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Editors' Note

As the Editors-in-Chief of Vidyodaya Journal of Management (VJM), Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Sri Lanka, we are delighted to publish the Volume 8, Issue I of the Journal. The VJM is dedicated to publishing quality and original research papers in Management and related areas. This issue contains eight research papers.

The research papers included in this issue are covering areas of impact of taxation on economic growth; influence of empathy and cynicism on green buying intention; marginal social cost and Pigouvian tax in a Ramsey setting; factors influencing savings behaviour among households; insurance companies' financial and market performance; organizational resilience; customers' technology know-how and self-service technologies; a legal framework for data protection and privacy.

The first paper analyses the short-run and long-run impact of taxation on the economic growth using a linear Auto-Regressive Distributed Lag (ARDL) model under two scenarios: without controlling for economic liberalization (from 1960 to 2018) and the post-liberalized period (from 1980 to 2018). The results of both pre- and post-economic liberalization conditions suggest that there is a significant long-run positive impact of tax level on economic growth. This implies that increasing taxes is a viable policy option in achieving fiscal independence without compromising growth potential in Sri Lanka. Examining the influence of empathy and cynicism on green buying intention and the mediating mechanism of consumer ethical beliefs is the focus of the second paper. The results revealed that empathy and cynicism predict consumer intention to buy green products directly and indirectly through ethical beliefs. The study asserts that the findings particularly important for developing countries like Sri Lanka in promoting sustainable consumption which enhances environmental, social and future generations' well-being.

The third research paper is investigating the relationship between Pigouvian tax and marginal social cost in the presence of distortionary taxes such as commodity and wage taxes in a Ramsey setting. The results indicated that the Pigouvian tax in the presence of wage tax is higher when the marginal social cost was considered a variable as opposed to a constant. The mathematical models used in

this study enable to see the factors, such as homogeneity/heterogeneity of household preferences and marginal social cost assumed as a variable as opposed to a constant, that impact the dynamics in determining the optimal Pigouvian tax. The fourth research paper approximates the socio-economic and demographic factors towards the level of saving of households in Sri Lanka using a quantile regression approach based on the Household Income and Expenditure Survey, conducted by the Department of Census and Statistics of Sri Lanka. The results showed that gender, income, education level have a significant positive impact towards the level of saving among households, whilst marital status and poverty have a significant negative impact towards the level of saving.

Insurance companies offer a range of economic and social benefits, such as minimizing the impact of losses, reducing uncertainty and fear, and creating job opportunities. Accordingly, the fifth paper critically analyzed the impact of company-specific and macro-economic factors on insurance companies' financial and market performance in Sri Lanka. The study provides evidence that the capital structure, capital adequacy, GDP growth rate, size of the company and liquidity position are essential factors that affect the insurance sector's financial and market performances. The concept of resilience is considered to be a very promising notion for explaining how businesses can survive and develop in the face of adversity or instability. The sixth paper evaluates the phases or dimensions of the organizational resilience process and its contradictions in order to improve the understanding of this complex and embedded construct. Findings revealed that contradictions which are encountered in different phases of the organizational resilience process are paradoxical tensions. The study proposed a framework that conceptualizes organizational resilience dimensions to be managed as a paradox to enhance the understanding of the concept of organizational resilience and thereby facilitate its operationalization.

Self-service technologies (SSTs) are characterized as the technologies, provided by an organization, specifically to enable customers to engage in self-service behaviors. Exploring the customer technology know-how, customers' corrective actions in the event of SSTs service/process failures, and differences between customers in terms of service performance, technology know-how, and error corrective capabilities in SSTs are the focus of the seventh paper. The study identified four types of knowledge that SSTs users need to effectively complete service transactions: computer knowledge, SST device knowledge, internet knowledge, and language ability. Furthermore, the study classified numerous mechanisms used by customers to correct errors in SSTs as 'error preventing' or 'error recovering' mechanisms. Interestingly, the study discovered customer performance disparities among SSTs based on their level of technological expertise and error-correcting capabilities.

The eighth research paper assesses the existing legal framework on data protection and privacy in Sri Lanka by comparing the Sri Lankan legal framework with the UK and Singapore, the countries that are known as pioneers of data protection and privacy. With the comprehensive review of existing legal frameworks, the study provides a basic guideline to the policymakers in Sri Lanka on how prevailing data protection and privacy regime need to be improved as non-existence of specific/separate law to deal with data protection and privacy which is identified as a major gap in the law.

On a final note, we are grateful for the contribution of authors, reviewers, editorial board, and the publisher for their continuous support in publishing of another volume and look forward to obtaining their valuable scholarly contribution for the upcoming volumes as well.

Dr. L. A. Pavithra Madhuwanthi and Dr. Vilani Sachitra
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The Dynamic Impact of Taxation on the Economic Growth of Sri Lanka: An ARDL bounds testing approach

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Abstract

Discussions on how a government can stimulate an economy through non-distortionary taxation and productive government expenditures have become prominent during the past three decades. Against this backdrop, this paper aims to analyse the short-run and long-run impacts of taxation on the economic growth of Sri Lanka. Some taxes can be distortionary, while others are not. Therefore, while analysing the effect of overall tax level on economic growth, we also estimated the distortionary nature of major tax categories on the economic growth of Sri Lanka. Sri Lanka presents a unique case to analyse the nexus between taxation and economic growth, as the economy was liberalized in 1977. Therefore, the impact of taxation level on economic growth was estimated using a linear Auto-Regressive Distributed Lag (ARDL) model under two scenarios: without controlling for economic liberalization (from 1960 to 2018) and the post-liberalized period (from 1980 to 2018). The results of both pre-and post-economic liberalization conditions suggest a significant long-run positive impact of tax level on economic growth. Similarly, the impact of consumption tax on short-run economic growth was significant. In addition, personal and corporate income taxes were non-distortionary, both in the short-run and the long-run, while consumption taxes were non-distortionary in the long-run. This suggests that increasing taxes is a viable policy option in achieving fiscal independence without compromising Sri Lanka's growth potential.

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Keywords: *ARDL, Economic Growth, Fiscal policy, Public Sector, Tax Levels, Tax Structure*
JEL: C32 E62, H21, O47

Introduction

The general business sentiment around taxes is that, the higher the taxes, the more likely businesses would leave the formal sector. This would discourage private investment leading to a decline in economic growth (World Bank, 2019). Taxes would also finance government expenditures which can be invested in productive sectors that develop physical and human capital. A tax system would effectively transfer resources from the private sector to the public sector allowing the public sector to finance investments. Also, taxes would direct private investments to desired avenues and influence relative factor prices (Waidyasekera, 2016). Hence taxes can have contrasting impacts on different economies, where particularly in developing economies, higher taxes are deemed beneficial, if not necessary, in driving the economy (Ricciuti, Savoia & Sen, 2019).

The existing literature has identified contrasting effects on the impact of taxation on economic growth. While some scholars have identified the impact of taxation on economic growth as distortionary, others have found no such negative impact. Therefore, the objective of this study is to analyse the short-run and the long-run impact of taxation on the economic growth of Sri Lanka. The distortionary effect of taxation on economic growth can be identified under two paradigms, i.e., due to the tax level and the tax structure (Arnold, 2008). The tax level is the total tax collection in the economy, while tax structure refers to individual tax types. Therefore, identifying the growth implications of the tax level is vital in deciding if overall tax levels should be lowered to allow for economic growth. Further, recognising the growth implications of different tax structures is also helpful since this can enable the government to focus on categories of taxes that have no positive impact on economic growth to support their fiscal programmes. Therefore, in this study, to achieve the objective of identifying the effect of taxation on the economic growth of Sri Lanka, we analysed the impact of tax under the paradigms of tax level and tax structure.

One of the twin deficits that negatively affect the Sri Lankan economy is the fiscal deficit. The fiscal deficit is large and is continuously widening due to insufficient government revenue supported by unsustainable spending. The requirement of countering the piling public debt caused by persistent fiscal deficits was re-

iterated through the global monetary bodies (IMF, 2019). As per the annual reports of the Central Bank of Sri Lanka (CBSL), since tax contributes to around 90% of total government revenue, enhanced taxation can effectively reduce this fiscal deficit. However, raising taxes may lead to sacrifices in the long-run aggregate growth of any economy. Therefore, Sri Lanka needs to make a trade-off decision on this aspect. This research is expected to lay the foundation for a solution by specifying the implications of tax cuts or hikes on economic growth.

CBSL classifies tax revenue in Sri Lanka into five components: Income Taxes, Value Added Tax, Excise Taxes, Taxes on foreign trade, and Other Taxes (Central Bank of Sri Lanka, 2019). Income taxes are charged on the personal income of households (PIT) and profits of corporates (CIT). Consumption taxes were initially introduced as Business Turnover Tax (BTT). In 1996, the Goods and Services Tax implemented along with the National Security Levy (NSL) replaced BTT. These two taxes were merged in 2002 and termed VAT (Waidyasekera, 2016). For this study, BTT, NSL, and the recently introduced Nation Building Tax (NBT) are also considered VAT due to similarities in the imposition of these taxes.

Excise Taxes are special consumption taxes charged on commodities by the government to restrict and direct consumption. Selective Sales Taxes, which were in force in the 1980s and in the early 1990s, were also considered excise duties in the context of this study. Taxes on foreign trade mainly involves custom duties and special commodity levies charged on international trade that would primarily direct imports of an economy. Other Taxes consisted of the balance taxes, which do not fit into any of the above categories. Despite rising in absolute terms (Figure 1), the Sri Lanka tax to GDP ratio has declined over time (Figure 2), indicating that the tax revenue has not kept up with the rising incomes.

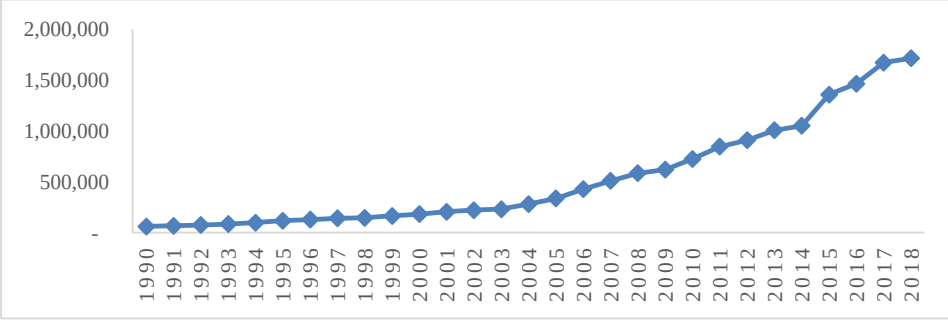

Figure 1 – Absolute Tax Revenue in Rs "Million", 1990-2018

Source: Annual Reports of Central Bank of Sri Lanka, 1990-2018.

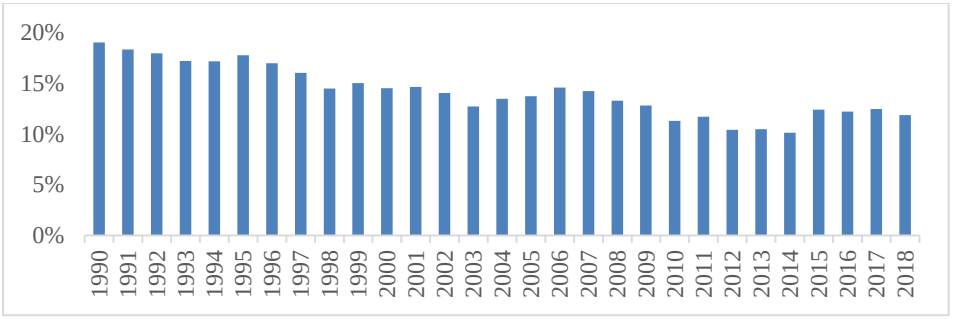

Figure 2 – Tax Revenue as a Percentage of GDP, 1990-2018

Source: Annual Reports of Central Bank of Sri Lanka, 1990-2018.

As per World Bank data, despite being a lower middle-income country, the tax ratio of Sri Lanka lags behind the current global and lower middle-income average ratios. The ratio is also marginally lower compared to the South Asian average as well (Figure 3). These conservative trends suggest that the Sri Lankan taxation system has not kept up with the rising incomes.

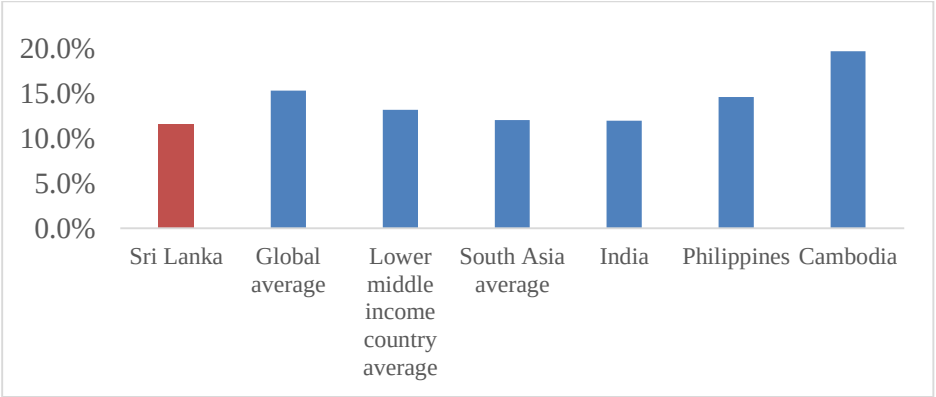

Figure 3 – Comparison of Sri Lankan Tax Ratio to Peer Countries

Source: World Development Indicators, 2020, World Bank.

Literature Review

Classical Economics that pioneered modern economic thought viewed that an economy's long-run economic capacity can only be affected by increased productivity on the supply side (Greenwald & Stiglitz, 1987). Later with the Keynesian school of thought, it was identified that the short-run economic expansion could be achieved through monetary or fiscal policies by influencing the aggregate demand as well (Marglin, 2018). However, when considering the long-run growth, the role of the public sector was not determined in either of these economic standpoints.

Later these theoretical backgrounds were extended into economic models used to explain long-term economic growth over the 20th century. For example, Harrod-Domar's economic model, which came into prominence towards the end of the second world war, identified investments as a critical factor in changing the capital stock and leading to long-term economic growth. (Kari, n.d.). In 1956, Solow and Swan modelled economic growth as a function of labour and capital. This model determined the long-run economic growth rate based on population growth and the rate of technological change. This model was followed up by Romer and Lucas's endogenous growth model, which incorporated aspects such as human capital accumulation and research expenditure in determining long-run economic growth (Kesavarajah, 2016).

Romer (1986) ruled out the exogenous nature of technological change and identified that investment in research on physical capital led to the knowledge that drives economic growth. Contrastingly, Lucas (1988) identified human capital as a leading determinant of economic growth. According to him, investment in human capital had higher spill-over effects on increased technology than investments in physical capital. Despite the progression of economic models over history, none of the above economic models factored in the impact of the public sector as a determinant of long-term growth. Initially, fiscal policy implications were thought to impact an economy's short-run output rather than its long-run growth rate. While the steady-state long-run economic growth was driven by the exogenous factors of population growth and technological progress, the fiscal policy could only affect the transitionary path to this steady-state (Kneller *et al.*, 1999).

However, Barro (1990) incorporated the impact of the public sector to a constant return model of economic growth. He argued that if the government invests the tax revenue in productive sectors, the distortion in production incentives would be offset by increased factor productivity.

Barro's endogenous model classified the elements of the public sector into four categories: distortionary and non-distortionary taxes and productive and non-productive expenditures (Kneller *et al.*, 1999). Distortionary taxes and productive public spending were deemed to affect the long-run steady rate of economic growth. Thus, the need to incorporate the fiscal sector in determining the economy's growth model was felt. As a representation of the fiscal sector, the

basis for using taxation in deciding the economic direction of a country was explored over the next three decades.

Easterly and Rebelo (1993) and Mendoza *et al.* (1997, 1994) found no relationship between an economy's growth rate and the changes in tax rates. Apart from a few selected studies such as this, most other studies have concluded the positive impact of tax cuts on economic growth. For example, Scully's (1996) study in New Zealand identified that the tax rate that maximizes economic growth is far less than the rate that maximizes tax revenue. Romer and Romer (2010) determined that tax changes would significantly affect an economy's output where a tax increase of one percent of GDP would decrease GDP by almost three percent.

Kneller et al. (1999) identified that certain taxes could be distortionary to economic growth, while some other taxes are non-distortionary taxes, which had no impact on economic growth. A distortionary effect of income taxes on economic growth was highlighted in studies conducted by Mertens and Ravn for the United States (2013), Macek (2015) for OECD economies, and Holcombe and Lacombe (2004) for the United States as well. Lee and Gordon (2005) found that while corporate taxes (CIT) have a significant negative association with growth, personal income taxes (PIT) do not. Jelena *et al*. (2018) and Szarowska (2011) further supported this view based on their studies for OECD countries and the European Union, respectively. This non-distortionary effect of PIT was also endorsed by Piketty et al. (2014) in their research on the US and other OECD economies. Arnold (2008), in his study of OECD economies, further identified that the negative relationship of PIT on economic growth would depend on the strength of progressivity of the tax system.

Ferede and Dahlby's (2012) analysis on Canada found an unexpected effect of consistent sales taxes positively correlating to growth. This was primarily because having a higher sales tax ratio replaced other forms of taxes that discourage investments. This growth-friendly nature of consumption taxes was also supported by the studies of Arnold (2008), Arnold *et al.* (2011), and Szarowska (2013). In addition, Wang and Yip's (1992) also identified that the growth-friendly nature of consumption taxes offset the negative effect of factor taxation (taxation on physical and human capital).

Jaimovich and Rebelo (2017) took a new take where they found in a low-developed economy that the marginal entrepreneur's ability is relatively low where increasing taxes leads to a slight decline in the growth rate. In contrast, in a highly developed economy, the ability of the marginal entrepreneur is comparatively high. So, in a developed economy, increasing the tax rates may lead to such high-ability entrepreneurs' exiting the production process, resulting in a significant decline in the growth rate. In contrast, for a less developed economy, this impact would be comparatively low. Bania *et al.* (2007) also confirmed this distortionary nature of higher tax levels. They found that the cumulative effect of taxes resulting in productive government expenditures and investments is initially positive but eventually declines with higher tax levels.

As discussed above, the existing literature reflects multiple and contradicting conclusions, particularly to the impact of the tax structure on economic growth. Certain taxes, such as sales taxes, were even found to impact economic growth positively. In considering the Sri Lankan context, the available literature in the area is extremely limited. Kesavarajah (2016) conducted an empirical study using the Johansen cointegration test and found that the overall tax burden did not have a significant impact on the economic growth of Sri Lanka. However, on analysing the impact of individual taxes, it was concluded that total income taxes and other taxes had a significant negative impact on output growth. In contrast, consumption taxes (VAT) showed a significant positive effect. Excise taxes were shown not to have any impact, while taxes on foreign trade also negatively impacted growth.

We hope to address the impact of personal income taxes and corporate taxes separately instead of considering total income taxes as a whole. Further in Kesavarajah's (2016) study, the models specified included total tax burden (tax level) as a control variable in estimating the impact of an individual tax category (tax structure) in each model. We believe this would lead to double counting of the specified individual tax. In this study, we hope to eliminate this issue.

Methodology

The research approach is deductive, where the data used was secondarily sourced from the databanks of the Central Bank of Sri Lanka and the World Bank. As identified previously, the impact of taxation on economic growth can be discussed under the impact of the tax level and the impact of the tax structure. Therefore, the methodology for the study was factored around these two paradigms. Through

this study, we aim to measure the impact of taxation on economic growth. Thus, we employed GDP at current prices as a proxy for the dependent variable. As for the key independent variable, we have used the tax revenue. Regarding other independent variables to be used in the analysis, we have considered the following variables based on the existing literature.

As stated, Barro's (1990) growth model suggested that government expenditures support long term economic growth given that they are productive. Generally, a government's consumption expenditure is considered 'unproductive' because it affects only the consumers' welfare but does not affect economic production efficiency. On the other hand, investment expenditure is treated as 'productive' (Kesavarajah, 2016). This is further supported through the literature in the studies of Bania *et al.* (2007) and Romer and Romer (2010).

The CBSL classifies government expenditure into three sectors: re-current expenditure, capital expenditure, and lending minus repayments. Re-current expenditure would include expenditure on goods and services, private transfer payments, and interest payments on public debt, all of which can be considered unproductive. Therefore, in this study, we have used a ratio of capital expenditure and lending minus repayments as a percentage of the total annual government expenditure as a proxy for the level of productive public investments.

Another important determinant of long-run economic growth is the level of human capital in an economy. In this study, to incorporate the growth of human capital, the growth rate of the working-age population (population aged 15 to 64), an internationally accepted indicator of the total number of people ready and able to work (OECD, 2019), was used. Arnold et al. (2011), Ferede and Dahlby (2012), and Lee and Gordon (2005) have used some indicators of human capital in their studies. In addition, Bania et al. (2007) have used the population between the ages 18-64 as a proxy for human capital.

Investment expenditures in an economy would determine the increase of capital stock, directly affecting long-term economic growth. Many studies have incorporated these investment expenditures as a control variable. See Jelena et al., (2018), Arnold et al (2011) and Ferede and Dahlby, (2012). We have proxied the level of investments in the economy through the Gross Fixed Capital Formation.

Another determinant of a country's long-run production is its involvement in international trade (Daumal, 2010). Arnold et al. (2011), Easterly and Rebelo

(1993), Lee and Gordon (2005) have included the impact of international trade in their studies conducted in this area. Trade openness, which is the sum of imports and exports value expressed as a percentage of the GDP, represents exposure to international trade in our study.

Model Specification

The baseline model is based on Barro's (1990) model, where the output of the economy (Y) is considered to be a function of physical (K) and public capital (G) inputs. The output function is of Cobb-Douglas nature, where a level of economic efficiency (A) to combine the relationship between private and public capital is introduced.

$$Y=A\,K^{1-\alpha}\,G^{\alpha`} \qquad (1)$$

Based on Barro's framework, we have extended the production function in equation (1), incorporating other explanatory variables as seen in previous literature as follows (Table 1).

$$Y= f\,(PV, HC, GOVT, TAX, TR) \qquad (2)$$

Table 1: Variables used in the study

Variable	Indicator	Abbreviation	Source
Y	Log (GDP at current prices)	LGDP	CBSL
TAX	Log (Tax Revenue)	LTR	CBSL
GOVT	Log (Capital Expenses to total public expenditure)	LPRGOV	CBSL
PV	Log (Gross Fixed Capital Formation)	LFCF	World Bank (3)
HC	Working Age Population growth rate	WPOPGR	World Bank
TR	Trade Openness to GDP ratio	TROPEN	CBSL

This study would utilize an ARDL model to analyse the relationship among the considered variables. ARDL models have been used to explore the short-run and the long-run effects among macroeconomic variables in recent times. The Error Correction Model (ECM) derived from the estimated ARDL model would integrate short-run dynamics to the long-run equilibrium. See Kwofie and Ansah (2018) and Fernando and Rajapakshe (2018). Furthermore, ARDL models are viable for identifying a long-run relationship despite the order of integration of the underlying variables. See: Bahmani-Oskooee and Ng (2002) and Nkoro and Uko (2016). Therefore, the empirical model of Equation 2 is specified as follows.

$$\Delta \ln Yt = a_0 + \sum_{j=1}^{4} \beta j \Delta \ln Y_{t-1} + \sum_{j=1}^{4} \Upsilon j \Delta \ln TAX_{t-1} + \sum_{j=1}^{4} \delta_j \Delta X_t + \theta_1 \ln Y_{t-1} + \theta_2 TAX_{t-1} + \theta_3 X_t + \varepsilon_t$$

Short-run parameters to be estimated are βj, Υj and δj and long-run parameters to be estimated are $\theta 1$, $\theta 2$and $\theta 3$ while the error term of the model is εt. Other exogenous variables (GOVT, PV, HC, and TR) are represented by Xt.

Since the impact of taxation on economic growth can be analysed under two paradigms, the analysis primarily consisted of two parts. Initially, when considering the impact of tax level, we analysed annual data up to 58 years from 1960 to 2018. However, the Sri Lankan economy underwent economic liberalization in 1977, which caused a significant structural change. Therefore, in analysing the impact of tax levels, a subsequent analysis solely focusing on post-economic liberalization data to account for structural distortions was also conducted. We hope that the secondary analysis would enhance the reliability of the initial analysis on the impact of tax levels on economic growth. The hypotheses to be tested on analysing the impact of tax levels are as follows.

Tax Level Analysis 1 (1960-2018)

H1: Tax Level does not affect the economic output in the long-run.

H2: Tax Level does not affect the economic output in the short-run.

Tax Level Analysis 2 (1980-2018)

H3: Tax Level does not affect the economic output in the long-run under liberalized economic conditions.

H4: Tax Level does not affect the economic output in the short-run under liberalized economic conditions.

Considering the second paradigm of the study, in estimating the impact of tax structure on the economy, a third analysis consisting of data from 1980 to 2018 was conducted. In this analysis, we have considered only post-economic liberalization data due to the inconsistencies seen in the tax classification before and after the economic liberalization in 1978.

In analysing the impact of tax structure, we separately calculated the effects of corporate income taxes (CIT) and personal income taxes (PIT). In addition, we have amalgamated the contribution of VAT and Excise Duties as taxes on the consumption of domestic goods and services (TDGS) as both can be considered as taxes on consumption. The impact of taxes on foreign trade (TFT) was also explored in this study. Other taxes were not considered due to the diverse and

temporary nature of taxes it captures and its negligible contribution to the total tax revenue.

Therefore, to identify the impact of tax structure, we extended the specified ARDL model up to 4 more models (Equation 4 - CIT, Equation 5 – PIT, Equation 6 – TDGS, Equation 7 – TFT) to incorporate the contribution of individual taxes. As a control variable, for each model, we have deducted the specified tax revenue from the total tax revenue and incorporated it into the model (BT). This was done to avoid double counting the specified individual tax in incorporating tax revenue as a control variable. The empirical models estimated under the impact of tax structure and the key hypothesis tested for each model are shown below. Short-run parameters to be estimated are βj, Υj, $\mathrm{Q}j$, and δj and long-run parameters to be estimated are $\theta 1$, $\theta 2$, $\theta 3$ and $\theta 4$ while the error term of the model is εt. Xt represents other exogenous variables.

Corporate income taxes

$$\Delta \ln \mathrm{Y}t = a_0 + \sum_{j=1}^{4} \beta j \Delta \ln \mathrm{Y}_{t-1} + \sum_{j=1}^{4} \Upsilon j \Delta \ln \mathrm{CIT}_{t-1} \sum_{j=1}^{4} \mathrm{Q}j \Delta \ln \mathrm{BT1}_{t-1} + \sum_{j=1}^{4} \delta_j \Delta \mathrm{X}_t + \theta_1 \ln \mathrm{Y}_{t-1} + \theta_2 \mathrm{CIT}_{t-1} + \theta_3 \mathrm{BT1}_{t-1} + \theta_4 \mathrm{X}_t + \varepsilon_t \quad (4)$$

H 5: CIT does not affect the economic output in the long-run.

