancements, the Farm Management system and the Mobile trading application hold substantial significance. Sorensen et al. (2011) highlighted that Farm Management Software aids production through yield enhancement, handling tasks from operational planning to documentation. Bourlakis and Bourlakis (2006) mentioned that this system facilitates data collection, allowing better competition in the market. It also aids in controlling resources, finances and adhering to regulations. Lokanathan and Kapugama (2012) further add that the system acts as an integrated circuit, reducing inventory costs, improving operations planning, integrating individuals, and enhancing efficiency in warehousing, inventory forecasting, and order fulfillment (Chow et al., 2017). As for Mobile trading Applications, De Silva et al. (2019) indicated that 60% of farmers in Northern Sri Lanka are smallholders, who face financial hardship due to middlemen and lack of capital. The stress induced by such conditions has led to an alarming increase in suicides among rural farmers. Baumuller (2016) suggested that mobile trading can alleviate these issues by enhancing supply

chains and maximizing rewards. One notable example is the BOT framework, a mobile application that connects farmers and buyers, simplifying and expediting trading processes (Patel et al., 2010). Further, the government and private investors have developed additional applications like Govi Mithuru and Govipola. The former was launched in 2015 to support farmers throughout their farming process, providing timely and individualized information via voice messages (Dialog, 2020; Palmer & Darabian, 2017). Govipola, on the other hand, aims to ensure fair market prices for farmers and provide transparency in price trends (Faaiz & Kohombange, 2019). While the technologies mentioned are available in the market, they are not yet widely adopted by farming households. In essence, the technological instruments pinpointed in these studies have the potential to assist farmers in several aspects, most importantly by reinforcing the supply chain, which ultimately results in enhanced benefits for farmers.

Theoretical Framework and Its Criticism

Third-Party Logistics (TPL) is seen as an effective governance structure capable of enhancing efficiency in supply chain management decisions. The author of this study employs four theories to explain its application to TPL, focusing on interfirm interaction, contracts, long-term relationships, and firm competencies. Principal-Agent Theory applied to TPL suggests an interfirm contracting perspective. This focuses on creating efficient contracts between the buyer and seller of logistic services, with incentives based on performance or behavioral outcomes. The TPL providers' payment depends on the measurement and control of their performance (Hertz & Alfredsson, 2003).

The Transaction Cost Analysis suggests that by reducing the supplier base of transport firms and creating long-term relationships with key supply chain operators, a firm can minimize costs associated with gathering supplier information, negotiating contracts, and enforcing post-negotiation. Safeguards must be incorporated into TPL agreements to avoid opportunistic behavior, such as penalty clauses for poor performance, joint investments, training programs, and labor exchange (Halldorsson, 2002).

The Network Perspective Theory emphasizes the value of openness and trust in cooperation among firms to enhance efficiency in administrative and logistical systems. Firms can benefit from the resources and skills of Third-Party Logistics providers through close cooperation, leading to a reduction in costs and contractual safeguards (Haakansson & Ford, 2002; Haakansson, 1987; Haakansson et al., 1999).

The Resource-based View, another theory applied to TPL, provides insight into the boundaries of the firm considering the limited availability of resources and capabilities in the market. The TPL acts as a conduit for improving logistic services and achieving mutual transfer of logistics experience. Long-term commitments, customized solutions, and mutual adjustments enhance the uniqueness and heterogeneity of logistics capabilities and resources (Halldorsson & Skjoett-Larsen, 2004). The ultimate goal is to create a learning environment, fostering the development of core logistics competencies. In addition, the features of these theories are outlined in the following *Table 1*.

Characteristics	Principal Agent Theory [PAT]	Transaction Cost Analysis [TCA]	Resource-Based View [RBV]	Network Theory [NT]
Behavioural Assumptions	Disparity in information between the freight sender and the third-party logistics provider, and conflicts in objectives.	Safeguards are fostered by trust based on calculations and specialized investments aimed at long-term agreements.	Establishment of personal trust, mutual learning, and the exchange of knowledge.	Building personal trust, sharing information, and fostering a mutually beneficial situation.
Problem Orientation	Evaluating performance, utilizing activity-based costing, maintaining transparency with open-book management, and using incentives.	What function should be delegated to a Third-Party Logistics (TPL) provider?	Cultivating skills internally and fostering competencies between the shipper and the Third-Party Logistics (TPL) provider.	Establishment of relationships through communication and interaction.
Time Dimension	Static	Static	Dynamic	Dynamic
Unit of Analysis	Official Third-Party Logistics Agreements	Third-Party Logistics Services, Transactional Expenses, and Logistic Efficiency	Shared Resources and Capabilities between the freight sender and Third-Party Logistics Provider	Relationship between the freight sender and Third-Party Logistics Provider
Nature of Relations	Negative relationships and contract terms can influence both the quantity and type of activities outsourced.	Impersonal relationships, frequent bids to gauge the Third-Party Logistics market, emphasis on cost-effectiveness, and short-term contracts.	Mutually beneficial resources, fostering new skills through Third-Party Logistics relationships.	Verbal agreements, leveraging resources owned by Third-Party Logistics firms, and ongoing Third-Party Logistics contracts.
Primary Domain of Interest	Harmonization of contracts based on behaviour and results.	Investment in specialized resources (like warehouses, IT, personnel), and reducing transaction costs.	Cultivating new skills (such as batch monitored shipments, merge in transit, track, and trace capabilities).	Joint adjustment of IT systems, processes, and routines.

Table 1: Summary view of theoretical framework applied to Third-Party Logistics

Source: (Developed by the Author)

Methodology of the Study

The methodology primarily centers around the hypothesis substantiated by the conceptual framework, research design, target population, sample design, techniques for data collection, data sources, and procedures for data management.

Conceptual Framework

Drawing from the extensive literature review, this study posits a hypothesis that the efficacy of the supply chain, encompassing third-party logistics functions such as warehousing, distribution, and order fulfillment, exerts a substantial influence on overall supply chain robustness, thereby indirectly impacting reward maximization (Lee & Billington, 2001; Millen & Sohal, 2010; Donahaye et al., 2016; Esham et al., 2006). A comprehensive depiction of all identified variables is presented in *Figure 2* below. Additionally, literature findings provide compelling evidence supporting the mediating role of supply chain robustness in the context of reward maximization (Hendricks & Singhal, 2005; Stricker & Lanza, 2014; Tang et al., 2016). Moreover, key insights gleaned from works by Ekanayake et al. (2018), Karippacheril et al. (2013), and Ackerley et al. (2010) suggest a significant association between technological adaptation, third-party logistics, and the robustness of the supply chain. In summary, based on the literature, the author posits the following hypotheses.

Hypothesis 1: Warehouse facilities have a positive effect on Reward Maximization.
Hypothesis 2: Distribution has a positive effect on Reward Maximization.

Hypothesis 3: Order fulfillment has a positive effect on Reward Maximization.
Hypothesis 4: The robustness of the supply chain mediates the relationship between the warehouse facilities, distribution and order fulfillment, and Reward Maximization.
Hypothesis 5: The technology adaptation moderates the relationship between the Third-Party Logistics and the Robustness of the Supply Chain.

Research Philosophy

The research philosophy employs an assortment of data collection techniques, steered by the author's comprehension of philosophical outlooks, theoretical development, and methodological preferences. This study employs a quantitative method, involving a questionnaire survey to collect and analyze data (Arend, 2003; Rasovska et al., 2008). The study is mainly anchored in a pragmatist philosophical viewpoint (Halfpenny, 1987; Reason, 2003). It emphasizes established theories and empirical discoveries to scrutinize the interrelation between independent and dependent variables, thereby adopting a deductive approach (Manna & Waldinger, 1980). The importance of Third-Party Logistics in bolstering supply chain resilience is explored, concluding that its fortification yields maximum benefits for farmers. A cross-sectional study design was employed as the most fitting to tackle the research queries due to the consistent behavior of the variables over time. The target population for this analysis comprises farming households from the Northern Province of Sri Lanka, particularly from the regions of Jaffna, Killinochi, Mannar, Mullaitivu, and Vavuniya. This choice was influenced by the predominant agricultural issues in this region (Chief Secretariat's Secretary Northern Province [CSSNP], 2019; CSSNP, 2020; DCS, 2019). The research primarily employs a two-step sampling approach, beginning with a stratified simple random sampling, followed by a subsequent simple random sampling. The chosen stratum for this process is determined by the household head. Within the Northern Province of Sri Lanka, there are a total of 4,395 households led by females, distributed across different districts: 2,709 in Jaffna, 669 in Kilinochchi, 273 in Mullaitivu, 378 in Mannar, and 366 in Vavuniya (DCS, 2022). Upon conducting a preliminary study, it was observed that there is heterogeneity within the samples of each stratum. Simultaneously, each stratum, when compared to other districts in the Northern Province, was deemed homogeneous. Subsequently, within the specified strata of the province, 36 households were randomly selected from each district using simple random sampling, resulting in a total sample size of 180 farming households in the Northern Province for this study.

The data collection strictly adheres to the code of conduct and regulations set by the Department of Survey Regulations Sri Lanka. Owing to the psychological insecurity instilled within households as a consequence of the three-decade-long Civil War in Sri Lanka and its aftermath, the freedom to articulate viewpoints is constrained by diverse means. To proactively address the identified grey area, participating farming households in the study are granted complete freedom to articulate their viewpoints during the questionnaire survey. Anonymity for questionnaire responses is assured. Furthermore, the survey is conducted at the farmers' convenience. The collected data were analyzed using SPSS v21 software.

Findings

This section systematically evaluates the survey data by commencing with a rigorous examination of its validity and reliability. Subsequently, it conducts a thorough analysis of the identified variables. The section culminates with the formal testing of hypotheses.

Goodness of Measures of Quantitative Analysis

The quantitative data collected were assessed for their quality using factor analysis, followed by validity and reliability tests. The sample for quantitative analysis comprised responses from 180 farming households across Jaffna, Kilinochchi, Vavuniya, Mannar, and Mullaitivu, obtained through a direct questionnaire survey. Per Guion (2004), a comprehensive evaluation was conducted to ascertain the validity, appropriateness of tests, ethical considerations, and financial implications associated with measuring the concepts or constructs inherent in the questions. Construct Validity was primarily based on Convergent and Discriminant analysis. The Conducted Convergent Validity indicated that the main study successfully met the minimum threshold limits as per the decision criteria outlined under the methodology aforementioned.

Upon individual evaluation of the results, it was evident that the Kaiser-Meyer-Olkin (KMO) values for all variables exceeded the threshold value (>0.5), implying that the sampling was adequate. Bartlett's test confirmed the significance of the variables under study, as all variables had significance levels below the threshold value (<0.005) (Garcia-Santillan et al., 2012). It was noted that the Composite Reliability (CR) for all identified variables was above the minimum required value of 0.7 (Purwanto, 2021). The Average Variance Extracted (AVE) measures were above the threshold limit of 0.5 (Adedeji et al., 2017). Thus, it was concluded that the data satisfies the requirements for convergent validity. *Table 2* below demonstrates the convergent validity of the variables.

Table 2: Convergent Validity of Variables

Variable	KMO (>.5)	Sig. of Bartlett's test (<.05)	(AVE) (>.5)	CR (>.7)
Warehousing	0.775	x^2: 474 Sig: 0.000	0.643	0.899
Distribution	0.725	x^2: 925 Sig: 0.000	0.706	0.920
Order Fulfilment	0.661	x^2: 291 Sig: 0.000	0.525	0.844
Robustness of Supply Chain	0.712	x^2: 570 Sig: 0.000	0.583	0.867
Technology Adaptation	0.806	x^2: 726 Sig: 0.000	0.681	0.911
Reward Maximisation	0.810	x^2: 850 Sig: 0.000	0.764	0.942

Source: (Developed by the Author)

The author conducted a reliability test to assess the internal consistency of the measures, specifically the inter-item consistency reliability, using Cronbach's alpha coefficient. The summary of the test results is provided in *Table 3* below. The analysis indicates that the criteria based on the literature's lowest threshold for Cronbach's alpha coefficient have been achieved. Therefore, the reliability analysis suggests that the data collected through the questionnaire successfully meets the decision criteria.

Table 3: Overall Reliability of Variables

Variable	Cronbach's Alpha (> 0.7)
Independent Variables	
Warehousing	0.843
Distribution	0.873
Order Fulfilment	0.737
Moderating Variable	
Technology Adaptation	0.879
Mediating Variable	
Robustness of the Supply chain	0.812
Dependent Variable	
Reward Maximisation	0.910

Source: (Developed by the Author)

With the aid of validity and reliability analysis, all criteria were successfully met.

Demographic Analysis

The demographic analysis was primarily focused on attributes such as gender, age, location, farming experience, educational qualifications, annual income, and farming methods. The majority of the respondents, approximately 88%, were farmers aged between 26 and 45 years. Furthermore, around 78% of these respondents had attained either a primary or secondary level of education. The study discovered a gender proportion of about 3:1 between male and female farmers, indicating an encouraging trend toward the participation of women in farming. To ensure neutrality in the simple random sampling, an equal number of respondents were chosen from each district. About 78% of farmers in the Northern Province had over five years of experience in farming and allied fields. The farmers mainly employed agricultural techniques such as intercropping, multiple cropping, and intensive cropping, in a ratio of 1:3.5 respectively. Moreover, a significant portion of the farmers, over 65%, reported an annual income above Rs. 250,000.

Descriptive Analysis

The descriptives of the variables are as follows,

Table 4: Descriptive Statistics Summary

Variables	Mean	Median	Std. Deviation	Variance	Skewness
Independent Variables					
Warehousing	2.4467	2.20	0.65471	0.429	1.177
Distribution	2.5667	2.40	0.59439	0.353	1.224
Order Fulfilment	2.5133	2.20	0.48720	0.237	0.700
Moderating Variable					
Technology Adaptation	2.4444	2.00	0.66905	0.448	1.061
Mediating Variable					
Supply Chain Robustnes	2.5611	2.4000	0.57240	0.328	1.063

Dependent Variable					
Reward Maximization	2.6367	2.40000	0.59174	0.350	1.215

Source: (Developed by the Author)

The independent variable, warehousing, demonstrated a positive skewness of +1.177, implying that most farmers experience inadequate warehousing. This claim is substantiated by a median value of 2.2 and a mean value of 2.447. With a coefficient of variance at 0.265, which is less than 1, the data suggest that responses are tightly distributed around the mean, thus, underscoring the prevalent issue of poor warehousing. Distribution, another facet of Third-Party Logistics, displayed a positive skewness of +1.224, further affirming the inadequate distribution situation in the Northern Province. The coefficient of variance, at 0.231, indicates that responses cluster strongly around the mean of 2.567, signifying farmer dissatisfaction with existing distribution systems. The last segment under Third-Party Logistics, order fulfillment, showed a relatively lower skewness of +0.7, suggesting a prevalence of weak order fulfillment methods and techniques. The weak order fulfillment scenario is further highlighted by the coefficient of variance at 0.194, which hovers closely around the mean value of 2.513. Farmers' responses from the Northern Province revealed negligible technological adaptations concerning Third-Party Logistics components, a claim reinforced by response bias, as evidenced by the skewness of +1.061 and a coefficient of variance of 0.274 dispersion around the mean of 2.444. The study found the supply chain's robustness, a variable mediating the condition between Third-Party Logistics and reward maximization, to be generally weak. This is suggested by a positive skewness of +1.063, pointing to weak supply chain practices in the Northern Province. This situation is further confirmed by a concentration of responses around the mean value of 2.561 and a coefficient of variance of 0.22.

The findings overall suggest that farmers in the Northern Province receive limited incentives in terms of yield, benefits, satisfaction, and sales. This argument is bolstered by the survey results, which show most of the responses leaning towards the positive side of the bell curve, with a value of +1.215, indicating a minimal level of rewards earned by the farmers.

Hypothesis Testing

The first hypothesis suggests that warehousing significantly influences reward maximization. The Pearson correlation coefficient of this hypothesis is found to be +0.954, indicating a strong association between the variables. Moreover, the observed p-value is less than the threshold (α) of 0.05, and the regression coefficient is a significant 0.862 at the 0.05 significance level. Consequently, warehousing is a reliable predictor of reward maximization. Using the Pearson correlation coefficient of warehousing, we derive a coefficient of +0.862 and an intercept of 0.527. When these coordinates are applied to the simple linear regression model ($Y = \beta 0 + \beta 1\ X$), the relationship is expressed as:

$$\text{Reward Maximization} = 0.527 + 0.862*(\text{Warehousing}) \quad (1)$$

The second hypothesis in the study proposes

that Distribution significantly influences reward maximization. With a Pearson correlation coefficient of +0.905, the association between the independent and dependent variables is strong. The p-value is also observed to be 0.000, which is less than the threshold value of 0.05. The regression coefficient of +0.901 is considered significant at 0.05, affirming that distribution is a strong predictor of reward maximization. Applying these findings to the simple linear regression model, the relationship is expressed as:

Reward Maximization = 0.324 + 0.901*(Distribution) (2)

The third hypothesis suggests that Order fulfillment significantly influences reward maximization. The association observed among the variables is +0.782, revealing a strong correlation. This relationship is substantiated by a p-value lower than the threshold and a regression coefficient of 0.949 significant at the 0.05 threshold. Therefore, it supports the hypothesis that order fulfillment is a significant predictor of reward maximization. Upon applying the Pearson correlation coefficient to the simple linear regression model, the relationship is:

Reward Maximization = 0.251 + 0.949*(Order Fulfilment) (3)

The fourth hypothesis posits that the robustness of the supply chain mediates the relationship between warehousing facilities, distribution, order fulfillment, and reward maximization. A Sobel test (as shown in *Figure 3*) was conducted to assess the mediating effect of the robustness of the supply chain between the independent variables (Warehousing, Distribution, Order fulfillment) and the dependent variable (Reward Maximization). This test, essentially a specialized t-test, investigates the statistical significance of the mediating variable. All identified explanatory variables have probability values less than the threshold of 0.05, leading to the conclusion that the Sobel mediator test is statistically significant. Moreover, it suggests that the explanatory variables (warehousing, distribution, and order fulfillment) influence the dependent variable (Reward Maximization) in the presence of the mediator (robustness of supply chain). *Table 4* displays the test outcomes of the Sobel test.

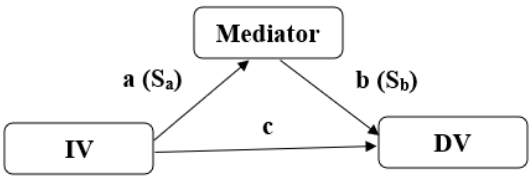


Figure 3: Sobel Test

Source: (Developed by the Author)

The final hypothesis of the study suggests that technology adaptation serves as the moderator between warehouse facilities, distribution & order fulfillment, and the robustness of the supply chain. To determine the moderating effect, multiple regression was conducted among the interaction variables, independent variables, and the Mediating Variable (Robustness of Supply chain) (Vij & Farooq, 2017; Hall & Rosenthal, 1991). The results show that the significance value observed under the interaction variable is less than the threshold of 0.05, implying that the interaction is statistically significant. Overall, the impact between the regressors (warehousing, distribution, order fulfillment) and the regress and (robustness of the supply chain)

is moderated by technology adaptation.

Table 4: Sobel Test Results of the Mediating Effect of Robustness of Supply Chain

	Sobel Test Statistics	p-value	Significant / Not Significant
Mediation of Robustness of Supply Chain on Warehousing and Reward Maximization	5.323	0.000	Significant
Mediation of Robustness of Supply Chain on Distribution and Reward Maximization	8.329	0.000	Significant
Mediation of Robustness of Supply Chain on Order Fulfilment and Reward Maximization	11.556	0.000	Significant

Source: (Developed by the Author)

Discussion

Overall, the study conducted concludes that warehousing, distribution, and order fulfillment influence reward maximization which is mediated by the robustness of the supply chain and moderated by technology adaptation. The paper showcases the importance and robustness of the agricultural supply chain and the importance of technology adaptation in the 21st century (Akkerman et al., 2010).

The study findings indicate that warehousing facilities in the Northern province face numerous challenges, including post-harvest damages, insufficient storage capacity, ineffective Third-Party Logistics strategies, and substandard transportation within the supply chain, resulting in lower profits for farmers. These results corroborate previous studies by Adhikarinayake (2015), Sundaram (2014), Donahaye et al. (2016), Ashenbaum et al. (2015), Wasala et al. (2014), and Jacob et al. (2014). Both current and past research emphasize that high-standard warehousing boosts farmers' ability to sell products at optimal market prices. The research also reveals the poor quality of farmers' distribution facilities in the Northern Province. Issues concerning drying, cleaning, milling, packing, and a lack of direct and indirect sales facilities were prevalent. Adequate distribution facilities are key to maximizing farmer profits, as supported by studies by Korgaonker (1990), Cilliers and Nagel (1994), Goh and Ang (2000), Bloomen and Petrov (2012), and Sohail et al. (2008). Both current and past research suggest that low distribution standards negatively impact crop production effectiveness, resulting in spoilage or damage to the produce. Further, the findings highlight that farmers face challenging contractual obligations, limited interest in in-farm value creation from firms, and a lack of responsiveness to customer demand. Effective order fulfillment is crucial in determining production and financial rewards, in line with viewpoints from Christopher (2000), Lee and Billington (2001), Malone (2000), and Perini and Susi (2004). Both sets of research underscore the importance of effective order fulfillment to the agricultural supply chain's effectiveness. Lastly, the study shows that farmers have a limited adaptation to technological platforms and a significant knowledge gap. This is supported by Ekanayake et al. (2018), Karippacheril et al. (2013), and Ackerley et al. (2010), who posit that the presence of technology can improve efficiency and

effectiveness.

The research paper explores the application of four distinct theories in decision-making regarding supply chain management: Transaction Cost Analysis (TCA), The Principal-Agent Theory (PAT), The Network Theory (NT); and the Resource-Based View (RBV). TCA and PAT, rooted in neo-classical economic theory, aid in managing the supply chain in various ways. These include deciding on in-house activities and outsourcing aspects of the supply chain to third-party firms, identifying roles and responsibilities of supply chain participants, safeguarding firms from opportunistic behavior, and establishing incentives to enhance supply chain outcomes. However, TCA and PAT theories have limitations due to assumptions about human behavior and static views of boundaries. In response, complementary theories like NT and RBV are employed in this study. NT examines how companies within a supply network can adapt their processes and systems through interaction and exchange, emphasizing the importance of third-party firms in creating operational effectiveness within the supply chain. RBV, complementing TCA, focuses on resources, capabilities, and competencies both within individual firms and in connections between firms in the supply chain. It helps in deciding which activities to outsource and which to keep in-house, based on the capabilities of potential partners in the supply chain. The dimensions of Third-Party Logistics for the selected sample highlight a minimal availability of facilities, suggesting the need for highly efficient and effective third-party service providers. Here, NT and RBV aid in effective decision-making concerning selection criteria. These theoretical frameworks guide entities in making appropriate decisions regarding warehousing, distribution, and order fulfillment. By employing these theories, strength can be fostered in the supply chain, reflected in the form of financial incentives, production increases, or satisfaction for farmers. Nonetheless, firms should be careful when selecting the appropriate theory to explain inter-firm cooperation due to the potential for contradictory explanations. The empirical findings of this research indicate that individuals/entities involved in agribusiness don't merely respond to PAT and TCA, but also to the contingencies associated with both.

Overall, for an agricultural supply chain to be efficient, farmers must have efficient warehousing, distribution, and order fulfillment facilities. Technology adaptation is also a significant factor in improving their economic condition. This study aimed to investigate the relationship between Third-Party Logistics and farmer rewards, the mediating effect of the robustness of the agricultural supply chain, and the moderating effect of technology adaptation. It successfully demonstrated a significant relationship between independent and dependent variables, along with a mediating and moderating effect.

Conclusion

The primary aim of this research was to investigate the impact of Third-Party Logistics on farmers' reward maximization, with the robustness of the supply chain acting as a mediating variable and technology adaptation as a moderating variable. An empirical study was conducted for this scientific research, with findings based on a sample of 180 farming households. These findings address issues highlighted in the Introduction section. Nearly 78% of the respondents indicated low levels of reward maximization, reflecting

the poor quality of Third-Party Logistics facilities. Theories related to this phenomenon are discussed in the following section. The author has developed a model to predict reward maximization, with this chapter explaining key survey findings, their potential contributions to related theories, and anticipated future research based on these findings.