H 6: CIT does not affect the economic output in the short-run.

Personal income taxes

$$\Delta \ln \mathrm{Y}t = a_0 + \sum_{j=1}^{4} \beta j \Delta \ln \mathrm{Y}_{t-1} + \sum_{j=1}^{4} \Upsilon j \Delta \ln \mathrm{PIT}_{t-1} \sum_{j=1}^{4} \mathrm{Q}j \Delta \ln \mathrm{BT2}_{t-1} + \sum_{j=1}^{4} \delta_j \Delta \mathrm{X}_t + \theta_1 \ln \mathrm{Y}_{t-1} + \theta_2 \mathrm{PIT}_{t-1} + \theta_3 \mathrm{BT2}_{t-1} + \theta_4 \mathrm{X}_t + \varepsilon_t \quad (5)$$

H 7: PIT does not affect the economic output in the long-run.

H 8: PIT does not affect the economic output in the short-run.

Taxes on domestic goods and services

$$\Delta \ln \mathrm{Y}t = a_0 + \sum_{j=1}^{4} \beta j \Delta \ln \mathrm{Y}_{t-1} + \sum_{j=1}^{4} \Upsilon j \Delta \ln \mathrm{TDGS}_{t-1} \sum_{j=1}^{4} \mathrm{Q}j \Delta \ln \mathrm{BT3}_{t-1} + \sum_{j=1}^{4} \delta_j \Delta \mathrm{X}_t + \theta_1 \ln \mathrm{Y}_{t-1} + \theta_2 \mathrm{TDGS}_{t-1} + \theta_3 \mathrm{BT3}_{t-1} + \theta_4 \mathrm{X}_t + \varepsilon_t \quad (6)$$

H 9: TDGS does not affect the economic output in the long-run.

H 10: TDGS does not affect the economic output in the short-run.

(7)

Taxes on foreign trade

$$\Delta \ln Yt = a_0 + \sum_{j=1}^{4} \beta j \Delta \ln Y_{t-1} + \sum_{j=1}^{4} \Upsilon j \Delta \ln TFT_{t-1} \sum_{j=1}^{4} \Omega j \Delta \ln BT4_{t-1} + \sum_{j=1}^{4} \delta_j \Delta X_t + \theta_1 \ln Y_{t-1} + \theta_2 TFT_{t-1} + \theta_3 BT4_{t-1} + \theta_4 X_t + \varepsilon_t$$

H 11: TFT does not affect the economic output in the long-run.

H 12: TFT does not affect the economic output in the short-run.

Analysis and Findings

Impact of Tax Level on Economic Growth - Analysis 1 (1960-2018)

We confirmed the absence of multicollinearity and unit root through ADF and VIF tests, respectively (Table 2). We included maximum dependent lags of 4 when evaluating the long-term impact of taxes, based on the prior literature. (Ferede and Dahlby, 2012 and Romer and Romer, 2010). Dynamic Regressors were LGDP and LTR, where TROPEN, WPOPGR, LFCF, and LPRGOV were considered fixed regressors.

Table 2: Testing for Unit Root and Multicollinearity – Analysis 1 (1960-2018)

Variable	ADF Test Statistic		Order of Integration	Uncentred VIF
	Level	1st Difference		
LGDP	0.7982	-8.1147***	I (1)	
LTR	0.0877	-7.0011***	I (1)	1.6365
LPRGOV	-1.8707	-8.9242***	I (1)	1.3064
LFCF	-0.6186	-6.7347***	I (1)	2.0851
WPOPGR	-0.6215	-7.8287***	I (1)	1.0397
TROPEN	-1.5532	-6.5866***	I (1)	1.2184

***, **, and * implies the rejection of the null hypothesis of a presence of Unit Root at the significance level of 1%, 5%, and 10%, respectively.

A suitable model was selected based on the lowest Akaike Information Criteria, AIC (-2.0270). The significant negative error correction term and the sufficiently large bound test co-efficient suggests a long-run cointegrating relationship between the dynamic regressors and the dependant variable. Furthermore, the levels equation coefficient for tax revenue was positive and significant at 5% (Table 3). Hence, there is sufficient evidence to deduce that tax levels significantly and positively impact long-run economic growth in the Sri Lankan context.

Table 3: Analysis 1 (1960-2018)

Selected Model	(1,1)
Bound Test F-Statistic	10.5875***
Error Correction Term	-0.3807***
Long-run Form and Levels Equation Coefficients for explanatory variables	
LTR	0.3341**
Error Correction Form	
D (LTR)	-0.1161
TROPEN	-0.5643***
WPOPGR	-6.5643
LFCF	0.1298***
LPRGOV	-0.0835*

***, **, and * implies the rejection of the null hypothesis of no long-run relationship at the significance level of 1%, 5%, and 10%, respectively.

The stability of the parameters estimated was confirmed (Figure 4) through Cumulative Squares (CUSUM) and Cumulative Sum of Square tests (CUSUM of Squares).

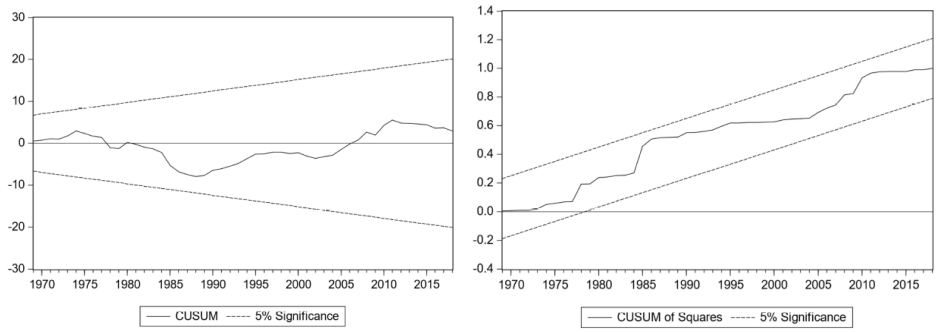

Figure 4 – Stability Diagnostics: Tax Level Analysis (1960-2018)

Source: Author prominent

Impact of Tax Level on Economic Growth - Analysis 2 (1980-2018)

Stationarity and multicollinearity were re-confirmed in the second part of the analysis (Table 4). A suitable model was selected based on the lowest AIC value (-2.8267). The significant negative error correction term and the sufficiently large bounds test statistic imply a long-run cointegrating relationship. The co-efficient for the tax levels was statistically significant at 1%. The established positive association was even stronger under post-economic liberalization conditions (Table 5).

Table 4: Testing for Unit Root and Multicollinearity – Analysis 2 (1980-2018)

Variable	ADF Test Statistic		Order of Integration	Uncentered VIF
	Level	**1st Difference**		
LGDP	-0.1768	-4.9495***	I (1)	
LPRGOV	-2.4737	-7.6582***	I (1)	1.3181
LFCF	0.6104	-4.8981***	I (1)	1.6959
WPOPGR	-1.4911	-6.7319***	I (1)	1.1255
TROPEN	-1.3580	-6.1114***	I (1)	1.1227
LTR	-1.1991	-5.3011***	I (1)	1.6197

***, **, and * implies the rejection of the null hypothesis of a presence of Unit Root at the significance level of 1%, 5%, and 10%, respectively.

Table 5: Analysis 2 (1980-2018)

Selected Model	(4,0)
Bound Test F-Statistic	12.5405***
Error Correction Term	-0.4835***
Long-run Form and Bound Test Coefficients for explanatory variables	
LTR	0.6127***
Error Correction Form	
LPRGOV	0.0691
WPOP_GR	-0.7188
LFCF	0.0615
TROPEN	-0.2651

***, **, and * implies the rejection of the null hypothesis of no long-run relationship at the significance level of 1%, 5%, and 10%, respectively.

Stability Diagnostics were re-confirmed through CUSUM and CUSUM of squares tests (Figure 5). For both models, a Jarque-Bera normality test was conducted. Next, Breusch-Godfrey LM test up to 4 lags was conducted to ensure no serial correlation between error terms, and finally, a Breusch Pagan heteroskedasticity test was also conducted. Test statistics for each model are given in Table 6.

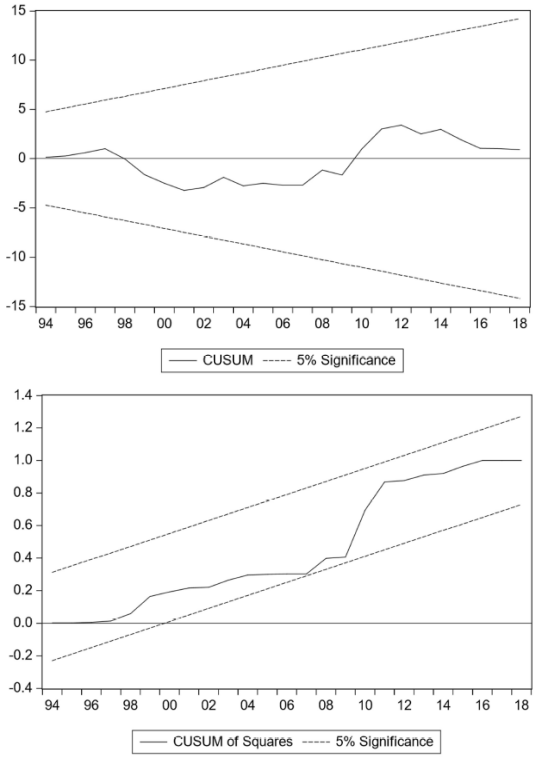

Figure 5 – Stability Diagnostics: Tax Level Analysis (1980-2018)

Source: Author prominent

Table 6: Diagnostics tests statistics – Analysis on Impact of tax levels

	Analysis 1	**Analysis 2**
Jarque-Bera normality test statistic	1.4530 (0.4836)	0.1605 (0.9229)
Breusch-Godfrey serial correlation LM test statistic	0.4058 (0.8035)	0.8641 (0.5015)
Breusch-Pagan-Godfrey heteroscedasticity F-test statistic	3.8255 (0.0046)	1.6806 (0.1467)

Note: Figures in the parenthesis indicate the probability value of the test statistics.

Impact of Tax Structure on economic growth

ADF tests were carried out to establish stationarity, and VIF tests were conducted to confirm the absence of multicollinearity. All models proved no multicollinearity and stationarity of data at 1st difference (Appendix 1). Separate

four ARDL models were estimated for CIT (4), PIT (5), TDGS (6), and TFT (7). Bound Test Statistics were significant for all the models, and the error correction coefficients were highly significant and less than one, which confirmed a cointegrating relationship among the considered variables (Appendix 2).

All models were found to be stable, except for (7), which recorded an instability in the CUSUM of Squares test (Appendix 3). In addition, residual diagnostics for all models were confirmed except for (7), which was found not to be free from heteroskedasticity (Appendix 4). While personal income taxes and corporate income taxes were found to have a negative relationship with long-run economic growth, the nature of the relationship was insignificant. A short-run positive association was seen between taxes on domestic goods and services and economic growth. However, their distortionary impact too was deemed insignificant in the long-run. Taxes on foreign trade were found not to affect economic growth in the long-run and the short-run.

Discussion

Under both pre-and post-economic liberalization data, increased tax levels were deemed beneficial for the long-term economic growth. This was contrary to Kesavarjah's (2016) previous study, which found no association between the overall tax burden and economic output of Sri Lanka. However, this result is consistent with the findings of Mendoza et al. (1994) and Wang and Yip (1992). The subsequent study on tax structure determines a negative but insignificant association of corporate and personal income taxes to the long-run economic growth of Sri Lanka. This can be attributed to Jaimovich and Rebelo (2017) finding lower distortion of income taxes to the growth of a less developed economy. So, with economic development, we can expect such negative associations to be significant in the future, as suggested by Bania *et al.* (2007).

Consumption taxes (VAT and excise duties) were found to have a significant positive short-run impact and a statistically insignificant long-run negative impact. This positive influence of consumption taxes on economic growth supports the findings of Ferede and Dahlby (2012), Arnold (2008), Arnold et al. (2011), and Szarowska (2013). It should be noted that the diagnostics checks performed on the model involving taxes on foreign trade were not found to be robust. Therefore, we are conservative on the interpretation of the impact of taxes on foreign trade on growth.

Conclusion

In this study, we analysed the impact of taxation on the economic growth of Sri Lanka. As highlighted in the literature, the impact of taxation on economic growth was analysed under two paradigms, tax structure and tax level, using a linear ARDL model. We found a positive impact of tax level on the short-run and long-run economic growth in Sri Lanka. In terms of tax structure, the expected negative impact, particularly to income taxes, was not significant. While the policymakers have re-iterated the need for an increase in direct taxes, our study suggests an opportunity to pursue such action. Also, for consumption taxes (VAT and excise duties), the long-run impact on economic growth was insignificant. Therefore, our study overwhelmingly suggests the possibility of increasing taxes in Sri Lanka. Raising taxes is a viable policy option in increasing government revenue without compromising the economy's growth potential. The tax ratio in Sri Lanka remains low and has decreased in the recent past. Under such scenarios, particularly with relatively lower direct taxes, it is reasonable to expect a non-distortionary effect of taxes on long-run economic growth. However, the impact of high tax ratios on economic growth and the threshold level of taxes needs to be further studied.

Declaration of Conflicting Interests

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

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APPENDIX 1

Unit Root and Multicollinearity Testing – Taxation Structure Analysis (1980-2018)

Variable	**ADF Test Statistic**		**Order of Integration**
	Level	**1st Difference**	
LGDP	-0.1768	-4.9495***	I (1)
LPRGOV	-2.4737	-7.6582***	I (1)
LFCF	0.6104	-4.8981***	I (1)
WPOPGR	-1.4911	-6.7319***	I (1)
TROPEN	-1.3580	-6.1114***	I (1)
CIT	0.0106	-6.6547***	I (1)
PIT	-1.8716	-7.3100***	I (1)
TDGS	-3.0987**	-5.3798***	I (0)
TFT	-0.0291	-5.6664***	I (1)
BT1	-1.4487	-5.7889***	I (1)
BT2	-1.1165	-5.2300***	I (1)
BT3	-0.5462	-5.5051***	I (1)
BT4	-2.5749	-4.6020***	I (1)

***, **, and * implies the rejection of the null hypothesis of a presence of Unit Root at the significance level of 1%, 5%, and 10% respectively.

APPENDIX 2

Selection of model and Estimated Outputs– Taxation Structure Analysis (1980-2018)

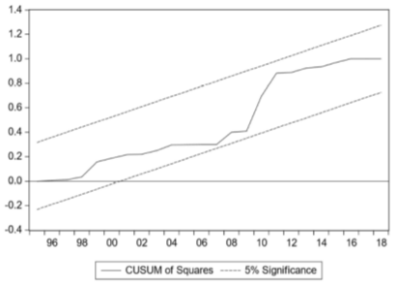
	CIT (4)	PIT (5)	TDGS (6)	TFT (7)
Bound Test Statistic	8.2760***	7.8309***	8.0961***	9.3309***
Error Correction Term	-0.4686***	-0.5340***	-0.5713***	-0.4652***
Long-run Form and Bound Test Coefficients for explanatory variables				
BT1	0.6526**			
BT2		0.4685		
BT3			0.6802***	
BT4				0.3292*
CIT	-0.0203			
PIT		-0.1119		
TDGS			-0.1200	
TFT				0.3954
Error Correction Form				
Coefficients for the explanatory variables				
D (BT2)		0.0591		
D (BT3)			0.1719**	
D (BT2 (-1))		-0.4104***		
D (BT3 (-1))			-0.1682**	
D (BT2 (-2))		-0.0836		
D (PIT)		-0.0879		
D (TDGS)			0.176878*	
D (PIT (-1))		0.0096		
D (PIT (-2))		0.1633**		
D (PIT (-3))		-0.0836*		
Other Exogenous Regressors				
TROPEN	-0.2348	-0.4704***	0.171520	0.0400
WPOPGR	0.6070	4.8576	-8.008406**	-4.3818
LFCF	0.0622	0.2932***	0.2043***	0.0097
LPRGOV	0.0989	-0.1847**	0.0461	0.1072

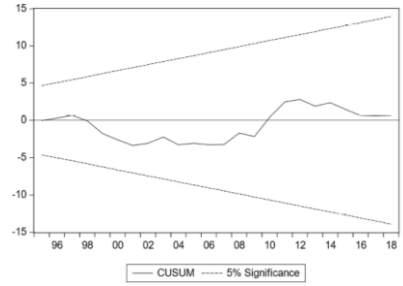
***, **, and * implies the rejection of the null hypothesis at the significance level of 1%, 5%, and 10%, respectively.

APPENDIX 3

Stability Diagnostics: Taxation Structure Analysis 1980-2018

(4)





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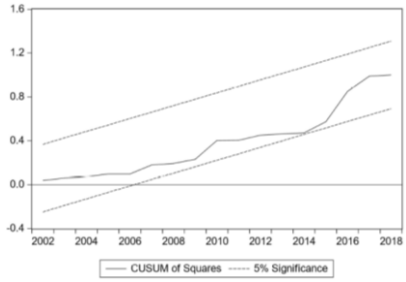

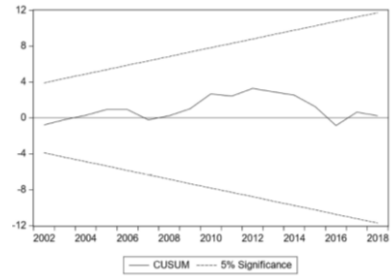

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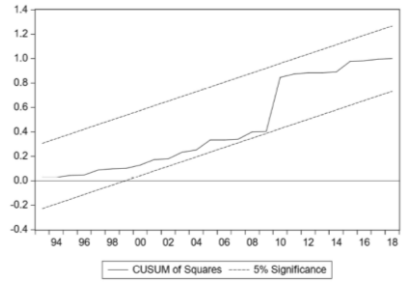
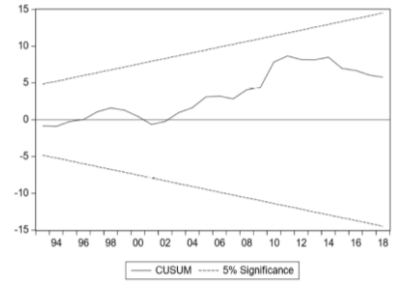
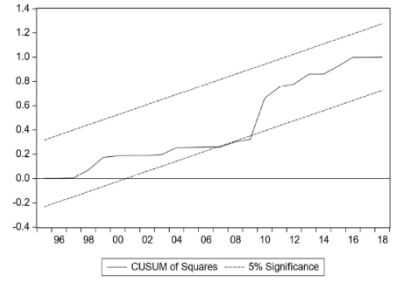
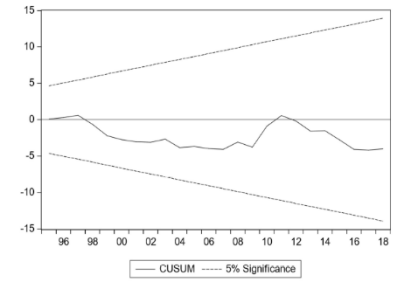




(7)





APPENDIX 4

Residual Diagnostics: Impact of Taxation Structure

	(4)	(5)	(6)	(7)
Jarque-Bera normality test statistic	0.0862 (0.9578)	1.7006 (0.4272)	0.7578 (0.6846)	1.2217 (0.5429)
Breusch-Godfrey serial correlation LM test statistic	1.0140 (0.4238)	2.3906 (0.1043)	1.0409 (0.4087)	1.9601 (0.1397)
Breusch-Pagan-Godfrey heteroscedasticity F-test statistic	1.7401 (0.1288)	0.8174 (0.6587)	1.2999 (0.2820)	2.7174 (0.0218)

Note: Figures in the parenthesis indicate the probability value of the test statistics.

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The Mediating Mechanism of Consumer Ethical Beliefs in Determining the Influence of Cynicism and Empathy on Green Buying Intention

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Abstract

Green buying intention can help society and companies to achieve sustainability while balancing their marketing objectives. Although there have been many studies done in relation to green buying intention, there are still calls for research to specifically study the impact of individual factors and the impact of ethical beliefs on green buying intention. The objective of this research is to examine the influence of empathy and cynicism on green buying intention and the mediating mechanism of consumer ethical beliefs. A structured questionnaire was administered using the online platform, and 345 valid responses were collected. Partial least squares-Structural equation modeling (PLS-SEM) was performed to test the hypotheses using the SmartPLS 3.0 program. The results reveal that empathy and cynicism predict consumer intention to buy green products directly and indirectly through ethical beliefs. This study contributes to both literature and business practice, and may be the first research study to investigate the relationship between empathy and cynicism and green buying intention. In addition, the study helps managers to articulate marketing strategies such as empathetic and ethical focused advertising to promote green buying intentions of customers. This research will be particularly important for developing countries like Sri Lanka in promoting sustainable consumption which enhances environmental, social and future generations' well-being. Sri Lankan business firms can improve their global presence by focusing on green consumerism as now many global firms have already begun sustainable business practices.

Keywords: *Green buying intention, Empathy, Cynicism, Consumer ethical beliefs, Green consumerism*

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Introduction

In Sri Lanka, green buying, which is a subdivision of sustainable consumerism, has received a great deal of attention. Green consumers are those who are willing to purchase ecologically friendly items with minimal environmental effect contents and manufacturing processes (Jaiswal, 2012). Further, consumers are sometimes activists and threaten companies, whose irresponsible conduct has negative environmental consequences, by switching labels, refusing to purchase these commodities, or by other ways (Webb et al. 2008). To take advantage of the rising green consumer trend, businesses are designing and developing more eco-friendly goods. Thus, green buying has become a marketing opportunity for companies, resulting in green/sustainable marketing that meets changing consumer product needs and desires. As a result, the consumer green movement has facilitated promoting profit-oriented businesses to incorporate green ideas into their marketing and manufacturing operations.

Academic studies have looked at the various antecedents of green buying. Studies concentrated on determining customer demographics including gender, age and income (Mostafa, 2007). Some researchers have investigated the effect of environmental factors on green purchasing intentions (Chan & Lau, 2000). Health-related factors such as food safety and health consciousness (Michaelidou & Hassan, 2008) were also factors that were found to influence green consumerism. In addition, individualism/collectivism (Lu et al., 2015), moral perspectives (Dean et al., 2008; Samarasinghe, 2012; Samarasinghe & Samarasinghe, 2010), ethical judgment (Chan et al., 2008) and ethical motives (Honkanen et al., 2006) have also been identified as factors that affect green buying.

While green consumerism research is growing, there are still gaps in the literature when it comes to understanding the individual motives that influence green buying intention. First, there has been a call for more studies on the personal factors that can influence green buying (Lu et al., 2015). Second, Vitell (2003) and Lu et al. (2015) point out that it is worth investigating the association between consumer ethical beliefs and green buying. Although consumer ethical beliefs have been identified as a factor that influences green buying intention, there has been inadequate research on the effects of personal values on consumer ethical beliefs that reflect the variable (Lu et al., 2015; Vitell, 2003). Third, the variables that are being considered as personal variables are empathy and cynicism, which are said to have an effect on ethical beliefs (Chowdhury & Fernando, 2014), but

these variables have not been examined specifically in relation to green consumerism. Lu et al. (2015) have considered two individual factors that affect ethical beliefs in green consumerism, but they call for the examination of more individual variables under this phenomenon. Further, Brown et al. (2019) have identified a need for research that investigates why empathy relates to sustainability. When considering these gaps, it is clear that it will be valuable to investigate the influence of cynicism and empathy on ethical beliefs and green buying intention. Therefore, the objective of this research is to examine the impact of empathy and cynicism on consumer ethical beliefs, and thereby to examine their impact on green buying intention. This is of particular importance to green consumerism literature since there is a lack of studies that have considered the impact of empathy and cynicism on green buying intention. The results of such an investigation could help firms motivate their consumers to buy green, and thus achieve their marketing goals by incorporating personal traits into strategy formulation.

The rest of the paper is presented in the following order: The theoretical background and formulation of hypotheses are presented subsequently, followed by the research design. Next, the researcher presents her empirical findings. Finally, the researcher analyzes the findings and draws conclusions that might be useful to both academics and practitioners.

Theoretical Background and Hypotheses

Green Buying Intention

Due to its many forms and definitions, green marketing is a broad and complex concept. The areas “green marketing”, “ecological marketing”, “environmental marketing” and “sustainable marketing”, all encompass social and ecological obligations from an academic standpoint. Under these broad concepts many researchers have studied green buying behavior, green consumerism or sustainable consumption (eg: Akehurst et al., 2012; Jaiswal and Singh, 2018). Green buying behavior is largely focused with the purchasing decisions of customers of items that are assumed to be environmentally friendly, conservable, and avoid unnecessary packaging and hazardous substances that hurt people and the environment (Akehurst et al., 2012; Tan, 2011). Similarly, according to Jaiswal (2012), "green consumerism" or "sustainable consumption" refers to the activities of consumers who want to buy ecologically friendly items with minimal environmental effect contents and production processes. Green consumerism includes behaviors such as recycling, consuming sustainable foods, purchasing items made of recycled materials, and applying environmental considerations in

business policies (Jaiswal and Singh, 2018). Simply put, these terms refer to the growing practice of using modern production, packaging and marketing methods to mitigate adverse environmental impacts. Green buying practices save natural resources, safeguard the environment, and are seen as a form of ethical consumer behavior.

Green buying intention is the expression of willingness to purchase sustainable products (Jaiswal and Singh, 2018). Researchers in the field of green consumer psychology have all agreed that intention is a key determinant of buying behavior, and that it is therefore possible to measure green consumer buying through consumer intention (Akehurst et al., 2012; Jaiswal and Singh, 2018; Wei et al., 2017) from an ethical perspective.

Empathy

Only in the twentieth century did the English word "empathy" become widely used (Slote, 2007). Previously, the term "sympathy" was used to describe what is now referred to as empathy. Sympathy is now more narrowly defined as feeling sad for or sympathetic towards someone. The term "empathy" is a transcription of the ancient Greek word empatheia, which means "passion". In the morality literature, empathy has received much attention (see Batson, 2011). According to Baron-Cohen (2012) empathy is: "our ability to identify what someone else is thinking or feeling, and to respond to their thoughts and feelings with an appropriate emotion" (p. 12). When Adam Smith spoke of the moral emotions of pity and compassion in The Theory of Moral Sentiments, he mentioned that "it is the emotion which we feel for the misery of others, when we either see it, or are made to conceive it in a very lively manner. That we often derive sorrow from the sorrow of others is a matter of fact too obvious to require any instances to prove it" (Smith 1759/2009, p. 11).