The research findings reveal a statistically significant relationship between the independent and dependent variables. The sample group consisted of 77.22% (or 139) male farmers. Notably, 53 respondents (29.44% of the sample) were farmers aged 41 years and above, and 63 (35% of the sample) had been engaged in agriculture for over a decade. These farmers, having weathered a decade of agricultural challenges, have the potential for future progress. It is inferred that these farmers can find satisfaction in their limited revenue. A small improvement in these farmers' supply chain practices could significantly enhance their overall operations. Technology, as a moderating variable, was found to have a significant impact on strengthening the supply chain. Hence, technology adaptation and knowledge are crucial for revenue maximization. Notably, 39 respondents (or 21.67% of the sample) reported an annual revenue above Rs. 300,000. Upon analysis, it was observed that these 39 respondents were also the ones who had attained at least a bachelor's degree and adopted intensive cropping, highlighting the important role education plays in revenue generation. However, logistic functions were less effective due to a knowledge gap regarding modernization and mechanization. Although third-party providers were integrated into the supply chain, their effectiveness was significantly hindered due to trust issues and other limitations in the Northern province market. The preliminary study conducted by the researcher before running the real survey indicated that farmers lacked confidence and networking capabilities, often exploited by middlemen. Ineffective warehousing, distribution, and order fulfillment facilities provided by third-party entities within the villages critically influenced revenue, establishing the dimensions of Third-Party Logistics as the independent variable. The mediating variable, the robustness of the supply chain, exhibited a significant relationship, mediating between the independent and dependent variables. The problems identified among the farmers in the Northern province are mainly due to the ineffective application of Third-Party Logistics, impacting the strength of the supply chain. It was identified that poor supply chain application was a key factor determining revenue.

Overall, the study confirmed a significant relationship among the variables considered. To summarize, the independent and moderating variables have a close relationship with the demographic factors studied, and all the independent variables are connected to the dependent variable through the mediating variable.

Implications

The research paper addresses the dimensions of Third-Party Logistics and how they intertwine with Principal-Agent Theory, Network Theory, Transaction Cost Analysis, and Resource-Based View explored in the study. The research reveals that agriculture in the Northern province requires significant improvements, particularly in areas such as Third-Party Logistics, technology adaptation, and the Agri Supply Chain Robustness.

Farmers exhibit notable gaps in their

adaptation to warehousing, distribution, and order fulfillment facilities. Although new facilities are being introduced for TPL, many farmers seldom employ effective outsourcing techniques. Common practices include forming partnerships or opting for managed services. Trust limitations have led most farmers to seek third-party firms within their familiar locales. However, partnering with third-party providers with limited capabilities has led to a critical market situation with limited growth potential. On the other hand, under managed services, the third-party provider's responsibility is broader, encompassing complete functions like transportation systems or storage systems management. Farmers often hesitate to adopt this strategy due to time constraints, as they balance between coordinating with logistics providers and cultivating their crops. Given these conditions, the research suggests shifting from Third-Party Logistics to Fourth-Party Logistics [FPL] could enhance revenue and supply chain efficiency (Jones & Rashid, 2020). In line with the view of Sullivan (2021), unlike TPL, FPL involves outsourcing the entire supply chain management to a provider that oversees warehousing, shipping, freight forwarding, and supply chain, agents. The FPL provider focuses on integrating and optimizing various supply chain aspects, thus improving service levels, and simplifying logistics functions. The transition to FPL can rapidly boost capacity and expand the business nationally and internationally. Technology is identified as a key factor in moderating the effectiveness of TPL and the strength of the supply chain. Despite the availability of mobile applications connecting farmers and retailers, the effective utilization of technology remains low (Khan et al., 2019; Ogbeide & Ele, 2015). Unlike the integration of TPL with a mobile application, incorporating the FPL into cloud systems, particularly System Application and Products [SAP], amplifies transparency concerning climate variations, raw material sourcing, tracking capabilities, and adherence to regulations (Gupta & Singh, 2021). [1]

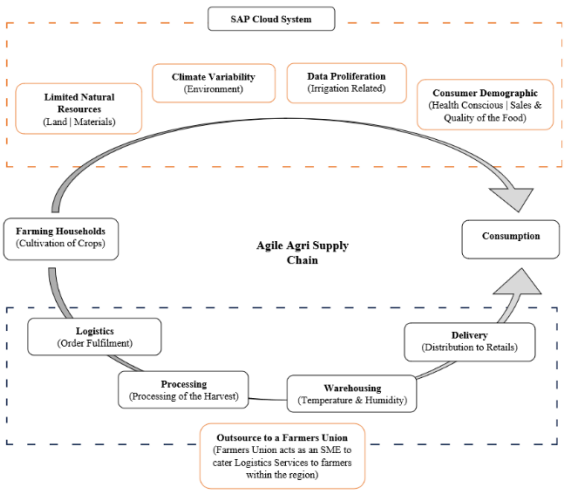


Figure 4: Agile Supply Chain to Bring Robustness and Efficiency

Source: (Developed by the Author)

The agricultural supply chain in the Northern Province is currently underperforming due to a lack of comprehensive integration. Its main process is the movement of raw materials from suppliers to farmers, and then from farmers to consumers via intermediaries.

The findings will be discussed following the commercial implementation of the proposed model with a threshold level of the sample population.

[1] The model, proposed and developed by the author, Gopikrishna Selvananthan, is currently under testing in Northern Sri Lanka since the fourth quarter of 2022. These test results pave the way for future research.

This simplistic structure doesn't allow for much environmental interaction or predictive capacity. However, the study suggests that technology has the potential to drastically enhance the efficiency of the agricultural supply chain by transforming the facets of third-party logistics and reinforcing the supply chain as a whole. Thus, in concurrence with the recommendations provided earlier, the author of this study proposes an adaptive supply chain that integrates the principles of Fourth-Party Logistics and technological applications, intending to achieve greater productivity and consumption efficiency. The recommended supply chain is illustrated in *Figure 4*.

References

Ackerley, N., Sertkaya, A., & Lange, R. (2010). Food transportation safety: characterizing risks and controls by use of expert opinion. *Food Protection Trends*, *30* (4), 212-222.

Adedeji, A. N., Lawan, M. O., & Sidique, S. F. (2017). Testing validity of observed indicators of local content policy in Nigeria: evidence from four-factor measurement model. *CBN Journal of Applied Statistics (JAS)*, *8*(1), 7.

Adhikarinayake. T.B. (2015). Paddy farming system in Sri Lanka. *Methodical design process to improve the income of paddy farmers in Sri Lanka*, *12* (3), 10-29.

Adigal, V.S., & Singh, S. (2015). Agricultural marketing vis-a-vis warehousing facility (A case study of Central Warehousing Corporation). *The Business & Management Review*, *5*(4), 43.

Agrawal, A.N. (2017). *Indian Agriculture*. 10th ed. New Delhi: Vikas Publishing House, Pvt. Ltd.

Akkerman, R., Farahani, P., & Grunow, M. (2010). Quality, safety, and sustainability in food distribution: a review of quantitative operations management approaches and challenges. *International Journal of Quantitative Operations Management*, *32* (4), 863-904.

Arend RJ (2003) Revisiting the logical and research considerations of competitive advantage. *Strategic Management Journal*, *24* (3), 279-284

Ashenbaum, B., Maltz, A.B., & Rabinovich, E. (2015). Studies of trends in third-party logistics usage: what can we conclude. *Transportation Journal*, *50*(5), 40-64.

Ballou, R.H. (2010). *Business logistics management: planning, organizing, and controlling the supply chain*. 7th ed. New York: Prentice Hall.

Barabasi, A.L, & Albert, R. (1999). The emergence of scaling in random networks. *Science*, *286* (5439), 509-512.

Baumuller, H. (2016). *Agricultural service delivery through mobile phones: local innovation and technological opportunities in Kenya*. In: In Technological and institutional innovations for marginalized smallholders in agricultural development. Cham: Springer, 143-162.

Bloomen, D.R., & Petrov, I.P. (2012). Logistics in Bulgaria: Concepts for Newmarket Expansion. *International Journal of Physical Distribution and Logistics Management*, *36*(7), 52-75.

Bogataj, M., Bogataj, L., & Vodopivec, R. (2005). Stability of perishable goods in cold logistic chains. *International Journal Production of Economics*, *93* (34), 345-356.

Boundeth, S., Nanseki, T., & Takeuchi, S.

(2012). Analysis of technical efficiency of maize farmers in the northern province of Sri Lanka. *Sri Lanka Journal of Agricultural Research, 7* (49), 1215-1285.

Bourlakis, M., & Bourlakis, C. (2006). Integrating logistics and information technology strategies for sustainable competitive advantage. *Journal of Enterprise Information Management, 19* (4), 389-402.

Bowersox, D.J. (2018). The strategic benefits of logistics alliances. *Harvard Business Review, 95* (15), 50-75.

Brush, S.B. (1992). Ethnoecology, biodiversity, and modernization in Andean potato agriculture. *Journal of Ethnobiology, 12*, 161-185.

Canfora, I. (2016). Is the short food supply chain an efficient solution for sustainability in the food market?. *Agriculture and Agricultural Science Procedia, 8*(1), 402-410.

Carr, A.S., Leong, K., & Sheu, C. (2000). A study of purchasing practices in Taiwan. *International Journal of Operations & Production Management, 20* (12), 1427-1445.

Carr, A.S., & Smeltzer, L.R. (2000). An empirical study of the relationship among purchasing skills and strategic purchasing, financial performance, and supplier responsiveness. *Journal of Supply Chain Management, 36* (3), 40-54

Carter, C., & Rogers, D. (2008). Framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistic Management, 38*(5), 360-387.

Central Bank of Sri Lanka [CBSL]. (2019). *Economic and Social Statistics of Sri-Lanka,* Colombo: Government Publication Bureau.

Chan, F.T., Chan, H.K., Lau, H.C., & Ip, R.W. (2006). An AHP approach in benchmarking logistics performance of the postal industry. *Benchmarking: An International Journal, 13*(6), 636-661.

Chief Secretary's Secretariat – Northern Province [CSSNP]. (2019). *Statistical Information Northern Province*. Jaffna.

Chief Secretary's Secretariat – Northern Province [CSSNP]. (2020). *Statistical Information Northern Province*. Jaffna.

Chow, H.K., Choy, K.L., Lee, W.B., & Chan, F.T. (2017). Integration of web-based and RFID technology in visualizing logistics operations e a case study. *Supply Chain Management: An International Journal, 20*(8), 158-225.

Christopher, M. (2000). *Logistics and Supply Chain Management*. London: Pitman Publishing.

Cilliers, W.W., & Nagel, P.J. (1994). Logistics trends in South Africa. *International Journal of Physical Distribution and Logistics Management, 24*(7), 4-14.

Closs, D.J., & Mollenkopf, D.A. (2004). A global supply chain framework. *Journal of Industrial Marketing Management, 33*(1), 37-44.

Coughenour, C.M., & Swanson, L.E. (2010). Rewards, values, and satisfactions with farm work. *Rural Sociology, 75*(14), 775-1110

David, J., Ketchen, J., & Larry, C. (2004). The intersection of strategic management and supply chain management. *Industrial Marketing Management, 33*(1), 51-56.

De Silva, L.N., Goonetillake, J.S., Wikramanayake, G.N., & Ginige, A. (2019). *Towards using ICT to enhance the flow of information to aid farmer sustainability in Sri Lanka*. In ACIS

2019: Location, location, location: Proceedings of the 30th Australasian Conference on Information Systems 2019, 05-20.

Department of Census Statistics [DCS]. (2017). *Department of Census and Statistics Paddy Statistics - 2017/18 Maha Season*. Ministry of Economic Reforms and Public Distribution. Battaramulla, Sri Lanka: Samples Survey Division, Department of Census and Statistics.

Department of Census & Statistics [DCS]. (2019). *Global Multidimensional Poverty for Sri Lanka*. Ministry of Economic Reforms and Public Distribution. Battaramulla, Sri Lanka: Samples Survey Division, Department of Census and Statistics.

Department of Census & Statistics [DCS]. (2022). *Household Income and Expenditure Survey - 2019*. Ministry of Economic Policies and Plan Implementation. Battaramulla, Sri Lanka: Samples Survey Division, Department of Census and Statistics.

Dharmaratne, T. A. (2014). *An overall assessment of the agricultural marketing systems in the Northern Province of Sri Lanka*. Hector Kobbekaduwa Agrarian Research and Training Institute.

Dharmasena, P.B. (2010). Traditional rice farming in Sri Lanka. *Economic Review*, *36*(2), 48-53.

Dialog. (2020). Govi Mithuru. [Online], Available at: https://www.dialog.lk/govi-mithuru. Accessed 04 February 2020

Donahaye, E., Navarro, S., Ziv, A., Blauschild, Y., & Weerasinghe, D. (2016). Storage of paddy in hermetically sealed plastic liners in Sri Lanka. *Tropical Science*, *31*(2), 109-121.

Ekanayake, E.T., Gunaratna, L.P., & Gunawardena, E.N. (2018). Technical and socio-economic assessment of micro irrigation system in the small-scale farming sector of Sri Lanka, Hambantota.

Esham, M., Usami, H., & Kobayashi, I. (2006). An Economic Study of Contract Farming in the Fruit and Vegetable Industry in Sri Lanka: A Case Study of Gherkin (Cucumis Sativus) Production. *Journal of Rural Problems*, *42*(1), 14-23.

Esham, M., & Usami, K. (2005). Present State and Issues of Farmers-agribusiness Linkages through Farmer Organization/Group in Sri Lanka: A Case Study of Hybrid Maize Production. *Journal of Agricultural Development Studies*, *16*(2), 27-36.

Faaiz, F., & Kohombange, S. (2019). An App for Agriculture [Interview]. Accessed 27 February 2019.

Flores, C.C., & Sarandón, S.J. (2004). Limitations of neoclassical economics for evaluating the sustainability of agricultural systems: comparing organic and conventional systems. *Journal of Sustainable Agriculture*, *24*(2), 77-91.

Gammelgaard, B., & Larson, P. (2001). Logistics skills and competencies for supply chain management. *Journal of Business Logistics*, *22*(2), 27-50.

Garcia-Santillan, A., Moreno-Garcia, E., Carlos-Castro, J., Zamudio-Abdala, J. H., & Garduno-Trejo, J. (2012). Cognitive, affective and behavioral components that explain attitude toward statistics. *Journal of Mathematics Research*, *4*(5), 8.

Goh, M., & Ang, A. (2000). Some logistics realities in Indochina. *International*

Journal of Physical Distribution and Logistics Management, *30*(10), 887-911.

Govinnage, D. Y., & Sachitra, K. M. V. (2019). Factors affecting e-commerce adoption of small and medium enterprises in Sri Lanka: Evidence from retail sector.

Guion, R. M. (2004). Validity and reliability. *Handbook of research methods in industrial and organizational psychology*, 57-76.

Gupta, A.P. (2010). *Marketing of Agricultural produce in India*, Bombay: Vora and Co., Publishers Pvt. Ltd.

Gupta, A., & Singh, R. K. (2021). Study of sustainability issues in an Indian logistics service provider: SAP-LAP approach. *Qualitative Research in Organizations and Management: An International Journal*, *16*(3/4), 530-549.

Haakansson, H. (1987). *Industrial Technological Development: A Network Approach*. London: Croom Helm.

Haakansson, H., & Ford, D. (2002). How do companies interact in business networks? *Journal of Business Research*, *55*(16), 133-139.

Haakansson, H., Havila, V., & Pedersen, A.C. (1999). Learning in networks. *Industrial Marketing Management*, *28*(12), 443-452.

Hall, J. A., & Rosenthal, R. (1991). Testing for moderator variables in meta-analysis: *Issues and methods. Communications Monographs*, *58*(4), 437-448.

Halfpenny, P. (1987). Laws, causality, and statistics: positivism, interpretivism, and realism. *Sociological Theory*, *5*(1), 33-36.

Halldorsson, A. (2002). *Third-Party Logistics: a means to configure logistics resources and competencies*, Ph.D. Series No. 25.2002, Frederiksberg: Copenhagen Business School.

Halldorsson, A., Kotzab, H., & Mikkola, J.H. (2007). Complementary theories to supply chain management. *Supply chain management: An International Journal*, *1*(2), 25-68.

Halldorsson, A., & Skjoett-Larsen, T. (2004). Developing logistics competencies through Third Party Logistics relationships. International Journal of Operations & Production Management, 24(2), 192-206.

Hendricks, K.B., & Singhal, V.R. (2005). An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm. *Product Operations Management*, *14*(1), 35-52.

Hertz, S., & Alfredsson, M. (2003). Strategic development of third-party logistics providers. *Industrial Marketing Management*, *32*, 139-149.

Herzberg, F. (1982). *The managerial choice: To be efficient and to be human*. 2nd ed. Salt Lake City, UT: Olympus.

Hugos, M. H. (2024). *Essentials of supply chain management*. John Wiley & Sons.

Huirne, R.M., Hendriks, T.B., Dijkhuizen, A.A., & Giesen, G.W. (1988). The economic optimization of sow replacement decisions by stochastic dynamic programming. *Journal of Agricultural Economics*, *39*(4), 426-438.

Jacob, A.P., Hadi, M., & Bingham, G. (2014). Deltamethrin contact bioassay and boring/chewing tests with the maize weevil, Sitophilus Zeamais (Mot). *International Journal of*

Agricultural Research and Review, *1*(12), 133-142.

Jacobs, F.R., Chase, R.B., & Lummus, R.R. (2011). *Operations and supply chain management*. 10th ed. New York: McGraw-Hill Irwin.

Jayatissa, R., Hossain, M., & Nanayakkara, L. (2012). *Assessment of Nutritional Status and Associated Factors in Northern Province*. Srilanka, Colombo: Medical Research Institute in collaboration with UNICEF and WFP.

Jones, E., & Rashid, M. (2020). Fourth Party Logistics-Enlarging 3PL a Step Further. *International Supply Chain Technology Journal*, *6*(4).

Karippacheril, T.G., Rios, D.L., & Srivastava, L. (2013). Global markets, global challenges: Improving food safety and traceability while empowering smallholders through ICT. [Online] Available at: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/ICT%20in%20Agriculture%20e-Sourcebook_0.pdf. Accessed 04 February 2020.

Khan, N. A., Qijie, G., Ali, S., Shahbaz, B., & Shah, A. A. (2019). Farmers' use of mobile phone for accessing agricultural information in Pakistan. Ciencia Rural, 49.

Kirshanth, L., & Sivakumar, S.S. (2018). Optimization of Water Resources in the Northern Province River Basins for Irrigation Schemes Used for Food Production in Sri Lanka. *International Journal of Scientific and Engineering Research*, *9*(7), 569-573.

Klau, G.W., & Weiskircher, R. (2005). *Robustness and Resilience*. In: Berlin/Heidelberg, Germany: Springer-Verlag, 417-437.

Knipe, D. W., Chang, S.S., Dawson, A., Eddleston, M., Konradsen, F., Metcalfe, C., & Gunnell, D. (2017). Correction: suicide prevention through means restriction: impact of the 2008-2011 pesticide restrictions on suicide in Sri Lanka. *PloS one*, *12*(4), e0176750.

Korgaonker, M.G. (1990). *Integrated supply chain management*. The Industry Magazine, 25 March, 73-85.

Kulkarni, K.R. (2012). *Agricultural Marketing in India*, Bombay: The Co-operators' Book Depot.

Kumar, K., Parikh, J. (2017). Indian agriculture and climate sensitivity. *Global Environmental Change*, *5*(20), 154-195.

Lancsar, E., & Louviere, J. (2006). Deleting irrational responses from discrete choice experiments: a case of investigating or imposing preferences? *Health Economics*, *15*(8), 797-811.

Larson, P.D., & Rogers, D.S. (1998). Supply chain management: definition, growth, and approaches. *Journal of Marketing Theory and Practice*, *6*(4), 1-5.

Lee, H.L., & Billington, C. (2001). Material Management in Decentralized Supply Chains. *Operations Research*, *60*(12), 1200-1542

Lee, H.L., Padmanabhan, V., & Whang, S. (1997). The bullwhip effect in the supply chain. *Sloan Management*, *38*(3), 93-102.

Lezoche, M., Hernandez, J. E., Díaz, M. D. M. E. A., Panetto, H., & Kacprzyk, J. (2020). Agri-food 4.0: A survey of the supply chains and technologies for the future agriculture. *Computers in industry*, *117*, 103187.

Li, D., Kehoe, D., & Drake, P. (2006). Dynamic planning with a wireless product identification technology in food supply chains. *International Journal of Advanced Manufacturing Technology*, *30*(14), 938-944.

Little, P.D., & Watts, M.J. (2008). *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*. Madison, London: The University of Wisconsin Press.

Lokanathan, S., & Kapugama, N. (2012). *Smallholders and Micro-Enterprises in Agriculture: Information Needs & Communication Patterns*. In: Colombo, Sri Lanka: Sri Lanka Book Publishers' Association, 1-48.

Lumsden, K. (2003). *Fundamentals of logistics*. In: Gothenburg: Chalmers University of Technology, 456-485.

Lynch, C.F. (2002). 3PLs: the state of outsourcing. *Logistics Management*, *41*(6), 47-50.

Malone, T.W. (2000). Modeling Coordination in Organizations and Markets. *Management Science*, *62*(24), 850-945.

Manna, Z., & Waldinger, R. (1980). A deductive approach to program synthesis. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, *2*(1), 90.

Manning, L., Baines, R.N., & Chadd, S.A. (2006). Quality assurance models in the food supply chain. *British Food Journal*, *108*(2), 91-104.

Marambe, B., Silva, P., & Athauda, S. (2017). Agriculture and rural development under the central government and provincial council set up in Sri Lanka. *Decentralization and Development of Sri Lanka Within a Unitary State*, 111-145.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, *22*(2), 1-25.

Millen, R., & Sohal, A. (2010). Current logistics practices in the Asia Pacific region. *International Journal of Physical Distribution and Logistics Management*, *38*(17), 24-36.

Min, H. (2015). *The essentials of supply chain management: New business concepts and applications*. FT Press.

Mondal, S.C., Ray, P.K., & Maiti, J. (2014). Modeling robustness for manufacturing processes. *International Journal of Production Research*, *52*(2), 521-538.

Morgan, K., & Murdoch, J. (2010). Organic vs. conventional agriculture: knowledge, power, and innovation in the food chain. *Geoforum*, *45*(6), 112-178.

Moro, M., Brereton, F., Ferreira, S., & Clinch, J.P. (2008). Ranking quality of life using subjective well-being data. *Ecological Economics*, *65*(3), 448-460.

Munasinghe, M.N., Stephen, C., Abeynayake, P., & Abeygunawardena, I.S. (2010). Paddy Cultivation Practices in the Northern Province of Sri Lanka: implications for disease control, industry sustainability, and rural development. *Veterinary Medicine International*, *3*(1), 42-85.

Nishanthan, K., Sivachandiran, S., & Marambe, B. (2013). Control of Parthenium hysterophorus L. and its impact on yield performance of tomato (Solanum Lycopersicum L.) in the northern province of Sri Lanka. *Tropical Agricultural Research*, *25*(1), 56-68.

Ogbeide, O. A., & Ele, I. (2015). Smallholder farmers and mobile phone technology in Sub-Sahara Agriculture. *Mayfair Journal of Information and Technology Management in Agriculture*, *1*(1), 1-19.

Palmer, T., & Darabian, N. (2017). *Govi Mithuru/Uzavar Tholan A mobile agriculture service by Dialog, Sri*

Lanka. London: GSMA Head Office.

Panabokke, C.R. (2018). Mahaweli Diversion Scheme Experience in Integrated Water Resource Integrated Water Resource Management, Colombo: Mahaweli Authority.

Patel, N., Chittamuru, D., Jain, A., Dave, P., & Parikh, T. S. (2010). Avaaj otalo: a field study of an interactive voice forum for small farmers in rural India. In *Proceedings of the SIGCHI conference on human factors in computing systems*, 733-742.

Perini, A., & Susi, A. (2004). Developing a decision support system for integrated production in agriculture. *Environmental Modelling & Software*, *19*(9), 821-829.

Purwanto, A. (2021). Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis for social and management research: a literature review. *Journal of Industrial Engineering & Management Research*.

Ragu-Nathan, B., & Rao, S.S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *Omega*, *34*(2), 107-124.

Rasovska, I., Zerhouni, N., & Chebel-Morello, B. (2008). A mixed method of knowledge capitalization in maintenance. *Journal of Intelligent Manufacturing*, *19*(3), 347-359.

Razzaque, M.A., & Sheng, C.C. (2014). Outsourcing of logistics function: a literature survey. *International Journal of Physical Distribution and Logistics Management*, *36*(8), 110-145.

Reason, P. (2003). Pragmatist philosophy and action research: Readings and conversation with Richard Rorty. *Action Research*, *1*(1), 103-123.

Sakalasooriya, N. (2021). Regional development disparities in Sri Lanka. *Open Journal of Social Sciences*, *9*(7), 62-91.

Samansiri, B.A., & Wanigasundera, W.D. (2019). Use of information and communication technology (ICT) by extension officers of the tea small holdings development authority of Technology (ICT) by extension officers of the tea small holdings development authority of Sri Lanka. *Agricultural Overview of Sri Lanka*, *5*(30), 1-25.