Empathy and green buying intention

Understanding the mental stress of others and being sensitive towards others is referred to as empathy (Hollin, 1994). Empathy leads to altruism, cooperation, and pro-social behavior, according to the literature in moral psychology (Batson & Ahmad 2009). Brown et al. (2019) argued that empathy plays a precise role in human-environment interactions and emphasized the importance of empathy for nature conservation practices. Further, empathy has been associated with wildlife conservation as well (Myers Jr et al., 2009), showing that the empathetic perspective plays a major role in environmental concerns (Kim & Cooke, 2020). Researchers explain that empathy represents and is associated with generosity

and compassion (Allen, 2018; Rapert et al., 2021). Since empathy increases generosity, it is likely to have a favorable impact on ideas about "doing-good/recycling" activities. In addition, a person's empathy may influence his/her concern about the future generation in a way that will prompt an interest in protecting the environment and empowering sustainability. Therefore, the researcher hypothesized that:
Hypothesis 1: Empathy positively associates with green buying intention.

Consumer Ethical Beliefs

Consumer ethical beliefs are moral views regarding potentially unethical consumer practices. Muncy and Vitell (1992) and Vitell and Muncy (1992) advanced the consumer ethics scale to assess consumer ethical beliefs. There are four dimensions in this scale: (1) Active/illegal dimension; (2) passive dimension; (3) active/legal dimension and (4) no harm, no foul. The active/illegal dimension refers to blatantly unlawful behaviors such as altering price tags on items at a retail business, and consuming products without payment. The passive dimension refers to acts that allow customers to profit passively from the seller's mistakes that aren't addressed or brought to the seller's attention, for example, lying about a child's age to obtain a reduced price or keeping mute when given too much change. The active/legal dimension is concerned with consumer acts that are ethically dubious but not unlawful. This level includes activities such as stretching the facts on a tax return. The 'no harm, no foul' dimension includes activities that do not directly hurt others but are deemed unethical by some, such as burning a CD rather than purchasing one. Another component suggested by Vitell and Muncy (2005) is the doing-good/recycling dimension, which includes beneficial actions related to assisting society and/or environmental preservation. Overall, consumer ethical beliefs are linked to how much a customer is willing to tolerate dubious consumer behaviors.

Empathy and Consumer Ethical Beliefs

Empathy has been shown in the business ethics literature to lead to fewer unethical negotiating practices (Cohen, 2010), greater helping behaviors (Burmann & Zeplin, 2005) and more principle-based moral judgments (Mencl & May, 2009). Mencl and May (2009) have specified that "individuals who empathize are more likely to form highly ethical intentions" (p. 208). As empathy is related to cheating (Brown et al., 2010) and other antisocial behaviors, empathetic concern should be connected to perceptions of consumer actions that are unjust, unfair, or harmful to others (Miller & Eisenberg 1988). Empathy

evokes positive moral emotions and there is less probability that an empathetic person's beliefs are unethical, involving theft, cheating or lying. In line with the above arguments, the following hypothesis is formulated.
Hypothesis 2: Empathy positively associates with consumer ethical beliefs

Consumer ethical beliefs and green buying intention

Individual beliefs influence attitudes toward their own actions and subjective norms, which in turn influence behavioral intention (Fishbein & Ajzen 1975). Based on this view, Hunt and Vitell (1986, 2006) explained the relationship among ethical beliefs, moral judgments and intention. Researchers revealed that ethical beliefs influence ethical intention in a favorable manner. (Singhapakdi et al., 2000). Generally, ethics include acting in a socially responsible manner (Treviño and Brown, 2005). Therefore, ethical beliefs may include beliefs such as doing good to others and for the environment, and such customers who have ethical beliefs have greater positive intentions to act in a more fair manner when making decisions on buying. Further, researchers have stated that persons with great ethical beliefs are prone to have green buying intentions than individuals with low ethical beliefs (Lu et al., 2015). Based on the above views, the researcher proposes the following hypothesis:
Hypothesis 3: Consumer ethical beliefs positively associate with green buying intention.

Empathy and green buying intention: the mediating role of consumer ethical beliefs

Green buying intentions represent intentions to preserve the environment, natural resources, and to use ecologically friendly products, or broadly represent intentions towards environmental responsibility (Lu et al., 2015). For environmental responsibility to be present, empathy plays a major role through consumer ethical beliefs, because empathetic concerns direct consumers towards positive and ethical beliefs which influence them to do good to others as well as for the environment. Consequently, the higher the empathetic concern, the higher would be the ethical beliefs and the lower will be the intention to be environmentally irresponsible. Furthermore, through previously established relationships between empathy and consumer ethical beliefs (Chowdhury & Fernando, 2014) and consumer ethical beliefs and green buying intention (Lu et al., 2015), this indirect influence of empathy on green buying intention through consumer ethical beliefs can be established empirically. Therefore, the current

researcher argues that consumers' ethical beliefs mediate the relationship between empathy and green buying intention.
Hypothesis 4: Consumer ethical beliefs mediate the association between empathy and green buying intention.

Cynicism

The origins of cynicism as a school of philosophy and a way of life can be traced back to ancient Greece (Dean et al., 1998). The term cynical used to refer to harsh critics, but currently, it refers to pessimism and skepticism (Mantere & Martinsou, 2001). Thus, while cynicism used to have a similar connotation to suspicion, disbelief and lack of trust, currently, it is more commonly associated with the terms 'critical, uneasy, and captious' (Mete, 2013). Belittlement, rage, embarrassment, and difficulty are some of the unpleasant feelings evoked by cynicism (Abraham, 2000). According to Vice (2011), cynicism is essentially immoral and incompatible with faith, hope and generosity.

Cynicism and consumer ethical beliefs

Several researches have looked at the cognitive and behavioral effects of cynicism. Detert et al. (2008) pointed out that there is a link between cynicism and unethical decision-making. According to Hochwarter et al. (2004), cynicism is associated with lower levels of organizational citizenship behavior, particularly less assistance to coworkers. Cynicism is also associated with a lack of trust. Based on the findings that cynicism leads to favorable assessments of unethical behavior (Detert et al., 2008), and that persons who are mistrustful of others are likely to embrace unethical behavior (Rotter, 1980), it may be assumed that cynicism will result in positive assessments of unethical consumer behavior. Also, because cynicism is associated with a profound skepticism and contempt for others, cynics are less inclined to participate in or support acts that benefit others. Therefore, cynics may not prioritize ethics when making decisions. Based on these arguments, the researcher puts forward the following hypothesis.
Hypothesis 5: Cynicism negatively associates with consumer ethical beliefs.

Cynicism and green buying intention

A cynical person is skeptical about company practices of green marketing, as they think "green" is merely a marketing strategy to enhance profitability and will doubt whether businesses are actually acting in an environmentally sustainable manner (Do Paço & Reis, 2012). It has also been argued that cynicism leads to questionable consumer practices which may benefit the consumer at the expense

of the business or seller (Chowdhury & Fernando, 2014). Thus, cynical consumers encourage marketers to produce less costly and less environmentally sustainable products that can be purchased at a lower price. Furthermore, since cynicism refers to a negative perspective on human-beings and reflects a certain amount of self-interest (Stavrova & Ehlebracht, 2019), cynics are less likely to respect others and act in a responsible manner. They may also be less supportive of the environment and of future generations. Similarly, Chowdhury and Fernando (2014) have argued that cynicism in consumers promotes less pro-social actions like recycling. In line with these arguments, the researcher proposes the following hypothesis:

Hypothesis 6: Cynicism negatively associates with green buying intention.

Cynicism and green buying intention: the mediating role of consumer ethical beliefs

The researcher argues that cynicism negatively relates to green buying intention indirectly through negative beliefs. Cynicism will not promote ethical beliefs as it associates with self-interest (Stavrova & Ehlebracht, 2019). Specifically, most cynics will selfishly attempt to gain benefits even at the expense of the benefits of others and of future generations, whereas selfless beliefs are fundamental in ethics and ethical beliefs relate to responsibility for the larger society. This means that cynical consumers will most probably engage in less environmentally friendly behaviors, as cynicism does not promote ethical beliefs that will benefit society. Further, it can be argued that cynical consumers will also fail to identify what is beneficial for society and the environment, as they do not bother to distinguish between the ethical and unethical (self-interested point of view), which is why cynicism associates negatively with green buying intention. Furthermore, empirical evidence for the negative relationship between cynicism and consumer ethical beliefs (Chowdhury and Fernando, 2014) as well as the relationship between consumer ethical beliefs and green buying intention (Lu et al., 2015) supports the indirect relationship between cynicism and green buying intention via consumer ethical beliefs. Based on the above arguments and support from empirical results, the researcher advances the following hypothesis:

Hypothesis 7: Consumer ethical beliefs mediate the negative association between cynicism and green buying intention.

The above hypotheses are visually depicted in the Figure 1: Conceptual Framework.

Conceptual framework

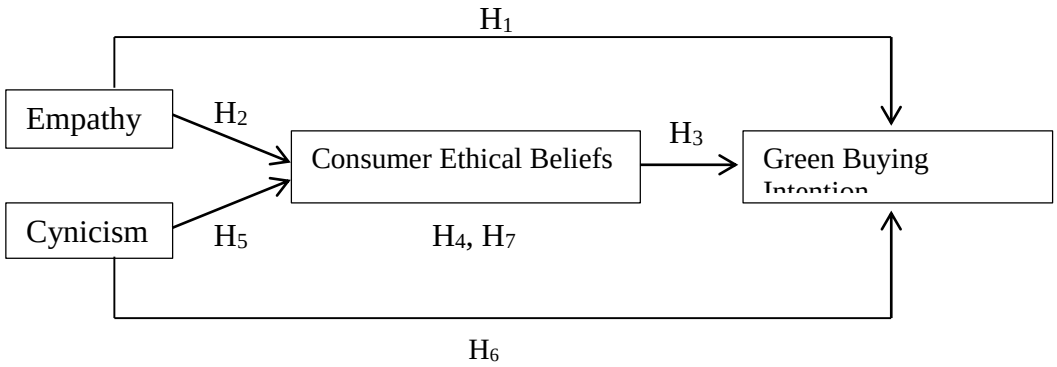

Figure 1: Conceptual framework

Methodology

Participants and Procedures

A convenience sample of Sri Lankan consumers was used to test the research model, which was based on data from an online survey questionnaire. The target audience was green consumers. In order to select green consumers, a filtering question was added to the questionnaire. If a respondent was categorized as a green consumer, he/she was asked to state his/her level of agreement with the statements. The questionnaire was distributed via email. A total of 353 valid responses were collected from a diverse group of people with various demographic backgrounds. A total of 345 questionnaires were obtained for analysis after compensating for the filtering question. Males made up 42.32 percent of the respondents, while females made up 57.68 percent. About 63 percent of those polled were between the ages of 20 and 29. The demographic characteristics of the sample are shown in Table 1.

Table 1: Demographic characteristics

	Frequency	Percentage
Gender		
Male	146	42.32
Female	199	57.68
Age		
Under 19 years	3	0.82
20-29 years	218	63.19
30-39 years	69	20.00
40-49 years	24	6.96
50-59 years	29	8.41

	Frequency	Percentage
Over 60 years	2	0.58
Education		
GCE Ordinary Level	-	
GCE Advanced Level	14	4.06
Diploma or higher diploma	61	17.68
Undergraduate Degree	242	70.14
Postgraduate Degree	28	8.12
Current Occupation/Student		
Student	208	60.29
Public employee	37	10.73
Private employee	69	20
Entrepreneur	2	0.57
Household	29	8.41

There was no statistically significant difference between responders and non-respondents ($p < 0.05$) according to the t test. These findings show that no selection bias has occurred through green consumers not taking part in the survey. To ensure that there was no common method bias, the full collinearity method was used (Kock, 2015). The VIF value obtained through analysis is less than 3.3, revealing that there is no common method bias in this study. Harman's single-factor test was also used to confirm that there was no common method bias. Multiple factors emerged as a result of the study and the first component did not account for the majority of the variance in the data.

Measures

Green Buying Intention: Kim and Choi's (2005) scale of green buying intention was used to measure how far consumers intended to buy green products. The items on the scale were graded on a 5-point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree”. Sample key items comprise “I make special effort to buy paper and plastic products that are made from recycled material” and “I have switched products for ecological reasons”.

Consumer Ethical Beliefs: Consumer ethical beliefs were assessed using the Muncy and Vitell (1992) and Vitell and Muncy (1992) scales, which were later revised by Vitell and Muncy (2005). This scale evaluates the morality of a set of consumer behaviors. The scale used was a 28-item one and four dimensions of consumer ethics are represented on this scale. Sample items for each dimension are: (1) Active/Illegal dimension: “drinking a can of soda in a store without paying for it”, “giving misleading price information to a cashier for an unpriced item” (2) Passive dimension: “getting too much change and not saying anything”, “observing someone shoplifting and ignoring” (3) Active Legal dimension “using

an expired coupon for merchandise", "Using a coupon for merchandise you did not" (4) No Harm, No Foul dimension: "Installing software on your computer without buying it", "Burning a CD rather than buying". On a 5-point scale, participants were asked to score each item (1= "strongly think that it is wrong", 5= "strongly think that it is not wrong").

Cynicism: The updated "philosophies of human nature" scale was used to assess cynicism (Wrightsman, 1991). This scale was changed and shortened, in a similar manner to that of Johnson and O'Leary-Kelly (2003) by picking five items. Sample items include: "If most people could get into a movie without paying and be sure that they would not be seen, they would do it"; "Most people would tell a lie if they could gain by it". Participants used a seven-point Likert-type scale to express their agreement with the items (1= "strongly disagree" and 7= "strongly agree").

Empathy: Empathy was assessed using a scale based on items from the Interpersonal Reactivity Index's (IRI) aspects of perspective taking (cognitive empathy) and empathetic concern (affective empathy) (Davis, 1980). The IRI's perspective taking and empathetic concern components have been used to measure empathy in the business ethics literature (Cohen 2010; Chowdhury & Fernando, 2014). A seven-point Likert scale, with "1 being strongly agree" and "7 being strongly disagree," was used to assess agreement with each of the eight items (Chowdhury & Fernando, 2014). Key items include: "believe that there are two sides to every question and try to look at them both", "I try to look at everybody's side of a disagreement before I make a decision".

Data Analysis

The data were analyzed using the structural equation modeling (SEM) approach utilizing partial least squares (PLS). The researcher used the SmartPLS 3.0 program for PLS-SEM. PLS-SEM is one of the most advanced ways of analysis, and it has become an important tool for researchers looking at a variety of social science topics. Before analyzing the overall model, the researcher made sure that the sample size for model estimation was adequate (Hair et al., 2017).

The measurement model and the structural model are both required for PLS-SEM analysis. The measurement model's goal is to assess the validity (convergent and discriminant) and reliability of each indicator that composes the latent constructs. The measurement model's goal is to assess the validity (convergent and discriminant) and reliability of each indicator that composes the latent constructs. (Hair et al. 2017) (Tables 2 and 3), the researcher moved on to the second stage of analysis, namely, assessing the quality of the structural model and tested the

hypotheses. Table 4 shows the results of the quality assessment of the structural model. Table 4 shows that the R^2 and adjusted R^2 values produced are good, ranging between 0.428 and 0.591. Furthermore, each predictor variable in the model generates an effect size value ranging from 0.181 to 0.312, putting it in the small-to-medium category. The predictive relevance value produced excellent endogenous variables, i.e. > 0, indicating that the model has predictive power. The value of the variance inflation factor (VIF) calculated for all of the independent variables in the model is < 3, indicating that the predictor variables are not collinear.

Table 2: Assessment of Measurement Model

Variable	Indicator FL range	Alpha	Composite reliability	AVE
Green Buying Intention	0.841-0.882	0.842	0.822	0.524
Consumer Ethical Beliefs				
Active/Illegal Dimension	0.751-0.792	0.781	0.862	0.523
Passive Dimension	0.652-0.693	0.711	0.777	0.512
Active/Legal Dimension	0.624-0.659	0.706	0.762	0.522
No harm, no Foul Dimension	0.733-0.752	0.721	0.772	0.548
Cynicism	0.766-0.786	0.791	0.798	0.552
Empathy	0.725-0.821	0.786	0.811	0.621

FL- Factor Loading; Indicator FL range >0.6; Alpha >0.7; Composite reliability > 0.7; AVE>0.5

Table 3: Mean, Standard Deviation and Discriminant Validity results

Variable	Mean	SD	1	2	3	4	5	6
1. Green Buying Intention	3.89	0.88						
2. Active/Illegal Dimension	3.01	0.97	0.789					
3. Passive Dimension	2.98	0.89	0.687	0.752				
4. Active/Legal Dimension	3.12	0.87	0.878	0.622	0.682			
5. No harm, no Foul Dimension	3.88	0.85	0.776	0.762	0.744	0.732		
6. Cynicism	3.89	1.01	0.652	0.752	0.623	0.754	0.652	
7. Empathy	4.61	0.78	0.762	0.852	0.751	0.741	0.751	0.681

Below the diagonal elements are the HTMT (heterotrait–monotrait ratio) values. HTMT values < 0.90 (Hair et al. 2017)

Table 4: Assessment of the structural model

Variable	R^2	Adj. R^2	F^2	Q^2	VIF
Green Buying Intention	0.571	0.562	-	0.226	
Consumer Ethical Beliefs	0.417	0.402	0.247	-	
Cynicism	-	-	0.181	-	1.553
Empathy	-	-	0.312	-	1.622

Hypotheses Testing

The repeated indicator model is recommended only when the lower order constructs have an equal number of indicators, according to Ringle et al. (2012). As a result, the structural model for higher-order latent variables was evaluated, and the higher-order structural model was used to test the hypotheses (based on 5000 subsamples). The results of the direct relationships are indicated in Table 5.

Table 5: Results of hypotheses testing: Direct relationships

Structural Path	β Coefficient	*p* Value	Decision
Empathy → GBI	0.553^{**}	0.000	H_1 supported
Empathy → CEB	0.422^{**}	0.000	H_2 supported
CEB→ GBI	0.626^{**}	0.000	H_3 supported
Cynicism → CEB	-0.317^{**}	0.002	H_5 supported
Cynicism → GBI	-0.309^{**}	0.000	H_6 supported

*CEB: Consumer Ethical Beliefs; GBI: Green Buying Intention; ** $p < 0.01$;*

Table 5 shows that all path coefficients of the direct relationships (based on 5000 subsamples) are significant (at the $p < 0.01$ level). According to the results of the analysis, the coefficient β values of the relationships Empathy→ GBI (β=0.553) and Empathy → CEB (β=0.422) are significant (p=0.000). Hypothesis$_1$ and Hypothesis$_2$ are therefore supported. Cynicism also has a significant negative association with GBI (β = -0.309; P=0.000) and CEB (β= -0.317; P < 0.01). Furthermore, the CEB→ GBI relationship is positive and significant (*$\beta = 0.626$; $p=0.000$*). Therefore, hypotheses 3, 5 and 6 are supported.

To test the mediating hypotheses (hypotheses 4 and 7), the researcher applied Preacher and Hayes' method (as cited in Hair et al., 2014) as it is recommended for PLS-SEM (Hair et al., 2014). The initial step was to assess the significance of the direct relationships of each of the two constructs (using boostrapping for 5000 subsamples). The path coefficient of Empathy → GBI was significant (β= 0.662, p=0.000). Similarly, the path coefficient of Cynicism → GBI was significant as

well (β=-0.453, p=0.000). Subsequently, the indirect effect was assessed by including the mediating variable. The indirect effect of Empathy → CEB → GBI was significant (β= 0.406, p= 0.000, *t* value= 3.627) as hypothised (hypothesis 4) and the indirect effect of Cynicism → CEB → GBI was also signisficant (β=-0.-316, p= 0.000, *t* value= 4.029) as per hypothesis 7. Finally, the VAF (variance accounted for) was calculated to assess the strength of the mediation. VAF was recorded as 48% and 29% for Empathy → CEB → GBI and Cynicism → CEB → GBI, respectively, so both mediation pathways can be catogorised as partial mediations (Hair et al., 2014). Figure 2 illustrate the PLS-SEM output

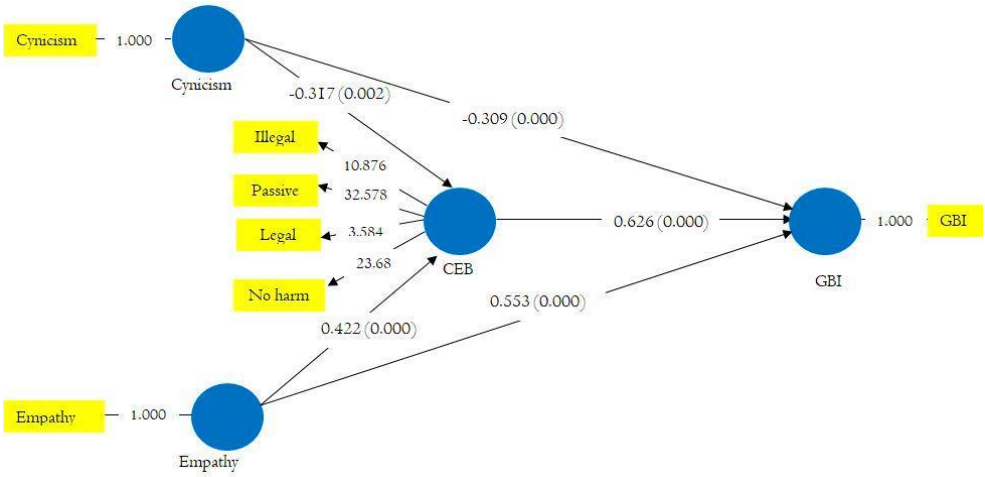

Figure 2: Structural Model Based on the Embedded Two-Stage Approach

Discussion and Conclusion

The impact of empathy, cynicism and consumer ethics on green consumer intention was investigated in this research. Grounded on 345 Sri Lankan consumers, primary data provided support for the hypotheses and for the proposed model. The results confirmed the influence of empathy and cynicism on consumer ethical beliefs which in turn impacted consumer green buying intention. The important theoretical findings of this study are discussed below, with special emphasis on innovative discoveries and how they connect to the findings of previous studies.

According to the findings, green buying intentions are influenced by customer ethical beliefs, and this isn't the first study to show this connection. Consumers with strong ethical awareness show a reasonably consistent urge to buy green items (D'Souza et al., 2007). Furthermore, some buyers see recycling and good practices as ethically acceptable, and they are more likely to buy green items (Lu

et al., 2015). Similarly consumers reveal that they examine ethical concerns of companies when purchasing (Basgoze, 2012), meaning that they base their ethical beliefs before they make their purchase and also look at the ethical behaviour of the companies. Consumers' positive thinking such as ethical beliefs is one reason for many organisations to practice sustainable marketing (Basgoze, 2012). Moreover, firms have claimed that many attempts to social responsibility are due to the growing attention of ethical concerns by the consumers for everyday purchase (Lee, 2016). Thus, it reveals ethical beliefs play a major role in determining purchase decision. Although this relationship has been established through many empirical studies in other countries, there have not been many studies conducted in developing countries like Sri Lanka to explain these phenomena.

The research findings confirm that consumers with strong empathy are very likely to possess ethical beliefs. Individuals with empathy place greater importance on helping others and often engage in pro-social behaviour (Batson & Ahmad 2009). A study done in Italy has found that emotional empathy of consumers showed high level of purchase intention to fair chocolate (Zerbini et al., 2019). Thus, it is fair to believe that strong empathy supports a better assessment of what is ethical and unethical, and thus, empathetic consumers know that engaging in recycling activities and environmental protection activities is ethical. This result is similar to that of Detert et al. (2008), who identified a link between empathy and unethical behavior. Similarly, Chowdhury and Fernando (2014) found that empathy associated negatively to the "active/legal dimension" of consumer ethics. Further to this finding, the current researcher extended the scope of the above studies by identifying the indirect effect of empathy on green buying intention through the mediating impact of ethical consumer beliefs. This indicates that ethical consumer beliefs play an important role in forming an empathetic person's intention to buy green products. Zerbini et al. (2019) explicates that, since empathy provides a base for social responsibility (which is considered as ethical) through social bonding, they tend to purchase ethical products. Therefore, we can conclude that empathetic persons recognize green consumerism as ethical. Cynicism was observed to be inversely associated to ethical beliefs, which is compatible with Detert et al. (2008)'s findings that cynicism was associated positively with unethical decision-making. Similarly, Rotter (1980) and Vice (2011) have postulated the association between cynicism and unethical behaviour. Their results indicate that cynicism fails in a better assessment of ethical beliefs, such that cynics may wrongly judge the ethicality and unethicality of their actions. Further, the results of this study extend this relationship by

explaining the mediating effect of consumer ethical beliefs on the relationship between cynicism and green buying intention to better clarify the reason why cynics are less likely to engage in green buying. It is also reasonable to suppose that a very cynical person has less concern for others and therefore, may not be particularly concerned for the welfare of future generations, and thus does not prioritize environmentally friendly behaviour.

Empirical studies done on understanding the influence of individual factors and consumer ethical beliefs on green buying intention are scarce (Lu et al., 2015). In attempting to fill this gap, the researcher assesses the impact of empathy and cynicism on green buying intention, as these individual antecedents have not been thoroughly studied, to the best of the researcher's knowledge. In addition, the mediating mechanism of consumer ethical beliefs was also investigated to better understand the relationship between empathy and cynicism and green buying intention. This is a vital theoretical contribution to the existing literature as it explicates why empathy and cynicism relate to green buying intention.

Implications for practice

The findings of this study have a few managerial implications. Gaining a deeper grasp of the link between consumer ethics and personal characteristics can help enhance customer relationship management strategies. First, it appears that cynicism and empathy are personal characteristics that influence consumers' ethical beliefs and green buying intention, and therefore, marketers should consider these characteristics when developing their strategies. Businesses might, for example, adapt marketing efforts to meet the expectations of customers who are more inclined to form connections with merchants and have favorable opinions toward the company. Since empathy encourages ethical beliefs and willingness to buy green products, marketers can focus on advertising strategies such as advertisements focusing on empathy and environmental credentials at different organisational levels. According to Crane (2001), a product's ethical augmentation can take place in four ways: at the "product level" (e.g., by stating how environmentally friendly the product is), at the "marketing level" (e.g., by engaging in cause-related marketing by supporting a relevant charity), at the "corporate level" (e.g., by participating in corporate social responsibility programs), and at the "country level" (e.g., by producing products across the country to support local industries and jobs, or in countries with labor standards that protect workers' rights). Therefore, these ethical branding methods should be considered by managers in order to enhance the green buying intentions of their customers.

In order to minimize customer cynicism, managers must also discover how consumer cynicism is heightened and address those processes. Tracking customer values and comparing them to business values is one approach to counteract cynicism by reducing value inconsistency. Consumer cynicism arising from aim inconsistency can be reduced by creating items that satisfy acceptable performance criteria and honest advertising that does not set misleading expectations.

Limitations and Future Research

This is a cross-sectional study that captures consumer perceptions on the variables of interest in a single snapshot. The association between the independent and dependent variables was derived theoretically and verified with survey data. However, using a cross-sectional design to test these relationships does not allow for the detection of causality. To address this limitation, future studies could use experimental or longitudinal designs. Secondly, intentions to engage in various types of consumer actions were used as the dependent variable in this study. However, intentions and behavior do not always align in the realm of consumer ethics (Auger & Devinney 2007). Therefore, the dependent variable in future research could be choice or behavior. This study looked at consumer ethical beliefs as a variable that relates to green buying intention, as well as to empathy and cynicism. In order to make the investigation more comprehensive, other individual factors may need to be examined.