Serdarasan, S. (2013). A review of supply chain complexity drivers. *Computers & Industrial Engineering*, *66*(3), 533-540.

Sheehan, M., Ellinger, A.E., & Ellinger, A.D. (2014). Leveraging human resource development expertise to improve supply chain managers' skills and competencies. *European Journal of Training and Development*, *2*(5), 54-87.

Skjoett-Larsen, T. (2000). Third-Party Logistics – from an inter-organizational point of view. *International Journal of Physical Distribution & Logistics Management*, *30*(2), 112-127.

Sohail, M., Bhatnagar, R., & Sohal, A. (2008). A comparative study on the use of Third-Party Logistics services by Sri Lankan and Indian Agricultural firms. *International Journal of Physical Distribution & Logistics Management*, *40*(5), 540-724.

Sorensen, C.G., Pesonen, L., Bochtis, D.D., Vougioukas, S. G., & Suomi, P. (2011). Functional requirements for a future farm management information system. *Computers and Electronics in Agriculture*, *76*(2), 266-276.

Srinivasa Rao, C., Gopinath, K. A., Rama Rao, C. A., Raju, B. M. K., Rejani, R., Venkatesh, G., & Visha Kumari, V. (2016). Dryland agriculture in South Asia: experiences, challenges and

opportunities. *Innovations in dryland agriculture*, 345-392.

Squire, B., Storey, J., Emberson, C., & Godsell, J. (2006). Supply chain management: theory, practice, and future challenges. *International Journal of Operations & Production Management*, *12*(2), 85-128.

Stank, T., Goldsby, T., & Vickery, K. (2003). Logistics service performance: estimating its influence on market share. *Journal of Business Logistics*, *24*(1), 27-55.

Stevenson, M., & Spring, M. (2007). Flexibility from a supply chain perspective: definition and review. *International Journal of Operations & Production Management*, *27*(7), 685-687.

Stones, R. (2005). *Structuration Theory*. New York, NY: Palgrave.

Stricker, N., & Lanza, G. (2014). The concept of robustness in production systems and its correlation to disturbances. *Procedia CIRP*, 19, 87-92.

Sullivan, M. (2021). Demystifying the Impacts of the Fourth Industrial Revolution on Logistics: An Introduction. *The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution*, 1-19.

Sundaram, D. (2014). *Indian Economy*, New Delhi: S.Chand.

Tang, L., Jing, K., & Stanley, H.E. (2016). Complex interdependent supply chain networks: Cascading failure and robustness. *Physica A: Statistical Mechanics and its Applications*, *443*(118), 58-69.

Tan, K.C. (2002). Supply chain management: practices, concerns, and performance issues. *Journal of Supply Chain Management*, *38*(4), 42-53.

Tekana, S.S., & Oladele, O.I. (2011). Impact analysis of Taung irrigation scheme on household welfare among farmers in North-West province, South Africa. *Journal of Human Ecology*, *36*(1), 69-77.

Thadakamalla, H.P., Raghavan, U.N., Kumara, S., & Albert, R. (2004). Survivability of multiagent-based supply networks:: A topological perspective. *IEEE Intelligent Systems*, *19*(5), 24-31.

Trienekens, J., & Zuurbier, L. (2008). Quality and safety standards in the food industry developments and challenges. *International Journal of Prod.Econ*, *113*(24), 107-122.

Udara, S., Somabandu, B. P. S., Jayakody, B., Amerasinghe, N., De Silva, D. I., & De Zoysa, R. (2022). Problems Faced by the Agricultural Sector and Solutions for the Impending Food Crisis in Sri Lanka. *International Journal of Engineering and Management Research*.

Van Hoek, R.I., Chatham, R., & Wilding, R. (2002). Managers in supply chain management, the critical dimension. *Supply Chain Management: An International Journal*, *7*(3), 119-125.

Varley, A.P., & Tolley, G.S. (2000). Simultaneous Target Planning for Farms and the Area. *Journal of Farm Economics*, *62*(12), 1200-1500.

Vermillion, D.L., Johnson, S.H., & Sagardoy, J.A. (Eds.). (1995). *Irrigation management transfer: Selected papers from the international conference on irrigation management transfer, Wuhan, China, 20-24 September 1994* (Vol. 5). Food & Agriculture Org.

Vij, S., & Farooq, R. (2017). Moderating

variables in business research. *The IUP Journal of Business Strategy*, *14*(4), 34-54.

Wagner, S.M., & Bode, C. (2006). An empirical investigation into supply chain vulnerability. *Journal of Purchasing & Supply Management*, *12*(6), 301-312.

Wasala, W. M. C. B., Dissanayake, C. A. K., Gunawardhane, C. R., Wijewardhane, R. M. N. A., Gunathilake, D. M. C. C., & Thilakarathne, B. M. K. S. (2014). Sensitivity and boring ability of rice weevil (Sitophilus Oryzae) and lesser grain borer (Rhizopertha Dominica) for insecticide-incorporated grain storage bags. In *ISAE 2014. Proceedings of the International Symposium on Agriculture and Environment 2014, Ruhuna, Sri Lanka, 27 November 2014* (51-54). Faculty of Agriculture, University of Ruhuna.

Weerakkody, W. A. P., & Mawalagedera, S. M. M. R. (2020). Recent developments in vegetable production technologies in Sri Lanka. *Agricultural Research for Sustainable Food Systems in Sri Lanka*: *Volume 1: A Historical Perspective*, 189-214.

Wijayaratna, C. (2010). Role of Farmer Companies in the Sri Lankan Rural Economy. *Sri Lanka Journal of Agrarian Studies*, *16*(5), 120-154.

Willock, J., Deary, I.J., McGregor, M.M., & Sutherland, A. (2009). Farmers' attitudes, objectives, behaviors, and personality traits: The Edinburgh study of decision making on farms. *Journal of Vocational Behavior*, *72*(11), 28-46.

Zhang, X., & Wang, H. (2011). Empirical research on associations among information technology, supply chain robustness, and supply chain performance. *International Journal of Business and Management*, *6*(2), 231-245.

Zhou, H., & Benton, W.C. (2007). Supply chain practice and information sharing. *Journal of Operations Management*, *25*(6), 1348-1365

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Opportunities for Upper Management Positions for Women Employees

W.M.C.S. Gunawardhana [a*], K.N. Nadeeshani Silva [b]

a Department of Agricultural Economics and Agribusiness, Faculty of Agriculture, University of Ruhuna, Sri Lanka.

b Department of Agricultural Economics and Agribusiness, Faculty of Agriculture, University of Ruhuna, Sri Lanka

To link to this article: https://doi.org/10.31357/jbri.v10i1.7554

ARTICLE INFO

***Article History**:*

Received 27 April 2024
Revised 30 May 2024
Accepted 04 June 2024

Keywords

Barriers, Career Advancement, Gender Stereotypes, Women's labor force, Work-Life Balance

To cite this article: Gunawardhana W . M.C.S., Nadeeshani Silva K.N , (2024), Opportunities for Upper Management Positions for Women Employees,10:01,106-127, DOI:10.31357/jbri.v10i1.7554

[*]Corresponding author. Tel: +94713310237. Email: csandagomi@gmail.com
https://orcid.org/0009-0003-4197-479
b) https://orcid.org/0000-0002-8539-2490

ABSTRACT

Gender inequality persists in Sri Lanka due to structural and cultural barriers, impacting women's economic, political, and personal prospects. It has observed significant gender disparities remain in job positions and executive levels in many Sri Lankan companies. This research aims to uncover the reasons behind these imbalances and identify barriers hindering women's career advancement, ultimately contributing to gender equity solutions. It encompasses three specific objectives: scrutinizing the criteria for job promotions in the company, identifying barriers hindering women's advancement, and evaluating the impact of women-specific characteristics on career progression. Data collection involved surveying 32 females at the managerial level and conducting exploratory studies with male counterparts. Both primary and secondary data sources were used, with inferential and descriptive statistical methods applied for analysis. This research delves into the complex landscape of gender inequality within the company. External factors like political connections shape promotions, while organizational, social, and individual factors collectively contribute to the disparity. Low female representation in decision-making roles, cultural stereotypes, and the absence of female role models pose substantial hurdles. While women specific characteristics may not heavily influence promotions, addressing these multifaceted barriers is vital for advancing gender equality in the workplace.

Introduction

Based on data from the International Labor Organization statistics, using World bank population estimates, it's noted that 67% of the workforce in the United States is made up of women (World Bank Organization, 2021). However, women occupy roughly fourteen percent of board positions and forty-one (around eight percent) of CEO roles in Fortune 500 companies on average (Catalyst, 2023).

Indeed, 40% of female leaders state that their efforts towards diversity, equity, and inclusion go unnoticed in performance evaluations. Investing time and energy in work that isn't acknowledged might pose challenges for the advancement of women leaders. It also means that women leaders are stretched thinner than men in leadership. Normally, women leaders play a greater role in supporting employee well- being and pro1moting diversity, equity, and inclusion initiatives that significantly enhance retention and job satisfaction. Unfortunately, these contributions are often not formally recognized in many organizations (Women in the Workplace, 2022).

According to the International Labor Organization Statistics, using World Bank population estimates, 38% of the workforce in the Sri Lanka is women (World Bank Organization, 2021). And also, according to the Department of Census and statistics (2021) reports the contribution of females to the total employment is 33.3 percent. Among the professional's female contribution is about 63.2 percent. This group generally consist of engineers, teachers, nurses, doctors …. etc. Managers, senior officials and legislators' female contribution is about 19.5 percent. When considering the employment rates of Sri Lanka after 30 years of age, which can be considered as fitting to get promoted to upper management positions, still the female employment level is comparatively lower than that of males. (This situation called as "Glass ceiling") According to Department of Census and Statistic reports in 2021 shows, estimated mean and median monthly gross wage/salary separately for monthly wage/salary earners and daily wage/salary earners. According to that estimated values of female values are comparatively lower than those of male. (Department of Census and Statistics, 2021).When considering the economically inactive population in Sri Lanka are females (73.3%). That is about 6.3 million (Department of Census and Statistics, 2021).

In Sri Lankan cultural women have much less economic, social, political and domestic power than men (Gunawardane, 2016). Normally they have played considerable role inside the family as homemakers. Rural women spend much time every day on agricultural and domestic tasks. Nowadays governments have invested heavily in education, health, and welfare programs. Therefore, both men and women can enjoy relatively high standard in health and education. However, even today Sri Lankan women facing several problems due to unequal factors of political participation, labor force participation and decision-making process (Gunawardane, 2016).

Gender inequality mean, sex refers to the biological differences that define male and female bodies. Men and women clearly differ in many biological characteristics such as average weight, height, amount of body fat, amount of body hair and genitals. This Biological difference is universal concept. Generation to generation the world is developed, at the same time women also improve in the societies. However, gender is

non-biological, culturally and socially created distinction between men and women. Despite the advanced that women have made in countries around the world. But the problem is still gender differences are continued due to basis of social inequalities (Gunawardane, 2016).

Gender equality is one of the struggles in Sri Lanka. Due to structural barriers and cultural stereotypes, women face limitations in workplace options, financial security, political participation, and personal safety. The first women to serve as CEO of major company was appointed in 2020. And also, the first prime minister was Sirimavo Bandaranayke was elected in 1960. Anyhow, these days only 5% of women represent seats in parliament. However, in Sri Lanka challenges companies to tackle gender equality in the workplace.

Women are always discouraged from continuing to work after having children. However few companies have childcare facilities. The country has no laws requiring paternity leaves. MAS holding (clothing manufacture) set a target for a 50% gender balance at all management levels by 2025. One of the biggest gender equality success stories of Sri Lanka comes from Diesel & Motor Engineering Plc. (DIMO). This company's concept based on the "culture change". Therefore, the company isn't changing its workforce composition by hiring more women in traditional roles. But aiming at core and non-conventional jobs (Sri Lankan Companies advancing gender equality in the workplace, 2023).

When considering job promotions, according to 2008 Catalyst survey of more than 4,000 full-time-employed men and women high potentials who graduated from top MBA programs worldwide from 1996 to 2007. It shows that the women are paid $4,600 less in their first post-MBA jobs, occupy lower-level management positions, and have significantly less career satisfaction than their male counterparts with the same education (Ibarra et al., 2010).

Research methodology

Target Population

In "ABC" Private Company, the workforce is predominantly male, with certain sections exhibiting a noticeable absence of female employees due to the physically demanding nature of the work, requiring special skills and significant energy. Consequently, recruitment restrictions are in place for women in these specific sections. This survey focused exclusively on female employees at managerial and executive levels, aiming to gather insights into their perspectives on promotion opportunities. The aim is to comprehensively understand the challenges and aspirations of women throughout the organization, with the ultimate goal of establishing a fair and inclusive system that promotes merit- based advancements and equal access to growth opportunities for all employees.

Study Sample and Sample Technique

In the context of this company, there are a total of 5 departments, out of which 2 departments limit recruiting female employees. Consequently, our focus is primarily on these 2 departments for the purpose of analysis. "ABC" Private Company comprises a workforce of 149 executives, but regrettably, the representation of female executives is quite low, with only approximately 32 female executives accounted for. This percentage of female representation at the executive level is concerning and warrants further attention. At the same time an exploratory study was

also conducted with 10 male employees at the executive level.

Theoretical framework for the study

This study's theoretical framework incorporates three pivotal theories: Glass Ceiling Theory, Organizational Culture Theory and Human Capital Theory. The Glass Ceiling Theory scrutinizes gender and diversity gaps within organizational hierarchies, elucidating barriers to career advancement. It identifies these barriers under three factors: Organizational factors, social factors, and individual factors. Organizational Culture Theory delves into how an organization's values and norms impact employee experiences and growth opportunities, focusing on elements such as service period, external influence, lack of female counterparts, lack of job- related skills and potentials, work-life balance, confidence and self – promotion, lack of technical skills, being silent, and being emotional. Human Capital Theory underscores the role of individual skills and knowledge in shaping career paths, concentrating on age, marital status, educational qualifications, service period, current position, willingness to work beyond office hours, and lack of higher education for career advancement. By synthesizing these theories, this research aims to unveil the intricate dynamics between gender, organizational culture, and human capital in career progression, ultimately striving to promote diversity and inclusion in workplaces.

Data Collection

Data, needed for the study collected by using both primary and secondary data collection methods. A semi structured questionnaire was prepared and respondents were interviewed by face- to- face interviews. Secondary data were collected through research articles, web pages, Company reports, articles in the newspapers, Central Bank reports, Department of Census and statistics reports, Annual reports of "ABC" Private Company and books which are related to the study. At the same time, Guidelines were prepared for the exploratory study and they were interviewed and information was recorded.

Analysis of Data

Collected data were analyzed by using descriptive and inferential statistical methods. Pie charts and tables were used in descriptive analysis while Wilcoxon sign rank test, Pearson Chi- Square Test and Spearman's correlation coefficient used in inferential analysis. As a data preparation method, reliability of collected data was tested by using Cronbach's Alpha value of Reliability test.

Results and Discussion

Criteria of Job Promotions in "ABC" Private Company

Descriptive Analysis

Following Equality Law when give promotions to the female

The government of Sri Lanka has ensured that, Section 12 of the Sri Lankan Constitution states that all persons should be equal before the law, making both men and women eligible for equal pay for equal work. However, only very few organizations implement the rules in considering the promotion and other benefits for the

females.

The study highlights a prevalent lack of adherence to gender equity rules in promotions and benefits within organizations. Specifically, production departments like the factory, distillery, and Agriculture are predominantly staffed by males, leading to an apparent bias in hiring and promotions contrary to equity laws. Respondents confirm this trend, with limited female representation in management positions, particularly within the factory, where the application of equity laws remains challenging due to historical gender disparities in hiring. However, in other departments, the implementation of equity laws appears more evident.

Influence of external factors, such as political considerations, on job promotions within the company

The analysis of external factors influencing promotions for female employees highlights the preeminent role of political influence. The research underscores the pervasive impact of politics on recruitment and promotions, often outweighing individual qualifications and performance. Respondents consistently stress the significance of political connections, particularly noting the influential role of recommendations from top management and Heads of Departments (HOD).

To Analyses the Barriers for Women to get Promotion in "ABC" Private Company

When study the analyses the barriers for women to get promotion in "ABC" Private Company, the barriers have been identified under main 3 factors; Organizational factors, social factors and Individual factors.

Organizational factors

Descriptive analysis

Organizational factors have been identified as the biggest obstacle to the promotion of women to leadership positions. A survey conducted among women confirmed that women's involvement in decision-making and leadership positions was low. This was further confirmed in an exploratory study with male employees. Also, it was proved that the female involvement in the hiring and promoting process is low.

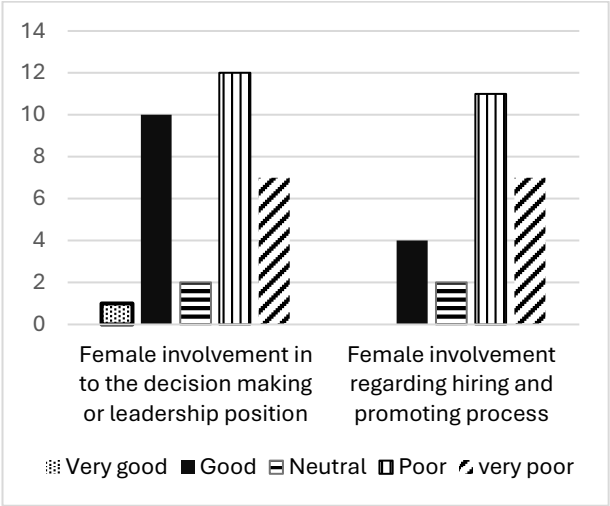


Figure 1: Female involvement into the decision making or leadership positions and hiring and promoting process

Source: Survey findings,2023

A Survey done at Perak State Secretariat, Ipoh, Perak indicate that the proportion of women in decision making especially in public sector still low (Saadin et al., 2015) . This kind of situation also exist in this "ABC" Private Company.

In the factory and Distillery, there are fewer women working in management positions. Right now, there is only one woman in such a role. In the discussions with the male

employees, it was possible to find out that the following factors have affected the promotion in the factory and Distillery departments and the relatively decrease in female leadership.

The research reveals a pronounced gender disparity in leadership roles within the factory and distillery departments, with minimal female representation. This underrepresentation in decision-making positions is affirmed by participant responses emphasizing the scarcity of women in these roles and the perception that women lack the necessary skills. Furthermore, company policies, such as the reduction of hiring women for factory and distillery departments, contribute to this gender gap, along with women's reluctance to apply for physically demanding or high heat places. Therefore, the application for such jobs has decreased. And even if he gets that job, they resign later. Notably, the majority of male employees in the production-oriented departments which are factory, distillery, and Agriculture departments further exacerbate this gender imbalance.

In the discussion with the male employees, it was confirmed that the company has reduced the number of women and hired more male employees. This situation can be seen, not only in the factory and distillery departments, but also in some fields of the agriculture department. Therefore, participation of women is less. This situation is not seen in some sections of the agriculture department and HR, Finance departments which are doing the administrative roles. Women participation is very high in those places.

"When women are recruiting, the company needs to provide protection for them, along with transportation facilities. These factors add to the company's costs. Moreover, many people are not accustomed to working together, and their mindset might not very open."

"However, when women take on managerial roles in the field, they have to encounter certain challenges in their work. There are occasions when early morning arrivals and field observations are necessary. Sometime they have to use vehicles to reach the observation sites. There are also areas where elephants hang out. As a result, a certain level of resilience is required to handle such situations. These factors can be affected to a reduction in women's participation for some sections. Because of these things, women's participation has decreased from the field'. If you look at the factory and workshop, the percentage of men is high, but if you look at HR, there is a high percentage of women."

Male female allocation differences when considering same positions

A Sri Lankan research study highlights empirical evidence of gender discrimination, particularly in steering women towards lower-paying roles and specific industries. This suggests that estimations not accounting for these factors may underestimate the true extent of discrimination (Gunawardena, 2006).

By looking at all of these, it appears that men maintain a gender imbalance in some departments. The survey with women also proves that. However, it seems that it is limited to the departments where it is produced. Below chart drown from the responses of women employees and can see differences in salaries, duties and promotions between women and men.

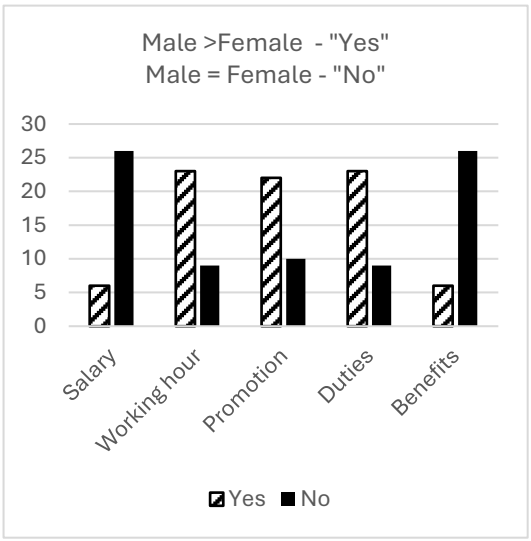


Figure 2: Male female allocation differences when considering same positions

Source: Survey findings,2023

Perpetuate the gender imbalance by men

In some poorest countries, as a rule, girls get less education than boys, there is low investment in women's health than in men's, legal rights of women in the economy and in marriage are weaker than men's rights, and women have less political power than men. As evidenced, for example, by women's low representation in parliaments. Normally men are persuading this kind of gender imbalance (Liu & Yang, 2014). Evidence for this can also be found from the "ABC" Private Company.

"When you look at departments like HR, Finance most of the time, instead of looking at male/female, they hire those people by giving place to talent. But factory, distillery and agriculture department have that belief some extent"

It is apparent that within the organization, there exists a prevailing opinion that certain roles are exclusively suited for men, with a belief that women are incapable of performing them. Consequently, this opinion has led to restricted recruitment of women in some departments. It was proved by above men's statement.

Male and female discrimination in the company

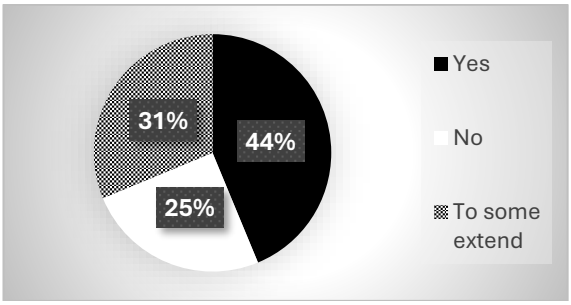


Figure 3: According to the skill of doing particular work, discrimination as male and female

Source: Survey findings,2023

One of research findings substantiate the occurrence of gender discrimination and instances of sexual harassment within the recruitment and promotion processes of the selected organizations (Dharmawardhane & Navaratne, 2019).

Based on the feedback provided by female respondents concerning gender discrimination within the company, a substantial portion of them reported experiencing gender-based discrimination. Specifically, 44% of the respondents indicated that they perceive the company as having clear distinctions between male and female roles, with sentiments such as "only men can do this job" and "women cannot," while 31% acknowledged experiencing some degree of discrimination. In contrast, 25% of women employees stated that they have not encountered any form of discrimination.

Limited mentoring and sponsorship opportunities

Certain research findings emphasize that women have not been provided with formal access to opportunities for growth and development, including training and education. Additionally, they have been deprived of informal opportunities such as mentoring and peer support (Kauser & Tlaiss, 2011).

However, this organization provides very less amount of mentoring and sponsorship opportunities for women's development. However, it was learned from the conversation with male employees that it is the same not only for women but also for men. This has also been one of the reasons why women are limited in getting promoted.

"There is a decrease in sponsorship opportunities without distinction between men and women."

Instances of failures among women holding senior positions

Upon querying women about their observations regarding instances of failures when occupying senior positions, 43.75% female individuals stated that failures occur on an occasional basis, 25% indicated rare occurrences, 18.75% stated they have not encountered failures, and 12.5% noted frequent failures.

Some literature suggest that when women successfully overcome barriers associated with the glass ceiling and attain leadership positions, they may possess a leadership advantage compared to their male counterparts (Rosette & Tost, 2010). Women's failures and setbacks is recognized as a strength, contributing to their effectiveness in leadership roles.

Inferential statistical analysis

The organizational factors were analyzed with 5-point Likert scale from very high to very low. Those factors are females' involvement into the decision making or leadership position, Female involvement regarding hiring and promoting process, Effect of traditional and old-fashioned ideas of male leaders in the top positions, Effect of Gender stereotypes and cultural norms and Effect of "female role models" as leaders in the company. And also Instances of failures among women holding senior positions is analyzed by 5-point Likert scale from using never to very often.