Declaration of Conflicting Interests

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

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A Comparative Mathematical Study of the Relationship Between Marginal Social Cost and Pigouvian Tax in the Presence of Commodity and Wage Taxes: Putting Ramsey theorem into Practice

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Abstract

The aim of this paper is to examine the relationship between Pigouvian tax and marginal social cost in the presence of distortionary taxes such as commodity and wage taxes in a Ramsey setting. The Ramsey theory highlights the amount of tax required to raise a given revenue for the government which also maximizes household utility. Previous research in this regard has been carried out either under homogeneous household preferences or constant marginal social cost. In this paper we go further by analyzing the relationship between Pigouvian tax and marginal social cost in the presence of commodity taxes when households have heterogeneous preferences as opposed to being assumed homogeneous. In addition, we also consider the relationship between Pigouvian tax and marginal social cost in the presence of wage tax when the marginal social cost is considered as a variable depending on Pigouvian tax as opposed to being considered a constant in previous literature. The results indicate that the Pigouvian tax in the presence of wage tax is higher when the marginal social cost was considered a variable as opposed to a constant. Under certain conditions, in the presence of commodity taxes it was observed that the value of the Pigouvian tax is higher when households have heterogeneous preferences as opposed to homogeneous preferences. The mathematical models used in this study enable to see the factors, such as homogeneity/heterogeneity of household preferences and marginal social cost assumed as a variable as opposed to a constant, that impact the dynamics in determining the optimal Pigouvian tax.

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Introduction

Sustainability in the economy is a multi-faceted discussion which is deemed highly relevant, in the current global context, by many experts. One of the key discussions pertaining to sustainability in the economy is the conversation revolving around environmental taxation. To explain the importance of environmental taxation and social cost, consider the example of the infamous case pertaining to DuPont in the 1960's. According to Rich (2016), in an article published in the New York Times magazine, DuPont factories manufactured Teflon nonstick pans since 1960's using a chemical known as PFOA. These chemicals were eventually disposed to nearby rivers and through gas emissions. The water and air were contaminated with PFOA chemicals. DuPont factory workers and people in neighborhoods were affected in terms of health, causing significant rise in cancer (Rich, 2016). The example of DuPont shows that the actions of a company are resulting in society bearing a loss i.e. a social cost. The activity causing this loss, in economics terms, is known as a Negative Externality (Ahuja, 2016). Negative externality causes an external cost on the third party (party which is outside the two main parties, the consumer and the producer) by a producer due to the production of harmful goods which may have negative implications on the third party (Ahuja, 2016). This implies that the producer is not considering the true cost in the manufacturing process. The production cost should not only consider cost pertaining to labor cost, fixed cost, raw material cost, transaction cost etc. These are all private costs. It should also include the external cost such as health-related cost of the people due to air pollution, contamination of rivers and the cost of cleaning the river, etc. caused by the production of such harmful goods. If this external cost is not included, the product price does not reflect the actual social cost and hence results in an overproduction. This leads to an economic concept known as Market Failure. Market Failure is where there exists an inefficient allocation of goods and services.

Various measures have been discussed and are undertaken to address this issue of negative externality caused by overproduction due to market failure. The aim of this research focuses upon examining the relationship between Pigouvian tax and marginal social cost in the presence of distortionary taxes such as commodity and wage taxes in a Ramsey setting (It should also be noted that the administrative cost pertaining to implementing a Pigouvian tax was not the objective of this

research, and it is another area where extensive research has been carried out. For example the paper published by Polinsky et al. (1981) looks into how the Pigouvian tax should be adjusted to reflect administrative costs and is a good starting point but is not related to this research). Correcting externalities by equating the marginal social cost to Pigouvian tax has been a long-discussed area (especially when in the context of distortionary taxes). Marginal social cost is simply the change in social cost due to a unit change in production or consumption of a good. Equating the Pigouvian tax to the marginal social cost, i.e. imposing lump sum taxes to eliminate the social cost, is named as Theory of First Best. It is a policy where the resulting equilibrium would be called "First Best".

There would be no market distortions considered in the first best case. However, the real world consists of market distortions mainly caused by other government taxes. In such a scenario obtaining the equilibrium position is called "Theory of Second Best". That is if a constraint is introduced into the general equilibrium system which prevents attaining one of the pareto conditions, then an optimum situation can be achieved only by departing from all other pareto conditions (Lipsey et al., 1956). In this regard, equating the two will not always eliminate the negative externality. In this regard, an important inquiry arises as to what the actual relationship should be when considering the requirement of government revenue (Ramsey, 1927) and simultaneously the utility maximization of households. An in-depth mathematical analysis of the optimal Pigouvian tax rate, in the presence of distortionary taxes is carried out. It is subject to maximization of household utility and requirement of government revenue by expanding on existing assumptions in a Ramsey setting. This analysis would help to understand the relationship between marginal social cost and Pigouvian tax in the presence of distortionary taxes when the household preferences are considered heterogenous as opposed to homogenous and marginal social cost considered as a variable, which depends on the Pigouvian tax, as opposed to being assumed as a constant.

Literature Review

The literature pertaining to Pigouvian tax dates back to the 1920's when economist Arthur Pigou first posed the idea in "The Economics of Welfare" (Pigou, 1920). It is almost a century old idea posited by Pigou which has been either criticized or idealized and supported by various economists. There have

been many contributions to the development of Pigou's idea of incorporating a tax to eliminate social costs.

According to Pigou (1920), the first-best tax on pollution is equal to the marginal social cost without the condition of no revenue requirement, or the use of lump-sum taxes by the government. In other words, Pigou proposed internalizing externalities via an optimum tax, called the Pigouvian tax. Such that the externality generating good or service production is decreased to the point that the marginal revenue equals the social marginal cost and thus, social welfare is maximized. The proposal of Pigou was a first–best remedy which, in the absence of distortionary taxes in the economy, moves the competitive equilibrium of the economy to its Pareto-efficient frontier. In a second–best environment, this is modified. Building upon the first best remedy, a significant contribution was made by Lipsey et al. (1956) on the theory of second best. The method of second best was used in the literature following this to take into consideration the presence of distortionary structures when calculating optimum solutions.

Sandmo (1975) considers indirect taxation to correct inefficiencies of resource allocation. The author, by analyzing second-best optimal tax structure, introduces the term of additive property. Among those who criticized Pigou's theory were Bovenberg, Mooij and Goulder. According to Bovenberg et al. (1994) and Bovenberg et al. (1996), the optimal environmental tax rate should be below the original Pigouvian tax rate (which fully internalizes the marginal social damage from pollution) in the presence of distortionary taxes in a second best setting. Fullerton et al. (1997) illustrates the concept of presumptive tax which, if it is not possible to tax commodities which create negative externalities, then complementary goods should be taxed. Cremer et al. (1998) analyzed the properties of optimal commodity and income taxes in the presence of externalities. Cremer et al. (2001) mentions about embodying both corrective and optimal tax objectives under a second-best tax rule.

The results obtained by Broadway et al. (2008) is of significant importance to the research we conducted since we built upon the models presented by these authors. The authors mathematically derive the relationship between Pigouvian tax and marginal social cost in the presence of other distortionary taxes such as commodity taxes and wage tax under given assumptions. These assumptions include homogeneity of households in the case of commodity taxes and marginal social cost being considered a constant in the presence of wage taxes. However, in our research we take it a step further by relaxing these assumptions. In the

presence of commodity taxes, we consider heterogeneity of households as opposed to homogeneity. Also, in the presence of wage taxes the marginal social cost is considered as a variable that varies depending on the wage tax as opposed to being considered as a constant. It is pragmatic to consider heterogeneity in its simplest form by considering two groups since households in the complex world have heterogeneous preferences. Also, it is important to consider the dynamics of the marginal social cost when a Pigouvian tax is imposed. It is pragmatic to state that the marginal social cost would vary depending on the Pigouvian tax and not remain a constant as assumed in the literature.

Throughout the years, economists starting from Pigou (1920), to Coase (1960), to Sandmo (1975), to Stiglitz, (1987), to Bovenberg et al. (1994), to Cremer et al. (2001), to Boadway et al. (2008), and so many others, have made significant contributions in this regard to find the optimal tax structure that would incorporate the Pigouvian tax alongside other distortionary taxes such as commodity tax and wage tax subject to various conditions and restrictions in order to maximize utility.

The analysis behind relaxing the above mentioned two assumptions not being addressed in Boadway's paper led us to analyze the relationship between Pigouvian tax and Marginal Social Cost when the above two assumptions were relaxed. Therefore, more recent literature was not applicable in this case as an extension on Boadway (2008) paper was not carried out post 2008, and more recent literature focused upon other segments of Pigouvian taxes such as impact bonds, redistribution of income mobilized via Pigouvian tax, Pigouvian taxes internalizing social cost pertaining to platinum group element emissions, meat tax, managing credit booms via Pigouvian tax etc. and addressed similar relationships by adopting different models under different circumstances.

Research Methodology

The relationship between Pigouvian tax (t_p) and marginal social cost (β) was analyzed using two mathematical models in the presence of distortionary taxes, namely commodity and wage tax by relaxing the two assumptions made in the paper by Boadway et al. (2008). This paper tries to expand on the literature by addressing the following.

1. The first model looked into the relationship between t_p and β with heterogeneous household preferences, constant β, and in the presence of commodity tax.

2. The second model analyzed the relationship between t_p and β with varying β that depended on t_p such that $-1 < \beta'(t_p) < 0$, homogeneous household preferences, and in the presence of wage tax.

It was assumed that the utility function pertaining to households represent a quasilinear preference in leisure (l) (Varian, 1992). Each household's utility function is given by $U_C(C) + U_D(D) + E - L$(Broadway et al., 2008). Where, $U_C(C)$ and $U_D(D)$ represent increasing, strictly concave utilities of clean good C and dirty good D, respectively and $L = T - l$ where L represents labour supply and T represents total time available. Further, environmental quality $E = E_A - \beta ND$, where E_A is environmental quality in the absence of pollution, and N is the number of households (Broadway et al., 2008). By specifying the preferences as quasilinear in leisure, demand for goods depends only on its own prices relative to wage rate, and not on either income or prices of other goods. The only effect of a wage change on one's labor supply decision is the substitution effect (Mascollel et al., 1995). These assumptions help to obtain explicit solutions for the optimal Pigouvian tax rates on a polluting good.

The Lagrangian multiplier is a concept in mathematical optimization, which enables to find the local maximum/minimum of a function subject to equality constraints. Therefore, it was used to mathematically derive the relationship between t_p and β, subject to constraints such as shadow price of government revenue (λ_2) and utility maximization (marginal utility of income given by λ_1) for N in the presence of commodity taxes (t_C). λ_2 is important since it signifies the Ramsey component of the tax (Ramsey, 1927). A polluting good comprises of both Ramsey and Pigouvian effect. The Pareto efficient results obtained below are a result of theory of second best, since the relationship is obtained in the presence of distortionary taxes (Lipsey et al., 1956).

Pigouvian Tax in the Presence of Commodity Taxes

According to Broadway et al. (2008), the mathematical derivation provides us with the basic model for the relationship between Pigouvian tax and marginal social cost in the presence of commodity taxes with homogeneous preferences and constant marginal social cost as,

$$t_P = \frac{\varepsilon N \beta}{(\varepsilon + 1)\lambda_2 - \lambda_1}$$

Where ε is price elasticity of demand.

However, the above result has been derived considering only one group of households (i.e. homogeneous preferences), comprising of a total N number of households, with similar wage rates w.

In the society, this is not the case. Therefore, an analysis was carried out by relaxing this assumption.

Consider a two-household group model namely N_1 and N_2 with wage rates w_1 and w_2, with $w_2 > w_1$ in the presence of commodity tax. This would represent the heterogeneity of household preferences, which has not been considered in previous literature when analyzing the relationship between t_P and β in the presence of commodity taxes.

Let $C_i = (C_1, C_2)$ where C_1 represents the amount of clean goods C bought by household group N_1 and C_2 be the amount of clean goods C bought by household group N_2. In similar fashion $D_i = (D_1, D_2)$ vector can be defined as the amount of dirty goods D bought by each household groups N_1 and N_2. $U_C(C_i)$ would represent the utility of consuming good C_i ($i \in \{1,2\}$).

L_i represents the labor supply of L_1 or L_2 pertaining to household groups N_1 and N_2 respectively**.** The commodity taxes, t_C and t_D, remain the same for either household group. The Lagrangian function for households would then be,

$$L_1(C_i, D_i, L_i, \lambda_i) = U_C(C_i) + U_D(D_i) + E - L_i - \lambda_i((1 + t_C) \times C_i + (1 + t_D) \times D_i - w_i L_i) \quad (1)$$

By first order conditions, $C_i = C_i(\frac{1+t_C}{w_i})$, $D_i = D_i(\frac{1+t_D}{w_i})$ and $\lambda_i = \frac{1}{w_i}$ (2)

Therefore, indirect utility: $v_i\left(\frac{1+t_C}{w_i}, \frac{1+t_D}{w_i}\right) + E$, where $E = E_A - \beta(N_1 D_1 + N_2 D_2)$ (3)

By Envelope theorem, $\frac{\partial v_i}{\partial t_C} = -\frac{C_i}{w_i}$ and $\frac{\partial v_i}{\partial t_D} = -\frac{D_i}{w_i}$ (4)

Now using the Lagrangian function for the government,

$$L_2(t_C, t_D, \lambda_3) = \rho_1 N_1[v_1(.) + E_A - \beta(N_1 D_1 + N_2 D_2)] + \rho_2 N_2[v_2(.) + E_A - \beta(N_1 D_1 + N_2 D_2)] + \lambda_3[t_C(N_1 C_1 + N_2 C_2) + t_D(N_1 D_1 + N_2 D_2) - R] \quad (5)$$

Where, ρ_1 and ρ_2 are arbitrary social weights chosen such that the government can redistribute from high to low wage and λ_3 is shadow price of government revenue. By first order conditions, (using the fact that $\lambda_i = \frac{1}{w_i}$)

$$\frac{\partial L_2}{\partial t_C} = \rho_1 N_1 \left(\frac{-C_1}{w_1}\right) + \rho_2 N_2 \left(\frac{-C_2}{w_2}\right) + \lambda_3 \left[(N_1 C_1 + N_2 C_2) + t_C \left(\frac{N_1 C_1'}{w_1} + \frac{N_2 C_2'}{w_2}\right)\right] = 0 \quad (6)$$

Therefore,

$$\frac{\partial L_2}{\partial t_C} = -(\rho_1 N_1 C_1 \lambda_1 + \rho_2 N_2 C_2 \lambda_2) + \lambda_3 \big((N_1 C_1 + N_2 C_2) + t_C (N_1 C_1' \lambda_1 + N_2 C_2' \lambda_2)\big) = 0 \quad (7)$$

By dividing above equation by $N_1 C_1 + N_2 C_2 \neq 0$;

$$\frac{-(\rho_1 N_1 C_1 \lambda_1 + \rho_2 N_2 C_2 \lambda_2)}{N_1 C_1 + N_2 C_2} + \lambda_3 [1 + \frac{t_C (N_1 C_1' \lambda_1 + N_2 C_2' \lambda_2)}{N_1 C_1 + N_2 C_2} = 0 \quad (8)$$

Consider elasticity $\varepsilon_C = \frac{C_1'(.)}{C_1(.)} \frac{1+t_C}{w_1} = \frac{C_2'(.)}{C_2(.)} \frac{1+t_C}{w_2}$ (9)

Then notice that $\frac{C_1(.)\varepsilon_C}{w_1} = C_1'(.)\lambda_1$ and $\frac{C_2(.)\varepsilon_C}{w_2} = C_2'(.)\lambda_2$. Also let $\overline{\alpha_c} = \frac{(\rho_1 N_1 C_1 \lambda_1 + \rho_2 N_2 C_2 \lambda_2)}{N_1 C_1 + N_2 C_2}$

Therefore, $-\overline{\alpha_c} + \lambda_3 \left[1 + \frac{t_C}{(1+t_C)} \varepsilon_C\right] = 0$ (10)

$$\frac{\partial L_2}{\partial t_D} = \rho_1 N_1 \left(\frac{-D_1}{w_1}\right) + \rho_2 N_2 \left(\frac{-D_2}{w_2}\right) - \beta(\rho_1 N_1 + \rho_2 N_2) \left(\frac{N_1 D_1'}{w_1} + \frac{N_2 D_2'}{w_2}\right) + \lambda_3 [(N_1 D_1 + N_2 D_2) + t_D \left(\frac{N_1 D_1'}{w_1} + \frac{N_2 D_2'}{w_2}\right)] = 0 \quad (11)$$

Dividing this equation by $N_1 D_1 + N_2 D_2 \neq 0$

$$\frac{-(\rho_1 N_1 D_1 \lambda_1 + \rho_2 N_2 D_2 \lambda_2)}{N_1 D_1 + N_2 D_2} - \beta(\rho_1 N_1 + \rho_2 N_2) \left(\frac{N_1 D_1' \lambda_1 + N_2 D_2' \lambda_2}{N_1 D_1 + N_2 D_2}\right) + \lambda_3 \left[1 + t_D \left(\frac{N_1 D_1' \lambda_1 + N_2 D_2' \lambda_2}{N_1 D_1 + N_2 D_2}\right)\right] = 0 \quad (12)$$

Let elasticity $\varepsilon_D = \frac{D_1'(.)}{D_1(.)} \frac{1+t_D}{w_1} = \frac{D_2'(.)}{D_2(.)} \frac{1+t_D}{w_2}$. Hence $\frac{D_1(.)\varepsilon_D}{w_1} = D_1'(.)\lambda_1$ and $\frac{D_2(.)\varepsilon_D}{w_2} = D_2'(.)\lambda_2$

Also let $\overline{\alpha_D} = \frac{(\rho_1 N_1 D_1 \lambda_1 + \rho_2 N_2 D_2 \lambda_2)}{N_1 C_1 + N_2 C_2}$ and $\overline{N} = \rho_1 N_1 + \rho_2 N_2$

Therefore, $-\overline{\alpha_D} + \beta \overline{N} \frac{\varepsilon_D}{1+t_D} + \lambda_3 \left[1 + \frac{t_D}{1+t_D} \varepsilon_D\right] = 0$ (13)

Since preferences are homothetic in C and D and separable in leisure, it implies $\frac{C_1}{D_1} = \frac{C_2}{D_2}$ so that $\overline{\alpha_D} = \overline{\alpha_C} = \alpha$. Also assume that $\varepsilon_D = \varepsilon_C = \varepsilon$.

Thus, the above equations reduce to

$-\alpha + \lambda_3 \left[1 + \frac{t_C}{(1+t_C)} \varepsilon\right] = 0$ (14)

$-\alpha + \beta \overline{N} \frac{\varepsilon}{1+t_D} + \lambda_3 \left[1 + \frac{t_D}{1+t_D} \varepsilon\right] = 0$ (15)

From which the equations for tax on good C and D are obtained,

$t_C = \left(\frac{\alpha - \lambda_3}{\lambda_3}\right) \frac{1+t_C}{\varepsilon}$ and $t_D = \left(\frac{\alpha - \lambda_3}{\lambda_3}\right) \frac{1+t_D}{\varepsilon} + \frac{\beta \overline{N}}{\lambda_3}$ (16)

Suppose $t_P = t_D - t_C$. Then the equation for the Pigouvian component of the tax is obtained in this case as,

$$t_P = \frac{\beta \overline{N} \varepsilon}{[(\varepsilon + 1)\lambda_3 - \alpha]}$$

Pigouvian Tax in the Presence of Wage Taxes

According to Broadway et al. (2008) paper the relationship between Pigouvian tax and marginal social cost in the presence of wage taxes with constant marginal social cost and homogeneous preferences is given by,

$$t_P = \frac{N \beta \varepsilon (1 - t_w)}{\lambda_2(\varepsilon + 1) - (1 - t_w)\lambda_1}$$

Now consider a deviation from the above model.

That is, consider the marginal social cost β as a function of t_p such that $-1 < \beta'(t_p) < 0$, which represents marginal social cost being considered as a variable that depends on the Pigouvian tax as opposed to being considered a

constant. Which is something that has not been addressed. The initial equations that were obtained by using the Lagrangian equation for household will remain the same. Thus,

$$C = C(\tfrac{1}{(1-t_w)w}),\ D = D(\tfrac{1+t_P}{(1-t_w)w}) \text{ and } \lambda_1 = \tfrac{1}{(1-t_w)w} \quad (17)$$

Also, the results from the Envelope theorem would also not change.

$$\frac{\partial V}{\partial t_P} = -\lambda_1 D(.) = \frac{-D(.)}{(1-t_w)w} \text{ and } \frac{\partial V}{\partial t_w} = -\lambda_1 wL(.) = \frac{-L(.)}{(1-t_w)} \quad (18)$$

By use of the Lagrangian equation on the government objective function,

$$L_2(t_P, t_w, \lambda_2) = N\big[V(.) + E_A - \beta(t_p)ND(.)\big] + \lambda_2[NC\tfrac{t_w}{1-t_w} + ND\tfrac{t_P+t_w}{1-t_w} - R] \quad (19)$$

The above equation differs from the model where the marginal social cost was considered a constant. In this model it is considered as a function of the Pigouvian tax itself. By the first order conditions the following expression is derived,

$$\frac{\partial L_2}{\partial t_P} = \frac{-ND}{(1-t_w)w} - \frac{\beta N^2 D'}{(1-t_w)w} - \beta' N^2 D + \lambda_2\left[\frac{ND}{1-t_w} + N\frac{t_P+t_w}{(1-t_w)^2 w}D'\right] = 0 \quad (20)$$

Thus resulting in, $\frac{-D}{w} - \frac{\beta ND'}{w} - \beta' N(1-t_w)D + \lambda_2[D + \frac{t_P+t_w}{(1-t_w)w}] = 0$ (21)

Dividing this equation by D and using the equation for elasticity and marginal utility of income, the following equation is obtained,

$$-(1-t_w)\lambda_1 - \beta N\varepsilon\frac{(1-t_w)}{(1+t_P)} - \beta' N(1-t_w) + \lambda_2[1 + \frac{\varepsilon(t_P+t_w)}{(1+t_P)}] = 0 \quad (22)$$

$$\frac{\partial L_2}{\partial t_w} = N\left[\frac{-L}{(1-t_w)} - \frac{\beta ND'(1+t_P)}{w(1-t_w)^2}\right] + \lambda_2[NC\frac{(1-t_w)-(t_w)(-1)}{(1-t_w)^2} + \frac{Nt_w}{(1-t_w)}C'\frac{1}{(1-t_w)^2 w} + \frac{ND(1-t_w)(1)-(t_w+t_P)(-1)}{(1-t_w)} + \frac{N(t_w+t_P)D'(1+t_P)}{(1-t_w)w(1-t_w)^2} = 0 \quad (23)$$

And thus, by similar substitutions made the following is obtained,

$$\frac{-C}{w} + \lambda_2\left[C + \frac{C't_w}{(1-t_w)w}\right] + (1+t_P)\left[\frac{-D}{w} - \frac{\beta ND'}{w} + \lambda_2 D + \lambda_2\frac{D'(t_P+t_w)}{(1-t_w)w}\right] = 0 \quad (24)$$

Therefore, by substituting above expression, the following is obtained,

$$-(1-t_w)\lambda_1 + \lambda_2(1+\varepsilon t_w) + (1+t_p)\beta' N\frac{D(.)}{C(.)}(1-t_w) = 0 \qquad (25)$$

Now by multiplying equation (25) by $(1+t_P)$, and rearranging the terms,

$$t_P[-(1-t_w)\lambda_1 + \lambda_2(1+\varepsilon) - \beta' N(1+t_w)] = \lambda_1(1-t_w) - \lambda_2(1-\varepsilon t_w) + N\beta\varepsilon(1-t_w) + N\beta'(1-t_w) \qquad (26)$$

Therefore, the Pigouvian tax in this case would be,

$$t_P = \frac{\lambda_1(1-t_w) - \lambda_2(1+\varepsilon t_w) + N(1-t_w)[\beta\varepsilon + \beta']}{[\lambda_2(1+\varepsilon) - (1-t_w)\lambda_1 - \beta' N(1-t_w)]}$$

Results and Discussion

The results derived were mathematically proven above as it is a mathematical based analysis. The Lagrangian Multiplier approach was adopted as it is an optimization problem. Based on the mathematical derivations, the objective of the first model is to determine the optimum Pigouvian tax rate in the presence of commodity taxes when households are determined as heterogeneous. In both prior models, households were considered as homogeneous entities. This model is an aberration from that. This model considers heterogeneous households. It considers two groups of households namely, $N_1$and N_2. These two groups earn two different wage rates, namely w_1 and w_2. It is important to note that w_2>w_1. However, for calculation simplicity stake the β value is considered as constant.

$$t_P = \frac{\beta\bar{N}\varepsilon}{[(\varepsilon+1)\lambda_3 - \alpha]}$$

This equation is also analogous to the expression that was obtained by Broadway et al. (2008), which provided us with the basic model for the relationship between Pigouvian tax and marginal social cost in the presence of commodity taxes with homogeneous preferences and constant marginal social cost, except for the changes in λ_3, α and $\bar{N}$.

Note that at $\varepsilon = -1$, $t_P = \frac{\beta\bar{N}}{\alpha} = \frac{\beta}{\alpha}(\rho_1 N_1 + \rho_2 N_2) = \frac{\beta}{\alpha}\rho_1 N_1 + \frac{\beta}{\alpha}\rho_2 N_2$, which is different to that of Broadway et al. (2008) model at $\varepsilon = -1$, where $t_P = \frac{\beta N}{\lambda_1}$. In the model we derived for t_P in the presence of commodity taxes, when we

consider unitary elasticity the Pigouvian tax depends on the marginal social weights assigned to each household group since β, N_1, N_2 are all constants and optimum value of α was pre-determined when considering the first order conditions in the Lagrangian function. Thus, the Pigouvian tax rate at unitary elasticity is an important observation.

Next it is important to analyze the sensitivity in the model we derived. That is, the sensitivity of the Pigouvian tax rate with regards to elasticity and the shadow price of government revenue. Therefore, by partially differentiating t_P, with respect to ε and λ_3,

$$\frac{\partial t_P}{\partial \varepsilon} = \frac{(\lambda_3 - \alpha)\beta \bar{N}}{[(\varepsilon+1)\lambda_3 - \alpha]^2} \text{ and } \frac{\partial t_P}{\partial \lambda_3} = \frac{-\beta \bar{N}(\varepsilon+1)\varepsilon}{[(\varepsilon+1)\lambda_3 - \alpha]^2}$$

Since α and $\bar{N}$ depend on the social weights assigned to them, the sensitivities also depend indirectly on the weights been assigned as well.