Table 1:Results of One-Sample Wilcoxon Signed Rank Test

Variable	Mean	P- value	Test value	Decision
Females' involvement into the decision making or leadership positions	3	0.049	1.971	Females' involvement into the decision making is not being barrier to getting promotions for women employees
Female involvement regarding hiring and promoting process	3	0.001	3.201	Female involvement regarding hiring and promoting process is not being barrier to getting promotions for women employees

Effect of traditional and old-fashioned ideas of male leaders in the top positions	3	0.005	-2.784	Effect of traditional and old-fashioned ideas of male leaders is not being barrier to getting promotions for women employees
Effect of Gender stereotypes and cultural norms	3	0.024	-2.254	Effect of Gender stereotypes and cultural norms is not being barrier to getting promotions for women employees
Instances of failures among women holding senior positions	3	0.007	-2.696	Instances of failures among women holding senior positions is not being barrier to getting promotions for women employees

Significant level is 0.05
Source: Survey findings,2023

Factors affecting as barrier to get promotions for women employees

One-Sample Wilcoxon Signed Rank Test is used for identify what factors are significant and find the which factor is mostly affect as the barrier to getting promotion for women employees. There are, female involvement in to decision making or leadership positions, female involvement regarding hiring and promoting process, effect of traditional and old-fashioned ideas of male leaders in the top positions, effect of Gender stereotypes and cultural norms, individual failures of women who are in senior positions (destructive issues such as controlling and bullying). According to that reject the null hypothesis ($P<0.05$). For above factors null hypothesis is rejected and that factors not being barrier to getting promotions for women employees.

Table 2:Results of One-Sample Wilcoxon Signed Rank Test

Variable	Mean	P-value	Significant level	Decision
Effect of "female role models" as leaders in the company	3	0.862	0.174	Effect of "female role models" as leaders in the company is being barrier to getting promotions for women employees.

Significant level is 0.05
Source: Survey findings,2023

Effect of "female role models" as leaders in the company is being barrier to getting promotions for women employees

However, only one factor's probability value is higher than the significant level. It is female role models as leaders. Here at 5%

level of significance, there is no sufficient evidence to reject the null hypothesis (P>0.05). The null hypothesis accepted and above factor are being barrier to getting promotions for women employees. So, most influence factor is lack of female role models as the leaders in the company.

Social factors

Descriptive analysis

Male patriarchal society affection

A research study highlights that Transport and logistics sector of Sri Lanka are male dominant and masculine characteristics are rooted in the industry in making decision mainly. In order to address the situation with more feminine essence at work, Equality and Diversity policy considerations are essential (Edirisinghe et al., 2021).

Sri Lanka exhibits characteristics of a patriarchal society, which provides insight into the extent of its influence on the organization. Women's perspectives and the responses on this matter reveal the impact of this patriarchal society. Out of 32 female employees who responded., 2 participants strongly disagreed, and 6 disagreed, indicating they do not view the male patriarchal society as a barrier. Six participants were neutral, while 14 agreed and 4 strong agreed that the male patriarchal society poses a barrier to women's promotions. Consequently, it is evident that the impact of this patriarchal society is discernible to some degree. The reference to Sri Lanka as exhibiting characteristics of a patriarchal society impact on the cultural context and it impact on workplace culture also.

Willingness in society to accept a woman as a leader

One may anticipate that due to women's prevailing status, men may be disinclined to relinquish men's dominance, perceiving gender equality as a potential threat. This may elucidate the adverse view held by people regarding women in leadership roles. For mitigate gender inequality within professional settings, organizations should actively engage in initiatives that address the concerns of the predominant group, prioritizing a strategic approach over mere power equilibrium (Kiser, 2015).

In responses to inquiries about whether societal acceptance of women as leaders influences their promotion, the collected data indicated that 63% of participants perceived that societal acceptance of women as leaders influenced for their promotion. These findings suggest that the dominant group may view gender equality as a treat, contributing to their negative perception of women in leadership roles. To address gender inequality in the workplace, organizations should consider strategies that actively engage the dominant group rather than merely striving for a balance of power.

Violence against women

Gender-Based Violence/violence against women in the workplace is a major problem when identifying the reasons for the gender gap in the world of work. It is an special term for any harmful act that is committed against a person's will, and that is based on socially attributed gender differences between males and females (Kalugman et al., 2014).

In the context of "ABC" Private Company, responses from female participants highlight the widespread nature of this issue. A majority of the women, 53.12%, concur that

violence against women affects their working environment. This data underscores the consensus among many women that gender – based violence has a tangible effect on their career advancement within the company.

Syndrome of legitimacy

One of exploratory study done in Bangladesh with female workers they indicate that their main barrier for the females is cultural. This can be identified as a syndrome of legitimacy. In their society and even in their organization women as the potential leader of the key departments or divisions are not recognized because most of the people believe that women are non-assertive and weak(Chou et al., 2005)

In addition, they have shown that a significant portion of people think that "women are non- assertive and weak". This collective evidence shows the imperative for concerted efforts to address deeply ingrained biases and promote equitable opportunities for women in various professional domains.

Further, survey results show that 81.3% acknowledge the syndrome of legitimacy as a barrier to job promotion for women employees, while 18.8% do not.

Inferential statistical analysis
Effect of social factors on getting promotions for women employees.

The Social factors were analyzed with 5-point Likert scale from Strong disagree to Strong agree. Those factors are Male patriarchal society, Society's willingness to accept a woman as a leader and Violence against women.
According to One – sample Wilcoxon Signed Rank Test results, the null hypothesis relating to two factors accepted and those factors are being barrier to getting promotions for women employees. Null hypothesis relating to Society's willingness to accept women as a leader rejected and it is not being barrier to getting promotions for women employees.

Table 3:Results of One-Sample Wilcoxon Signed Rank Test

Variable	Mean	P- value	Test value	Decision
Male patriarchal society	3	0.078	1.763	Male patriarchal society is being barrier to getting promotions for women employees.
Violence against women	3	0.086	1.717	Violence against women is being barrier to getting promotions for women employees
Society's willingness to accept a woman as a leader	3	0.000	4.369	Society's willingness to accept a woman as a leader not being barrier to getting promotions for women employees.

Significant level is 0.05
Source: Survey findings,2023

Individual factors

Descriptive analysis

More often, individual factors have contributed to the reduction of promotion opportunities. Accordingly, family support, Willingness to taking risk in workplace, lack higher education for career advancement, Effect of extra talents, Lack of job-related skills and potentials, Willingness to work beyond office hours etc. have been affected. That is proved by the following responses of women.

Willingness to working beyond office hours

It has been noted that approximately 62.5% of individuals are not inclined to work beyond standard office hours. Nevertheless, in the context of their employment at the company, they frequently find themselves required to work outside of these established hours. This observation suggests a certain level of reluctance on their part.

Male employees typically engage in full-time, preferably uninterrupted work, often involving extended working hours. This practice can have adverse effects on the career trajectory of women, who generally exhibit a preference for shorter working hours (Metz, 2003).

Furthermore, survey results indicate that 37.5% are willing to work beyond office hours, while 62.5% are not. This research observation underscores the need for workplace policies that accommodate diverse work preferences to promote employee satisfaction and gender equity.

Women avoid job transfers

As a common hurdle for married women especially, in Sri Lanka also the industry women experience the struggle in balancing work and family responsibilities. When there is an imbalance of it, majority of females select family and leave the job. This affects for the disturbed career paths for females and also inefficient paid work contribution due to great time allocation for care work (Edirisinghe et al., 2021).

Very few women have canceled job transfers. Nevertheless, it is evident that a significant number of women receive strong family support, which has not hindered their professional advancement. Survey result show that 84.37% of individuals did not avoid job transfers.

Willingness to taking risk in workplace

According to the survey results, 40.6% of them reported high willingness. 28.16% reported moderate willingness and 25% reported low willingness. It is often seen that women are less willing to take risks and prefer comfortable office environments. This tendency has been substantiated both through their responses and an exploratory study involving male employees.

"They don't want to take on responsibilities, even if they desire job promotions. They are afraid to take on such responsibilities. Most of the time, they try to depend on someone else."

"Women's participation is often seen in the work done inside the office."

Other individual factors

This shows that lack of educational qualification and extra talents has hindered them from getting promotion.

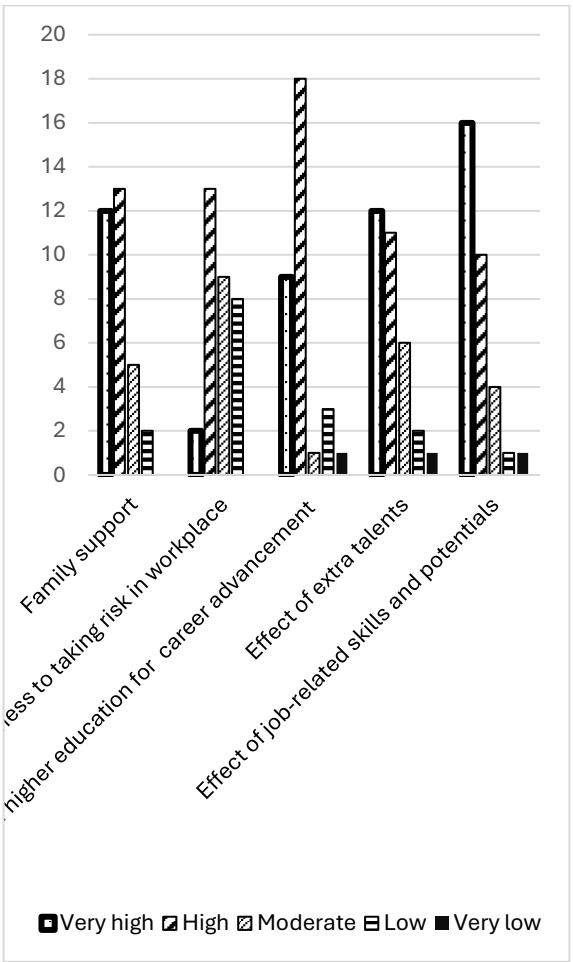


Figure 4: Other individual factors

Source: Survey findings,2023

Inferential statistical analysis

The individual factors were analyzed with 5-point Likert scale from very high to very low. Those factors are Family support, Willingness to taking risk in workplace, Effect of lack higher education for career advancement, Effect of extra talents and Lack of job-related skills and potentials.

And also Lack of female counterparts is analyzed by 5-point Likert scale from strongly disagree to strongly agree.

Effect on individual Factors on getting promotions for women employees

Table 5: Results of One-Sample Wilcoxon Signed Rank Test

Variable	Mean	P- value	Test Value	Decision
Family Support	3	0.000	-4.289	Family Support is not being barrier to getting promotions.
Effect of lack higher education for career advancement	3	0.000	-3.855	Effect of lack higher education for career advancement is not being barrier to getting promotions.
Effect of extra talents	3	0.000	-3.704	Effect of extra talents is not being barrier to getting promotions.
Lack of job-related skills and potentials	3	0.000	-4.173	Lack of job-related skills and potentials is not being barrier to getting promotions.

Lack of female counterparts	3	0.004	2.891	Lack of female counterparts is not being barrier to getting promotions.
Willingness to taking risk in workplace	3	0.093	-1.678	Willingness to taking risk in workplace is being barrier to getting promotions.

Significant level is 0.05
Source: Survey findings,2023

According to One-Sample Wilcoxon Signed Rank test results almost all considered individual factors except willingness to taking risk have not acted as barriers to getting promotions for women employees.

To analysis the Impact of Women Specific Characteristics on Career Advancement Opportunities.

Descriptive analysis

Table 6: Women specific characteristics

	Very high	High	Moderate	Low	Very low
Work life balance	56.3 %	31.3 %	6.3 %	6.3 %	0%
Confidence and self-promotion	62.5 %	31.3 %	6.3 %	0%	0%
Negotiation skills	50%	25%	18.8 %	6.3 %	0%
Lack of career aspiration	9.4 %	25%	43.8 %	18.8 %	3.1 %
Mother's role	40.6 %	31.3 %	18.8 %	9.4 %	.0%
Panic quickly when problems arise	6.3 %	37.5 %	53.1 %	3.1 %	0%
Being emotional	21.9 %	40.6 %	28.1 %	9.4 %	0%
Being silent	6.3 %	37.5 %	40.6 %	12.5 %	3.1 %
Representation and role models	25%	37.5 %	34.4 %	3.1 %	0%

Source: Survey findings,2023

Work life balance

The most formidable challenge lies in the difficulty faced by women striving to reconcile professional obligations with family responsibilities in order to achieve success (Ashari, 2012).
Occasionally, the family environment can pose an impediment to women's career advancement. Women frequently assume the primary caregiving role within their households, necessitating equilibrium between their responsibilities toward their children and their professional obligations within the company. Consequently, they may exhibit reluctance to undertake substantial responsibilities. When women were questioned about the impact of these dynamics on the organization, the evidence

indicated that do indeed exert some influence.

The family environment itself can emerge as a barrier to women's career advancement, as the primary caregiving role assumed by women may necessitate a delicate balance between familial and professional duties, leading to hesitancy in undertaking substantial responsibilities. However, when considering women working in departments like HR and Finance can be observed comparatively easy to maintain work life balance due to having fewer night duties in their roles.

Confidence and self-promotion

According to Bombuwela and De Alwis (2013), person's unique qualities and characteristics can be may be hinder their competitiveness in comparison to others. These factors can include a lack of confidence, women specific, and difficulty in self-promotion, which can impede career progression (Gunawardena, 2015).

According to above collected data from women employees, it can be concluded that confidence and self-promotion will help them to move forward and getting promotions. This was also confirmed in the exploratory study conducted with male employees.

"They don't want to take on responsibilities, even if they desire job promotions. They are afraid to take on such responsibilities. Most of the time, they try to depend on someone else. Their confidence is very low"

According to the above references and collected data underscores the pivotal role of confidence and self-promotion shaping career trajectories. By addressing these kinds of aspects may prove crucial in fostering career growth and breaking down barriers that hinder professional advancement, particularly for women.

Negotiation skills

Furthermore, the cultivation of negotiation skills can prove highly advantageous. In line with the feedback provided by these female respondents, it is apparent that many women harbor relatively modest career aspirations.

Lack of career aspiration

According to above results (figure :5) their career aspiration is somewhat low.

"Women often like to work from comfort zones. Most of the time, they like to work from inside the office. Even if the salary is low, they care about their mental freedom. But trying to get promotion somehow. There are times when they don't have the capacity to do it after getting the promotion."

As well as research finding shows insufficient provision of information regarding career prospects for women in the transport and logistics sector. The predominant trend observed is that a considerable number of female employees enter the industry not by deliberate choice but rather as a result of job-seeking endeavors, often prompted by familial obligations or the need for immediate employment. Therefore, these women tend to forego their inherent aspirations and constructive career planning. The intricacies of talent mapping further compound this situation, posing challenges for both female employees and employers alike, as individuals possessing the requisite interest and aptitude are found to be scarce within the industry(Edirisinghe et al., 2021).

Efforts to enhance career prospects should consider not only performance-based promotion criteria but also the need for comprehensive information dissemination and support for women navigating career choices in traditionally male-dominated fields in "ABC" Private Company.

Mother's role

One of research done with Worldwide studies of professional and managerial dual-earner couples in specific professions have indicated that with the double burdens of work and mother's role in family, working long hours limit women's career aspirations (Kodagoda, 2018).

Here, it has been shown that a higher percentage of women said mother's role affects their progress and getting promotions. Women who are in so far away often encounter challenges due to limited facilities compared to urban areas. As they balance their maternal responsibilities, they confront various obstacles. This assertion was substantiated during the exploratory study conducted in conjunction with male employees.

"In the past, this "ABC" Private company was like a paradise. They gave free houses to anyone who came, water, electricity and all those things were given for free. But people from far away were hired for this. Then they don't go to another company...Anyone have day care facilities. Then it was be easy for them to come here and live with their families. Because of these things, many women applied for jobs here. But now due to the weakness of the administration, those things have been limited. Applying has also decreased."

However, changing in administration and a reduction in these supportive measures have led to a decline in applications from women. The reduction of daycare facilities is specifically highlighted as a deterrent, making it challenging for women to balance maternal responsibilities with their professional commitments. This research thus underscores the importance of organizational support, especially in terms of facilities and policies, in fostering a conducive environment for the career advancement of women in dual-earner couples, particularly those in remote areas.

Panic quickly when problems arise

The professional environment often subjects women to scrutiny for displaying heightened emotions. This differential perception about women contributes to women being labeled as "weak" and deemed "unprofessional" in the workplace. Instances of women being perceived as "emotionally unstable" arise, with tendencies attributed to expressions of anger, sadness, despair, or jealousy occurring more frequently than observed in their male counterparts in the workplaces. Addressing such gender-specific biases is important for fostering an equitable and inclusive workplace culture (Edirisinghe et al., 2021).

Numerous women have expressed a tendency to experience some degree of panic when faced with challenges or problems. This observation was further corroborated by the findings of an exploratory study conducted in collaboration with male employees.

"Sometimes, no matter how much they have studied, they are panic to some problems and do not face the problems properly. Such things can become a problem when going to

higher positions."
And also, this study shows that these biases contribute to women being less able to face challenges and ultimately affect their career development. Interestingly, an exploratory study involving male and female employees supports the idea that women develop a sense of dread when faced with challenges.

Being emotional

There is also a tendency to be emotional when they are making decisions. Male employees also said that frequent problems can be seen among women. Discussions with them revealed that maintaining control in such situations can be particularly challenging.

Lack of technical skills and Lack of interpersonal skills

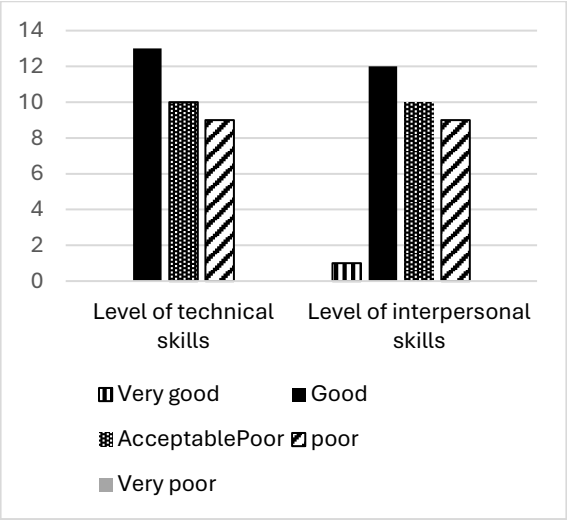


Figure 5: Level of technical and interpersonal skills
Source: Survey findings,2023

It can be seen that their technical skills and interpersonal skills are somewhat lacking. This was also confirmed in the exploratory study conducted with male employees.

"When we look at the technical skills of women, we can see that some people's technical skills are low. The reason is that sometimes they don't receive proper training. There are instances when such factors affect promotions."

In the service industry women are easier to get into managerial positions but in like high-tech companies and more of the producing industries, like car company or something it's very difficult for women to be in a managerial position. That research indicates they difficult to get managerial positions due to lack of technical skills.(Chou et al., 2005)
Furthermore, gender dynamics come into play when considering management positions in some companies. When considering service sector, it seems relatively easy for women to rise to management roles.

Inferential analysis

Chi-Square test enables us to explain whether two attributes are associated with each other or not. So, it is used to test the significance of association or relationship between two attributes.

Table 7: Results of Pearson Chi-square test

Factor	Chi–square value	Sig.	Decision
Work life balance	10.589	0.014	Work life balance is dependent on the change in

			promotion opportunities based on gender differences
Confidence and self-promotion	8.495	0.014	Confidence and self-promotion are dependent on the change in promotion opportunities based on gender differences
Negotiation skills	10.667	0.014	Negotiation skills are dependent on the change in promotion opportunities based on gender differences
Lack of career aspiration	4.211	0.378	Lack of career aspiration is independent of the change in promotion opportunities based on gender differences
Mother's role	10.279	0.016	Mother's role is dependent on the change in promotion opportunities based on gender differences
Panic quickly	4.529	0.210	"Panic quickly" is independent of the change in promotion opportunities based on gender differences
Being emotional	11.711	0.008	Being emotional is dependent on the change in promotion opportunities based on gender differences
Being silent	2.551	0.636	Being silent is independent of the change in promotion opportunities based on gender differences
Representation of role models	9.679	0.021	Representation of role models is dependent on the change in promotion opportunities based on gender differences
Lack of technical skills	5.791	0.055	Lack of technical skills is independent of the change in promotion opportunities based on gender differences
Lack of interpersonal skills	6.840	0.077	Lack of interpersonal skills is independent of the change in promotion opportunities based on gender differences

Significant level is 0.05

Source: Survey findings,2023

In this analysis, it is observed that certain factors exhibit the Chi- square Test "P" value is less than the significant level. Here significant level is 5%. Therefore, null

hypothesis is rejected (P<0.05). Hence; that factors are dependent on the change in promotion opportunities based on gender differences. That factors are work life balance, confidence and self-promotion, negotiation skills, mother's role, being emotional, representation of role models.

Used the correlation test to find the relationship between promotion opportunities for women and barriers to getting promotions. Spearman's correlation coefficient measures the direction and strength of the association between two ranked variables when data is measured at ordinal, interval or ratio scale (Tulsian & Jhunjhnuwala, 2010).

Table 8: Results of Spearman's correlation coefficient

Factors	Significant level(2-tailed)	Decision
Change on promotional opportunities based on gender differences & Work life balance	0.008	Significantly correlate between each other
Change on promotional opportunities based on gender differences & Confidence and self- promotion	0.005	Significantly correlate between each other
Change on promotional opportunities based on gender differences & negotiation skills	0.004	Significantly correlate between each other
Change on promotional opportunities based on gender differences & mother's role	0.002	Significantly correlate between each other
Change on promotional opportunities based on gender differences & being emotional	0.001	Significantly correlate between each other
Change on promotional opportunities based on gender differences & representation of role models	0.007	Significantly correlate between each other

**. Correlation is significant at the 0.01 level (2-tailed).

In summary, the results of the analysis support the alternative hypotheses (H_1) for each of the examined factors. The p-values for work-life balance, confidence and self-promotion, negotiation skills, mother's role, being emotional, and representation of role models are less than the significant level. ($p < 0.05$). As a result, the null hypotheses (H_0) are rejected in each case, confirming a significant correlation between these factors and the changes in promotion opportunities based on gender differences. These findings underscore the importance of considering these variables in the context of gender-related disparities in promotion opportunities within the studied population.

Based on the above findings, it is evident that certain factors significantly influence promotion opportunities for women compared to men. These factors encompass work life balance, confidence and self-promotion, negotiation skills, mother's role, being emotional, representation of role models.

However, it is worth noting that certain characteristics specific to women, such as a relatively lower prevalence of career aspirations, a tendency to become flustered when confronted with challenges, a proclivity towards maintaining silence, and limitations in technical and interpersonal skills, do not appear to exert a notable impact on women's promotion prospects in comparison to men.

Conclusion

Based on the research conducted involving female and male employees, several key findings have emerged. Regarding the implementation of equity laws in promotions, it was observed that very few organizations adhere to these rules when considering promotions and other benefits for female employees. This is particularly evident in departments responsible for production, such as the factory, distillery, and Agriculture departments, where male employees are predominantly favored in hiring and promotion processes.

The study also revealed that political influence plays a significant role in promotions and hiring processes, often superseding performance-based criteria. Recommendations from top management or Heads of Departments (HODs) carry considerable weight in the promotion decisions. The analysis of barriers to women's promotion within “ABC” Private Company identified three main factors: organizational, social, and individual. Women's limited involvement in decision-making and leadership positions, as well as their minimal participation in the hiring and promotion process, were evident. However, these barriers were more pronounced in departments like the factory and distillery, where women are not typically hired. Recruitment challenges and the costs associated with providing protection and transportation for female employees contributed to these limitations.

Discrimination was apparent in salary, duties, and promotions, with certain roles believed to be exclusively suitable for men. The institution offered limited mentoring and sponsorship opportunities for women's development; a pattern also noted for male employees. Interestingly, factors such as gender stereotypes, cultural norms, and individual failures in senior positions did not appear to be significant barriers to women's promotions. The most influential barrier was the lack of female role models in leadership positions within the company. The study also pointed to the impact of a patriarchal society and violence against women as additional social barriers. It was noted that many individuals perceived women as non-assertive and weak. Individual factors, including family support, willingness to take risks in the workplace, lack of higher education, lack of job-related skills, and working beyond office hours, occasionally hindered promotion opportunities for women. While some women received strong family support, others were reluctant to take workplace risks and preferred office-based roles.

In conclusion, the research findings indicate that certain factors, such as work-life balance, confidence, self-promotion, negotiation skills, and the representation of role models, significantly influence promotion opportunities for women compared to men. However, characteristics specific to women, such as lower career aspirations, a tendency to become flustered in challenging situations, and limitations in technical and interpersonal skills, do not appear to notably impact women's promotion prospects relative to men.

References

Ashari, H. (2012). *Perspectives An opportunity for women to have access to higher*. 1–12.

Catalyst. (2023). *Women CEOs of the S&P 500*. Catalyst. https://www.catalyst.org/research/women-ceos-of-the-sp-500/

Chou, W. C. G., Fosh, P., & Foster, D. (2005). Female managers in Taiwan: Opportunities and barriers in changing times. *Asia Pacific Business Review*, *11*(2), 251–266. https://doi.org/10.1080/13602380420000291153

Department of Census and Statistics. (2021). *Sri Lanka Labour Force Survey Annual Report - 2021* (Vol. 2012).

Dharmawardhane, I. M., & Navaratne, N. N. J. (2019). Gender Discrimination against Female Managers and Professionals in Sri Lankan Private Sector. *Asian Business Review*, *9*(2), 57–64. https://doi.org/10.18034/abr.v9i2.253

Edirisinghe, L., Waidyasekara, V., Ranwala, L., & Siriwardena, S. (2021). Mind the gender gap in workforce, including transport and logistics: the perspective from Sri Lanka and beyond. *The Economic and Social Commission for Asia and the Pacific (ESCAP) Serves*. https://repository.unescap.org/handle/20.500.12870/4344%0Ahttps://repository.unescap.org/bitstream/handle/20.500.12870/4344/ESCAP-2022-WP-Mind-gender-gap-in-workforce-Sri-Lanka.pdf?sequence=1&isAllowed=y

Gunawardane, D. (2016). Gender Inequality in Sri Lanka. *Abhinandana Shastheeya Sangrahaya*, *Table 01*, 64–81. http://repository.kln.ac.lk/bitstream/handle/123456789/12052/journal1 (1).64-81.pdf?sequence=1%26isAllowed=y%0Ahttp://www.ssrn.com/abstract=1964782

Gunawardena. (2006). Exploring gender wage gaps in Sri Lanka: A quantile regression approach. *5th PEP Research Network General Meeting, June*, 18–22.

Gunawardena. (2015). Women in Sri Lanka: achievements and challenges. *Journal of the College of Community Physicians of Sri Lanka*, *20*(1), 4. https://doi.org/10.4038/jccpsl.v20i1.8067

Ibarra, H., Carter, N. M., & Silva, C. (2010). Why men still get more promotions than women: Your high-potential females need more than just well-meaning mentors. *Harvard Business Review*, *88*(9), 80.

Kalugman, J., Hanmer, L., Twigg, S., Hasan, T., & Santamaria, J. (2014). *Voice and agency*.

Kauser, S., & Tlaiss, H. (2011). The Arab Women Manager: Participation, Barriers, and Future Prospects. *Journal of International Business and Economy*, *12*(1), 35–56. https://doi.org/10.51240/jibe.2011.1.3

Kiser, A. I. T. (2015). Workplace and leadership perceptions between men and women. *Gender in Management*, *30*(8), 598–612. https://doi.org/10.1108/GM-11-2014-0097

Kodagoda, T. (2018). Working Long Hours and Its Impact on Family Life: Experiences of Women Professionals and Managers in Sri Lanka. *Indian Journal of Gender Studies*, *25*(1), 108–126. https://doi.org/10.1177/0971521517738432

Liu, T., & Yang, C. (2014). On the degrees of freedom of asymmetric MIMO

interference broadcast channels. *2014 IEEE International Conference on Communications, ICC 2014*, *1*, 1971–1976. https://doi.org/10.1109/ICC.2014.6883612

Metz, I. (2003). Individual, interpersonal, and organisational links to women's advancement in management in banks. *Women in Management Review*, *18*(5), 236–251. https://doi.org/10.1108/09649420310485087

Rosette, A. S., & Tost, L. P. (2010). Agentic Women and Communal Leadership: How Role Prescriptions Confer Advantage to Top Women Leaders. *Journal of Applied Psychology*, *95*(2), 221–235. https://doi.org/10.1037/a0018204

Saadin, I., Ramli, K., Johari, H., & Harin, N. A. (2015). Women and Barriers for Upward Career Advancement – A Survey at Perak State Secretariat, Ipoh, Perak. *Procedia Economics and Finance*, *35*(October 2015), 574–581. https://doi.org/10.1016/s2212-5671(16)00070-8

Sri Lankan Companies advancing gender equality in the workplace. (2023). *Sri Lankan companies advancing gender equality in the workplace*. 2023; Unitated nations global impact. https://unglobalcompact.org/take-action/impact/sri-lankan-companies-advancing-gender-equality-in-the-workplace

Women in the Workplace. (2022). Women in the Workplace. In *Women in the Workplace 2022*. McKinsey & Company. https://www.mckinsey.com/featured-insights/diversity-and-inclusion/women-in-the-workplace

World Bank Organization. (2021). *World Bank Organization*. https://data.worldbank.org/indicator/SL.TLF.ACTI.FE.ZS

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Impact of individual and organizational antecedents on generation Z employees' engagement in selected Sri Lankan large apparel industry

Maduwanthi M.N[a*], Perera G.D.N[b]

a University of Ruhuna, Sri Lanka

b University of Sri Jayewardenepura, Sri Lanka

To link to this article: https://doi.org/10.31357/jbri.v10i1.7555

ARTICLE INFO

***Article History**:*

Received 12 May 2024
Revised 18 June 2024
Accepted 27 June 2024

Keywords

Employee Engagement, Individual Antecedents, Organizational Antecedents, Z Generation

To cite this article: Maduwanthi, M, N. Perera, G, D, N. (2024). Impact of individual and organizational antecedents on generation Z employees' engagement in selected Sri Lankan large apparel industry. , 10: 01, 128-XX, DOI:10.31357/jbri.v10i1.7555

[*]*Corresponding author. Tel: +719540610.*
Email: maduwanthimn93@gmail.com
https://orcid.org/0000-0002-8498-0397
b) https://orcid.org/0000-0002-9379-2099

ABSTRACT

Employee Engagement can be considered one of the fleeting sentiments for the development of an organization. The large apparel industry is one of the important sectors in Sri Lanka as it significantly contributes to the economy. However, their Z-generation employees' lower level of engagement is the biggest problem facing the industry. Hence, the primary purpose of this study is to identify the impact of individual and organizational antecedents on Generation Z employees' engagement in selected large Sri Lankan apparel industry. Accordingly, this study has used random sampling and self-structured questionnaires distributed among 364 Z-generation employees in the selected large apparel industry. To analyze the gathered data, SPSS version 25 was used by the researcher. Multiple Regression Analysis was conducted to test the developed hypotheses. It revealed that both individual and organizational antecedents significantly positively impact employee engagement. The study results will guide the corporate management to develop the relevant policies and procedures to properly focus on the most influencing antecedents to employee engagement of Z-generation employees in the large apparel industry.

Introduction

Companies must concentrate on a series of strategies or actions for generating products and services connected to employee performance due to intense competition in the business sector. To achieve a competitive advantage, businesses strive to incorporate their utmost effort (Elegbe, 2020). To survive and compete successfully in today's tumultuous business atmosphere, commercial organizations demand that employees be proactive and resourceful in their work roles and commit to high-quality work and engagement (Bakker & Leiter, 2010).

Professionals in the human resource field are increasingly being challenged to assist in creating initiatives that encourage employee engagement in the workstation (Macey & Schneider, 2008). Employee engagement has been connected to critical organizational outcomes, such as productivity and profitability. The emphasis of this study is to investigate possible connections between good antecedents of engagement that are commonly thought to be related to engagement and have practical implications for human resource development scholars and practitioners worldwide. Using the existing study literature as a guide, several variables were identified that could go beyond prior studies in terms of antecedents of employee engagement. Employees who worked in jobs where the demands of the position aligned with their interests and values (Resick et al., 2007) felt emotionally connected to their workplace (Rhoades et al., 2017), and worked in a favourable psychological climate (Brown & Leigh, 2016), workplace flexibility, organizational support and self-efficacy were more likely to be engaged, according to the previous researchers. This set of variables was deemed to reflect employees' most essential, context-sensitive cues when perceiving work-related occurrences.

In the Sri Lankan context, when considering the importance of studying employee engagement levels within the country, it can be identified that Sri Lanka is still developing, and a high level of employee engagement within the country is necessary to fast-track the development of the country. The apparel industry is the highest industrial employment generator in Sri Lanka, according to the Department of Census and Statistics (2020), and it was one of the leading industries that continuously carried out operations even during the COVID-19 pandemic situation and gave a significant contribution to hold the economic strength of the country during the pandemic period. Therefore, it can be identified that the engagement level of the employees in the apparel industry makes a significant contribution to the economic side of Sri Lanka and is vital to the country's economy. As a result, firms must be concerned with new working practices and approaches to compete with the rest of the globe (Jayasinghe & Thavakumar, 2020). According to the empirical evidence of the industry, 35% of Generation Z employees are working in the selected large apparel industries in Sri Lanka (Dheerasinghe, 2019). Therefore, Understanding Gen Z is essential for the business to satisfy employee needs, enhance engagement, and gain a competitive advantage. Employee engagement is a significant human resource management activity in the apparel industry today due to the industry's high employment growth (Pinto & Thalgaspitiya,

2017). As a result, sound antecedence will benefit the level of employee engagement amongst Z-generation employees.

Problem Identification

According to Gallup (2021), employee engagement in Sri Lanka is 27% and has shown a decreasing trend compared to previous years. Generation Z employees believe they won't be able to work for a single company till they retire. As a result, employees have a lower level of loyalty to their companies and have lower expectations of reciprocity (Eisenberger, Malone & Presson 2016). The physical and emotional health of the youngest workers is impacted by being born during a period of technological developments and frequent social media use. Gen Z had the worst mental health of all generations in 2018, with 27% ranking it as fair or poor (Bethune,2019). Studies have provided practice on characteristics that promote engagement in different generations, especially in the Z generation. It has been reported that employee engagement is waning, and disengagement is rising in several countries (Gallup, 2018). According to their most recent worldwide workforce report, only 15 percent of employees worldwide are satisfied with their jobs. Eighty-five percent of employees are actively disengaged or not engaged at work. As a result of the seeming engagement gap, the topic of what motivates employees is raised. More research is needed to examine the effects of a wide range of engagement factors on Z-generation employees. Many researchers have discovered the general behavioral features of Generation Z. There are currently only a few studies of Gen Z and their work-related ideas and habits concerning employee engagement. Organizational leaders will struggle to properly engage Gen Z employees if they do not understand them. This study examines how Gen Z displays engagement while filling a vacuum in the literature.

While organizations are focusing on employee engagement as a promising strategy for improving efficiency and output, there is a lack of empirical research on employee engagement that focuses on Generation Z in the Sri Lankan context (Macey & Schneider, 2018).

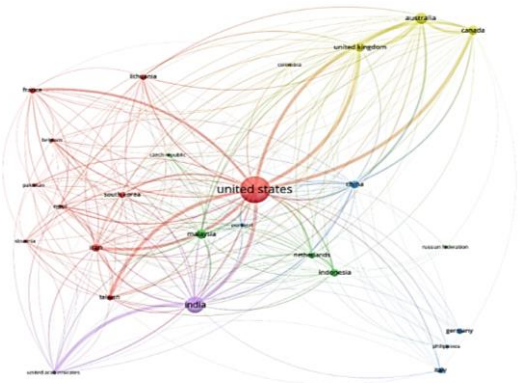


Figure 1: Country-wise coupling
Source: VosViewer (2022)

In the country-wise coupling visualization map (Figure 1), the node's size denotes the number of occurrences in each country. Further, the larger the node, the greater the number of occurrences. As a result of country-wise coupling visualization map analysis, the researcher discovered that "United States" and "India" denoted larger nodes in the map. It demonstrates that these are the most studies conducted in developed countries. Therefore, the researcher can identify a considerable gap in the Sri Lankan context.

In the keyword co-occurrences visualization map (Figure 2), the node's size indicates the number of occurrences. As a result, the greater the node, the higher the number of occurrences. As a result of our term co-occurrence analysis, the researcher discovered that "employee engagement," "work engagement," and "generation Y" were associated with larger nodes on the map. Studies show that established knowledge of employee engagement in generation Z is limited.

Figure 2: Keyword co-occurrence Network Visualization Map

Source: VosViewer, (2022)

It is evidence that (refer Figure1) there is a lack of studies in the Sri Lankan context, on antecedents' (individual and organizational) impact on generation Z employee engagement in selected Sri Lankan large apparel industry. However, there is a lack of studies that have been commenced empirically to recognize the impact of antecedents on employee engagement in generation Z employees in selected Sri Lankan large apparel industry. To fill the prevailing gap, the research problem addressed in this study is as follows: Do individual and organizational antecedents impact generation Z employee engagement in the selected Sri Lankan apparel industry?

This study's objectives are (1) To study the impact of individual antecedents (IA) (psychological climate (PC), affective commitment (AC), and self-efficacy (SE) on Generation Z employee engagement in the selected Sri Lankan large apparel industry and (2) To study the impact of organizational antecedents (OA) (job fit (JF), workplace flexibility (WF) and organizational support (OS) on generation Z employee engagement in the selected Sri Lankan large apparel industry.

Literature Review

Theoretical Underpinning on Employee Engagement

This section refers to the theories underpinning employee engagement.

Social Exchange Theory

The social exchange theory is the most frequently acknowledged and applied theory in contemporary studies on employee engagement. Social exchange theory (SET) offers "a credible theoretical justification for explaining employee engagement," according to Saks (2006), People make social decisions based on perceived costs and advantages, according to the core principle of the social exchange theory (Cropanzano & Mitchell,2005).

The social exchange theory explains why employees become more or less engaged at work. According to the social exchange theory, obligations are created through a sequence of exchanges between persons that are mutually dependent on one another.

Psychological Contract Model

For the first time, Kahn (1990) introduced the Psychological Contract Theory (PCT),

emphasizing the psychological circumstances necessary to heighten employee involvement. He asserts that three psychological factors are essential for inspiring workers to become more engaged. These pertain to psychology. These are psychological availability, psychological safety, and psychological meaningfulness. The PCT's arguments are similar to those of those employees who are likely to perform better if firms can ensure these three psychological circumstances and degree of involvement in their work. Contrary to PCT, these three psychological states specifically described by PCT strengthen their use in explaining how HRM practices impact employee engagement.

Individual Antecedents

The individual antecedents that make up employee engagement are often referred to as their drivers. To promote high engagement, several individual characteristics must be present. Therefore, it is essential to pinpoint the primary individual factor(s) that can inspire employees to carry out their duties successfully and efficiently to encourage them to achieve high levels of participation and commitment to their jobs and organizational roles.

Individual antecedents of employee engagement are understood to generally contribute to the growth of employee engagement. There are certain connections described in the literature; this problem is not, however, without controversy and criticism.

Considering the existing literature on antecedents of individual antecedents, the researcher used three main antecedents given many researchers consider these factors as antecedents (Borah & Barua, 2018; Rhoades et al., 2017; Shuck et al., 2011).

Dimensions of Individual Antecedents

Psychological Climate

Individual explanations of organizational performance and policies that relate to organizational inspirations on individual performance, gratification, and stimulation are referred to as the psychological climate (Baltes, 2001). Further, they at the individual level, the psychological environment is conceptualized and researched (Baltes, 2001). The perception or explanation of an organization's environment, which includes its structures, activities, and events, is known as its psychological climate (Brown & Leigh, 1996; Parker et al., 2003). It relates to how someone perceives if their surroundings are psychologically significant and/or secure enough to affect their motivation, affect, and attitude (Harter et al., 2002; Kahn, 1990; Parker et al., 2003). According to Shuck and Wollard (2010), the PC is a crucially important antecedent that might affect employee engagement and other workplace attitudes and behaviors.

Affective Commitment

Employee identification with, involvement in, and emotional attachment to the organization are all examples of affective commitment (Meyer & Allen,1991).A sense of belonging and emotional connection to one's employment, organization, or both were described as AC (Rhoades *et al.*, 2017).

Self-Efficacy

A person's sense of self-efficacy affects how they feel, think, motivate themselves, and act. These beliefs cause these various consequences through four main processes (Bandura, 1997). SE measures a broad and consistent perception of one's competence to handle various stressful circumstances (Schwarzer et al.,1997). Additionally, SE is the belief of an individual that they can effectively execute tasks required to make a professional decision (Taylor & Betz, 1983). Additionally, it refers to perceptions of abilities regarding the behaviours needed for a specific career-relevant domain (Maduwanthi & Priyashantha,2018).

Organizational Antecedents

Organizations are essentially complex, intricate puzzles that employees must navigate. However, when it comes to EE, the prime needs of the individual and the anthropological condition are the antecedents that drive the growth of engagement at the organizational level. The fact that fundamental requirements are being met demonstrates a lack of complexity but also emphasizes how challenging it is to set up the administrative surroundings for engagement truly. This may be familiar to anyone who has attempted to drive work teams of various personalities and organizational perspectives (Shuck & Wollard,2011).

Considering the existing literature on antecedents of OA, the researcher used three main antecedents given many researchers considering these factors as an antecedent (Shuck et al., 2011).

Dimensions of Organizational Antecedents

Job Fit

Job fit is "the compatibility between people and organizations that happens when: (a) at least one entity supplies what the other wants, (b) they share similar underlying qualities, or (c) both," according to Kristof *et al*., (2005). The degree to which an employee's personality and values align with their current job was defined as their "JF" (Resick et al., 2007). According to those who study job fit, a good fit offers employees the chance to engage in personally fulfilling work that influences the formation of work-related attitudes. Additionally, a good match encourages significant professional congruence with organizational experiences. Based on these experiences, employees establish attitudes toward their jobs, which have an impact on their performance as a whole. Additionally, a good fit gives workers the cognitive stimulus they need to act in ways that benefit the firm.

Workplace Flexibility

Saks (2006) asserts in his pioneering article on the causes and effects of EE that traditional home responsibilities have experienced a kind of "role reversal" , particularly among working couples with kids, where the parents alternately take care of the household as a whole and the kids in particular. These parents take priority work flexibility above all else. Along with freedom, Saks further contends that employees desire organizational assistance in the form of training opportunities and rewards that could boost engagement (Ugargol & Patrick, 2018).

Organizational Support

Organizational support refers to the development of perceptions and attitudes on behalf of the employee when it is thought that the company has a genuine interest in the welfare of its workers (Wang *et al.*,2020). Support from the organization enables social, emotional, and practical support (Kim *et al*., 2007). The relationship between OS and several other factors has been studied, and the results are consistent with the idea that OS lowers employee stress and burnout (Bobbio et al., 2012). According to Zaman (2020), OS increases employee productivity, raising staff members' commitment and performance levels. "Additionally, it has been demonstrated that when employees receive OS, their cognitive and emotional opinions of their company are strengthened (Zaman,2020).

Employee Engagement

Kahn's (1990) conceptualization is the first in the scholarly literature to discuss EE (Shuck & Wollard, 2010). Currently, companies in a competitive marketplace are trying to achieve beyond the expected outcomes by changing the way of practices of managing employees in the workplace (Thavakumar & Evangeline, 2016). In the current occupational context, EE is discussed in a broader aspect on the employer side to achieve high performance in businesses (Chartered Institute of Personnel Development, 2017). According to Bakker et al. (2006), employee engagement is the level of alignment between employee and organization. Moreover, Anitha (2014) suggested that EE is the degree of employee involvement and commitment to the company and its value. Therefore, engaged employees are an important element for the smooth functioning of companies (Ariani, 2013)

According to Kahn (1990), an early initiator of the EE concept defined it as an individual who is satisfying the employment and expression favor themselves toward the task behavior and personal presence physically, cognitively, and emotionally (Othman *et al.*, 2019). The physical dimension of employees has defined engagement as the energy level of the individuals to attain their goals. The cognitive dimension has been considered as employees who believe in the organization, its leaders, and working conditions. The emotional dimension indicates that individuals feel about every two dimensions either negatively or positively toward the organization and its leader (Abraham, 2012).

Generation Z

This generation was born after 1996 and represented the current labour market. Generation Z is familiar with technology because the internet has covered them since birth. As the rising generation to the new market, it should understand their needs, wants and expectations (Goh & Lee, 2018). Suslova and Holopainen (2019) have called them 'digital human' and 'online generation'. Further, they identify as the silent generation, post-millennials, and homelands. 'Generation I, Gen Tech, Digital natives, Gen Wii, Do-It-Yourself generation' (Singh & Dangmei, 2016). They are also active and tend to adapt quickly to changing environments. Those researchers have stated the standards that describe these generations' behaviours and attitudes. They are customization, scrutiny, integrity, collaboration, entertainment, speed, innovation, and freedom.

Research Methodology

The research philosophy is based on positivism and the deductive approach. It is the base of gathering data from observed reality and uncovering commonalities in the data.

Conceptual Framework and Hypotheses

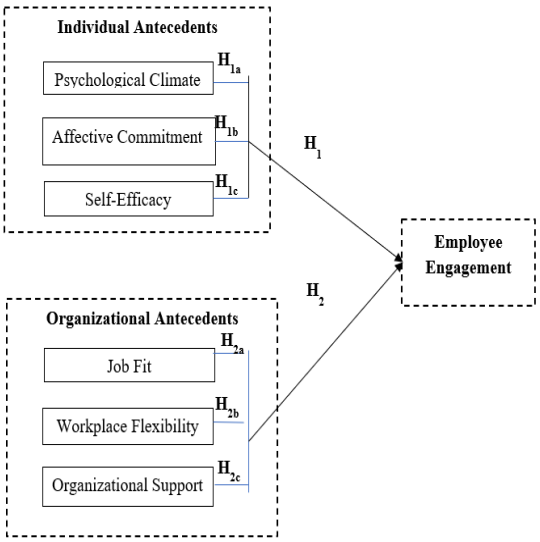


Figure 03: Conceptual Framework

Source: Author's Construct (2023)

Employee engagement is an individual factor that is frequently assessed at the organizational level (Shuck & Wollard, 2010). A person's personality and other characteristics significantly affect their life inside and outside the job.

According to Macey and Schneider (2018), self-efficacy, psychological climate, proactive personality, AC and trait positive affect served as the antecedents for the emergence of EE at the individual level. According to this paradigm, which was founded on Maslach (2011)'s theory that employee perceptions of their work environment would affect organizational outcomes (Maslach, 2011), SE and AC cues may play a role in the growth of EE. Others have concurred, arguing that stress, PC, attitude, family and job status, emotional connection, SE and a willingness to focus personal energies are all connected to EE growth. Based on the extant literature, this study proposes the following hypothesis;

H_1: Individual antecedents positively impact the engagement of Generation Z employees.

Currently, a significant challenge for HR professionals is how to effectively maintain a good psychological climate to recruit and retain acceptable and skilled people in an organization. Therefore, psychological climate cannot be viewed as merely an impersonal arrangement between employers and employees but rather as a tool for gauging the caliber of a specific organization's workforce. Numerous scholars have discussed the psychological climate's essential function. Following this ongoing study on a psychological climate is inevitable, according to the majority of the researchers, because it plays a crucial function in an organization. Additionally, (Coyle-Shapiro & Kessler, 2000) mostly concur with the idea that engagement and retention can be attained by sustaining a favorable PC. Further, Social exchange theory and psychological climate theory also suggest that this antecedent has positive impact on engagement.

Similarly, a climate at work that encourages customer-focused behaviors is likely to help people become more invested in their work, especially when interacting with clients. Peccei and Rosenthal (2001) mentioned employee job satisfaction and organizational performance may be

impacted by service orientation at the organizational level. Hence, the following hypothesis is advanced:

H_{1a}: Psychological climate positively impacts the engagement of Generation Z employees.

This study considers affective commitment as an individual antecedent of employee engagement. The core premise is that AC has to do with the genuine affection and bond employees feel for their work and the company, which motivates them to stick with it through good times and bad. As a result, emotionally dedicated employees are typically terrific assets for the company (Mercurio, 2015).

Saks (2006) suggested two essential aspects to consider in determining the relationship between engagement and AC. Employees can first decide whether to get involved with the organization or not. Second, employee engagement is a personal construct that must contribute to personal outcomes before it can result in commercial benefits. The expectation is that human attitudes, intentions, and behaviours, such as organizational commitment, will be associated with employee engagement (Saks, 2006). Researchers predict that their AC to the organization would rise due to this line of thinking. The literature has demonstrated that employee engagement and affective commitment are positively correlated (Demerouti et al., 2001; Hakanen et al., 2006; Saks, 2006; Richardsen et al., 2006). This leads to the following hypothesis:

H_{1b}: Affective commitment positively impacts the engagement of Generation Z employees.

According to Mangkuprawira and Hubeis (2007), both intrinsic and extrinsic factors have an impact on employee performance. Self-efficacy and employee engagement are intrinsic variables that influence employee performance. Someone will be highly motivated to work so that the final performance will be optimal if they are encouraged or motivated to be more confident in their own abilities and feel actively connected in the organization. Employees that are very self-effective and engaged in their work will perform well. On the other hand, performance declines when EE and SE rise. Therefore, it can be claimed that SE positively impacts EE. This argument is confirmed by numerous prior studies that detail the impact of SE on employee engagement, such as the study conducted regarding SE, EE the findings by Sklett et al. (2018); on EE. Based on the extant literature, this study proposes the following hypothesis;

H_{1c}: Self-efficacy positively impacts the engagement of Generation Z employees.