Note that, as before in this case also when unitary elasticity is considered the sensitivity of the Pigouvian tax to the shadow price of government revenue is zero. In the same case the sensitivity of Pigouvian tax rate to elasticity $\frac{\partial t_P}{\partial \varepsilon} = \frac{(\lambda_3 - \alpha)\beta \bar{N}}{\alpha^2} > 0$ assuming that $\lambda_3 > \alpha$. Also, assuming that $\alpha < \lambda_1$(marginal utility in this model is less than the marginal utility of the first model) then the sensitivity is higher in this model compared to the model obtained by Broadway et al. (2008) and vice versa.

$\frac{\partial t_P}{\partial \lambda_3} = \frac{-\beta \bar{N}(\varepsilon+1)\varepsilon}{[(\varepsilon+1)\lambda_3 - \alpha]^2}$ value depends on the elasticity. If $-1 < \varepsilon < 0$, then it is positive. However, if elasticity is greater than -1, then the value is negative. This value compared to the value obtained in Broadway's model, depending on $\bar{N}$, α and λ_3, will help determine which Pigouvian tax rate is more sensitive to the shadow price of government revenue under each scenario laid out.

Subtle changes were made to the model obtained by Broadway et al. (2008) where the model we derived looked at heterogenous households as opposed to homogeneous households. The changes were then compared with each other to get an understanding and an insight into Pigouvian tax rates in the presence of commodity taxes. Further research could be carried out where in the model we derived the β could be considered as a function of tax on good D rather than a constant. Such alterations enable other researchers to further delve into the theory

of Optimal Pigouvian taxes in the presence of commodity taxes given that it is analyzed in a Ramsey environment.

The objective of the second model was to understand the behavior and nature of the Pigouvian tax when the marginal social cost is considered as a function of the Pigouvian tax in the presence of a wage tax t_w. This is a somewhat complex model. However, the calculation was made simple, and the derivation was not difficult.

The Pigouvian tax obtained in this scenario was,

$$t_P = \frac{\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)+N(1-t_w)[\beta\varepsilon+\beta']}{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_w)]} \tag{27}$$

The numerator can also be re-written in the following manner, by substituting

$(1+t_p)\beta' N\frac{D(.)}{C(.)}(1-t_w)$ for the expression $\lambda_1(1-t_w)-\lambda_2(1-\varepsilon t_w)$,

$$t_P = \frac{(1+t_p)\beta' N\frac{D(.)}{C(.)}(1-t_w)+N(1-t_w)[\beta\varepsilon+\beta']}{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_w)]} \tag{28}$$

Unlike the other equations, the Pigouvian tax component in this case cannot be separated easily since t_P determines the demand for goods C and D. Also, it determines β. Since all three of these variables depend on the Pigouvian tax t_P, it is not possible in this case to separate them. However, a basic understanding can be obtained from the expression derived for the Pigouvian tax component in this scenario.

From the model obtained by Broadway it is possible to obtain an equation similar to the equation above. It would be in the following form,

$$t_P = \frac{\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)+N\beta\varepsilon(1-t_w)}{\lambda_2(\varepsilon+1)-(1-t_w)\lambda_1} \tag{29}$$

which is very much similar to equation (28). However, why the equation that was obtained in model by Broadway et al. (2008) is different to that of equation (29) above is that, $\lambda_1(1-t_w)-\lambda_2(1-\varepsilon t_w)$ was proven to equal zero. However, in model we derived, the same equation does not equal to zero. It equals to $(1+t_p)\beta' N\frac{D(.)}{C(.)}(1-t_w)$. Which implies that the Pigouvian tax depends on the optimum demand for goods D and C. Where D in turn depends on the Pigouvian tax. However, the optimum demands were calculated when the Lagrangian

equation was used for the objective function of households in order to determine the optimum demands. If $(1+t_p)\beta' N\frac{D(.)}{C(.)}(1-t_w)$ were to be substituted instead of $\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)$ then t_P would be,

$$t_P=\frac{\beta' N(1-t_w)(\frac{D}{C}+1)+N\beta\varepsilon(1-t_w)}{\lambda_2(\varepsilon+1)-(1-t_w)\lambda_1-\beta' N(1-t_w)(\frac{D}{C}+1)}$$

Keeping in mind that $-1<\beta'<0$.

Clearly the Pigouvian tax in this case is smaller in value compared to the Pigouvian tax obtained in model obtained by Broadway et al. (2008). Why? Since the term $\beta' N(1-t_w)(\frac{D}{C}+1)$ is added to the denominator due to the fact that $-1<\beta'<0$. Also, the same term is deducted from the numerator.

Thus, when the marginal damage to the environment (β) is a constant then the Pigouvian tax is larger compared to when the marginal damage to the environment is considered as a function of t_P., which is an important observation. β may also be considered as a function of both t_P and t_w. Since the tax on wages and tax on consuming dirty goods would eventually have an impact on curtailing the usage of goods harming the environment due to the reduction in disposable income with respect to tax on wage.

In such a case suppose $\beta=\beta(\frac{t_P}{1-t_w})$ such that $-1<\frac{\partial\beta}{\partial t_P}<0$ and $-1<\frac{\partial\beta}{\partial t_w}<0$. That is marginal damage to the environment decreases as tax on wage and tax on dirty good increases. The same calculation can be observed with minor alterations. The important expression that is obtained in this calculation is the following,

$$\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)=[-\beta' N t_P\frac{D}{C}+\frac{(1+t_P)\beta N D'}{cw}]$$

By substituting this expression in $t_P=\frac{\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)+N[\beta\varepsilon(1-t_w)+\beta']}{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N]}$ the following equation is obtained for Pigouvian tax in the scenario where the marginal damage to the environment is not only depending on tax on the dirty good but also the wage tax. After a few mathematical manipulations the following important expression is obtained.

$$t_P = \frac{N\beta\varepsilon(1-t_w)(\frac{D}{C}+1)+\beta' N}{\left[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_P\frac{D}{C})\right]}$$

It is important to compare this expression, which is the Pigouvian tax component when the marginal damage is a function of both t_P and t_w, with the Pigouvian tax obtained when the marginal damage is a function of t_P only. This provides a better understanding of the behavior of Pigouvian tax in differing environments, even when changes as subtle as this are made. It is not very clear as to which tax is larger since it depends on the values of tax on wage and the values of the demands of goods D and C.

Next it is important to analyze the sensitivity in the model we derived. That is, the sensitivity of the Pigouvian tax rate with regards to elasticity and the shadow price of government revenue. Therefore, by partially differentiating t_P, with respect to ε and λ_2,

$$\frac{\partial t_P}{\partial \varepsilon} = \frac{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_w)](N\beta(1-t_w)-\lambda_2 t_w)-\lambda_2[N\beta\varepsilon(1-t_w)+[\lambda_1(1-t_w)-\lambda_2(1+\varepsilon t_w)]+N\beta'(1-t_w)]}{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_w)]^2} \quad (30)$$

$$\frac{\partial t_P}{\partial \lambda_2} = \frac{-N\beta\varepsilon(1-t_w)(1+\varepsilon)-\lambda_1\varepsilon(1-t_w)^2-N\beta'\varepsilon(1-t_w)^2}{[\lambda_2(1+\varepsilon)-(1-t_w)\lambda_1-\beta' N(1-t_w)]^2} \quad (31)$$

Implications and Conclusions

The overall objective of this research was to scrutinize the changing dynamics of Pigouvian tax rate in relation to marginal social cost within the presence of an already existing distortionary tax system in a Ramsey environment. The distortionary tax system was not taken up as a whole i.e., all the distortionary taxes were not considered together in a single system, but rather it was segregated into commodity taxes, and wage taxes such that the tax structure had only one distortionary tax at a time alongside the Pigouvian tax. This was done in order to obtain a better understanding of the optimal Pigouvian tax behavior in the presence of individual distortionary tax systems in place.

In the model (presented by Boadway) for Pigouvian tax in the presence of commodity taxes, the assumption on homogeneity of households was relaxed.

Practically in an economic sense, it is not possible to come across a homogeneous set of households. It is safe to assume that almost all the households are heterogenous. Therefore, this model focused upon finding the Pigouvian tax rate and its relationship to marginal social costs when the households are heterogeneous, while keeping the marginal damage to the environment constant. It was interesting to see that the Pigouvian tax rate was analogous to that of the model obtained by Broadway although the terms are different. If the elasticity is a negative one in both models, and the marginal utility of income in the model we derived is less than that of the model obtained by Broadway, then the value of the Pigouvian tax is higher in the model we derived compared to the model obtained by Broadway. This again is an important observation, since it tells the policy maker to be aware of the relevant details pertaining to not only the elasticity of the good but also have a certain understanding of the marginal utility of income of families when imposing such a tax.

The deviation from the model obtained by Broadway for Pigouvian tax in the presence of wage taxes is presented in the model we derived where the marginal damage to the environment is considered as a function of tax on dirty good. It was considered that when the tax rises the marginal damage reduces. One important observation is that in the model we derived the Pigouvian tax is greater in value than that of the optimal Pigouvian tax in the model obtained by Broadway under certain conditions. That is, the optimal Pigouvian tax in the presence of wage tax is higher when the marginal damage to the environment was considered a variable as opposed to a constant. However, it was observed that a comparison could not be drawn in the other occasion, for which raw data was required. The sensitivity of the Pigouvian tax to elasticity was lower in our model compared to the model obtained by Broadway in one case. That is the Pigouvian tax was more sensitive to elasticity in the presence of wage tax when the marginal damage was considered a constant as opposed to being considered as a variable. The other case required raw data in order to draw comparisons. Analyzing equation (31) showed us that the sensitivity of the Pigouvian tax to shadow price of government revenue, in absolute terms, was lower in our model compared to Broadway's model. That is to say, that when the marginal damage to the environment was considered a constant, the sensitivity of the Pigouvian tax was higher as opposed to when the marginal damage was considered to be a variable in the presence of wage taxes.

In the case where optimal Pigouvian tax is calculated in the presence of commodity taxes, policy makers should consider the following. In the case of

inelastic demands, the Pigouvian tax would diverge positively from marginal social cost as government revenue requirements increase. The Pigouvian tax would diverge negatively from marginal social cost as revenue requirements increase in the case of elastic demands. In an example, when deciding upon introducing a carbon tax into a tax structure which already comprises of a commodity tax on fuel (which could be treated as an inelastic good), as the government revenue requirements increase, the carbon tax should be imposed at a higher level than the marginal social cost caused by the consumption of fuel in the economy. Also policy makers should consider the fact that if for example, the marginal damage caused by the release of toxic waste by a certain factory to the waterway reduced along with the increase of the tax imposed on the company factory, then what the research outcome posits is that the government should impose a relatively lower Pigouvian tax compared to the case where a Pigouvian tax is imposed when the marginal damage caused by the release of toxic waste to the waterway remained constant (that is to say the company does not reduce the amount of toxins released).

In the case of Pigouvian tax implemented in the presence of wage taxes, policy makers have to take into consideration the elasticity of the good. If the elasticity of the good is such that a change in price will not affect total revenue (i.e., unrelated goods), then the Pigouvian tax should be implemented equivalent to the marginal social cost. However, if these goods are either complementary or substitutable, then the Pigouvian tax should be set at a lower value compared to Pigouvian tax set under commodity tax structure. However, the sensitivity of the Pigouvian tax to elasticity was higher in the presence of commodity taxes as opposed to linear progressive income tax. Policy makers should also collect data pertaining to income tax, marginal social damages, shadow price of government revenue etc. in order to draw comparison between the optimal Pigouvian tax in the presence of commodity tax and in the presence of linear progressive income tax. This would enable them to come up with an optimal value for the Pigouvian tax.

In conclusion it is of vital importance to have policy dialogue pertaining to Pigouvian tax, since understanding the optimal value at which it should be imposed would help countries to raise more revenue and direct this revenue as cash transfers to those from rural society, which is another area of research where much research is being carried out. In the long run, having an understanding of an optimum Pigouvian tax (in the presence of distortionary taxes) would help to implement taxes such as carbon taxes in order to bring down emissions quickly

and lower the cost of transition (moving to a low carbon economy as is the main priority to tackle climate change).

Further research could include a model that could be developed such, that it includes all three of these distortionary taxes along with the Pigouvian tax, thereby determining the optimal Pigouvian tax in the midst of three types of distortionary taxes. Econometric/Machine Learning based modeling based on data to analyze the relationship between Pigouvian taxes and Marginal social cost in situations where the mathematical models do not provide answers is also another aspect that could be further looked into in order to either disprove or further existing mathematical models. Also, the administrative cost pertaining to implementing Pigouvian taxes in this scenario can be considered in further research to determine the dynamics of Pigouvian taxes and how its relationship with marginal social cost would differ.

Declaration of Conflicting Interests

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

Authors' Contributions

TSV performed the mathematical analysis and was responsible for partially drafting the manuscript, K participated in its design and coordination and helped to draft the manuscript. All authors have read and approved the final version of the manuscript and agree with the order of presentation of the authors.

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Influence of Socio-economic and Demographics factors on Households' Savings in Sri Lanka

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Abstract

The purpose of this paper is to examine the factors influencing saving behavior among households in a developing country. Sri Lanka being a developing country, has recorded a relatively lower households' saving rate when compared with its peer regional counterparts. The study approximates the socio-economic and demographic factors towards the level of saving of households in Sri Lanka using a quantile regression approach based on the Household Income and Expenditure Survey, conducted by the Department of Census and Statistics of Sri Lanka. Results were obtained by using the stepwise quantile regression technique. The findings of this study conclude that when Sri Lankan households have a higher per-capita income, they tend to have a higher saving level. Moreover, age and marital status have a significant impact on the level of saving in Sri Lankan households. Additionally, poverty and employment status have a significant impact to the level of saving on Sri Lankan households. This research paper bridges empirical gaps in this area of study. Furthermore, this study has been conducted encompassing the entire country rather than limiting it to a district or segment, hence, is comprehensive. As per the generated results gender, income and education levels have shown a significant positive impact towards the level of saving, whilst marital status and poverty have shown a significant negative impact towards the level of saving. It is considered that when the demographic and socio-economic factors are affecting favorably, the level of saving tends to increase and vice versa. Accordingly, findings of the study can provide insights to policymakers to devise policies and

incentives to encourage savings behaviour and level of savings among households in Sri Lanka. This is beneficial as coping strategies specially during

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crises, where dependency of households on government assisted welfare schemes is likely to be less.

Keywords: *Household Saving Behaviour, Motives of Savings, Barriers to Saving, Quantile Regression*

Introduction

In the global context, savings can be considered as an essential element in financial behavior, which provides an individual with psychological security and boosts their overall sense of wellbeing. It is seldom a conventional topic in social work. Financial functioning of individuals and households plays a vital role in wellbeing. Saving money is essential as it helps to protect households in a financial emergency. Moreover, saving money can help households to pay for large acquisitions, avoid debt, reduce financial stress and provide them with a greater sense of financial freedom. The household saving can be considered as the portion of disposable income which is kept aside without spending on consumption but accumulated or invested in different sources. Likewise, savings can be broadly defined as: "Saving is a flow variable and refers to the accumulation of assets and debts over a specific period. Savings is a stock variable and refers to the net worth of a person's assets at a moment in time. The saving ratio expresses the part of income that is saved during a period and gives a relative measure of saving" (Nyhus, 2018). This conveys the tendency of an individual to save since it explains which portion of an individual's income is set aside. Furthermore, household saving is the foremost domestic source of funds deployed to finance capital investments, a major influence for long term economic growth. The total amount of net savings as a percentage of net household disposable income can be considered as the net household saving rate.

Even though saving is an adaptive strategy or behaviour, many individuals do not possess the required knowledge, or they do not tend to save money. Therefore, inadequate amount of savings cannot uplift the living standards of households. The World Bank statistics show that developing countries such as Thailand and Bangladesh, have recorded Gross Savings of $171.08bn and $107.92bn respectively, whereas Sri Lanka has recorded around $24.4bn (The World Bank, 2019). In many instances it has been proved that saving money is important. The latest example is the outbreak of the coronavirus (COVID-19) pandemic in early 2020, which has interrupted daily activities of economies, organizations, and households. Since many countries have imposed lockdown mechanisms to curb

the spread of the virus, companies have started to downsize, and cutting down on wages, and work contracts have been dried up (The World Bank, 2019). Income sources of households are disturbed, and this has created a hectic situation. Generally, financial advisors recommend households to set aside three to six months' worth of living expenses in order to be used in a precautionary situation (Elkins, 2020). This justifies the importance of saving, as many households struggle to fulfill their basic needs, especially the households who earn daily wages and are severely hit by the crisis.

Sri Lankan household saving ratio is linked to the ratio of household income saved to household net disposable income at a given period of time. The factors affecting savings behaviour, saving motives, and impact of socio-economic and demographic factors will be discussed in detail to investigate the saving behaviour among Sri Lankan households. Furthermore, the Gross Domestic Savings in Sri Lanka as a percentage of GDP from 2010 to 2019 has been fluctuating in the range of 15.2% to 27.2%. The household saving rate has decreased from 21.3% in 2019 to the forecast value of 20% in 2020 (Trading Economics, 2020). In the above circumstances, a research gap can be noted in the Sri Lankan setting. Therefore, there is a significant need to discuss household saving behaviour and socio-economic and demographic characteristics that affect the savings among households in Sri Lanka.

Objective

The objective of this study is to identify the influence of socio-economic and demographic factors towards the level of saving in Sri Lankan households.

Significance of the Study

This research differs from existing studies in some ways. First, savings among households is a pressuring issue in the country. Over the years, an ordinary household needs to save for precautionary situations due to various reasons such as to consume after retirement, to spend on higher education, to purchase assets, and to settle huge bills. Therefore, it is essential to save as households. Second, research studies in the Sri Lankan context conducted to date were confined to district-wise or province-wise. This study is the first attempt carried out at a broad level, based on the Household Income and Expenditure Survey (HIES) survey data that represent the entire country. Thus, this study will be useful to understand findings that are unique to the local context. Thirdly, the HIES carried out by the Department of Census and Statistics (DCS) of Sri Lanka has recorded an average household income of Sri Lankan Rupees (SLRs) 62,237 per month whereas

SLRs. 43,511 was the median household income per month in the year 2016. The Sri Lankan saving ratio is linked to the ratio of household income saved to household net disposable income at a given time. Hence, findings of this research can provide valuable insights to the Government of Sri Lanka for planning welfare provisioning and social policies as an essential part of its fiscal management. Therefore, factors affecting savings behavior, saving motives and the impact of socio-economic and demographic factors will be discussed in detail to investigate the saving behaviour among Sri Lankan households. Finally, these findings will be helpful especially for the banking and financial services sector as well as policymakers who aim to revive the economy in COVID-19, the global pandemic which occurred in late 2019.

The remaining sections of this paper are organised as follows. Section 2 describes literature review with previous studies highlighting significance of this study, while Section 3 presents data and the methodology. Section 4 describes empirical results and the discussion and finally Section 5 presents the conclusion with policy implications.

Literature Review

A comparative study on household behavior carried out in India and China stated that in order to understand household saving behavior among developing countries, the life-cycle hypothesis is found to be useful. Here, income growth and age dependency showed a positive effect and a negative effect respectively. Therefore, reasons are valid to consider the demographic structure as a key determinant in household saving behavior (Ang, 2009). Chamon & Prasad (2010) also carried out a study on rising saving behavior rates in China. The study has been based on data from the annual urban household surveys conducted by China's National Bureau of Statistical which asserted that households headed or controlled by young and old households (25-69 age group) have the highest saving rates. On the contrary, it was also found that some researchers have stated that age has a negative effect on household saving (Ozcan et al., 2003). Finally, a study conducted in the local context has also confirmed that age of households is not a significant determinant of savings. Abundant literature and evidence prove that age does not affect household savings.

When a male individual is considered, it is expected for them to save more before their retirement given that, that person is in the labor market for a short period of time (Yamada et al., 1992). Female households are negatively associated with saving, since results show a significant negative impact between saving and

gender. It was also indicated that female households are not good at saving compared to male households According to a study conducted by Mori, (2019) in Tanzania, females prefer informal sources to save in line with the perception that formal sources are for the high-income category.

The present study takes into account the variable, martial status of households. Grinstein-Weiss et al. (2006) discovered that marital status has an influence on household savings, but married households tend to save more. Another study carried out by Jianakoplos et al., (1996) stated that married households save significantly higher than single, divorced or widowed households who are estimated to accumulate 16% of target wealth than the others listed above. Marital status of a household as a variable for the saving behavior has a negative effect. Households that are widowed, separated or polygamous are found to save less than household heads who have never married. This can be further explained based on married households in Nigeria who try to meet the daily consumption needs rather than saving (Nwosu et al., 2019). Kumarasinghe & Jayasinghe, (2016) confirm that gender and marital status are significant determinants of savings.

The findings supported the fact that household saving rates tend to be higher for households with higher education, more workers, better health and more assets (Lugauer et al., 2019). On the contrary, when household education level is considered, households with decision makers with no schooling background have the highest saving rate which is 27.7% whereas, households with decision makers with primary education, secondary education and post-secondary education show a saving rate of 17%, 15.5% and 14% respectively (Poon and Hon, 2015). The study carried out by Jayasinghe et al. (2016) explored that a lower level of education and less awareness on the benefits of savings are found among most of the households in this district; analysis found out that lack of education and confidence have a significant influence on the level of saving.

Precautionary saving appears to be significant since it increases the income variable which leads to considerably more savings (Jianakoplos et al., 1996). Income level is considered to have a significantly positive impact on the level of saving rates in Turkey and growth rate of income is not statistically significant (Ozcan et al., 2003). Low-income consumers are more likely to save for daily expenses, while the middle-income group prefers saving for emergency expenses (Mauldin et al., 2016). Additionally, in the local context it was found that there is a negative stimulus on the awareness of financial products and a positive value on differentiation of income sources (Heenkkenda, 2014).

For self-employed workers, the income variability is likely to be greater. It is found that there is a positive and statistically significant relationship with household saving, and level of income varies with the households where more than one person is working/employed (Jianakoplos et al., 1996). A long-term reduction of unemployment and the necessity on unemployment, disable households, sole parents' payments could increase the nation's saving rate since the income of the households are being raised (Harris et al., 2002). However, in the local context, government and business sector employees have recorded a positive and statistically significant value with household saving (Heenkkenda, 2014).

The urban household saving rates in China has risen while rapid income growth and prospects of sustained high-income growth have been approximately 7 per cent during the period from 1995–2005 (Chamon & Prasad, 2010). Results of another study supported the fact that in the urban sector, propensity to save is substantially higher than in the rural sector. This points out to the role of income redistribution between the said sectors (Gupta, 1974). Finally, in the local context, it was identified that there is a positive impact on saving among both rural and urban sectors. These two sectors possessed the highest knowledge on household saving than the households who live in the estate sector in the country (Heenkkenda, 2014).

Moav and Neeman (2012a) concluded that the rate of saving increases with income, in particular, that the poor's savings rate is very low, the reason being that the poor fail to save and spend their income on festivals and tobacco. The generated results of the study support the fact that household's level of poverty has a positive impact on household level of saving. A study carried out in India stated that 2.22% reduction in rural poverty has increased the share of savings by 1% in the years 1997 to 2010 (Karlan et al., 2014). Another study pointed out that households who live in poverty face many difficulties which have intensified over the past years due to a relatively higher number of households who do not save money. Although these low-income households tend to save, they have to set aside money to build better living standards for their families (Halpern-Meekin et al., 2015). In the local context, Colombage (2012) discovered that the majority of households were poor, below the poverty line and also possess a low financial literacy compared to other households above the poverty line. It is likely that these households find it difficult to access financial services in the country. Therefore, household savings of these households tend to be lower than that of other households.

As per the above, surveys carried out in the savings field stated that there are significant factors affecting savings behaviour. Therefore, literature of shortlisted in the study reflects the influence and behaviour of various socio-economic and demographic characteristics of savings. When focusing more on practical implications of the current society regarding the factors which will affect the level of savings, it is necessary to investigate how socio-economic and demographic factors influence the level of saving.

Table 1 represents all the variables that were used by previous researchers in order to measure the level of savings.

Table1: Common Variables Used to Measure Level of Savings

Variable	Research Paper
Age	(Ang, 2009) (Chamon & Prasad, 2010) (Ozcan et al. 2003) (Kumarasinghe and Jayasinghe, 2016)
Gender	(Yamada et al. 1992) (Mori, 2019)
Marital Status	(Grinstein-Weiss et al., 2006) (Jianakoplos et al., 1996) (Nwosu et al., 2019) (Kumarasinghe & Jayasinghe, 2016)
Employment	(Jianakoplos et al., 1996) (Harris et al., 2002) (Heenkkenda, 2014)
Income Level	(Ozcan et al., 2003) (Jianakoplos et al., 1996) (Heenkkenda, 2014)
Level of Education	(Lugauer et al., 2019) (Poon & Hon, 2015) (Jayasinghe et al., 2016)
Geographical Location	(Chamon & Prasad, 2010) (Gupta, 1974) (Heenkkenda 2014)
Poverty Level	(Moav & Neeman, 2012a) (Karlan et al. 2014) (Halpern-Meekin et al., 2015) (Colombage, 2012)

Methods

Conceptual Framework

The following conceptual framework was inspired and developed based on a study carried out by Garcia et al. (2011). Figure 1 illustrates, the conceptual framework developed which contains two independent and dependent variables

such as demographic characteristics and socio-economic factors, and level of saving respectively. The researchers were able to identify four demographic characteristics and five socio-economic factors that affect the saving behaviour of households with the help of the literature review. As the final objective, the impact of socio-economic and demographic characteristics towards the level of saving of households will be identified.

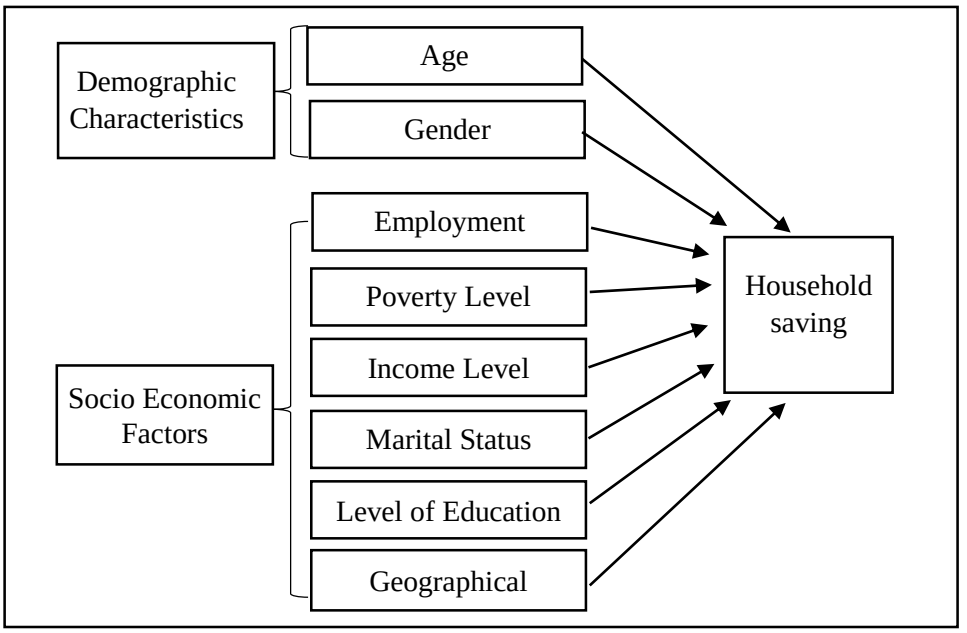

Figure 1: Conceptualization Framework
Source: Based on Garcia et al. (2011)

Data

The current study is aimed at finding the influence of socio-economic and demographic characteristics on the level of households' saving in the Sri Lankan context. This study is handling quantitative data compiled from secondary information sources. Since 1980, the DCS in Sri Lanka have been gathering data through the HIES to assess living conditions of Sri Lankan households. This study focuses on the latest HIES conducted in 2016. The sample comprises of 25,640 household units including responded households of 21,756. According to data that contribute to the HIES 2016, the survey captures the most significant socio-economic information to adopt for financial improvements, socio-economic approaches, and related plans.