Organizations are frequently complex mazes that employees must navigate. However, when it comes to employee engagement, the fundamental employee/human relations issues are the antecedents that drive the development of engagement at the organizational level needs. Meeting fundamental requirements is highlighted despite the lack of complexity and the challenges of establishing organizational frameworks that encourage engagement occur.

Some authors contend that employee and organizational development programs that entail talent management systems and learning opportunities (Hughes & Rog,

2008) are precursors to engagement. Although it is a strongly indicated antecedent, no "empirical research could be found that specifically focused on the role of human resource development, organizational development, and human resource management techniques as antecedents to the development of employee" engagement. The role of organizational support has been empirically studied before, most notably through research employing the satisfaction-engagement approach (Shuck, 2011). According to research; nondefense organizational factors favorably influence the growth of engagement (Shuck et al., 2011). Based on the extant literature, this study proposes the following hypothesis;

H_2: Organizational antecedents positively impact the engagement of Generation Z employees.

According to May et al. (2004), organizational antecedents are significant for employee engagement. A strong fit between people and their job roles is one of the requirements (Juhdi et al., 2013). In other words, good hiring practices result in high engagement since employees' abilities and skills match job requirements. The Scroggins (2008) idea of the job fit towards meaningful labor can be used to explain the relationship between job fit and engagement. The idea is comparable to notion of job fit, which included meaningful work as one of its origins. Employees are more likely to adapt to their jobs and those of their employers fit well (Scroggins, 2008).

In addition, Leiter and Maslach (2018) emphasized that "the greater the perceived congruity, the greater the possibility of engagement with work" from a similar perspective. On the other hand, it is anticipated that low engagement will be associated with a low degree of job fit (Warr & Inceoglu, 2019). Based on the extant literature, this study proposes the following hypothesis;

H_{2a}: Job fit positively impacts the engagement of Generation Z employees.

A study by Okemwa (2016) that aimed to determine the influence of flexible work arrangements among nurses in public hospitals in Kenya explored that there was strong commitment and engagement among nurses as they had the flexibility to attend to other personal engagements, there was a strong sense of responsibility and engagement among nurses. Similarly to this, a study by Hill et al., (2010) found a high correlation between workplace flexibility and employees' ability to combine work and home obligations, which in turn increased their motivation, commitment, and engagement. Based on the extant literature, this study proposes the following hypothesis;

H_{2b}: Workplace flexibility positively impacts the engagement of Generation Z employees.

The relationship between organizational support and employee engagement has been the subject of numerous researches. Studies by Kamanja et al. (2019) revealed a high correlation between organizational support on employee engagement. According to this study, the organizational support is the main factor connecting employees' occupations to their motivation, job satisfaction, and higher employee performance when improved.

According to Zaman (2020), organizational support increases employee productivity, raising staff members' commitment and performance levels. Additionally, it has been demonstrated that when employees receive organizational support, their cognitive and emotional opinions of their company are strengthened (Zaman,2020). According to this interpretation of the relationship between employees and their organization as a dyad, it may be assumed that employees who get high levels of organizational support will be more engaged, even if adverse workplace features lowers engagement levels. Based on the extant literature, this study proposes the following hypothesis;

$H_{2c:}$ *Organizational support* positively impacts the engagement of Generation Z employees.

Population

The population of this research study is all the Z generation working in the selected large apparel companies of Sri Lanka. The total number of populations is 7002 in the selected three companies.

Sample

The sample size of this study is 364 Z-generation employees comprised both managerial and non-managerial employees, according to Krejice and Morgan table and Raosoft Sample Size Calculator. The sampling method of the study is considered random sampling under probability sampling. The sampling framework was derived through the respective companies' Human Resource Information Systems (HRIS).

Primary data

Researcher collected primary data through a leading source, a questionnaire. Data about the Generation Z employees' IA, OA and EE were gathered through a self-administered questionnaire representing this study's quantitative aspect. Further, the questionnaire has been translated into the Sinhalese language to enhance the understandability of the respondents.

Data analysis tool and methods

Statistical analysis was executed to test the hypotheses and objectives of the study. Therefore, descriptive, correlation and regression techniques were used to analyze the data. The Social Science Statistical Package (SPSS 25) was used to analyze the data and produce helpful findings.

Data collection

In line with the research questions and objectives, the survey method is selected as a data collection method.

Findings and & Discussion

Results of the Pilot Study

The pilot study was conducted for 30 respondents from the sample. Cronbach's alpha was determined for each construct and the dimensions to ensure the adequate reliability of the scale. The range of reliability is listed from 0.799 to 0.862, which is well within the satisfactory level according to Kline (1999).

Response Rate of the Study

Questionnaires were distributed among 364 Z-generation employees according to the

sample size. 19% valid responses were not received, yielding a response rate of 81%.

Reliability statistics

Table 01: Reliability Statistics

Variable	Items	Cronbach Alpha >.7
Individual Antecedents	**28**	**0.828**
PC	10	0.812
AC	09	0.839
SE	09	0.834
OA	**24**	**0.840**
JF	06	0.846
OS	09	0.841
WF	09	0.834
EE	**17**	**0.864**

Source: Survey data (2023)

All Cronbach Alpha values are above 0.80 in table 5.8; hence the reliability of the variables was ensured.

Sample Profile

According to the data, most respondents (76 %) of the sample are females. This may be because Sri Lanka has one of the most significant female labor force participation rates in the apparel industry. In terms of age, 69% of the population fell into the 1997 to 2000 age range. According to marital status, 70% of people were not married. Further, the sample comprised both managerial and non-managerial employees in the Z generation. Non-managerial employees represented 85% of the sample.

Hypotheses Testing

Table 02 disclosed the summary statistics of hypotheses 1, 1a, 1b, and 1c, as follows.

Table 02: Summary Statistics of H1 and Sub Hypothesis of H1

	H1	H1a	H1b	H1c
Pearson Correlation	0.896**	0.884**	0.799**	0.864**
R Square	0.803	0.781	0.638	0.746
Coefficient Beta	0.883**	0.792**	0.838**	0.871**
P-value at ANOVA	0.000	0.000	0.000	0.000

**. Correlation is significant at the 0.01 level (2-tailed)

Source: Survey data (2023)

H_1: Individual antecedents positively impact the engagement of Generation Z employees

According to Table 2, H1 the observed Pearson Correlation Coefficient is 0.896, indicating a strong positive relationship between the individual antecedents and the employee engagement. In order to achieve the research objective and to test hypothesis 1, multiple regression analysis was applied to determine the impact between the independent variable and dependent variable.

The findings indicate (Table 2,H1) that the R2 of the independent variables associated with individual antecedents and employee engagement was 0.803. It suggests that individual antecedents explain around 80% of the employee engagement variance.

According to the projected coefficient, the P-value is 0.000, less than 0.05(P- P-value; 0.000<0.05). This indicates that the individual antecedents significantly contribute to the model.

As a result, IV of Z generation employees' regression equation is EE=0.385+0.883 (IA). This explains that employee engagement will increase by 0.883 for every increase of individual antecedents by

one unit. The p-value is below 0.05. This ensures individual antecedents significantly impacts employee engagement in this study (refer to Table 2). According to statistical findings, Hypothesis one (H1) is accepted.

H_{1a}: Psychological climate positively impacts the engagement of Generation Z employees.

The Pearson movement correlation between the two variables is 0.884**, as shown in Table 2(H1a). It was found that there is an association between psychological climate and employee engagement among Z-generation employees in Sri Lankan large apparel industry. Therefore, it is statistically possible to assert that psychological climate and employee engagement have a positive relationship.

Regression analysis was performed to evaluate the impact of psychological climate on employee engagement. In the model summary, the value of R square is 0.781, showing that variation in psychological climate accounts for 78% of the employee engagement. According to statistical findings, Hypothesis 1a is accepted.

By demonstrating empirically, the existence and directionality of psychological climate's impact on employee engagement, researchers contend that psychological climate's long-standing position as a foundation for employee engagement, corporate success and sustainable competitive advantage is accurate. Researchers discovered that work outcomes, such as employee engagement, are not only affected by psychological climate but also can be instrumental in its accumulation, with the relationship potentially functioning as a virtuous cycle. The researcher did this by using cross-sectional data and exploring the impact of psychological climate on employee engagement in the Z generation. Therefore, employee engagement results support sub-hypothesis H1a.

H_{1b}: Affective commitment positively impacts the engagement of Generation Z employees

The Pearson movement correlation between the two variables is 0.799**, as shown in Table 2. It was found that there is an association between affective commitment and EE among Z-generation employees in the Sri Lankan large apparel industry. Therefore, it is statistically possible to assert that affective commitment and employee engagement have a positive relationship.

Regression analysis was performed to evaluate the impact of affective commitment on employee engagement. In the model summary, the value of R square is 0.638, showing that variation in affective commitment accounts for 64% of the employee engagement. The p-value is below 0.05. This ensures affective commitment significantly impacts this study's employee engagement model (refer to Table 2). According to statistical findings, Hypothesis 1b is accepted.

The regression analysis results show that affective commitment can predict employee engagement. The results of this study are consistent with earlier research that revealed an affective commitment to be a key driver of employee engagement (Hakanen et al., 2012; Saks, 2006; Llorens et al., 2022). This finding implies that a greater level of affective commitment will

translate into greater employee engagement. The employee who experiences a happy and rewarding work-related state of mind (Schaufeli and Bakker, 2004) is likely to reflect positive views regarding working in the apparel industry and have more affective commitment, which is a feasible explanation for this result. The findings of this study also suggest that affective commitment significantly impacts employee engagement in Z-generation employees.

H_{1c}: Self-efficacy positively impacts the engagement of Generation Z employees.

The observed relationship is statistically significant as a positive association at the 99% confidence level. Therefore, it is statistically possible to assert that self-efficacy and employee engagement have a positive relationship (refer Table 2 (H1c).

Regression analysis was performed to evaluate the impact of self-efficacy on employee engagement. In the model summary, the value of R square is 0.746, showing that variation in self-efficacy accounts for 75% of the employee engagement. The p-value is below 0.05. This ensures self-efficacy significantly impacts this study's employee engagement model (refer to Table 2). According to statistical findings, Hypothesis 1c is accepted.

According to the study results, the commonly acknowledged psychological state of self-efficacy can help individuals understand them better and increase employee engagement, which adds value to workplace outcomes. This field-based research study also discovered an independent influence of self-efficacy above and beyond the effects on employee engagement. It identified a strong relationship that is directly derived from self-efficacy and employee engagement. It's interesting to note that depending on the nature of the work at hand and the particular performance metric being employed, self-efficacy and employee engagement had positive effects.

Table 03: Summary Statistics of Sub Hypothesis of H2

	H2	H2a	H2b	H2c
Pearson Correlation	0.857**	0.799**	0.829**	0.849**
R Square	0.734	0.638	0.687	0.721
Coefficient Beta	0.883**	0.643**	0.681**	0. 700**
P-value at ANOVA	0.000	0.000	0.000	0.000

**. Confidence is significant at the 0.01 level (2-tailed)

Source: Survey data (2023)

H_2: Organizational antecedents positively impact the engagement of Generation Z employees.

According to Table 3, the observed Pearson Correlation Coefficient is 0.857, indicating a strong positive relationship between the organizational antecedents and the employee engagement. In order to achieve research objective 02 and to test hypothesis 2, multiple regression analysis was applied to determine the impact between the independent variable and dependent variable.

The findings indicate (Table 2) that the R2 of the independent variables associated with organizational antecedents and employee engagement was 0.734. It suggests that OA explains around 82.5% of the employee engagement variance.

The organizational antecedents of Z generation employees' regression equation

is EE=0.789+0.795 (OA). This explains that employee engagement will increase by 0.795 for every increase of organizational antecedents by one unit.
The p-value is below 0.05. This ensures organizational antecedents significantly impact employee engagement in this study (refer to Table 03, H1). According to statistical findings, Hypothesis two (H2) is accepted.

H_{2a}: Job fit positively impacts the engagement of Generation Z employees.

The Pearson movement correlation between the two variables is 0.799**, as shown in Table 3. It was found that there is an association between job fit and employee engagement among Z-generation employees in Sri Lankan large apparel industry.

Regression analysis was performed to evaluate the impact of job fit on employee engagement. In the model summary, the value of R square is 0.638, showing that variation in job fit accounts for 64% of the employee engagement. The p-value is below 0.05. This ensures JF has a significant positive impact on this study's employee engagement model (refer to Table 3). According to statistical findings, Hypothesis 2a is accepted.

This result is consistent with earlier studies (Chi & Pan, 2012), which positively impacted job fit and work-related outcomes, including employee engagement. According to the comprehensive job-demands resources (JD-R) model (Xanthopoulou et al., 2009), personal resources like job fit are likely to promote work engagement and a calm motivational-affective state because of their motivating potential.

H_{2b}: Workplace flexibility positively impacts the engagement of Generation Z employees.

The Pearson movement correlation between the two variables is 0.829**, as shown in Table 3. It was found that there is an association between workplace flexibility and employee engagement among Z-generation employees in Sri Lankan large apparel industry.

Regression analysis was performed to evaluate the impact of workplace flexibility on employee engagement. In the model summary, the value of R square is 0.687, showing that variation in workplace flexibility accounts for 69% of the employee engagement. The p-value is below 0.05. This ensures workplace flexibility significantly impacts this study's employee engagement model (refer to Table 3). According to statistical findings, Hypothesis 2b is accepted.

H_{2c}:Organizational support positively impacts the engagement of Generation Z employees.

The Pearson movement correlation between the two variables is 0.849**, as shown in Table 3. It was found that there is an association between organizational support and employee engagement among Z-generation employees in Sri Lankan large apparel industry.

Regression analysis was performed to evaluate the impact of organizational support ~~OS~~ on employee engagement. In the model summary, the value of R square is 0.721, showing that variation in organizational support accounts for 72% of the employee engagement. The p-value is below 0.05. This ensures organizational

support significantly impacts this study's employee engagement model (refer to Table 3). According to statistical findings, Hypothesis 2c is accepted**.** According to Ahmed and Jaaffar (2017), organizational support is necessary for employee engagement in the large apparel industry.

Conclusions

A particular organization's level of employee engagement plays a huge role in enhancing its competitive advantages. Therefore, knowing the antecedents that affect employee engagement in a specific organization is critical. As mentioned before, employee engagement can be a significant factor in driving an organization to success. Therefore, it is essential to understand the antecedents that impact employee engagement within an organization. According to past research, several antecedents affect employee engagement within the organization (Anitha, 2014; Iddagoda & Opatha, 2017). However, in order to arrive at a better insight into this phenomenon, the researcher identified two significant antecedents affecting employee engagement: individual antecedents (phycological climate, affective commitment, and self-efficacy) and organizational antecedents (job fit, workplace flexibility, and organizational support) were taken into consideration. Primary data was collected from 295 Z-generation employees in the large apparel industry in Sri Lanka and data were collected through self-administrated questionnaires in order to address the purpose of the study.

The primary goal of the current study was to determine the impact of individual and organizational antecedents on employee engagement in the Z-generation employees in the large Sri Lankan apparel industry. This analytical research was mainly conducted utilizing correlation, multiple regression and with SPSS to provide more meaning and clarify the context to mitigate the research gap.

This study supports the claim that IA and OA improve employee engagement at work. Additionally, it has been demonstrated that such an effect promotes workers to feel better about their jobs, which can be gauged by how content they are with their colleagues, jobs, flexible organizational environment, and support of the organization. Findings suggest that IA and OA could aid young, brilliant Z-generation employees in understanding their employment relationship and applying their superior performance to organizational goals in the context of the significant apparel industry. The current study bridged the gaps in the body of knowledge about the circumstances of employee engagement and its antecedents. It offered an empirical contribution of respondents to help fill the gap in empirical research on the impact of IA and OA on EE in Z-generation employees. In particular, it contributed a newly developing perspective to the large apparel industry and the Sri Lankan setting. The present study results have significant implications for managers and manufacturing organizations that are employing Z-generation employees, which can be inferred from the context mentioned above. The study's conclusions support the idea that investing in human capital will improve performance if organizations adopt Employee Engagement techniques. Since this study is limited to a sample from the large apparel industry (three prominent companies), future research can be

conducted on another industry operating in Sri Lanka. Further, future studies can use a qualitative approach to obtain more accurate data from the respondents; apart from relying only on one methodology to conduct the study, future researchers can focus on a mixed method to arrive at more diverse findings in this context. As stated in the study's limitations, a longitudinal study could be recommended to evaluate employee engagement before and after adopting individual and organizational factors to determine the actual effects. Using a variety of methodologies for evaluating responses, any variances can be seen in the subjective data.

Competing Interests

The authors declared no potential conflicts of interest for the research, authorship, and publication of this article.

Authors' Contributions

Maduwanthi M.N conducted the experiments, collected and analyzed the data, and drafted the initial version of the manuscript, including the methods and results sections.

Perera G.D.N. Conceptualized and designed the study, provided critical guidance and supervision throughout the research process, and revised the manuscript critically for important intellectual content.

Both authors contributed to the interpretation of the data, reviewed the manuscript, and approved the final version for publication.

References

Abraham, S., (2012). Job satisfaction as an antecedent to employee engagement. *Sies Journal of Management*, 8(2).

Ahmed, S., Ahmad, F. B., & Jaaffar, A. R. (2017). Employee engagement on employee relations with supervisor and employee performance relationship in developing economy: critical analysis with PLSSEM. *Saudi Journal of Business and Management Studies*, *2*(4), 389-398.

Anitha, J., (2014). Determinants of employee engagement and their impact on employee performance. *International journal of productivity and performance management*.

Ariani, D.W., (2013). The relationship between employee engagement, organizational citizenship behavior, and counterproductive work behavior. *International Journal of Business Administration*, 4(2), pp.46.

Baltes, B. B. (2001). Psychological climate in the work setting. *International Encyclopedia of the Social and Behavioral Sciences* (Vol. 18, pp. 12355 – 12359). Elsevier (Pergamon), New York, NY.

Bakker, A. B., Gieveld, J. H., & Van, R. K. (2006). A study on burnout, work engagement and performance. Right Management Consultants, Diemens.

Bakker, A.B. and Leiter, M.P., (2010). *Work engagement*: A handbook of essential theory and research. Psychology press.

Bandura, A., (1997). Self-efficacy: The exercise of control. Macmillan.

Bethune, S., (2019). Gen Z more likely to report mental health concerns. Monitoron Psychology, 50(1), pp.20.

Bobbio, A., Bellan, M. and Manganelli, A.M., (2012). Empowering leadership, perceived organizational support, trust, and job burnout for nurses: A study in an

Italian general hospital. Health care management review, 37(1), pp.77-87.

Borah, N. and Barua, M., (2018). Employee Engagement: A Critical Review Of Literature. *Journal of Organisation & Human Behaviour*, 7(4).

Brown, S. P., & Leigh, T. W. (1996). A new look at psychological climate and its relationship to job involvement, effort, and performance. *Journal of applied psychology*, 81(4), 358.

Chartered Institute of Personnel and Development. "To gig or not to gig? Stories from the modern economy." (2017)

Chi, N. W., & Pan, S. Y. (2012). A multilevel investigation of missing links between transformational leadership and task performance: The mediating roles of perceived person-job fit and person-organization fit. *Journal of Business and Psychology*, *27*, 43-56.

Coyle-Shapiro, J., & Kessler, I. (2000). Consequences of the psychological contract for the employment relationship: A large scale survey. Journal of management studies, 37(7), 903-930.

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. Journal of management, 31(6), 874-900.

Demerouti, E., Bakker, A. B., De Jonge, J., Janssen, P. P., & Schaufeli, W. B. (2001). Burnout and engagement at work as a function of demands and control. *Scandinavian journal of work, environment & health*, 279-286.

Department of Census and Statistics. (2020). *Sri Lanka Labour Force Survey Annual report*.

Dheerasinghe, R. (2019). Garment Industry in Sri Lanka Challenges, Prospects and Strategies. Staff Studies, 3(2), 33-72

Elegbe, J. A. (2020) 'Managing Employee Engagement', Talent Management in the Developing World, 2020(4), pp. 93–116. doi: 10.4324/9781315611822-10.

Eisenberger, R., Malone, G.P. and Presson, W.D., (2016). Optimizing perceived organizational support to enhance employee engagement. Society for Human Resource Management and Society for Industrial and Organizational Psychology, 2(2016), pp.3-22.

Gallup (2018) State of the Global Workplace. https://www.gallup.com/workplace/229424/em employee-engagement.aspx#ite-229856.

Gallup (2021) 'State of the global workplace: 2021 report', Workplace Insights, pp. 219. Available at: https://www.gallup.com/workplace/insights.aspx.

Goh, E. and Lee, C., (2018). A workforce to be reckoned with: The emerging pivotal Generation Z hospitality workforce. *International Journal of Hospitality Management*, 73, pp.20-28.

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of school psychology*, *43*(6), 495-513.

Harter, J.K., Schmidt, F.L. and Hayes, T.L., (2002). Business-unit-level relationship

between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of applied psychology*, 87(2), p.268.

Hill, R. W., Huelsman, T. J., & Araujo, G. (2010). Perfectionistic concerns suppress associations between perfectionistic strivings and positive life outcomes. *Personality and Individual Differences*, *48*(5), 584-589.

Hughes, J., & Rog, E. (2008). Talent management: A strategy for improving employee recruitment, retention and engagement within hospitality organizations. *International journal of contemporary hospitality management*, 20(7), 743-757.

Iddagoda, Y.A. and Opatha, H.H., (2017). Relationships and mediating effects of employee engagement: An empirical study of managerial employees of Sri Lankan listed companies. Sage Open, 10(2), p.2158244020915905.

Jayasinghe, W.G.N.M. and Thavakumar, D., (2020). The Effect of Supportive Work Environment on Employee Commitment-Mediating Role of Employee Engagement in Apparel Industry in Sri Lanka. Available at SSRN 3853930.

Juhdi, N., Pa'wan, F., & Hansaram, R. M. K. (2013). HR practices and turnover intention: the mediating roles of organizational commitment and organizational engagement in a selected region in Malaysia. *The International Journal of Human Resource Management*, *24*(15), 3002-3019.

Kahn, W.A., (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), pp.692-724.

Kamanja, D. M., Ogolla, D., & Gichunge, E. (2019). Influence of work environment on employee engagement among central government ministries in Kenya, a case of Meru County.

Kim, M., Chelladurai, P. and Trail, G.T., (2007). A Model of Volunteer Retention in Youth Sport. *Journal of Sport Management*, 21(2).

Kline, R. B. (1999). Book review: Psychometric theory. *Journal of Psychoeducational Assessment*, *17*(3), 275-280.

Kristof-Brown, A.L., Zimmerman, R.D. and Johnson, E.C., (2005). Consequences of Individuals 'fit at work: A meta-analysis OF person–job, person–organization, person

Leiter, M. P., & Maslach, C. (2018). Interventions to prevent and alleviate burnout. In *Current issues in work and organizational psychology* (pp. 32-50). Routledge.

Llorens, S., Salanova, M., Chambel, M. J., Torrente, P., & Ângelo, R. P. (2022). Organizational drivers of burnout and work engagement: a multilevel study in Portuguese firefighter brigades. *International Journal of Environmental Research and Public Health*, *19*(7), 4053.

Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. Industrial and organizational Psychology, 1(1), 3-30.

Maduwanthi, M.N. and Priyashantha, K.G., (2018). Determinants of Career Indecision: With Special Reference to Management Undergraduates in Sri Lankan State Universities. In Proceedings of 7th International Conference of Management and Economics.

Mangkunegara, A. P., Mangkuprawira, S., & Hubeis, A. V. (2007). Manajemen mutu sumber daya manusia.

Maslach, C. (2011). Burnout and engagement in the workplace: New perspectives. European Health Psychologist, 13(3), 44-47.

May, D. R., Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of occupational and organizational psychology*, *77*(1), 11-37.

Mercurio, Z. A. (2015). Affective Commitment as a Core Essence of Organizational Commitment: An Integrative Literature Review. *Human Resource Development Review*, 14(4), 389-414. https://doi.org/10.1177/1534484315603612

Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human resource management review*, 1(1), 61-89.

Okemwa, D. O. (2016). Relationship between flexible work-arrangement and commitment of nurses in public hospitals in Kenya.

Othman, B., Harun, A., Rashid, W., & Ali, R. (2019). The impact of Umrah service quality on customer satisfaction towards Umrah travel agents in Malaysia. Management Science Letters, 9(11), 1763-1772.

Parker, C. P., Baltes, B. B., Young, S. A., Huff, J. W., Altmann, R. A., Lacost, H. A., & Roberts, J. E. (2003). Relationships between psychological climate perceptions and work outcomes: a meta-analytic review. Journal of Organizational Behavior: *The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 24(4), 389-416.

Peccei, R., & Rosenthal, P. (2001). Delivering customer-oriented behaviour through empowerment: An empirical test of HRM assumptions. *Journal of Management Studies*, 38(6), 831-857.

Pinto, H.P.A.S.U. and Thalgaspitiya, U.K., (2017). Impact of HR practices on employee engagement among machine operators in the large apparel industry in Sri Lanka. *Human Resource Management Journal*, 5(1).

Resick, C. J., Baltes, B. B., & Shantz, C. W. (2007). Person-organization fit and work-related attitudes and decisions: Examining interactive effects with job fit and conscientiousness. *Journal of Applied Psychology*, *92*(5), 1446–1455. https://doi.org/10.1037/0021-9010.92.5.1446

Rhoades, L., R. Eisenberger, and S. Armeli. (2017). Affective commitment to the organization: The contribution of perceived organizational support.

Journal of Applied Psychology, 86: 825–36.

Richardsen, A. M., Burke, R. J., & Martinussen, M. (2006). Work and health outcomes among police officers: The mediating role of police cynicism and engagement. *International Journal of Stress Management*, 13(4), 555.

Saks, A.M., (2006). Antecedents and consequences of employee engagement. *Journal of managerial psychology*.

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1997). The assessment of optimistic self-beliefs: comparison of the German, Spanish, and Chinese versions of the general self-efficacy scale. *Applied psychology*, 46(1), 69-88.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, *25*(3), 293-315.

Scroggins, W. A. (2008). The relationship between employee fit perceptions, job performance, and retention: Implications of perceived fit. Employee Responsibilities and Rights Journal, 20, 57-71.

Shuck, B. (2011). Integrative literature review: Four emerging perspectives of employee engagement: An integrative literature review. *Human Resource Development Review*, *10*(3), 304-328.

Shuck, B. and Wollard, K., (2010). Employee engagement and HRD: A seminal review of the foundations. *Human resource development review*, 9(1), pp.89-110.

Shuck, B., Reio J.R., T.G. and Rocco, T.S., (2011). Employee engagement: An examination of antecedent and outcome variables. *Human resource development international*, 14(4), pp.427-445.

Singh, A.P. and Dangmei, J., (2016). Understanding the generation Z: the future workforce. *South-Asian Journal of Multidisciplinary Studies*, 3(3), pp.1-5.

Sklett, V. H., Lorås, H. W., & Sigmundsson, H. (2018). Self-efficacy, flow, affect, worry and performance in elite world cup ski jumping. Frontiers in psychology, 9, 364703.

Suslova, A. and., Holopainen, (2019). Job Satisfaction and Employee Motivation: Case Generation Z.

Taylor, K.M. and Betz, N.E., (1983). Applications of self-efficacy theory to the understanding and treatment of career indecision. *Journal of vocational behavior*, 22(1), pp.63-81.

Thavakumar, D. and Evangeline, S.J., (2016). The influence of Involvement and participation, compensation, communication and work-life balance on Employee Engagement: A Case of Insurance Companies in Batticaloa District. *International Journal of Multidisciplinary Studies*, 3(1).

Wang, Z., Zaman, S., Rasool, S.F., uz Zaman, Q. and Amin, A., (2020). Exploring the relationships between a toxic workplace environment, workplace

stress, and project success with the moderating effect of organizational support: empirical evidence from Pakistan. Risk Management and healthcare policy, 13, pp.1055.

Warr, P., & Inceoglu, I. (2018). Work orientations, well-being and job content of self-employed and employed professionals. *Work, employment and society*, *32*(2), 292-311.

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational behavior*, *74*(3), 235-244.

Zaman (2020). Mediating effect of perceived organizational support on the relationship between leader-member exchange and the innovation work behavior of nursing employees: a social exchange perspective. *Business Innovation and Entrepreneurship Journal*, 2(1), 67-76.

Contents lists available at JBRI

Journal of Business Research and Insights

Journal homepage: https:/www.journals.sjp.ac.lk/JBRI

Article

Investigating University Students' Willingness to Invest in Cryptocurrencies in Sri Lanka: Does Financial Risk Tolerance Matter?

W D G G Abhayagunarathna[a*], L D C K Gunawardana[b]

a & b NSBM Green University, Sri Lanka

To link to this article: https://doi.org/10.31357/jbri.v10i1.7556

ARTICLE INFO

***Article History**:*

Received 16 May 2024
Revised 30 June 2024
Accepted 03 July 2024

Keywords

Attitude, Subjective Norms, Perceived Behavioral Control, Financial Risk Tolerance, Investment Intention, University Students, Sri Lanka

To cite this article: Abhayagunarathna W.D.G.G, Gunawardana L.D.C.K., (2024), Investigating University Students' Willingness to Invest in Cryptocurrencies in Sri Lanka: Does Financial Risk Tolerance Matter? 10: 01, 150-167, DOI:10.31357/jbri.v10i1.7556

[*]*Corresponding author. Tel: +94710811028. Email: gishan.a@nsbm.ac.lk*
https://orcid.org/0009-0006-8705-0677
b) https://orcid.org/0009-0007-3876-2675

ABSTRACT

Cryptocurrencies have sparked debates globally, leading to diverse reactions from countries regarding their regulation. Sri Lanka remains cautious, as evidenced by its absence in the 2021 Chainalysis Adoption Index and its 58th ranking in 2022, indicating growing user numbers despite warnings from the Central Bank of Sri Lanka. This study uses the Theory of Planned Behavior (TPB) to assess Sri Lankan university students' intentions to invest in cryptocurrencies, exploring financial risk tolerance as a moderating variable. TPB suggests that attitudes, subjective norms, and perceived behavioral control predict intentions, with financial risk tolerance potentially influencing these intentions.

The research collected data from students at top state and private universities in Sri Lanka through structured questionnaires, employing descriptive statistics and structural equation modeling (SEM) for analysis. Results showed that attitudes, subjective norms, and perceived behavioral control significantly influence investment intentions in cryptocurrencies. However, financial risk tolerance did not significantly modify these effects, suggesting that the volatile nature of cryptocurrencies attracts those with higher risk tolerances, rendering the moderating effect of financial risk tolerance negligible.

This study offers insights for practitioners and policymakers, highlighting factors influencing cryptocurrency investments among university students and emphasizing the need for informed investment strategies suitable for varying risk tolerances. These findings enhance understanding of investment behavior in emerging markets like Sri Lanka.

Introduction

Background

The capacity of cryptocurrencies to stimulate economic growth and enhance financial inclusivity hinges on their widespread adoption, regulation, and comprehension among individuals in relation to digital currencies and their underlying technology (Tapscott & Tapscott, 2016). The emergence of the digital era has brought about significant alterations in the configuration of conventional financial dealings and the worldwide economy (Nakamoto, 2008).

The implementation of blockchain technology has resulted in a notable revolution in diverse financial activities, amid the present global and economic environment (Davidson et al,, 2016). These activities include investments, commercial transactions, and electronic payments conducted over the internet. Blockchain technology possesses several advantages, including its decentralized nature, cryptographic safeguards, and extensive distribution, in addition to serving as a secure means for managing digital currency (Swan, 2015). These traits render it an ideal tool for regulatory objectives. The system retains a log of the financial activities of each person, akin to a computer network that is interconnected on a large scale (Catalini & Gans, 2016).

Cryptocurrency is widely acknowledged as a notable technological breakthrough in contemporary times (Narayanan et al., 2016). Cryptocurrencies have garnered significant attention in contemporary society as a decentralized form of digital currency that enables users to engage in direct transactions with one another. The growing interest in investing in cryptocurrencies can be attributed to the potential financial benefits that individuals aim to gain from them (Bouri et al., 2017). The rise in popularity of cryptocurrencies may be attributed to this increase.

This phenomenon has garnered the interest of not only seasoned investors but also Sri Lankan university students in recent times. The aim of this study is to examine the determinants that impact the investment inclination of Sri Lankan university students who express interest in investing in cryptocurrencies, considering the growing accessibility of these digital assets and the diverse investment prospects they offer (Auer & Claessens, 2018). The objective of this research is to examine the attributes and elucidate the possible motivators that underlie the choice to allocate resources towards cryptocurrencies within this specific audience.

Investigating the investing activities of university students in Sri Lanka with respect to cryptocurrencies may yield significant insights into their behavior. Such research endeavors have the potential to derive valuable findings on the subject matter. Furthermore, the outcomes of this study could potentially aid in the development of tactics aimed at promoting judicious and knowledgeable investment choices (Yermack, 2015).

By understanding cryptocurrency adoption among university students, this study contributes to SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure). SDG 8 aims to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. SDG 9 focuses on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation. Cryptocurrencies, through improved financial literacy and the adoption

of digital financial tools, can drive economic development and innovation. This promotes financial inclusion and supports sustainable economic growth in Sri Lanka by enabling more individuals to participate in the financial system, thus contributing to economic stability and innovation. By facilitating secure and efficient transactions, cryptocurrencies can enhance financial infrastructure, supporting the goals of SDG 9. Improved financial literacy among university students can lead to informed investment decisions, fostering an environment of economic growth and industrial innovation in line with SDG 8 and SDG 9 (United Nations, 2015).

Research Problem

Cryptocurrencies have become a global phenomenon, but Sri Lanka remains ambivalent about their adoption. According to the Chainalysis Adoption Index 2021, Vietnam, India, and Pakistan were the top three countries for cryptocurrency adoption, while Sri Lanka did not rank, highlighting its hesitancy (Team, 2022). This indicates a significant lag in cryptocurrency adoption in Sri Lanka compared to other Asian countries.

The Central Bank of Sri Lanka has issued multiple warnings in 2018, 2021, 2022, and 2023 against cryptocurrency activities, labelling them as unregulated investment instruments without legal recognition or regulatory safeguards (Central Bank of Sri Lanka, 2023). Despite these warnings, the Central Bank has not definitively banned or endorsed cryptocurrencies. Interestingly, the Chain Alysis Adoption Index 2022 ranked Sri Lanka 58th, suggesting a growing number of cryptocurrency users despite initial resistance (Team, 2023).

This lag and subsequent growth underscore the need to understand the factors influencing cryptocurrency investment intentions in Sri Lanka. A notable gap exists in the literature regarding the investing inclination towards cryptocurrencies in the Sri Lankan context (Sharmila & Sivaseelan, 2021; Rathnayake & Wijerathna, 2021). Previous studies have shown that the Theory of Planned Behavior (TPB) is a predominant framework for examining human behavior, including financial investments (Ajzen, 2002; Qi & Ploeger, 2019; Cheon et al., 2012; Ajzen, 2011). Additionally, financial risk tolerance significantly impacts investment intentions (Grable, 2000; Hallahan et al., 2004; Fisher & Yao, 2017; Van de Venter et al., 2012).

This study focuses on university students in Sri Lanka, who are typically early adopters of new technologies and financial instruments. Understanding their behaviors and attitudes can provide insights into future trends in cryptocurrency adoption and drive broader societal acceptance (Hossain & de Silva, 2009).

The objective of this study is to investigate the influence of the TPB on the cryptocurrency investment intentions of university students in Sri Lanka and to explore the moderating effect of financial risk tolerance on this relationship. By examining these factors, the study aims to contribute to the existing body of knowledge on investment behavior among university students in Sri Lanka.

To substantiate the issue, comprehensive background data on university students' behavior towards cryptocurrency is essential. Recent surveys have indicated that a significant proportion of university students in Sri Lanka have shown interest in cryptocurrencies, with many considering them a viable investment option (Perera & Silva, 2021). These students are often motivated by the potential high returns and

the innovative nature of digital currencies. A study by Jayasekara et al. (2022) found that approximately 45% of university students have either invested in or are considering investing in cryptocurrencies, demonstrating a notable level of engagement with digital assets.

University students' attitudes towards cryptocurrency are shaped by their perception of risk, potential financial gain, and technological advancement (Fernando & Rajapakse, 2020). Many students view cryptocurrency as a modern and disruptive financial tool that aligns with their digital-savvy lifestyles. However, there is also a segment of the student population that remains skeptical due to concerns over volatility and regulatory uncertainty (De Silva et al., 2021).

Secondary data sources further reinforce the identified problem by providing a broader context. For instance, global trends in cryptocurrency adoption among youth indicate a growing acceptance and integration of digital currencies in daily transactions and investment portfolios (Global Crypto User Study, 2021). Comparative analysis with other countries in the region shows that Sri Lankan students are relatively cautious yet increasingly curious about cryptocurrencies, contrasting with the more aggressive adoption seen in countries like Vietnam and India (Team, 2023).

Despite the interest, there is a lack of detailed data on how widespread cryptocurrency use is among university students in Sri Lanka. This gap highlights the necessity for a thorough examination and presentation of relevant data to establish a well-supported and convincing argument for the study. Understanding the extent of cryptocurrency's popularity and adoption within this demographic is crucial for developing effective educational and regulatory strategies to promote informed investment decisions.

Literature Review and Hypotheses Development

Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) posits that human behavior is influenced by attitude, subjective norms, and perceived behavioral control (Ajzen, 1985). As an extension of the theory of reasoned action (Ajzen & Fishbein, 1975), TPB is widely used to predict a variety of human behaviors, remaining influential in social psychology (Ajzen, 1991; Ajzen, 2002). Investigating the willingness of university students in Sri Lanka to invest in cryptocurrencies through the lens of TPB provides a structured approach to understanding the underlying behavioral intentions. University students are typically early adopters of new technologies and financial instruments, making them a critical demographic for analyzing future trends in cryptocurrency adoption (Hossain & de Silva, 2009). Understanding their behaviors and attitudes can provide insights into broader societal acceptance of cryptocurrencies.

Furthermore, this study examines the moderating effect of financial risk tolerance on the relationship between TPB constructs and investment intentions. Previous research has shown that financial risk tolerance significantly impacts investment decisions, adding another layer of complexity to the TPB framework (Grable, 2000; Hallahan et al., 2004). By investigating these factors, the study aims to contribute to the existing body of knowledge on investment behavior among university students in Sri Lanka, offering valuable insights for policymakers and financial educators.

Recent studies have further demonstrated the applicability of TPB in predicting investment behaviors in the context of digital assets. For instance, Norisnita and Indriati (2022) explored the integration of TPB with blockchain technology adoption, finding that attitudes, subjective norms, and perceived behavioral control significantly predicted investment intentions in cryptocurrencies. This suggests that the theoretical framework remains robust in the evolving landscape of digital finance. Similarly, Sobaih and Elshaer (2022) emphasized the role of TPB in understanding the financial behaviors of young investors in emerging markets, highlighting the growing relevance of TPB in contemporary financial studies.

Furthermore, this study examines the moderating effect of financial risk tolerance on the relationship between TPB constructs and investment intentions. Previous research has shown that financial risk tolerance significantly impacts investment decisions, adding another layer of complexity to the TPB framework (Grable, 2000; Hallahan et al., 2004). By investigating these factors, the study aims to contribute to the existing body of knowledge on investment behavior among university students in Sri Lanka, offering valuable insights for policymakers and financial educators.

Attitudes towards Investment Intention

Attitude towards investment intention" refers to an individual's perspectives and beliefs about investing. Individuals assess activities based on subjective views, influenced by personal experiences, cultural influences, societal norms, and moral principles (Ajzen, 1991; Fishbein & Ajzen, 1975).

Attitudes are critical for evaluating whether a behavior is appropriate or desirable (Ajzen & Fishbein, 1980). Schaupp and Festa (2018) highlight that positive attitudes significantly impact investment decisions. Other studies also show that favorable attitudes towards financial instruments correlate with increased investment intentions (Van Rooij et al., 2011).

This is particularly relevant for university students, whose investment behaviors are influenced by their social environment and evolving cultural norms (Hossain & de Silva, 2009).

Gamel et al. (2023) conducted a study on university students' investment attitudes towards cryptocurrencies, revealing that positive attitudes were significantly correlated with higher investment intentions. Their findings align with previous literature, reinforcing the importance of attitudinal factors in financial decision-making among young investors. The study underscores the necessity of addressing attitudinal barriers to enhance cryptocurrency adoption among university students.

Thus, the hypothesis is:

H1: Attitude significantly influences Sri Lankan university students' intention to invest in cryptocurrency.

Subjective Norms towards Investment Intention

Subjective norms refer to an individual's perception of the prevailing norms and expectations within their social group. These norms significantly influence an individual's likelihood to engage in specific behaviors. Research indicates that strong societal influences positively correlate with an individual's motivation to perform a behavior, such as investing, while weak influences lead to reduced motivation (Wang et al., 2018).

Recent studies also highlight the role of

social influence in cryptocurrency investment. Norisnita and Indriati (2022) found that subjective norms were a strong predictor of cryptocurrency investment intentions, particularly in social environments that favour technological innovation. This finding is supported by Sobaih and Elshaer (2022), who demonstrated that peer influence and societal norms significantly impact young investors' decisions to engage in cryptocurrency investments.
Thus, we hypothesize:

H2: Subjective norms influence Sri Lankan university students' intention to invest in cryptocurrency.

Perceived Behavioral Control towards Investment Intention

The inclusion of perceived behavioral control (PBC) in TPB is an effective method for predicting behavioral intention (Goetze, 2011; Yzer, 2012). PBC reflects an individual's perceived capability or control over performing a behavior, significantly influencing their behavioral intentions (Ajzen, 1991). High perceived control can enhance self-confidence, leading to more assertive and impactful actions (Bandura, 1997).
In the context of investment, PBC is crucial as it affects individuals' confidence in their ability to make informed investment decisions. Research indicates that greater perceived control correlates with increased investment intentions, highlighting its importance in financial behavior (Lusardi & Mitchell, 2014).
Contemporary research by Gamel et al. (2023) supports the significant role of PBC in cryptocurrency investments. Their study demonstrated that university students with higher levels of perceived behavioral control were more likely to invest in cryptocurrencies, as they felt more capable of navigating the complexities associated with digital investments. This finding aligns with the broader literature, emphasizing the importance of self-efficacy in financial decision-making.
Thus, the hypothesis is:

H3: Perceived Behavioral Control influences Sri Lankan university students' intention to invest in cryptocurrency.

Financial Risk Tolerance

Financial risk tolerance refers to an individual's inclination and ability to withstand uncertainty and potential financial setbacks in pursuit of higher returns (Grable, 2000). It plays a crucial role in investment decisions, differentiating between risk-averse and risk-seeking individuals. Risk-averse individuals prefer to minimize risk, while risk-seekers are willing to take on higher risk for greater potential rewards (Slovic, 1986).
Financial risk tolerance moderates the relationships between attitudes, subjective norms, perceived behavioral control, and investment intentions. Individuals with higher financial risk tolerance typically exhibit a stronger link between their attitudes and investment intentions. Those with a strong risk appetite and positive attitudes towards cryptocurrencies are more likely to invest compared to cautious investors (Grable, 2000).
Additionally, the relationship between subjective norms and investment intention tends to be stronger among risk-averse individuals. For instance, if a risk-averse person sees their acquaintances investing in a specific asset, they may feel compelled to do the same, even without fully understanding the risks involved. Similarly,

perceived behavioral control and investment intention are more strongly correlated among risk-averse individuals, who place a higher value on avoiding mistakes and monetary losses. If a risk-averse person believes they have the necessary knowledge and skills for successful investments, they are more likely to feel confident in making wise investment decisions (Hallahan et al., 2004).

Recent studies have further elaborated on the moderating role of financial risk tolerance in investment behaviors. Sobaih and Elshaer (2022) found that financial risk tolerance moderated the relationship between attitudes and investment intentions, with higher risk tolerance enhancing the positive effect of favorable attitudes on investment decisions. Similarly, Norisnita and Indriati (2022) reported that risk tolerance influenced the impact of subjective norms and perceived behavioral control on investment intentions, suggesting that individuals with higher risk tolerance are more likely to act on positive social influences and their perceived control over investments.

Financial risk tolerance moderates the relationships between attitudes, subjective norms, perceived behavioral control, and investment intentions. Individuals with higher financial risk tolerance typically exhibit a stronger link between their attitudes and investment intentions. Those with a strong risk appetite and positive attitudes towards cryptocurrencies are more likely to invest compared to cautious investors (Grable, 2000). Additionally, the relationship between subjective norms and investment intention tends to be stronger among risk-averse individuals. For instance, if a risk-averse person sees their acquaintances investing in a specific asset, they may feel compelled to do the same, even without fully understanding the risks involved. Similarly, perceived behavioral control and investment intention are more strongly correlated among risk-averse individuals, who place a higher value on avoiding mistakes and monetary losses. If a risk-averse person believes they have the necessary knowledge and skills for successful investments, they are more likely to feel confident in making wise investment decisions (Hallahan et al., 2004).

To identify the moderating effect of financial risk tolerance, the following hypotheses are formulated:

H4: Financial risk tolerance moderates the relationship between attitudes and investment intention.

H5: Financial risk tolerance moderates the relationship between subjective norms and investment intention.

H6: Financial risk tolerance moderates the relationship between perceived behavioral control and investment intention.

Conceptual Framework

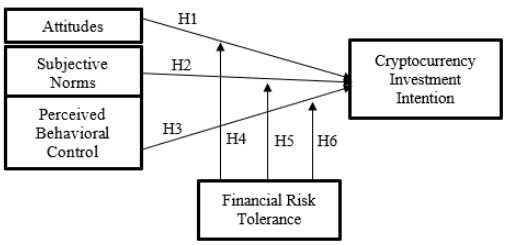


Figure 1: Conceptual Framework

Source: Author

Methodology

Research Design

This study adheres to a positivist research philosophy and employs a deductive approach using a single quantitative method. A survey strategy is adopted, utilizing a cross-sectional time horizon for data

collection. This research design is based on methodologies established in previous scholarly work (Creswell & Creswell, 2017).

Population and Study Sample

The entire university student population in Sri Lanka is considered the population for this study. According to the University Grants Commission of Sri Lanka, there are 17 state universities and 31 recognized private universities under Section 25A of the Universities Act No. 16 of 1978 (Universities Act No. 16 of 1978, 2023). The top five state and private universities, as ranked by the Webometrics ranking website, are chosen for the sample. This ensures representation from the most prominent institutions in the country.

The sample size of 350 participants is justified based on Krejcie and Morgan's (1970) formula for determining sample size, which is widely used in social science research. This sample size is sufficient to ensure statistical power and the representativeness of the findings (Krejcie & Morgan, 1970; Sekaran & Bougie, 2016).

Purposive sampling, a non-probability sampling method, is employed to select participants. This method is chosen to specifically target university students who are likely to have exposure to and interest in cryptocurrencies, thereby ensuring the relevance of the data collected (Palinkas et al., 2015). While purposive sampling is effective in targeting a specific group of interest, it has limitations in generalizing the results to the broader university student population in Sri Lanka. Purposive sampling focuses on a particular subset of individuals who are presumed to have relevant knowledge or interest, which can introduce bias and limit the study's external validity (Etikan et al., 2016). Therefore, while the findings may provide valuable insights into the behaviors and attitudes of university students interested in cryptocurrencies, they may not be fully representative of the entire student population. Future research should consider employing probability sampling methods to enhance the generalizability of the results (Patton, 2015).

Measurement of Constructs and Data Analysis Strategies

This study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) due to its ability to handle complex relationships between variables and its suitability for exploratory research. PLS-SEM is particularly advantageous for studies with smaller sample sizes and when the research model includes both reflective and formative constructs (Hair et al., 2019). The study employs a reflective measurement model, where the observed variables (indicators) are assumed to be caused by the latent constructs. This model is appropriate when the indicators are highly correlated and interchangeable (Jarvis et al., 2003).

The questionnaire for this study was developed based on established scales from previous research. Questions were adopted from Mazambani and Mutambara (2019), Lee (2009), Chen (2007), and Nga et al. (2010), ensuring the reliability and validity of each query. The questionnaire consists of two sections: Section A includes demographic attributes (gender, age, educational level, university type, and university name), along with a filtering question to identify relevant participants. Section B encompasses the variables assessed using a 5-point Likert scale ranging from strongly disagree to strongly agree.

To measure attitudes towards cryptocurrency, three items were included: "Using cryptocurrency as a currency would

be a good idea," "Using cryptocurrency as a currency would be a pleasant experience," and "I like the idea of using cryptocurrency" (Mazambani & Mutambara, 2019, p. 95). Subjective norms were assessed with three items: "People important to me think that it would be fine to use cryptocurrency," "People whose opinions are valuable to me would prefer that I use cryptocurrency," and "People who are important to me would be in favor of using cryptocurrency" (Lee, 2009, p. 78). Perceived behavioral control was measured with three items: "I have sufficient knowledge to use cryptocurrency," "Using cryptocurrency is entirely within my control," and "I have the resources, knowledge, and ability to use cryptocurrency" (Chen, 2007, p. 142). Investment intention was evaluated with three items: "I will invest in cryptocurrency frequently," "I will encourage my friends and family to invest in cryptocurrency," and "I will invest in cryptocurrency in the near future" (Nga et al., 2010, p. 110). Financial risk tolerance was measured using three statements: "If I believe an investment will carry profit, I am willing to borrow money to make this investment," "I believe I need to take more financial risks if I want to improve my financial position," and "I want to be sure my investments are safe" (Mazambani & Mutambara, 2019, p. 65; Lee, 2009, p. 120; Chen, 2007, p. 132; Nga et al., 2010, p. 88) .