Data analytical tool

Data collected by the HIES 2016 has been analyzed under the quantile regression method. The concept of quantile regression was essentially instituted in the late ’70s. Ordinary sample quantile in the location model has neutrally combined with the learner model and it has generated a new statistical term regression quantile (Koenker and Bassett 1978). In this study, the most basic function of quantile regression has been unveiled.

$$Y_i = x_i\beta_q + e_i \quad \ldots\ldots (1)$$

Instead of having one coefficient beta, this function has sets of coefficient data that is beta “q” where it is associated with the q’s quantile of the dependent variable.

Furthermore, it’s necessary to utilise quantile regression in this study since the study has a well-distributed population among the whole county. The quantile regression has similar model setups for household saving function under cluster and individual data. Specifically, data with regard to household characteristics and backgrounds enable to investigate the household’s optimization impact in detail from a quantile regression (Chen et al., 2007).

$$S_i = x_i'\beta + \varepsilon_{i'}\ i = 1,2,\ldots n, \quad \ldots\ldots (2)$$

where:

X is a vector of covariates,

β is the vector of parameters and ε is the error.

The vector X accommodates the influence of household savings with income, household expenditure, and other socio-economic and demographic factors relevant in the household’s decision. The decision as to which independent variable to espouse is supported by an empirical classification and exploratory analysis. Table 2 shows the possible independent variables that could affect the level of saving among Sri Lankan households, including socio-economic, demographic, and geographic location of the households. The stepwise quantile regression technique was selected to evaluate whether there is a significant difference between the explanatory variables and the level of saving among Sri Lankan households.

Table 2: Variable Definitions for the Household Dataset

Variable	Description	Expected Sign
Level of saving	10 saving deciles	
Income	The monthly per-capita income of the household heads (SLRs. '000)	(+)
Age	Age of the household heads (in years.)	(-)
Gender	1 if male: 0 if female	(+)
Marital Status	Separate dummy variables for never married, married, widowed, divorced; Divorced is the reference category	(-/+)
Education	Separate dummy variables for no schooling, primary, secondary, tertiary, special education; Special education is the reference category	(+)
Geographical Location (Sector)	Separate dummy variables for Urban, Rural, Estate; Estate is the reference category	
Geographical Location (District)	Separate dummy variables for Colombo, Gampaha, Kaluthara, Kandy, Matale, Nuwara Eliya, Galle, Matara, Hambantota, Jaffna, Mannar, Vavuniya, Mullaitivu, Kilinochchi, Batticaloa, Ampara, Trincomalee, Kurunegala, Puttalam, Anuradhapura, Polonnaruwa, Badulla, Monaragala, Rathnapura, Kegalle. Mullaitivu is the reference category	(-/+)
Poverty	1 if poor: 0 if non-poor; Poverty line adopted by DCS to measure poverty in Sri Lanka. (The current value of OPL is Rs. 4,166 per person per month for 2016)	(-)
Employment Status	Separate dummy variables for government sector employee, semi-government sector employee, private sector employee, employer, own-account worker, unpaid family worker;	(-/+)

Results and Discussion

Quantile Regression of Households' Per Capita Savings

This study presents empirical findings on the influence of socio-economic and demographic factors towards the level of savings among households in Sri Lanka

by utilizing the Ordinary Least Square (OLS) and quantile regression methods. The basic characteristics of each independent variable are presented in Appendix 1. Regarding the consideration of socio-economic and demographic factors of households in Sri Lanka, an average of 74.41% are male-headed households and 25.86% are controlled by female-headed households. The average age of a household head is 53 years and 77.63% of household heads tend to be married. The majority of household heads has completed their education in Sri Lanka to the secondary stage, and, as a percentage, it stands at 71%. Additionally, the highest number of households located in the rural area of Sri Lanka is approximately 79.95%. In Sri Lanka, the majority of the household heads are employed in the private sector which is 30.26% following the lowest recording from the employer category unpaid family worker with 0.47%.

The initial quantile regression was estimated by utilizing all explanatory variables and results are shown in Appendix 2. Finalizing the variables for the stepwise quantile regression technique was adopted with a coefficient above 0.10 and some of the already selected variables were removed when evaluating the final stepwise quantile regression model. i.e. variables such as Buddhist and Burgher.

In Table 3, the study has reported the result for the whole sample of household units in Sri Lanka by applying the stepwise quantile regression. The OLS results are presented in the column labeled "OLS" and quintiles regression results have been classified into nine quantiles which have labelled as Q1 for q= 0.1, Q2 for q=0.2, etc.

The figures of quantile regression results estimators for some covariates and especially for household saving often deviate significantly from the corresponding OLS regression estimator. This again specifies that utilizing the quantile regression is more adequate for this study than the OLS regression methods.

Income of Households' Savings

In Table 3, the first line is represented by household per-capita income which tends to be the most important factor affecting household saving. By investigating the results, the scholars have established that across the quantiles of per-capita income the effect has become stronger over the quantiles, i.e. in quantile one (Q1) the households who have a lower income tend to save SLRs. 6.42. Nevertheless, when the income is expanding households tend to save more, i.e. in the ninth quantile (Q9) households tend to save SLRs. 817.53 as indicated by the past researchers' Current household income tends to have a positive impact on

household saving. Specifically, an increase in household income can lead to an increase in household savings (Hua & Erreygers, 2019). When considering with the past researchers, it can be said that the study's generated results support the fact that household income has an impact on household saving and also the household saving rate in Sri Lanka.

Age of Households' Savings

The age variable results in Table 3 contain a significant difference when it approaches OLS and quantile results itself. The impact of age on household-level of saving among the quantiles has decreased. Furthermore, the estimated coefficient demonstrates that the age of households has a statistically larger, negative contribution on the highest quantile of households' per capita savings. According to the study carried out by Kumarasinghe and Jayasinghe (2016), it was found that age dependency is not a significant determinant of the households' saving. However, that particular study was limited to the Colombo district only; on the contrary this study reflects a holistic view about the entire country and thereby, identified that age has a negative impact on households' savings.

Gender of Households's Savings

When considering the gender of the household head on household saving, there is a significant difference between OLS results and other quantile results which revealed that the fourth quantile has a negative impact compared to the third quantile, while all the eight quantiles recorded a positive impact on households' savings (refer Table 3). Therefore, it can be said that gender of household head has a significant positive impact on households' saving. A study conducted in Tanzania stated that gender of the household head has a significant negative impact towards households' saving (Mori, 2019). Nevertheless, the per capita income of Tanzania in the year 2016 was around $ 2,500 whilst, Sri Lanka recorded a per capita income of $ 12,000. Therefore, when comparing these two economies the Tanzanian economy can be considered as one of the world's poorest economies.

Marital Status of Households' Savings

According to the results of Table 3, the generated coefficients of the marital status categories, the results revealed that married, widowed and separated marital status categories have a statistically significant larger negative contribution on the highest quantile of household per capita saving, than the lowest and median quantile which are 606.62, 681.68 and 1,036.27. The relationship tends to have a decreasing manner from Q1 quantile to Q9 quantile in separated household heads

respectively Another study supported the fact that, marital status of a household as a variable for the saving behavior has a negative effect. Households that are widowed, separated or polygamous are found to save less than household heads who have never married (Nwosu et al., 2019). Therefore, when the marital status of the household head is considered, it can be said that this study and the study conducted by the past researchers are on par with one another.

Education of Households' Savings

The impact of the education of the household head on household saving is complex. The primary education results tend to have fewer amounts of savings rather than secondary and tertiary education levels. Furthermore, the results indicate the gap comparing levels of education and in some quantile this gap is insignificant (Refer Table 3). Additionally, no schooling tends to have no results among the eight quantiles which conclude that there is no significant difference and there is no significant impact from no schooling to the level of saving of households in Sri Lanka. However, there is a significant positive impact among the household heads that have completed up to primary, secondary and tertiary education. Xiao and Fan (2002) concluded that households with higher educational backgrounds tend to save more for retirement, purchases, asset growth, and children. Hence it is evident that results related to education variable of this study are on par with the results of the past researchers and thereby the education level of the household head has a significant positive impact on the households' savings.

Geographical Location of Households' Savings

When considering the estimated coefficient of the geographical location, sector wise generated results revealed that the urban sector has a statistically significant negative contribution on the median quantile to highest quantile of household per capita saving which are SLRs -483.78, SLRs 521.85, SLRs -521.80, SLRs -442.32 and SLRs -557.46 respectively. Moreover, generated results in Table 3 revealed that the urban sector has a statistically significant positive contribution on the quantile one to quantile four which was SLRs 356.06, SLRs 266.79, SLRs 372.94 and SLRs 408.75 respectively. By referring to Table 3 the gap of urban and rural households' impact on the level of saving is comprehensible. According to past literature, it is evident that rural households have higher saving rates than urban households. Thus, it can be concluded that urban and rural households have a statistically significant impact towards level of saving (Pan, 2016).

Coefficient demonstrates that among the 25 districts, 17 districts represent an insignificant relationship towards the per capita savings. However, Polonnaruwa, Badulla and Moneragala represent a statistically larger negative contribution among the lowest to the highest quantile of household per capita saving. The coefficient of other districts revealed that there is a statistically larger negative contribution to each quantile of household per capita savings. Matale district tends to record the highest saving value as SLRs. 965.68 and the lowest saving was recorded from Colombo as SLRs. -3246.61. Even though the results obtained for urban and rural sectors showed a positive impact on households' savings and on the contrary when the districts of the country were taken into consideration the results showed a different picture, as the population was scattered among the 25 districts. Consequently, when the districts of the country were analyzed, it revealed that there is an insignificant relationship towards households' savings.

Poverty Level of Households' Savings

Furthermore, in Table 3 the estimated coefficient of households 'poverty level has a statistically larger negative contribution for each quantile. As per the generated results, the larger contribution on the lowest quantile of household per capita saving was SLRs.3750.56 whereas the highest quantile of household per capita saving was SLRs.2512.22. As per the evidence of Moav and Neeman (2012b) it was concluded that the poor fail to save, since they spend their income on expenses such as festivals and tobacco. The generated results of the study and the results of past researchers support the fact that households' level of poverty has a negative impact on households' level of saving.

Employment Status of Households' Savings

When considering the estimated coefficient of the five categories of employment status, results of Table 3 revealed that the government sector and semi-government sector employment categories have a statistically proven positive contribution to the lowest quantile of the households' per capita saving than the median and highest quantile of the households' per capita saving. Furthermore, the estimated coefficient of the private sector employment category also shows a statistically larger positive contribution to the lowest quantile which was SLRs.3314.59 compared to the median and highest quantile which was SLRs.1361.55 and SLRs.447.65 respectively. Results of employment status illustrate that the employer category has recorded a statistically larger negative contribution to the lowest quantile which was SLRs.8291.55 compared to the highest quantile which was SLRs.1334.54. According to the studies conducted by

Jianakoplos et al. (1996) those self-employed workers' income variability is likely to be greater, thus there is a positive and statistically significant relationship with household saving. Finally, it is evident that the household heads who are employed have a significant positive impact towards the level of savings.

In accordance with the above findings and studies carried out relevant to the savings field, it is evident that above-mentioned demographic and socio-economic factors affect the level of saving positively as well as negatively. As per the generated results gender, income and education levels have shown a significant positive impact towards the level of saving, whilst marital status and poverty have shown a significant negative impact towards the level of saving. It is considered that when the demographic and socio-economic factors are affecting favourably, the level of saving tends to increase and vice versa.

Table 3: Stepwise Quantile Regression Estimation Results for Household Dataset, Sri Lanka

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Per capita income	512.7***	6.4	175.1***	277.6***	375.9***	475.9***	564.0***	638.4***	720.6***	817.5***
	(4.17)	(3.92)	(2.55)	(1.87)	(1.59)	(1.45)	(1.38)	(1.67)	(1.40)	(1.63)
Age	31.7***	37.6***	31.7***	24.7***	18.6***	17.9***	12.6***	9.62***	6.66***	3.44*
	(7.57)	(7.01)	(4.56)	(3.37)	(2.96)	(2.71)	(2.46)	(2.73)	(2.03)	(1.89)
Gender	-569.0**	-789.6***	-687.9***	-469.7***	-502.3***	-417.5***	-238.0***	-285.1***	-234.0***	-180.1***
	(277.81)	(262.44)	(168.37)	(124.22)	(106.44)	(98.49)	(88.01)	(98.81)	(70.60)	(65.65)
Marital Status	1169.7***	1279.3***	727.5**	553.0**	569.7***	606.6***	665.8***	574.8***	423.8***	489.7***
Married	(542.19)	483.298	(329.78)	(244.98)	(211.07)	(187.60)	(166.99)	(192.35)	(142.26)	(131.54)
Widowed	1246.33**	994.00*	804.97**	581.60**	765.79**	681.68**	660.64**	670.98**	512.67**	583.50**
	(581.19)	(515.82)	(350.16)	(260.92)	(225.88)	(201.23)	(179.46)	(206.99)	(153.80)	(142.54)
Separated	1707.33**	1617.96**	1130.88**	901.32**	1055.01***	1036.27***	985.64**	939.95**	759.81**	736.19**
	(751.74)	(667.70)	(455.41)	(338.59)	(292.17)	(260.42)	(231.65)	(266.13)	(197.36)	(181.67)
Education										
No Schooling				-3,277.6						
				(2,133.)						
Primary	-962.9*	-991.1**	-542.9*	-3849.7*	-491.6**	-455.7**	-570.4***	-537.8***	-443.9***	-295.5**
	(514.34)	(454.99)	(310.38)	(2,123.8)	(199.79)	(177.88)	(158.75)	(182.51)	(135.79)	(125.36)
Secondary	-2754.48***	-2061.54***	-1294.37***	-4648.16**	-1257.16***	-1177.64***	-1294.52***	-1216.94***	-1068.49***	-790.99***
	(503.19)	(440.23)	(301.18)	(2,122.217)	(195.10)	(174.10)	(155.63)	(179.66)	(134.36)	(124.74)

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Tertiary	-9516.42***	-7394.53***	-4592.83***	-8004.05***	-5174.21***	-5119.95***	-4960.34***	-4689.73***	-4284.35***	-3672.62***
	(737.87)	(659.45)	(447.88)	(2,135.85)	(288.42)	(257.88)	(230.49)	(265.19)	(200.15)	(188.91)
Geographical Location										
Sector	-799.31***					-483.78***	521.85***	-521.50***	-442.32***	-557.46***
Urban	(293.09)					(101.41)	(91.24)	(105.74)	(78.49)	(72.06)
Rural		356.06	266.79*	372.94***	408.75***					
		(220.18)	(151.91)	(114.04)	(100.17)					
Districts	-4148.19***	-2771.85***	-2200.72***	-2730.36***	-2522.91***	-3058.71***	-3246.61***	-3118.37***	-3117.01***	-2439.16***
Colombo	(398.44)	(323.14)	(226.65)	(166.22)	(151.07)	(145.90)	(151.51)	(155.67)	(121.73)	(108.41)
Gampaha	-2079.93***	-1236.52***	-462.51**	-1194.08***	-1160.98***	-1528.45***	-2005.98***	-1898.39***	-1828.71***	-1471.64***
	(362.19)	(310.09)	(218.09)	(155.41)	(139.61)	(131.91)	(138.64)	(139.92)	(109.29)	(97.60)
Kaluthara	-2699.25***	-2054.64***	-1066.01***	-1467.60***	-1173.09***	-1568.35***	-1529.25***	-1378.50***	-1395.21***	-905.16***
	(430.32)	(370.60)	(258.87)	(187.10)	(166.019)	(153.96)	(155.49)	(161.80)	(124.49)	(112.09)
Kandy	-2162.27***	-1362.36***		-1000.36***	-695.27***	-1231.48***	-1176.94***	-1066.97***	-1035.02***	-787.53***
	(406.84)	(350.30)		(176.22)	(157.24)	(146.14)	(149.38)	(153.59)	(118.47)	(106.17)
Matale		965.6**	782.3**			-723.7***	-931.9***	-751.9***	-600.1***	-637.1***
		(482.11)	(333.09)			(194.40)	(187.94)	(202.06)	(152.78)	(138.95)

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Nuwara Eliya	-832.12**			-737.91***	-451.07**	-1247.19***	-1316.06***	-1138.16***	-1086.54***	-771.57***
	(495.60)			(221.17)	(196.22)	(175.41)	(172.31)	(182.61)	(139.16)	(124.92)
Galle	-1219.51***	-740.76**	-734.56***	-1282.54***	-822.39***	-1036.35***	-1212.94***	-957.33***	-1125.27***	-796.43***
	(414.25)	(358.52)	(249.62)	(179.39)	(159.83)	(148.73)	(151.35)	(156.50)	(120.43)	(107.83)
Matara	-884.83**		431.05*			-617.29***	-740.18***	-651.96***	-697.36***	-572.78***
	(429.89)		(259.53)			(153.73)	(155.16)	(160.87)	(123.62)	(110.44)
Hambantota	-2337.81***	-1360***	-970.43***	-1613.35***	-889.26***	-1469.02***	-1636.02***	-1483.57***	-1399.66***	-1177.73***
	(498.96)	(435.40)	(302.34)	(218.80)	(193.28)	(176.72)	(173.71)	(184.52)	(140.34)	(125.6975)
Jaffna		-718.29				-355.75**	-606.94***	-485.96**	-386.84***	-331.93**
		(464.64)				(188.69)	(183.15)	(196.26)	(149.15)	(134.56)
Mannar		-2451.19***	-1237.72***	-1565.94***	-1267.35***	-1623.71***	-1791.38***	-1459.73***	-1305.33***	-838.71***
		(651.93)	(450.62)	(332.28)	(289.31)	(261.37)	(243.92)	(269.04)	(202.69)	(184.64)
Vavuniya						-873.30***	-1117.50***	-1019.43***	-1217.44***	-1195.04***
						(255.19)	(238.85)	(263.24)	(198.15)	(181.22)
Kilinochchi	1002.26		808.63*							
	(728.01)		(436.89)							
Batticaloa	1669.86***	725.64	935.39***		355.83**		-286.91		-331.99**	
	(529.47)	(461.89)	(318.56)		(205.49)		(181.58)		(147.33)	

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Ampara				-829.25***	-482.78**	-932.50***	-1259.84***	-1035.78***	-1041.87***	-877.99***
				(223.58)	(197.48)	(180.31)	(176.56)	(187.32)	(143.01)	(128.71)
Trincomalee	894.81		874.74*		489.4**					
	(620.21)		(375.66)		(240.73)					
Kurunegala	-2535.27***	-1577.43***	-555.23**	-1162.04***	-841.01***	-1199.05***	-1238.23***	-1029.35***	-985.72***	-782.02***
	(382.79)	(329.24)	(231.03)	(164.73)	(147.42)	(137.66)	(142.76)	(145.40)	(112.80)	(100.75)
Puttalam	-2046.32***	-1588.85***	-1633.59***	-1728.47***	-1299.69***	-1688.96***	-1640.25***	-1472.25***	-1583.97***	-998.12***
	(518.83)	(452.75)	(314.38)	(228.42)	(201.13)	(183.56)	(179.21)	(191.34)	(145.31)	(131.31)
Anuradhapura		609.26	783.48***			-431.19**	-948.62***	-918.24***	-944.05***	-783.16***
		(434.63)	(302.90)			(177.25)	(173.92)	(184.86)	(140.88)	(127.51)
Polonnaruwa	1049.8*		724.2**		435.6*		-367.0 *	-329.45	-355.3**	-359.6**
	(578.79)		(351.60)		(224.40)		(195.43)	(211.47)	(159.93)	(145.37)
Badulla	697.39		702.1**		439.5**		-225.95			
	(508.96)		(307.27)		(197.46)		(175.99)			
Monaragala	1548.49***	1795.25***	1597.48***	760.95***	699.80***					
	(587.46)	(515.29)	(354.91)	(259.16)	(227.53)					
Rathnapura		759.48**	869.31***		378.60**	-213.51	-393.40**	-270.40	-399.11***	-381.73***
		(384.09)	(268.86)		(172.41)	(158.64)	(158.87)	(165.53)	(127.11)	113.42270
Kegalle	-1201.13**			-664.62***		-9879.60***	-1008.64***	-970.37***	-1065.29***	-782.48***
	(475.03)			(207.58)		(168.74)	(166.93)	(175.88)	(134.54)	(121.01)

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Poverty										
Poor	4439.31***	3750.56***	3419.12***	3221.75***	3209.63***	3120.60***	2967.76***	2794.18***	2699.92***	2512.22***
	(499.85)	(430.10)	(297.23)	(221.17)	(192.74)	(172.74)	(155.04)	(179.24)	(133.66)	(125.38)
Employment Status		2374.81***	1244.34***	977.62**	712.26**	566.78**	199.22		-375.31**	-475.87**
Government sector employee		(372.08)	(229.45)	(170.98)	(147.61)	(140.72)	(127.77)		(99.34)	(91.65)
Semi government employee		1472.20***	1288.41***	830.18**	381.05		-373.29*	-520.43**	-601.72**	-602.60**
		(565.13)	(371.60)	(277.73)	(239.71)		(196.73)	(221.34)	(161.63)	(149.88)
Private sector employee	1860.37***	3314.59***	2593.69***	2033.27***	1549.54***	1361.55***	1132.98***	918.06**	683.16**	447.65**
	(243.09)	(250.02)	(133.14)	(98.71)	(85.05)	(91.95)	(85.26)	(88.81)	(57.67)	(53.52)
Employer	-3125.84***	-8291.55***	-2701.17***	-2136.86***	-2050.97***	-1600.51***	-1585.72***	-1685.22***	-1542.69***	-1334.54***
	(638.77)	(581.10)	(382.95)	(284.04)	(245.43)	(224.90)	(201.47)	(227.46)	(165.96)	(154.21)
Own account worker	486.5**	-416.46*				134.51	115.43	122.73		
	(235.48)	(238.75)				(88.03)	(81.22)	(85.41)		
Unpaid family worker									711.2**	
									(338.40)	
Pseudo R^2		0.0460	0.0541	0.0879	0.1345	0.1965	0.2731	0.3638	0.4743	0.6225
R^2	0.4198									

Note: * p<0.1; ** p<0.05; *** p<0.01; Standard errors in parenthesis.
Source: Authors 'calculation based on the DCS (2016)

Conclusion and Policy Implications

This research paper investigated the influences of socio-economic and demographic factors towards the level of saving of households in Sri Lanka based on data of the HIES 2016. To achieve research objectives of the study, authors

applied quantile regression as an alternative for OLS regression for analysis of data. Most importantly, results of quantiles have a significant difference from the OLS regression. The main findings of the study by utilizing OLS and quantile regression can be concluded as follows.

Results of quantile regression illustrate that households with higher per-capita income tend to save higher than households with lower per-capita income. This concludes that when per-capita income gets higher, the saving too will be higher among Sri Lankan households. Policy implications can be recommended through the Government of Sri Lanka collaborating with financial sector institutions. The policymakers can draw policies targeting those who are in lower quantiles to offer them attractive saving rates compared to rates offered to people who are in higher quantiles. By revising the saving rate applicable for the lower quantile, people will save more and people who already save will experience a less effect because this does not concern their quantile. Furthermore, more tax-supported saving plans can be introduced to increase the saving behaviour of the poor people.

The policymakers can pay attention to how the marital status has affected household savings in Sri Lanka. The separated households tend to save more than the married households exhibiting a social issue in Sri Lanka in the year 2016. On the other hand, it is useful to explore the composition of expenses of married households and investigate what expenses account for a larger share of the total income, root causes etc. Moreover, the policymakers can look beyond traditional savings instruments and programmes such as new financial services, investments etc., with flexible conditions and attractive returns on savings, to boost the urban households. Moreover, the government can increase the awareness of school children in order to nurture a positive attitude towards savings at the earliest age.

It can be recommended that people from self-employment categories need to be provided with a wide range of facilities, as their level of savings seems to fluctuate with their income levels, exploring how people of different household levels perceive the risk aspect when saving is useful. Employment variable does not capture migratory workers, a segment which makes a significant contribution to the local economy, whose remittances to their home country (Sri Lanka) can positively impact towards the level of saving among households.

This study includes several limitations as well. Limitations of secondary data in the HIES 2016, hindered researchers of this study from broadening the findings.

A further study can use panel data that would enable researchers to examine more accurate inference of the model parameter with greater capacity.

Declaration of Conflicting Interests

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

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Appendix 1: Characteristics of Sri Lankan Households in 2016

	Analytical Sample (N=21,756)	
Variable	**% (Mean if numerical)**	**Std. deviation**
Income[a]	16.39	22.60
Age[a]	52.63	14.05
Gender		
Male[b]	74.14%	
Female[b]	25.86%	
Marital Status		
Never married[b]	2.22%	
Married[b]	77.63%	
Widowed[b]	16.80%	
Divorced[b]	0.65%	
Separated[b]	2.70%	
Education		
No Schooling[b]	3.42%	
Primary[b]	22.81%	
Secondary[b]	70.80%	
Tertiary[b]	2.93%	

Variable	Analytical Sample (N=21,756) % (Mean if numerical)	Std. deviation
Special Education[b]	0.03%	
Geographical Location		
Sector		
Urban[b]	15.76%	
Rural[b]	79.95%	
Estate[b]	4.29%	
Districts		
Colombo[b]	9.13%	
Gampaha[b]	8.34%	
Kaluthara[b]	5.26%	
Kandy[b]	6.04%	
Matale[b]	2.91%	
Nuwara Eliya[b]	3.74%	
Galle[b]	5.76%	
Matara[b]	5.24%	
Hambantota[b]	3.67%	
Jaffna[b]	3.16%	
Mannar[b]	1.50%	
Vavuniya[b]	1.58%	
Mullaitivu[b]	1.37%	
Kilinochchi[b]	1.60%	
Batticaloa[b]	3.23%	
Ampara[b]	3.52%	
Trincomalee[b]	2.24%	
Kurunegala[b]	7.11%	
Puttalam[b]	3.35%	
Anuradhapura[b]	3.64%	
Polonnaruwa[b]	2.62%	
Badulla[b]	3.50%	
Monaragala[b]	2.54%	
Rathnapura[b]	4.79%	
Kegalle[b]	4.14%	
Poverty Status		
Poor[b]	3.36%	
Non-poor[b]	96.64%	
Employment Status		
Government sector employee[b]	6.91%	
Semi government employee[b]	2.21%	
Private sector employee[b]	30.26%	
Employer[b]	2.11%	
Own account worker[b]	28.33%	
Unpaid family worker[b]	0.47%	

Source: Author's calculation based on the (DCS 2016)

Notes: [a] Based on all households that reported every explanatory variable.