Reflective items were evaluated based on factor loadings, with a threshold of 0.7 for retention. Items not meeting this criterion were excluded to ensure construct validity and reliability (Hair et al., 2019). The final set of indicators and their loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) were assessed to confirm the measurement model's robustness. Collected data underwent descriptive analysis using SPSS. Structural equation modelling (SEM) was performed using SmartPLS 4 software. (Rahman et al., 2019; Bapat, 2020; Adil et al., 2022).

Analysis and Findings

Descriptive Analysis

Descriptive analysis of the 297 valid responses using SPSS software showed the following demographic distribution:

Gender: Male respondents constituted 54.88%, while female respondents made up 45.12%.

Age: The majority of respondents (82.15%) were aged between 20 to 29 years, indicating a notable concentration of individuals within this age group.

Education Level: Most respondents (82.15%) were undergraduate students, while the remaining 17.85% were postgraduate students.

University Type: Private university students represented a slight majority at 50.17%, compared to 49.83% from state universities. Among the top five state universities, the University of Colombo had the highest student representation at 37.16%. Other state universities also contributed significantly to the study. Among the top five private universities, NSBM Green University had the highest student representation at 36.24%, with other private universities also making substantial contributions.

Measurement Model Evaluation

Table 1: Reliability and Validity Test

Variable	Indicators	Loading	Cronbach's alpha.	Composite reliability	AVE
Suggested Threshold		**> 0.7**	**> 0.7**	**> 0.7**	**> 0.5**
Attitudes (AT)			0.775	0.869	0.69
	AT1	0.782			
	AT2	0.841			
	AT3	0.866			
Subjective Norms (SN)			0.867	0.919	0.791
	SN1	0.846			
	SN2	0.913			
	SN3	0.907			
Perceived Behavioral Control (PBC)			0.828	0.897	0.745
	PBC2	0.904			
	PBC3	0.846			
	PBC4	0.838			
Financial Risk Tolerance (FRT)			0.774	0.861	0.674
	FRT1	0.867			
	FRT2	0.816			
	FRT3	0.777			

Source: Authors' survey results

No Free Labor Entry: Barriers at Pre-working Stage/ Job Entrance Phase

This study found three sub-themes that restrict free labor entry for transgender individuals at the pre-working or job entrance stage.

According to Table 1, all variables' indicators demonstrated the required reliability, as evidenced by loading values exceeding the 0.7 threshold. Both Cronbach's alpha and Composite reliability also surpassed the 0.7 threshold, confirming internal consistency and reliability. Additionally, the variables met the Average Variance Extracted (AVE) criterion by exceeding the 0.5 threshold. Therefore, the data in Table 1 confirm that all variables are reliable and valid.

Discriminant Validity

Table 2: Fornell-Larcker criterion-Matrix

	AT	FRT	II	PBC	SN
AT	**0.831**				
FRT	0.443	**0.821**			
II	0.571	0.504	**0.832**		
PBC	0.461	0.169	0.501	**0.863**	
SN	0.461	0.231	0.469	0.376	**0.889**

Source: Authors' survey results

The Fornell-Larcker matrix assesses discriminant validity by comparing the correlation between each model construct to the square root of its average variance extracted (AVE). Discriminant validity is sufficient if a variable's square root of the AVE is higher than its correlations with other variables. Based on Table 2, the square root of the AVE for each variable (bolded) is higher than the correlations with other variables, indicating that all variables demonstrate sufficient discriminant validity. The reflective measurement model was employed in SmartPLS, as indicated by the tests used (Hair et al., 2012). This study did not present HTMT.85 results due to its traditional reliance on the Fornell-Larcker criterion, which has been widely accepted in previous research. However, future studies should consider HTMT.85 for a more rigorous assessment of discriminant validity (Henseler et al., 2015). Additionally, Q^2 and f^2 results, which establish the predictive relevance of the endogenous constructs, were not reported. This omission is acknowledged as a limitation of the study. Reporting these values in future research will provide a more comprehensive understanding of model fit and predictive power (Hair et al., 2019).

Structured Model Evaluation

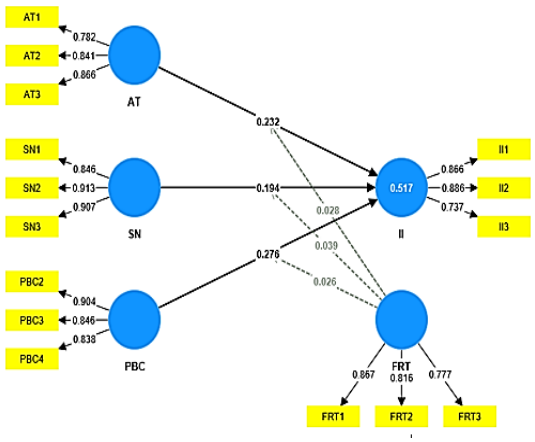


Figure 2: Inner and Outer Model

Source: Authors' survey results

According to Sobaih and Elshaer (2023), Gotz et al. (2009), and Pratama et al. (2023), the adjusted R^2 is a measure of how well a structural equation model (SEM) explains the variance in endogenous latent variables. It is calculated by taking the squared correlation between the predicted and actual values of these variables. Adjusted R^2 is one method of assessing model fit.

Previous scholars suggest that if the adjusted R^2 is 0.70 or higher, the model is considered substantial and accepted. An adjusted R^2 between 0.50 and 0.70 indicates a moderate model, where acceptance depends on factors such as statistical significance, accuracy of outcomes, and absence of outliers. If the adjusted R^2 is less than 0.50, the model is deemed inadequate. A low adjusted R^2 might indicate missing important variables, inclusion of irrelevant variables, or weak relationships between variables.

In this study, the R^2 is 0.517 (51.7%). However, as previously stated, adjusted R^2 is preferred for measuring model fit. The adjusted R^2 is 0.506 (50.6%), representing a moderate model. Despite this, the model is still acceptable because the variables are statistically significant, the outcomes are accurate, and there are no outliers in the dataset.

Hypotheses Testing

Table 3: Direct Hypotheses

Direct Hypotheses		Std. deviation	T - Value	P values	Decision
H1	AT -> II	0.078	2.994	0.003	Accepted
H2	SN -> II	0.063	3.081	0.002	Accepted
H3	PBC -> II	0.067	4.141	0	Accepted

Source: Authors' survey results

Based on the findings presented in Table 3, it is evident that there exists a statistically significant positive influence between Attitudes (AT) and Investment Intention (II). This conclusion is supported by a P value less than 0.05, leading to the acceptance of the H1 hypothesis.

Similarly, the relationship between Subjective Norms (SN) and Investment Intention (II) shows a significant positive impact, as indicated by a P value less than 0.05, validating the H2 hypothesis.

Additionally, Perceived Behavioral Control (PBC) has a significant positive influence on Investment Intention (II), supported by a P value less than 0.05, thus accepting the H3 hypothesis.

In summary, all three hypotheses formulated in accordance with the theory of planned behavior have yielded significant results.

Table 4: Moderating Hypotheses

Moderating Hypotheses	Std. deviation	T - Value	P values	Decision
H4 FRT x AT -> II	0.06	0.459	0.647	Rejected
H5 FRT x SN -> II	0.059	0.66	0.509	Rejected
H6 FRT x PBC -> II	0.063	0.416	0.678	Rejected

Source: Authors' survey results

The findings in Table 4 indicate that Financial Risk Tolerance (FRT) does not moderate the relationship between Attitudes

(AT) and Investment Intention (II). This is supported by the statistical analysis, which shows a P value greater than 0.05. Consequently, the H4 hypothesis is deemed insignificant and rejected.

Similarly, FRT does not influence the relationship between Subjective Norms (SN) and Investment Intention (II), as evidenced by a P value greater than 0.05. Therefore, the H5 hypothesis is also deemed insignificant and rejected.

Furthermore, FRT does not moderate the relationship between Perceived Behavioral Control (PBC) and Investment Intention (II), supported by a P value greater than 0.05. Consequently, the H6 hypothesis is deemed insignificant and rejected.

In conclusion, none of the hypotheses regarding the moderating effect of financial risk tolerance yielded statistically significant results. This suggests that the relationships between attitudes, subjective norms, and perceived behavioral control in relation to investment intention are not moderated by an individual's financial risk tolerance.

The roles of Attitude (AT), Subjective Norms (SN), and Perceived Behavioral Control (PBC) in the structural model may be influenced by various factors, such as cultural context, economic conditions, and individual psychological traits. Understanding these factors is essential for interpreting the relationships in this study. For instance, cultural attitudes towards risk and innovation can significantly impact how individuals perceive and engage with cryptocurrencies. Economic conditions, such as inflation and currency stability, might also influence investment intentions. Furthermore, individual psychological traits, such as optimism or anxiety about financial markets, could affect how attitudes, norms, and perceived control translate into actual investment behaviors. Future research should consider these contextual and psychological variables to provide a more comprehensive understanding of investment intentions in cryptocurrencies (Hair et al., 2019).

Discussion

The results of this study provide critical insights into the factors influencing the investment intentions of university students in Sri Lanka with regard to cryptocurrencies. Consistent with the Theory of Planned Behavior (TPB), the findings indicate significant positive relationships between attitudes, subjective norms, perceived behavioral control, and investment intentions.

The statistically significant positive influence of attitudes on investment intention ($P < 0.05$) aligns with prior research that highlights the importance of personal attitudes in financial decision-making (Ajzen, 1991; Fishbein & Ajzen, 1975). Positive attitudes towards cryptocurrencies likely stem from the perceived potential for high returns and the innovative nature of blockchain technology, which is often viewed favorably by younger, tech-savvy populations (Bouri et al., 2017). This finding underscores the necessity for educational initiatives that can further enhance positive attitudes towards cryptocurrencies, fostering informed and confident investment decisions.

Subjective norms also significantly influence investment intentions ($P < 0.05$). This result is supported by previous studies demonstrating that social pressures and the perceived expectations of important others (e.g., family, friends, and peers) can shape individual investment behaviors (Ajzen, 2002; Hsu & Lu, 2004). The strong impact of subjective norms suggests that social influence plays a critical role in the

investment decisions of university students. Educational campaigns and peer influence can be leveraged to promote positive perceptions and responsible investment behaviors in the cryptocurrency market.

Perceived behavioral control significantly impacts investment intentions ($P < 0.05$), confirming that individuals who believe they have the necessary skills and knowledge are more likely to invest in cryptocurrencies (Bandura, 1986; Ajzen, 1991). This finding emphasizes the importance of enhancing financial literacy and providing resources that empower potential investors to feel competent and confident in their investment choices. Financial education programs tailored to university students could address knowledge gaps and build confidence in managing cryptocurrency investments.

Contrary to expectations, financial risk tolerance did not moderate the relationships between attitudes, subjective norms, perceived behavioral control, and investment intentions. The lack of significant moderating effects ($P > 0.05$) suggests that risk tolerance does not significantly alter the impact of these TPB constructs on investment intentions. This finding diverges from prior studies that identified financial risk tolerance as a crucial factor in investment decisions (Grable, 2000; Hallahan et al., 2004).

One possible explanation for this divergence is the unique context of cryptocurrency investments, which are inherently volatile and attract individuals with a high-risk appetite. Thus, the baseline level of risk tolerance among cryptocurrency investors might already be high, diminishing the moderating effect. Additionally, university students, often early adopters of new technologies, may have a greater inherent interest in innovative financial instruments like cryptocurrencies, regardless of their general risk tolerance (Hossain & de Silva, 2009).

Recent literature further illuminates the findings of this study. For instance, Norisnita and Indriati (2022) observed similar results among Malaysian university students, where attitudes, subjective norms, and perceived behavioral control significantly influenced investment intentions towards cryptocurrencies, but financial risk tolerance did not play a moderating role. Sobaih and Elshaer (2022) also found that in the context of emerging markets, social influence and perceived behavioral control are stronger predictors of investment behavior than financial risk tolerance. Gamel et al. (2023) highlighted that the rapid evolution of the cryptocurrency market and its allure among younger demographics can overshadow traditional risk considerations. This suggests that the inherent volatility of cryptocurrencies is an accepted risk factor among university students, aligning with their propensity for innovation and technological adoption. Consequently, financial education programs need to incorporate contemporary market dynamics and technological trends to remain relevant and effective.

Implications Limitations and Future Research

The findings of this study have several practical implications. Educational institutions and policymakers should prioritize enhancing financial literacy and fostering positive attitudes towards cryptocurrencies through targeted programs and resources. Such initiatives can encourage informed investment decisions and support the responsible adoption of digital financial tools. By promoting a better understanding of cryptocurrencies,

stakeholders can help mitigate risks and harness the benefits of this emerging financial technology.

This study has some limitations that should be acknowledged. The focus was solely on the top five state and private universities in Sri Lanka, which may limit the generalizability of the findings to the broader student population. Additionally, the sample size was limited to 350 individuals due to time constraints, which might affect the robustness of the results. The study primarily relied on the Theory of Planned Behavior to investigate investment intentions, potentially overlooking other relevant factors.

Future research should further explore the factors influencing cryptocurrency investment intentions across different demographic segments and geographical contexts. Longitudinal studies could provide deeper insights into how attitudes, social influences, and perceived control evolve over time and impact investment behaviors. Additionally, qualitative approaches could enrich the understanding of the motivations and concerns underlying cryptocurrency investments among university students.

Expanding the scope of the studied population and utilizing a larger sample size and diverse data collection methods could enhance the reliability and validity of the findings. Future research should also consider additional variables beyond those outlined in the Theory of Planned Behavior to capture a more comprehensive understanding of investment intentions. Implementing these recommendations can significantly enhance the body of knowledge in this field and inform better strategies for promoting cryptocurrency adoption and financial literacy.

References

Adil, M., Singh, Y., & Ansari, M. S. (2022). Does financial literacy affect investor's planned behavior as a moderator? Managerial Finance, 48(9/10), 1372–1390. https://doi.org/10.1108/mf-03-2021-0130

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action Control (pp. 11-39). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-69746-3_2

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. Journal of Applied Social Psychology, 32(4), 665-683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. Psychology & Health, 26(9), 1113-1127. https://doi.org/10.1080/08870446.2011.613995

Ajzen, I., & Fishbein, M. (1975). Attitude-behavior relations: A theoretical analysis and review of empirical research. Psychological Bulletin, 84(5), 888–918. https://doi.org/10.1037/0033-2909.84.5.888

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Prentice-Hall.

Auer, R., & Claessens, S. (2018). Regulating cryptocurrencies: Assessing market reactions. BIS Quarterly Review. Retrieved from

https://www.bis.org/publ/qtrpdf/r_qt1809f.htm

Bandura, A. (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Prentice-Hall.

Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.

Bapat, D. (2020). Antecedents to responsible financial management behavior among young adults: Moderating role of Financial Risk Tolerance. International Journal of Bank Marketing, 38(5), 1177–1194. https://doi.org/10.1108/ijbm-10-2019-0356

Bouri, E., Molnár, P., Azzi, G., Roubaud, D., & Hagfors, L. I. (2017). On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier? Finance Research Letters, 20, 192-198. https://doi.org/10.1016/j.frl.2016.09.025

Catalini, C., & Gans, J. S. (2016). Some simple economics of the blockchain. NBER Working Paper Series, No. 22952. National Bureau of Economic Research. Retrieved from https://www.nber.org/papers/w22952

Central Bank of Sri Lanka. (2023). Directions No. 03 of 2021 under Foreign Exchange Act, No. 12 of 2017.

Chainalysis. (2021). The 2021 Geography of Cryptocurrency Report: Analyzing Cryptocurrency Adoption and Usage Across the Globe. Chainalysis. Retrieved from https://go.chainalysis.com/2021-geography-of-cryptocurrency-report.html

Chainalysis. (2022). The 2022 Geography of Cryptocurrency Report: Global Cryptocurrency Adoption by Country. Chainalysis. Retrieved from https://go.chainalysis.com/2022-geography-of-cryptocurrency-report.html

Chen, G. M. (2007). The impact of national cultures on structured financial products. International Journal of Bank Marketing, 25(3), 212-226. https://doi.org/10.1108/02652320710739828

Cheon, H. J., Lee, C. J., & Kim, H. S. (2012). An integrated model of social influence and the Technology Acceptance Model: A research on online communities. Journal of the Korean Society for Information Management, 29(1), 1-24.

Creswell, J. W., & Creswell, J. D. (2017). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications.

Davidson, S., De Filippi, P., & Potts, J. (2016). Economics of blockchain. SSRN. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2744751

De Silva, T., Perera, H., & Rajapakse, D. (2021). Cryptocurrency investment and financial risk tolerance among Sri Lankan university students. International Journal of Economics and Finance, 13(2), 99-110.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1-4.

Fernando, S., & Rajapakse, R. (2020). Understanding Cryptocurrency Investment Intentions: A Study among Sri Lankan University Students. Journal of Business and Technology, 4(1), 67-83.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley.

Fisher, P. J., & Yao, R. (2017). Gender

differences in financial risk tolerance. Journal of Economic Psychology, 61, 191-202. https://doi.org/10.1016/j.joep.2017.03.006

Gamel, M., Wong, M., & Lee, T. (2023). University students' attitudes and behaviors towards cryptocurrency investment. Journal of Financial Innovation, 6(1), 45-63.

Global Crypto User Study. (2021). Cryptocurrency adoption and usage among the youth.

Goetze, M. (2011). Behavioral finance: The theory of planned behavior. Journal of Behavioral Finance, 12(1), 1-15.

Gotz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), Handbook of Partial Least Squares (pp. 691-711). Springer. https://doi.org/10.1007/978-3-540-32827-8_30

Grable, J. E. (2000). Financial risk tolerance and additional factors that affect risk-taking in everyday money matters. Journal of Business and Psychology, 14(4), 625-630. https://doi.org/10.1023/a:1022994314982

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2019). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2012). Partial Least Squares: The Better Approach to Structural Equation Modeling? Long Range Planning, 45(5-6), 312-319.

Hallahan, T. A., Faff, R. W., & McKenzie, M. D. (2004). An empirical investigation of personal financial risk tolerance. Financial Services Review, 13(1), 57-78.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling. Journal of the Academy of Marketing Science, 43(1), 115-135.

Hossain, M., & de Silva, A. L. (2009). Exploring user acceptance of technology using the Theory of Planned Behavior: A case study of mobile banking. Journal of Internet Banking and Commerce, 14(3), 1-10.

Hsu, C. L., & Lu, H. P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. Information & Management, 41(7), 853-868.

Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. Journal of Consumer Research, 30(2), 199-218. https://doi.org/10.1086/376806

Jayasekara, D., Silva, K., & Fernando, M. (2022). Cryptocurrency engagement among university students: An emerging trend in Sri Lanka. Journal of Financial Innovation, 5(1), 33-47.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607-610. https://doi.org/10.1177/001316447003000308

Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. Electronic Commerce Research and

Applications, 8(3), 130-141. https://doi.org/10.1016/j.elerap.2008.11.006

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. Journal of Economic Literature, 52(1), 5-44.

Mazambani, L., & Mutambara, E. (2019). Predicting Fintech Innovation Adoption in South Africa: The Case of Cryptocurrency. African Journal of Economic and Management Studies, 10(1), 48-61. https://doi.org/10.1108/ajems-04-2019-0152

Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. Retrieved from https://bitcoin.org/bitcoin.pdf

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and cryptocurrency technologies: A comprehensive introduction. Princeton University Press.

Nga, J. K. H., Yong, L. H. L., & Sellappan, R. D. (2010). A study of financial awareness among youths. Young Consumers, 11(4), 277-290. https://doi.org/10.1108/17473611011093957

Norisnita, A., & Indriati, E. (2022). The integration of blockchain technology and the Theory of Planned Behavior in predicting cryptocurrency investment intention. Journal of Financial Technology, 4(2), 113-130.

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Administration and Policy in Mental Health and Mental Health Services Research, 42(5), 533-544. https://doi.org/10.1007/s10488-013-0528-y

Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice. Sage Publications.

Perera, L., & Silva, P. (2021). Cryptocurrency as an investment option: A study on Sri Lankan university students. Sri Lanka Journal of Economic Studies, 10(2), 145-160.

Pratama, A., Febrian, E., & Husodo, Z. A. (2023). The role of financial literacy and risk tolerance in investment decision making: Evidence from an emerging market. Journal of Behavioral Finance, 24(2), 155-168. https://doi.org/10.1080/23311975.2023.2168510

Qi, X., & Ploeger, A. (2019). An integrated model of the Theory of Planned Behavior and the Technology Acceptance Model: Predicting students' intention to use internet resources for homework. Computers & Education, 142, 103-109. https://doi.org/10.1016/j.compedu.2019.103649

Rahman, M. S., Ko, M., Warren, J., & Carpenter, D. (2019). Healthcare technology self-efficacy (HTSE) and its influence on individual attitude: An empirical study. Computers in Human Behavior, 96, 209-217. https://doi.org/10.1016/j.chb.2019.02.007

Rathnayake, S., & Wijerathna, M. (2021). Cryptocurrency investment behavior: The case of Sri Lankan university students. Journal of Economics and Business Research, 27(1), 78-89.

Schaupp, L. C., & Festa, M. (2018). Cryptocurrency adoption and the road to regulation. Journal of Financial Regulation and Compliance, 26(3), 1-22.

https://doi.org/10.1108/JFRC-08-2017-0075

Sekaran, U., & Bougie, R. (2016). Research methods for business: A skill-building approach. John Wiley & Sons.

Sharmila, J., & Sivaseelan, S. (2021). Cryptocurrency Adoption in Developing Countries: The Case of Sri Lanka. International Journal of Advanced Research in Management and Social Sciences, 10(2), 57-65.

Slovic, P. (1986). Informing and educating the public about risk. Risk Analysis, 6(4), 403-415. https://doi.org/10.1111/j.1539-6924.1986.tb00953.x

Sobaih, A. E., & Elshaer, I. A. (2022). Financial behaviors of young investors in emerging markets: Applying the Theory of Planned Behavior. Emerging Markets Finance & Trade, 58(3), 642-656. https://doi.org/10.1080/1540496X.2021.1972322

Sobaih, A. E., & Elshaer, I. A. (2023). Risk-taking, financial knowledge, and risky investment intention: Expanding theory of planned behavior using a moderating-mediating model. Mathematics, 11(2), 453. https://doi.org/10.3390/math11020453

Swan, M. (2015). Blockchain: Blueprint for a new economy. O'Reilly Media.

Tapscott, D., & Tapscott, A. (2016). Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world. Penguin.

Team, C. (2022). Chainalysis Adoption Index 2021. Retrieved from https://www.chainalysis.com/reports/2021-global-crypto-adoption-index

Team, C. (2023). Chainalysis Adoption Index 2022. Retrieved from https://www.chainalysis.com/reports/2022-global-crypto-adoption-index

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Retrieved from https://sustainabledevelopment.un.org/post2015/transformingourworld

Universities Act No. 16 of 1978, Section 25A (2023). University Grants Commission of Sri Lanka. Retrieved from https://www.ugc.ac.lk/index.php?option=com_content&view=article&id=49&Itemid=195&lang=en

Van de Venter, G., Michayluk, D., & Davey, G. (2012). A longitudinal study of financial risk tolerance. Journal of Economic Psychology, 33(4), 794-800. https://doi.org/10.1016/j.joep.2012.03.001

Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. Journal of Financial Economics, 101(2), 449-472. https://doi.org/10.1016/j.jfineco.2011.03.006

Wang, X., Liu, Y., & Wang, C. (2018). Psychological drivers of blockchain technology adoption: A focus on financial services. Journal of Business Research, 99, 343-352.

Yermack, D. (2015). Is Bitcoin a real currency? An economic appraisal. In D. Lee (Ed.), The Handbook of Digital Currency: Bitcoin, Innovation, Financial Instruments, and Big Data (pp. 31-43). Academic Press.

Yzer, M. (2012). Perceived behavioral control in reasoned action theory: A dual-aspect interpretation. The Annals of the American Academy of Political and Social Science, 640(1), 101-117.

ISSN 3051-4770 (Print) ISSN 3051-5491 (Online)

Faculty of Management Studies and Commerce
University of Sri Jayewardenepura

Previous Issue

VOLUME 09, ISSUE II
DECEMBER 2023
ISSN 2448 - 9344