[b] Binary variable.

Appendix 2: Initial Quantile Regression estimation results for household data set, Sri Lanka

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Per capita income	512.92	8.08*	175.18	276.70	377.31	475.29	563.88	637.98	720.79	817.95
	(4.19)	(4.17)	(2.75)	(2.02)	(1.76)	(1.59)	(1.41)	(1.58)	(1.50)	(1.6211)
Age	32.090	39.62*	31.46*	26.20*	19.41*	16.71*	12.73*	10.23*	7.296*	4.45**
	(7.99)	(7.52)	(5.20)	(3.87)	(3.43)	(3.02)	(2.52)	(2.69)	(2.25)	(1.92)
Gender	-	-	-	-	-	-	-	-	-	-
	(288.5	(279.2	(192.62	(141.8	(125.1	(109.2	(90.23)	(96.23	(80.37)	(69.08)
Marital										
Never married	-	-	-498.62	345.49	349.78	-0.03	-225.53	-15.39	-360.6	-
	(1,248.	(1,144.	(811.00	(603.2	(535.0	(471.6	(392.91	(417.0	(350.16	(300.9
Married	33.39	1,136.	219.35	838.23	833.89	605.97	444.25	567.26	232.09	310.24
	(1,110.	(1,013.	(722.87	(537.2	(475.8	(419.4	(349.31	(370.9	(311.39	(268.1
Widowed	122.63	873.24	317.08	898.63	1007.3	697.52	438.06	654.46	311.4	396.84
	(1,122.	(1,024.	(727.58	(541.3	(480.5	(423.8	(353.09	(374.9	(315.20	(270.3
Divorced	-	-	-	-	-					
	-	-	-	-	-					
Separated	580.36	1,571.	665.54	1222.8	1315.9	1025.7	758.12	942.62	562.54	584.16
	(1,221.	(1,122.	(794.33	(590.1	(523.5	(461.5	(384.23	(408.1	(342.30	(292.8
Education										
No Schooling	-	-	-	-	-	-	-	-	-980.28	-435
	(4,955.	(1,522.	(2,807.	(2,298.	(1,921.	(1,732	(1,409.	(1,590	(1,212.	(391.3
Primary	-	-	-	-	-	-	-	-	-	-
	(4,935.	(1,463.	(2,792.	(2,287.	(1,911.	(1731.	(1,402.	(1,583	(1,205.	(375.7
Secondary	-	-	-	-	-	-	-	-	-	-
	(4,932.	(1,456.	(2,790.	(2,286.	(1,910.	(1,742	(1,402.	(1,583	(1,205.	(373.4
Tertiary	-	-	-	-	-	-	-	-	-	-
	(4,960.	(1,539.	(2,809.	(2,301.	(1,924.	(1,740	(1,411.	(1,593	(1,215.	(394.7
Geographical Sector										
Urban	-	325.08	323.61	84.54	-63.63	-	-469**	-	-	-
	-	(523.8	(365.33	(274.9	(246.8	(219.0	(183.45	(196.8	(166.86	(144.6
Rural	782.69	616.92	512.93	439.06	351.58	95.73	52.03	44.88	20.26	-
	(295.9	(459.1	(319.89	(241.6	(217.6	(193.7	(162.54	(174.3	(147.94	(127.5
Estate	1012.5	-	-	-	-					
	(578.7	-	-	-	-					
Districts										
Colombo	-	-	-	-	-	-	-	-	-	-
	(846.7	787.47	(548.12	(408.5	(362.2	(320.3	(267.08	(285.1	(239.25	(204.6
Gampaha	-	-	-490.40	-	-	-	-	-	-	-
	(820.46)	(762.33)	(534.10)	(397.43)	(351.58)	(310.42)	(258.49)	(275.27)	(230.77)	(197.75)
Kaluthara	-	-	-	-	-	-	-	-	-	-
	(851.3	(795.6	(554.31	(412.4	(364.9	(322.1	(268.23	(285.3	(239.13	(204.6
Kandy	-	-	-249.35	-	-	-	-	-	-	-
	(841.0	(786.3	(547.34	(407.1	(360.4	(318.2	(265.00	(282.0	(236.52	(202.2
Matale	-	1,309.	729.42	363.36	-	-	-	-	-	-
	(918.5	(8,860.	(597.82	(444.6	(393.6	(347.4	(289.47	(308.0	(258.02	(220.2
	-	563.00	142.44	-	-	-	-	-	-	-

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Nuwara	(920.3	(852.6	(591.62	(442.2	(393.3	(348.3	(290.55	(309.7	(260.30	(223.4
Galle	-	-	-736.45	-	-	-	-	-	-	-
	(843.8	(790.6	(549.38	(408.6	(361.6	(319.3	(265.89	(282.9	(237.16	(202.9
Matara	-	341.08	390.63	219.86	-	-	-	-	-	-
	(851.2	(796.3	(554.56	(412.4	(364.9	(322.1	(268.09	(285.1	(238.80	(203.8
Hambantota	-	-	-	-	-	-	-	-	-	-
	(887.5	(830.7	(576.91	(429.5	(380.4	(335.7	(279.78	(297.7	(249.36	(213.6
Jaffna	-	-	268.32	158.82	-80.33	-	-	-	-	-
	(907.5	(848.6	(590.21	(439.4	(389.2	(343.1	(285.77	(303.9	(254.61	(217.1
Mannar	-	-	-	-	-	-	-	-	-	-
	(1,048.	(980.7	(682.03	(506.7	(449.0	(396.5	(330.26	(351.5	(294.18	(251.5
Vavuniya	-	353.24	50.43	-	-	-	-	-	-	-
	(1,035.	(966.1	(673.55	(500.7	(444.0	(391.6	(326.24	(346.9	(290.71	(249.2
Kilinochchi	667.76	1,117.	778.80	566.25	280.17	-90.29	44.55	-25.75	-109.63	-
	(1,029.	(960.1	(666.90	(498.4	(441.6	(389.1	(324.31	(344.3	(288.31	(245.5
Batticaloa	1,300.	1,106.	868.39	654.03	321.27	-	-243.82	-	-413.39	-
	(905.6	(851.8	590.67	(439.2	(388.6	(342.6	(285.07	(302.9	(253.42	(216.3
Ampara	-73.76	109.58	-65.79	-	-	-	-	-	-	-
	(895.1	(838.9	(582.91	(433.6	(383.7	(338.7	(281.97	(299.7	(251.24	(214.1
Trincomale	530.61	1,013.	859.15	731.09	447.77	62.18	13.220	86.94	-51.49	-
e	(960.9	(901.7	(626.27	(466.0	(412.2	(363.6	(302.66	(321.9	(269.22	(229.6
Kurunegala	-	-	-581.50	-	-	-	-	-	-	-
	(827.0	(774.3	(537.84	(400.2	(354.3	(312.9	(260.61	(277.4	(232.56	(199.0
Puttalam	-	-	-	-	-	-	-	-	-	-
	(898.0	(841.9	(584.47	(434.5	(385.3	(339.8	(283.23	(301.3	(252.37	(215.8
Anuradhap	-	1,030.	803.13	516.25	133.26	-	-	-	-	-
ura	(887.5	(829.2	(577.25	(429.5	(380.2	(335.7	(279.74	(297.8	(249.61	(213.9
Polonnaruw	685.77	819.46	760.63	629.91	378.85	-57.94	-321.41	-	-	-
a	(933.7	(870.8	(608.02	(452.1	(400.2	(353.3	(294.28	(313.1	(262.30	(224.4
Badulla	307.25	800.64	743.82	434.50	364.21	104.65	-165.57	-	-204.1	290.76
	(898.0	(837.5	(582.60	(433.8	(384.5	(339.7	(283.33	(302.1	(253.31	(217.0
Monaragala	1,224.	2234.3	1,556.7	1191.3	631.25	233.68	162.90	87.21	-52.83	-
	(938.4	(880.4	(611.10	(454.4	(402.4	(355.1	(295.70	(314.4	(263.34	(225.3
Rathnapura	-30.57	1,215.	856.65	556.03	321.92	-	-329.13	-302.9	-	-
	(859.3	(804.8	(559.72	(416.5	(368.5	(325.1	(270.60	(287.7	(240.85	(206.1
Kegalle	-	347.09	51.77	-	-	-	-	-	-	-
	(874.1	(819.1	(569.72	(423.5	(374.7	(330.7	(275.42	(293.0	(245.57	(209.5
Poverty										
Poor	4420.2	3731.2	3422.5	3233.6	3184.8	3118.4	2959.4	2812.4	2711.3	2,535.
	(501.4	(455.9	(319.90	(239.4	(213.8	(189.3	(158.60	(169.9	(143.07	(123.2
Employment										
Governmen	317.65	2376.9	1183.1	981.49	696.43	556.14	206.50	45.85	(358.08	(395.4
t sector	(416.1	(396.4	(272.62	(202.5	(179.5	(157.5	(131.03	(139.2	(116.67	99.33)
Semi	-	1458.2	1306.7	815.59	294.01	-11.62	-	-	-	-
government	(641.8	(598.3	(418.41	(311.2	(275.6	(242.9	(201.79	(214.8	(179.79	(153.7
Private	1886.5	3371.9	2564.9	2060.7	1557.4	1350.6	1144.6	951.96	704.76	477.24
sector	(278.5	(266.3	(183.56	(135.5	(120.1	(105.4	(87.74)	(93.73	(78.44)	(67.22)
Employer	-	-	-	-	-	-	-	-	-	-
	(655.3	(618.9	(428.15	(318.3	(281.9	(248.1	(205.99	(219.9	(183.65	(157.7
	522.02	-	-74.97	5.83	-17.47	115.30	124.27	146.77	30.86	61.60

	OLS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Own	(266.0	(254.5	(175.68	(129.4	(114.8	(100.7	(83.71)	(89.29	(74.82)	(63.66)
Unpaid	1,072.	985.93	623.38	393.28	187.65	433.77	253.12	407.85	723.52	173.74
family	(1,303.	(1,221.	(843.69	(627.7	(553.1	(491.3	(408.83	(434.5	(363.84	(312.4
Pseudo R^2		**0.0463**	**0.0542**	**0.0881**	**0.1346**	**0.1966**	**0.2732**	**0.3639**	**0.4743**	**0.6226**
R^2	**0.4200**									

Note: * p<0.1; ** p<0.05; *** p<0.01; Standard errors in parentheses.

Source: Authors 'calculation based on the (DCS 2016).

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The impact of Company-specific and Macro-economic factors on Company Performance: Evidence from Insurance Sector in Sri Lanka

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Abstract

This study examines the impact of company-specific and macro-economic factors on insurance companies' financial and market performance in Sri Lanka. The analysis was conducted using a panel regression. The sample consisted of nine listed insurance companies from 2010 to 2019, inclusive of both years. Capital structure, capital adequacy, liquidity position, and company size were considered as company-specific factors, whereas inflation and GDP growth were considered as market-specific factors. Net profit margin, return on assets, return on equity, and earnings per share were considered to measure the financial performance. In contrast, market value-added (MVA) was used to measure the market performance. Capital adequacy and capital structure have a significant negative association with financial performance, whereas the size is positively related to financial and market performance. The GDP growth rate is negatively associated with financial performance. Moreover, the liquidity position of the company is positively related to the MVA. The study provides evidence that the capital structure, capital adequacy, GDP growth rate, size of the company and liquidity position are essential factors that affect the insurance sector's financial and market performance in Sri Lanka. The study recommends that Sri Lankan insurance companies pay due attention to these factors to address financial and market performance matters. There is a dearth of studies in Sri Lanka on this

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phenomenon. We contribute as the direct study that analyzes the financial and market performance of the insurance sector in Sri Lanka in a single study.

Keywords: *Company-specific factors, Financial performance, Market performance, Insurance sector, Macroeconomic factors, Sri Lanka.*

Background of the Study

The insurance sector is a vital part of the country's financial system. The performance of this sector would significantly impact the other sectors and the development of the economy. Consequently, insurance companies offer a range of economic and social benefits, such as minimizing the impact of losses, reducing uncertainty and fear, and creating job opportunities (Mazviona et al., 2017). The business world is risky without insurance, and due to the prevailing uncertain business environment, the companies cannot fully absorb the risk (Akotey et al., 2013). The insurance sector in Sri Lanka is contributing largely to the economy while achieving significant execution of their industry averages in terms of Gross Written Premium (GWP), profitability, insurance penetration, and density as well as from the view of the claiming of losses (Gulsun & Umit, 2010; Ansah–Adu et al., 2011). Hence, it is crucial to identify and keep the momentum of the factors that drive this sector's performance.

The growth of a company's financial performance is one of the main objectives of its management (Burca & Batrinca, 2014). The insurance sector is determined by underwriting performance, claims management, risk selection, and marketing campaigns (Malik, 2011). Further, the financial performance of insurance companies is influenced by a variety of company-specific characteristics, industry-specific characteristics, and macro-economic factors. Therefore, investors, financial analysts, researchers, and supervisory authorities are vigilant in identifying the factors that contribute to the financial performance of insurance companies (Burca & Batrinca, 2014).

The problematic factors encountered by the companies are to precisely and reliably identify whether company-specific factors (internal) and macro-economic factors (external) impact a company's financial and market performance. Both developed and developing countries have used company-specific factors (i.e., capital structure, capital adequacy, liquidity position, age, and size of the company) and macro-economic factors (i.e., GDP growth rate and

inflation rate) in their studies (Thangavelu, 2015) to analyze how these independent variables impact the company's financial performance and market performance, relating to various industries. Specifically, in the context of Sri Lanka, a dearth of studies is seen relating to this phenomenon, and the impact on the financial and market performance of the insurance sector may vary due to variable differences among countries.

Moreover, many studies have focused on the financial sector around the world. In the beginning, such studies were conducted in developed countries, mainly focusing on the banking sector (Thangavelu, 2015). Financial institutions cover both banks and insurance companies. Still, due to industry regulations, policies, and other environmental and economic changes related to the insurance sector, findings related to the banking sector cannot be applied to the insurance sector. Thangavelu (2015) reveals that the operations of the banking and insurance sectors are based on different models, and there are significant differences between them. Over time, several studies have been conducted on the financial performance of insurance companies in developed countries and emerging markets in developing countries (Sanni et al., 2019; Kozak, 2011; Ondigi & Willy, 2016; Kaya, 2015; Ahmed et al., 2010).

The insurance sector has been studied and examined in terms of different facets in Sri Lanka. However, a dearth of studies is found regarding the company and market-specific factors and their impact on financial and market performance. A study by Abdelkar (2014) only focused on the private sector of the insurance industry, and that study has not analyzed all the relevant factors in-depth. Cekrezi and Xhuvani (2015) have focused only on investment insurance, and further research is needed on other internal and external factors that affect the financial performance of different insurance companies. Furthermore, this research area has been described in detail by Naseem et al. (2012), but the data used for that research are old (2006-2010). The findings of these studies are based on the information published in those companies for a specific period. Hence, a practice gap has arisen in the consistency of these findings threatened by the current dynamic economic and social environment. Although several studies have been conducted internationally (Ahmed et al., 2010; Chen & Wong, 2004; Asimakopoulos et al., 2009; Alomari & Azzam, 2017; Charumathi, 2012), there is an absence of consensus on what determines financial and market performance of insurance companies in Sri Lanka. That is, the impact may change country-wise due to the variable differences. That is,

though the factors do have a significant effect on financial and market performance in one country, they may not affect the insurance companies in the context of Sri Lanka.

Thus, it also creates a vital gap to identify the insurance sector's financial and market performance factors. Furthermore, existing studies comprise mixed conclusions on the impact of company-specific and macroeconomics factors on financial performance and market performance (Deyganto & Alemu, 2019; Shawar & Siddiqui, 2019). Hence, further investigations should be conducted as the studies are rare in Sri Lanka and contradictory internationally. Accordingly, the objectives of this study are two-fold. Firstly, to examine the impact of company-specific factors on insurance companies' financial and market performance in Sri Lanka. Secondly, to investigate the effects of macro-economic factors on insurance companies' financial performance and market performance in Sri Lanka.

This study contributes to the empirical literature by analyzing an area that is not significantly addressed in the Sri Lankan context. The significance of this study is enhanced when dealing with the insurance sector since insurance companies transfer risk in the economy, promote savings and provide a mechanism to encourage investment activities (Kripa & Ajasllari, 2016). Also, Sri Lanka has an emerging economy and, in the future, the demand of its citizens for insurance will increase. Consequently, the insurance sector will become one of the fastest-growing industries in Sri Lanka. Further, an in-depth analysis of the factors affecting the financial and market performance of the insurance industry in Sri Lanka will lead to the development and improvement and accelerate the industry's growth.

As a practical contribution, this study offers management of the insurance companies to identify the factors that will enhance the financial and market performance of the company and gather required knowledge for economic decision-making purposes. Further, potential investors would also be able to make the right decisions before investing to protect their investments after comparing the performance of the different companies. Moreover, regulators would be able to capture the companies which are not financially strong and can take proactive actions to minimize future financial difficulties.

The rest of the paper is organized as follows. The literature review is presented in the next section. Then, the research methodology to achieve the research objectives is discussed. The following section, i.e., results and discussion section, precede the conclusions section.

Literature Review

When considering the related theories, the Modigliani Miller Theory (MM Theory) states that the company value is primarily impacted by the presence of numerous investment projects with positive net present value, rather than the company's debt level (Obim, Anake & Awara, 2014). The founders developed two theories (MM theory I & II) due to various limitations in theory I, i.e., perfect capital market, absence of taxes, brokerage cost, and symmetric information. MM theory II is closer to the real-world scenario, which states that the cost of equity directly correlates with the leverage level, i.e., borrowing increases shareholder return (Corporate Finance Institute, 2021). These theories lead to investigate how it impacts on company's financial performance.

As per the signaling theory, financial markets exhibit information asymmetry. There have to be effective mechanisms to minimize the information asymmetry to accurately inform investors to appropriately measure the value of the companies (Lotfi, 2019). Company performance is one of the signaling mechanisms, and it governs the resource allocation in an economic system. If a company makes a profit (or loss), more resources (or fewer resources) are allocated for that company. It's a feedback loop that changes depending on performance, i.e., negative feedback if the company loses money and positive feedback if the company makes money (Noung, 2002).

Empirical evidence

Numerous factors can affect insurance companies' financial performance and market performance, and these factors can be categorized as company-specific factors and macro-economic factors. However, most of the studies focus on internal factors that affect financial performance. Financial performance is an indicator of the strength and progress of each company. It shows how the company can efficiently use its resources to increase its shareholders' value (Akotey et al., 2013). However, profitability as a proxy for financial performance alone cannot be used to compare performance between different companies, hence, the financial performance of a company is measured using specific financial ratios (Abate, 2012). Consequently, many studies focus on various

models such as Return on Assets (ROA), Return on Equity (ROE), Gross Profit Margin, Net Profit Margin, and Tobin's Q for examining the financial performance of a company (Malik, 2011; Wahla et al., 2012). Although there are numerous approaches, the financial performance of insurance companies are expressed through the net premiums earned, investment income, profitability from underwriting activities, annual turnover, returns on investment, ROA as well as ROE (Chen & Wong, 2004; Asimakopoulos et al., 2009; Greene & Segal, 2004).

Most of the empirical studies on the financial performance of insurance companies employ ROA and ROE to measure financial performance (Ahmed et al., 2010; Burca & Batrinca, 2014; Naseem et al., 2012; Berteji & Hammami, 2016; Alomari & Azzam, 2017). Besides, Lee (2014), examines the association between company-specific factors that affect the financial performance of the Taiwanese property-liability insurance industry, using the operating ratio and ROA. Hence, it is evident from previous literature that many studies use ROA and ROE to evaluate the financial performance of insurance companies.

The Market Value Added (MVA) is a measure of external performance, which is considered the best indicator of value creation of the shareholders of the company (Khan et al., 2012). Prasad and Shrimal (2015) clarify the importance of using profitability ratios and market value ratios as tools for MVA and shows a positive correlation between MVA and the financial performance of selected infrastructural companies. Further, the study justifies that MVA can explain other financial performance measures and that MVA can be used instead of other financial performance measures. Conversely, Akgun et al. (2018) conducted a study to identify the impact of MVA on the profitability in Turkish information and technology companies via evaluating the financial information content and three traditional accounting performance measures. The study concludes that ROA and ROE have an absence of a significant association with MVA.

Similarly, it is observed that the MVA measure has a lack of a substantial effect on the shareholders' value of Jordanian commercial banks (Saifi & Amarah, 2015). Further, Panigrahi (2017) suggests an inverse association between the market value added and equity value. This is due to, lower level of market value-added relative to the efficiency of the Amman Stock Exchange.

Many banks consider their stock prices to be lower than their fair value, and the market value of those stocks has fallen over the study period, without any

indication to justify that decline. The results of a Jordanian study indicate that commercial banks cannot create positive value for shareholders. However, the financial statements of Jordanian commercial banks have shown that banks' profitability is better since banks earn positive ROA and ROE. Throughout the study period, it is observed that there is a positive association between the economic values added (EVA) and MVA, which reflects the potential for commercial banks in Jordan to create positive economic and market value (Al-Awawdeh & Al-Sakini, 2018).

Moving towards the company-specific factors, Harrington (2005) extensively examines the linkage between leverage and financial performance of companies and argues that insurers with lower leverage typically report higher ROA, but lower ROE. This is because ROE does not reflect the risks associated with high leverage. Farhad and Aliasghar (2013), survey the association between capital structure and financial performance in Tehran and observe a positive correlation between ROE and short-term debt, consistent with earlier theories. Accordingly, this suggests that increasing short-term debts with a lower interest rate will lead to increased company profitability and a negative association between ROE and long-term debt. Thus, this study reveals that when companies increase long-term debt, their profitability decreases. Nevertheless, the results reflect a positive association between ROE and total debt. Similarly, Abor (2005) investigated the association between capital structure and financial performance of listed companies in the Ghana Stock Exchange and found identical results.

Nirajini and Priya (2013) examine the capital structure and financial performance of the listed trading companies in Sri Lanka. They conclude that there is a significant positive correlation between the capital structure and financial performance of selected trading companies. The results showed that debt-asset ratio, debt-equity ratio, and long-term debt correlated with net profit margin, gross profit margin, return on asset, return on equity and return on capital employed. Further, it is found that short-term debt has a significant positive correlation with profitability on the Nairobi Stock Exchange. Nevertheless, a study by Shubita and Alsawalhah (2012) determines a significant negative association between profitability and debt; thus, the higher the debt, the lower the company's profitability, which is a contrary view to the study by Abor (2005). However, recommendations based on these findings should be considered to use an optimal capital structure in an entity. Correspondingly, Mohammadzadeh et al. (2013) state that there is a significant negative correlation between the profitability and capital structure of the company, and it signifies that

pharmaceutical companies have adopted the pecking order theory and that internal financing has led to higher profitability.

In line with the pecking order theory, the managers choose to invest, using the company's retained earnings to increase its financial performance and profitability, assuming that the company is in its first stage. This implies that internal financing will continue until the retained earnings of the company reach zero. Also, the faster the company's growth, the more likely it will be for external financing. However, this increase in external financing is mainly an increase in liabilities, and as the company grows consequently, the solvency margin will thus become smaller (Durinck et al., 1997). Although solvency margin is a key indicator of the insurer's financial stability, previous empirical studies conducted on that variable have been limited. Hence, this variable has been extensively investigated in this study, taking into account the gap, particularly in the Sri Lankan context.

Capital adequacy is an essential indicator of the company's financial stability, and insurance companies with high solvency margins are considered financially strong. It denotes the ability to survive in the long run. Available solvency margin is the excess value of the assets of an insurance company over the value of insurance liabilities of policyholders' and shareholders' funds (Charumathi, 2012). While it is theoretically acknowledged that financially stronger insurance companies are better able to attract potential policyholders, in practice, most policyholders' attractiveness is determined by the price. Moreover, since better risks attract more robust and stable insurers, it is worth nothing trying to improve the performance of an insurance company through a higher insurance margin (Tesfaye, 2018).

Consequently, a higher solvency margin in insurance companies may provide better insurance performance. Many researchers have shown in their study a significant positive correlation between financial performance and solvency margin. Insurance companies with relatively high solvency margins outperform companies with lower solvency margins. But this does not mean that solvency is a driver of profit (Shiu, 2004). Shiu (2004) conducts an empirical test based on a panel dataset to analyze the determinants of the performance of UK general insurance companies and show that the performance of insurers was positively correlated with the solvency margin. Studies on capital adequacy further reveal that this variable and the financial performance of insurance companies are

positively related, as the insurer's financial stability is an important benchmark to potential customers (Burca & Batrinca, 2014).

Most of the studies in the insurance industry consider liquidity as a factor that affects financial and market performance, and the current ratio represents the liquidity value. However, different empirical pieces of evidence present that liquidity and financial and market performance yield almost inconsistent results. Several studies conclude the absence of a significant association between the liquidity and profitability of insurance companies (Ahmed et al., 2010), while other studies conclude that the liquidity and financial and market performance of insurance companies have statistically significant negative linkage (Chen & Wong, 2004; Raheman et al., 2010). Due to its close association with routine business operations, liquidity studies are of great importance to both internal and external analysts (Bhunia & Khan, 2011). The dilemma of liquidity management is to achieve the desired trade-off between liquidity and the financial performance of a business (Raheman & Nasr, 2007). For instance, in an investigation of Sub-Saharan countries, Valentina et al. (2009) find a significant negative association between banks' profitability and liquidity. Similarly, Wang (2002) investigated the association between liquidity management and the company's financial performance, corporate value and found that the cash conversion cycle was negatively correlated with the financial performance measured by returns on assets or returns on equity. The authors also found that aggressive liquidity management improves the company's operating performance.

In contrast, several studies provide evidence that the financial performance of an insurance company is positively related to the ratio of liquidity assets in the asset mix (Browne et al., 2001; Charumathi, 2012; Shiu, 2004). Ejigu (2016) reveals that Ethiopian insurance companies had a significant impact on profitability through their liquidity. The companies with relatively higher liquidity assets are less likely to fail and are expected to outperform. Another study discloses a weak positive association between liquidity and profitability of listed banks in the Stock Exchange in Ghana (Lartey et al., 2013). Zygmunt (2013) states that liquidity management is vital to the profitability of Polish listed IT companies. Also, a study indicates that working capital management of a company, i.e., management of short-term assets and liabilities, plays a crucial part in achieving the success of the company. A similar study, focusing on small and medium-sized Spanish companies, reveals that a company's profitability increases as the cash conversion cycle shortens (Garcia-Terupel & Solano, 2004).

In Sri Lanka, Priya and Nimalathasan (2013) find a significant linkage between the liquidity and profitability of the listed manufacturing companies. The current ratio and operating cash flow ratio are significantly associated with ROA and ROE of such companies. Previous literature explains that the company's size is positively correlated with its financial performance. The size of a company affects its financial performance in various ways, and it is considered an influential factor since larger companies are well-positioned in the marketplace and enjoy higher benefits of operating with economies of scale. It is widely accepted that large companies have economies of scale in terms of labor costs (Flamini et al., 2009). Besides, it is observed that the size of a company has a positive impact on its profitability, support with greater diversification, economies of scale production, greater access to new technology, and cheaper sources of funding in Canadian companies (Orser, 2000). Further, an analysis of life and non-life insurance sectors in Pakistan finds a significant and positive correlation between the size of the company and its profitability (Malik, 2011). Browne et al. (2001) state that the company's size is positively linked with profitability and financial performance. Further, another study discovers that the size of a company has a significant positive impact on the profitability of insurance companies, (Berhe & Kaur, 2017).

However, a study of a Norwegian company presents that performance and profitability were not subject to its size, which reveals that small companies are as capable enough as large companies, and the main competitive advantage is their products and technology (Moen, 1999). Nevertheless, when the company's size is more significant, there is a higher tendency of having an inverse association between size and profitability, due to lack of coordination and inefficiencies (Majumdar, 1997; Li, 2007). Similarly, several studies state that there is an absence and significant but inverse linkage between size and financial performance of companies in different sectors (Kazeem, 2015; Mazviona et al., 2017; Mwangi & Murigu, 2015; Olaosebikan, 2012; Singapurwoko & El-Wahid, 2011; Saklain, 2012). When considering the macroeconomic factors, inflation is having an adverse effect on insurance companies operating activities, expenses, and technical provisions. (Daykin et al., 1994). If the inflation is substantially higher than anticipated, it triggers financial difficulties for insurance companies (Suheyli, 2015). A previous study has shown that a country's unforeseen inflation would lower the actual returns of fixed income securities, i.e., bonds than estimated, resulting in compression of profit margins of insurance companies and undermining financial performance (Browne et al., 2001).

Studies related to inflation and banks profitability reveal that if a bank revenue increase is quicker than its cost, the bank profitability would be positively affected by inflation. Negative coefficients are anticipated when the bank costs increase more rapidly than its revenue (Damena, 2011). Besides, several investigations were conducted on the insurance sectors in different contexts, and, considering inflation, reflects that the unanticipated inflation in a country has a significant and negative impact on the profitability of a company (Abreu & Mendes, 2001; Browne et al., 2001; Doumpos et al., 2012; Hailegebreal, 2016). However, several other studies have stated that there is an absence of a significant link between inflation and the financial performance of companies. A study based on Philippine non-life insurance market data shows a lack of evidence of an inflation rate on profitability (Datu, 2015). In addition, research into the Ethiopian banking industry reveals an absence of a significant association between inflation and financial performance (Abera, 2012).

Considering the GDP growth rate, Kozak (2011) and Tesfaye (2018) suggest that increasing GDP growth has a positive and significant impact on the financial performance of non-life insurance companies in Poland and Ethiopia. The investigation of Bashir (2003) reflects that favorable macro-economic conditions, such as the growth of GDP, positively impacted the performance of Islamic banks. It has been identified that all macro-economic factors positively and significantly affect the financial performance of conventional and Islamic commercial banks in GCC Countries, except for inflation (Srairi, 2009). A recent study reveals that GDP has a significant positive impact on the financial performance of insurance companies in Hawassa city Administration, Ethiopia (Deyganto & Alemu, 2019).

Conversely, when examining the association between macro-economic factors and profitability in the Philippine non-life insurance market, the results illustrate an absence of evidence of a correlation between GDP and Profitability (Datu, 2015). Merin (2012) also finds that all external variables do not significantly affect bank profitability, including GDP growth rate. Thus, since many previous empirical studies have emphasized that GDP growth has a significant and positive impact on the financial performance of the insurance sector, this study also considers GDP growth as an independent variable, intending to contribute to the Sri Lankan context.

Methodology

The purposive sampling technique was used to select the sample, covering the period from 2010 to 2019, inclusive of both years. The insurance companies listed in the Colombo Stock Exchange (CSE) were considered when selecting the sample. Each company must be listed in the CSE during the study period, and relevant data for the analysis must be available. Hence, the final sample consisted of 09 insurance companies listed in the CSE out of the total 27 insurance companies in Sri Lanka. Through a formal review of annual reports, it was observed that the selected insurance companies have sound experience in insurance operations and a sample of 33.33% of the total population of 27 insurance companies in the country was taken.

Secondary data collection was used to collect the data for the study, and appropriate data diagnosis tests were conducted to verify the validity and reliability assumptions. Net Profit Magin (NPM), ROA, ROE, and Earnings per Share (EPS) were considered dependent variables to measure the financial performance. In contrast, MVA was regarded as the dependent variable to estimate market performance[1]. Gering ratio (as a proxy for the capital structure), solvency margin (as a proxy for the capital adequacy), current ratio (as a proxy for the liquidity position), total assets (as a proxy for the company size), inflation rate, and GDP growth rate were deemed as independent variables.

Accordingly, after conducting a comprehensive literature analysis and based on the identified contractionary evidence in empirical findings (Saifi & Amarah, 2015; Panigrahi, 2017; Al-Awawdeh & Al-Sakini, 2018; Harrington, 2005; Abor, 2005; Nirajini and Priya, 2013; Ahmed et al., 2010; Raheman et al., 2010; Lartey et al., 2013; Orser, 2000; Mazviona et al., 2017; Suheyli, 2015; Browne et al., 2001; Datu, 2015; Tesfaye, 2018) the following hypotheses were developed to achieve the objectives of this study.

Developed hypotheses for objective 01

H_1: There is a significant association between capital structure and financial performance.

H_2: There is a significant association between capital structure and market performance.

H_3: There is a significant association between capital adequacy and financial performance.

H_4: There is a significant association between capital adequacy and market performance.

[1] The measurement of NPM, ROA, ROE, EPS and liquidity position is estimated via their general formulars.

H_5: There is a significant association between liquidity position and financial performance.
H_6: There is a significant association between liquidity position and market performance.
H_7: There is a significant association between the size of the company and financial performance.
H_8: There is a significant association between the size of the company and market performance.

Developed hypotheses for objective 02

H_9: There is a significant association between inflation and financial performance.
H_{10}: There is a significant association between inflation and market performance.
H_{11}: There is a significant association between GDP growth and financial performance.
H_{12}: There is a significant association between GDP growth and market performance

Moreover, based on the reviewed empirical studies and the objectives of this study, the following conceptual framework (*Figure 01*) is exhibited to illustrate the linkage between selected independent and dependent variables.

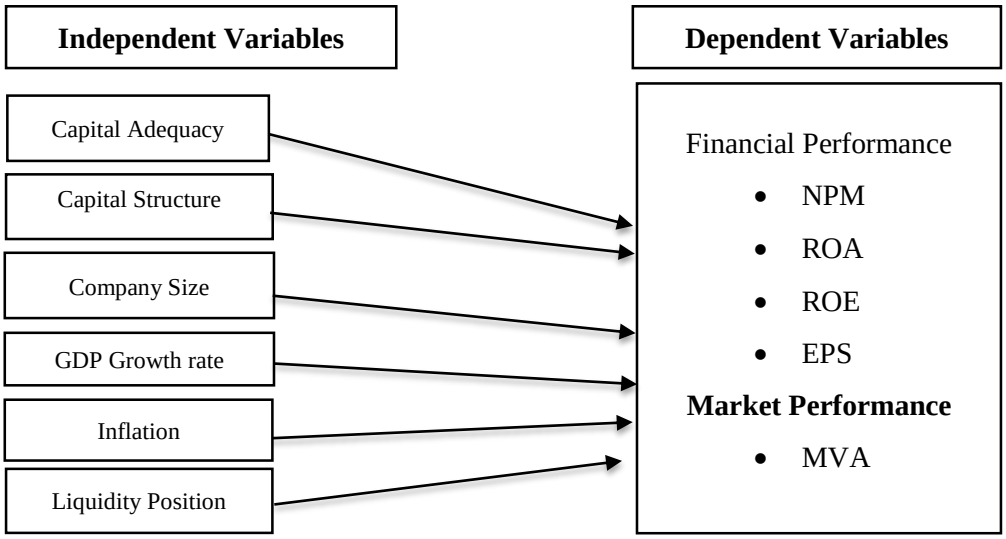

***Figure 01*: Conceptual Framework**

The following table (Table 01) summarizes the measurements of the variables.

Table 01: A summary of the measurements of the variables.

Variable	Measurement Item	Calculation	Reference
Capital Adequacy	Solvency Margin	[Equity capital/Total assets] × 100	(Tesfaye, 2018; Abebe & Abera, 2019; Ullah et al., 2016).
Capital Structure	Gearing Ratio	[Debt capital/Total capital] × 100	(Anojan, 2014; Balasundaram, 2009; Velnampy & Niresh, 2012; Hardita, 2017; Purnamawati, 2016).
Company Size	Company Size/Total Assets	Natural Logarithm of Total Asset	(Tesfaye, 2018; Mehari & Aemiro, 2013; Ondigi & Willy, 2016; Ullah et al., 2016)
GDP Growth	GDP growth rate	Yearly GDP Growth Rate	(Tesfaye, 2018; Lire & Tegegn, 2016; Deyganto & Alemu, 2019; Batool & Sahi, 2019)
Inflation	Inflation rate	Yearly General Inflation Rate	(Tesfaye, 2018; Lire & Tegegn, 2016; Deyganto & Alemu, 2019)
Liquidity Position	Current Ratio	[Current Assets/ Current Liabilities] × 100	(Tesfaye, 2018; Mehari & Aemiro, 2013; Ondigi & Willy, 2016)
Financial Performance	NPM	[Net Profit/Sales] × 100	(Priya & Nimalathasan, 2013;Velnampy & Niresh, 2012; Hardita, 2017).
	ROA	[Net Profit After Tax/ Total Assets] × 100	(Tesfaye, 2018; Mehari & Aemiro, 2013; Ondigi & Willy, 2016).
	ROE	[Net Profit After Tax/ Equity Capital] × 100	(Priya & Nimalathasan, 2013).
	EPS	[Net Profit/Total Number of Equity Shares]	(Raheman et al., 2019; Arulve & Ajanthan, 2013);

Market Performance	MVA	Market Value of Shares - Book Value of Shareholders' Equity	(Prasad & Shrimal, 2015; Nugroho, 2018; Akgun et al.,2018).

The data were analyzed via a panel regression model. However, the data set was diagnosed for pre-requisite tests which consist of normality, heteroscedasticity, and multicollinearity tests, before conducting the panel regression analysis. Additionally, the Hausman specification test was employed to select the applicable model for this study among random effect (RE) and fixed effect (FE) models.

Finally, we derived the following specified regression models to identify the impact on financial (equations: 01, 02, 03 & 04) and market performance (equation 05).

NPM = β_1 *Solvency margin* + β_2 *Gearing ratio* + β_3 *Total assets* + β_4 *GDP Growth rate* + β_5 *Inflation rate* + β_6 *Current ratio* ……(01)

ROA = β_1 *Solvency margin* + β_2 *Gearing ratio* + β_3 *Total assets* + β_4 *GDP Growth rate* + β_5 *Inflation rate* + β_6 *Current ratio*…….....(02)

ROE = β_1 *Solvency margin* + β_2 *Gearing ratio* + β_3 *Total assets* + β_4 *GDP Growth rate* + β_5 *Inflation rate* + β_6 *Current ratio*……...……(03)

EPS = β_1 *Solvency margin* + β_2 *Gearing ratio* + β_3 *Total assets* + β_4 *GDP Growth rate* + β_5 *Inflation rate* + β_6 *Current ratio*…….....(04)

Impact on Market Performance

MVA = β_1 Solvency margin + β_2 Gearing ratio + β_3 Total assets + β_4 GDP Growth rate + β_5 Inflation rate + β_6 Current ratio…….(05)

Results and Discussion

Moving towards the results of the first objective, it can be observed that solvency margin, gearing ratio, and the GDP growth rate had a significant negative

association with NPM and ROA, which was significant at 5% level. The overall model was significant at the 5% level, where the independent variables have the explanatory power of 32% and 30%, respectively. The gearing ratio and the GDP growth rate had a significant negative association with ROE, whereas total assets were positively associated with ROE at a 5% level. The ROE as one of the measurements of the financial performance was explained 30% by the independent variables, and the model is significant at 5%. When considering the EPS, the only significant variable is the total assets which had a significant positive association with EPS. The model has an explanatory power of 63%, the highest explanatory power out of the given performance measurements (Table 4.1). The results of this study's second objective reflected a significantly positive (negative) association between total assets (current ratio) and the MVA. The overall model is significant at 5% level, and the independent variables explained 27% of the variation of the MVA (Table 02).

As a common factor, it could be observed that the gearing ratio as a proxy for the capital structure and the GDP growth rate has a significant negative association with NPM, ROA, and ROE. At the same time, total assets had a significant positive association with ROE, EPS, and MVA. This would be an exciting finding when making the financial decision of the insurance companies and addressing the growth strategies of the companies with the country's GDP growth rates.

The negative impact of the gearing ratio on financial and market performance contradicted the results of a similar study done in the local context. That is, a study by Nirajini and Priya (2013) suggests that there is a significant positive association between the debt-asset ratio, debt-equity ratio, and long-term debt with the financial performance in Sri Lanka. Further, it is observed that there is an inverse association between the market value-added and equity value since lack of market value-added is relative to the efficiency of the Amman Stock Exchange (Panigrahi, 2017).

However, Shubita and Alsawalhah (2012) provide similar results relating to the outcome of the current study. The authors reveal that there is a significantly negative association between profitability and debt. Thus the higher the debt, the lower the profitability of the company. Nevertheless, recommendations based on these findings should be considered for the company to use an optimal capital structure. Moreover, from the agency cost theory perspective, Chechet and Olayiwola (2014) investigated Nigerian listed companies' capital structure and profitability for ten years and found that the debt ratio is negatively correlated with profitability, but equity is directly related it. Meanwhile, another researcher has scrutinized the association between the capital structure and the profitability

of pharmaceutical companies in Iran, using the net profit margin and debt to asset ratio as indicators of profitability and capital structure, respectively (Mohammadzadeh et al., 2013). The results show a significant negative correlation between the profitability and capital structure of the company, and it denotes that pharmaceutical companies have adopted the pecking order theory and that internal financing has led to higher profitability.

The current ratio of this study has a weakly significant association with financial performance. A similar kind of study by Ahmed et al. (2010) is found, and the authors reveal that the association between liquidity and profitability of the insurance companies is not substantial. Moreover, Lartey et al. (2013) and Zygmunt (2013) observe a weak positive association between liquidity and profitability of listed banks in the Stock Exchange in Ghana. However, evidence finds that liquidity has a significant inverse association with market performance (Chen & Wong, 2004; Raheman et al., 2010). Additionally, Valentina et al. (2009) reveal a significant negative association between liquidity and the banks' profitability and the market performance in Sub-Saharan countries.

The evidence discloses that the financial and market performance are subjected to the size of the company. It is argued that, compared to small insurers, large insurers can easily recruit a large number of employees with great expertise and professional knowledge, resulting in better performance from large insurers compared to smaller insurers. Consequently, Malik (2011) states that there was a significant and positive correlation between the size of the company and its profitability of life and non-life insurance sectors in Pakistan. In the context of the UK, it is found that the size of the company has a positive association with the profitability of the insurance companies. The authors argue that the theory of market power hypothesis states that large companies typically use their market power in utilizing their products to maximize profits (Berhe & Kaur, 2017). Further, it can be understood that the large insurers typically have greater capacity and ability to deal with adverse market fluctuations, but the ability to deal with these fluctuations is relatively low in small insurers. Consequently, the large insurers outperform the market compared to smaller insurers, and unfortunately, the ability of smaller insurers is relatively low (Shiu, 2004). Additionally, smaller companies may have less power compared to larger companies. Hence they may find it challenging to compete with large companies, particularly in highly competitive markets.

As a macroeconomic factor, GDP growth rate has a weakly significant association with profitability. Comparably, it is observed that there is a weakly significant association between the said variables in the context of the Philippines insurance sector (Datu, 2015). Moreover, a study by Abera (2012) states that there is an absence of a significant association between inflation and financial performance in the Ethiopian banking sector. Additionally, Datu (2015) and Merin (2012) discover that GDP growth rate and inflation rate are not having a significant association with profitability.

Table 02: Results of the regression analysis

	NPM		**ROA**		**ROE**		**EPS**		**MVA**	
Variable	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**
Solvency margin	**-.08**	**0.02**	**-0.00**	**0.003**	0.032	0.14	0.109	0.64	-4.45	0.43
Gearing ratio	**-1.41**	**0.01**	**-0.79**	**0.001**	**-2.39**	**0.00**	-4.05	0.92	-4.06	0.97
Total assets	4.72	0.70	-9.25	0.82	**9.14**	**0.41**	**1.11**	**0.00**	**0.083**	**0.001**
GDP Growth rate	**-.035**	**0.00**	**-.009**	**0.006**	**-.018**	**0.04**	-.265	0.13	-9.07	0.65
Inflation rate	0.02	0.82	-.001	0.65	-.007	0.52	0.622	0.56	-2.44	0.35
Current ratio	-.04	0.02	0.014	0.08	0.032	0.14	-1.75	0.36	**-1.44**	**0.003**
R^2	0.32		0.30		0.30		0.63		0.27	
Prob.	0.000007		0.000020		0.000020		0.000000		0.000122	

Note: *statistical significance of test statistics at 0.05 level.

The following table summarises the overall results of the tested hypotheses of the study.

Table 03: Summary of the status of the hypotheses

Types of Hypotheses	**Status of the null hypothesis**
H_1: There is a significant association between capital structure and financial performance	Not Supported
H_2: There is a significant association between capital structure and market performance	Supported
H_3: There is a significant association between capital adequacy and financial performance	Not Supported

H_4: There is a significant association between capital adequacy and market performance	Supported
H_5: There is a significant association between liquidity position and financial performance	Supported
H_6: There is a significant association between liquidity position and market performance	Not Supported
H_7: There is a significant association between the size of the company and financial performance	Not Supported
H_8: There is a significant association between the size of the company and market performance	Not Supported
H_9: There is a significant association between inflation and financial performance	Supported
H_{10}:There is a significant association between inflation and market performance	Supported
H_{11}:There is a significant association between GDP growth and financial performance	Not Supported
H_{12}:There is a significant association between GDP growth and market performance	Supported

Implications and Conclusions

This study examined the impact of company-specific factors on the financial performance and market performance of insurance companies in Sri Lanka and the impact of macro-economic factors on the financial performance and market performance of insurance companies in Sri Lanka. The study covered the period from 2010 to 2019 inclusive of both years. The purposive sampling technique and the secondary data were used for the sample selection and data collection. The final sample consisted of nine listed insurance companies in CSE. We employed panel regression to analyze the study.

As per the first objective, the results revealed a significant negative association between capital structure, capital adequacy, and GDP growth rate with the financial performance of the insurance companies. However, size as an independent variable has a positive association with financial performance. Considering the impact to MVA as per the second objective, it can be concluded that the liquidity of the insurance companies is positively (negatively) impacted to MVA. Hence, these variables could be considered as some of the variables that determine the financial and market performance of insurance companies in Sri Lanka.

As main implications, the inferences of this study will benefit the insurance sector, especially in the Sri Lankan context, i.e. Sri Lanka as an emerging economy with rapid growth in the insurance sector that will attract more potential

investments cum regulatory reforms. Hence, our study's findings will benefit stakeholders at large and, more specifically, potential investors, regulators, and insurance companies to make their economic decisions. For instance, an investor can identify what factors drive the financial and market performance of insurance companies in Sri Lanka. Moreover, the study's findings will also benefit existing investors to make their investment decisions about insurance companies. Hence, this study recommends that Sri Lankan insurance companies should provide due attention to these factors to address financial and market performance matters when conducting their operations.

However, this study focused on six quantitative factors affecting the insurance sector's financial and market performance. Hence, it could be recommended to consider more external quantitative and qualitative factors: the number of the insurance policyholder and the companies' regulatory and compliance structure, since it is rare to investigate the qualitative factors as the determinants of the performance in the insurance sector. Furthermore, having qualitative explorations will corroborate the quantitative findings. We recommend future studies consider internal factors such as loss ratio, the volume of capital, and the age of the life insurance companies since there is an absence of studies investigating them. Moreover, future studies may enlarge the population to involve cross-country analysis.

Declaration of Conflicting Interests

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

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Organizational Resilience: A Paradox-Based Conceptualization

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Abstract

The concept of resilience has recently gained significant popularity in organizational research. It is considered to be a very promising concept for explaining how businesses can survive and develop in the face of adversity or instability. Past literature focuses on various perspectives of organizational resilience and frameworks mainly based on processes, resources and capabilities. However, a significant amount of these studies have focused on polarized attributes resulting in contradiction of studies which blurs the conceptualization of organizational resilience. The purpose of this study is to address this gap by critically evaluating the phases or dimensions of the organizational resilience process and its contradictions in order to improve the understanding of this complex and embedded construct. Findings in the study reveal that the contradictions which are encountered in different phases of the organizational resilience process are paradoxical tensions. Paradoxical thinking refers to opposite demands that are contradictory or polarized but are interconnected and such tensions should be managed by both/and approach instead of either/or approach. The anticipation phase consists of opposite tensions of opportunities or threats, the concurrent phase consists of tensions of stability or adaptability, and finally, the reactive phase consists of tensions of growth or performance. Therefore the new framework conceptualizes organizational resilience dimensions to be managed as a paradox to enhance the understanding of the concept of organizational resilience and thereby facilitate its operationalization. The proposed conceptual framework configuration can add to the business and management literature by enhancing the comprehensive conceptualization of organizational resilience.

Keywords: *Conceptualization, Dynamic capabilities, Organizational resilience, Paradoxical thinking, Resilience process*

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Introduction

Today often organizations globally are surprised or shocked by unexpected drastic or incremental changes. These include extreme climatic conditions, terrorist attacks, international forces, political unrest, globalization, global pandemics, change or shift in consumer preferences, which includes a broad spectrum of threats and sometimes opportunities for organizations. Organizational resilience studies in the Sri Lankan context is only a handful which is puzzling as the island was named second most affected nation on climate related extreme events in 2019 by the Global Climate Risk Index (Eckstein, Hutfils, & Winges, 2019). Purchasing Managers Index (PMI) of the Central Bank of Sri Lanka which is the indicator used worldwide to show the economic health for the manufacturing and service sectors, indicates a sharp contraction in time periods of the first, second and third waves of the pandemic COVID-19 due to drop in performance implying low organizational resilience (Central Bank of Sri Lanka, 2021). However the increase of high risk events globally in the past few decades such as pandemics, economic recessions, financial crises, terrorist attacks, and extreme climatic changes has motivated the management of adversary as a key topic for both practitioners and academics.

A popular question on review of resilience literature is why do some organizations succeed and some fail if the organization is attacked by adverse internal or external environment? (Xiao & Cao, 2017; Linnenluecke, 2017). In contemporary management practices, organizational resilience seems to be the buzzword to answer the above question. The concept of resilience is new to organizational science and has been gaining momentum recently (Hillmann & Guenther, 2020).

At the organizational level, the term "resilience" has been used to characterize the fundamental features of those firms that are able to adapt faster, recover faster, or invent more unconventional ways of conducting business under strain than others. Organizations must be able to handle all of these aspects of the unexpected in order to survive in uncertain environments and drive future success. Firms must have a resilience capability that allows them to respond appropriately to unexpected occurrences and capitalize on opportunities that could jeopardize their survival.

Previous research on organizational resilience

The concept of resilience is not new; it originated from the field of material science in 1800, thereafter diffused to multiple disciplines such as ecology, psychology resulting in lack of an agreement of the concept (Banahene, Anvuur & Dainty, 2014). Engineering and psychology perspective of resilience is the capacity to absorb or withstand shock and maintain functions while ecology perspective is the capacity for renewal, re-organisation or change which is more dynamic compared to engineering.

Ruiz-Martin, López-Paredes and Wainer (2018) extends the diversification of resilience to supply chain resilience, community, organizational management and admits the amphibious nature of the concept but explains the relationship to organizations' resilience despite the plethora of fields. For example resilient organizations will require resilient individuals and supply chains while resilient communities require resilient organizations. However the core principle of resilience is the ability of the system to cope with change due to the dynamic unpredictable environment.

The concept was soon absorbed to the organization context as the business world is inherited with incremental change and sudden disruptions (Annarelli, & Nonino, 2016). Researchers and practitioners have looked into how to protect businesses from disruptive events through the field of enterprise risk management, business continuity management, emergency management, crisis management (Ruiz-Martin et al., 2018). However, Carden et al., (2018) state some adverse events such as negative consumer response on fast foods to an industry that appears to be never-ending and is not limited to an event and also threatens the firm's viability. Some crisis events can be repetitive as COVID-19 which shocked the world in waves. Therefore, resilience organizations are required for organizations to be able to cope with any event which can be incremental, continuous, repetitive or extraordinary as organizations cannot predict all the risk in future and to face never ending type of risk and also due to the possibility of failure of emergency response or crisis management systems.

Linnenluecke (2017) states that in the recent past resilience in business and management has increased dramatically and has continued to develop in the following fields.

1. Organizational responses to external threats
2. Organizational reliability

3. Employee strengths
4. The adaptability of business models
5. Design principles that reduce supply chain vulnerabilities

Duchek (2020) sates the above streams have given their own understanding, conceptualization and measurements, as a result the concept has been fragmented. In literature organizational resilience is defined in a variety of ways, including as a capability, capacity, characteristic, outcome, process, behavior, strategy or approach, performance type, or a combination of these (Hillmann & Guenther, 2020). Different dimensions of resilience are also used by some authors in their definitions (Ruiz-Martin, et al., 2018). These studies imply that the various views are all part of resilience, and that only when they are combined can they contribute to growth in the face of a disaster. Duchek (2020) emphasises that organizational resilience is a major source of competitive advantage despite such confusion of the construct and array of definitions.

Problem Domain

The concept resilience is relatively new in the organization context where it is fragmented and heterogeneous and there is little consensus on its conceptualization and operationalization (Hillmann & Guenther, 2020; Linnenluecke, 2017; Ruiz-Martin, et al., 2018).

Hillmann and Guenther's (2020) review of literature to summarize the conceptual definition and achieve more clarity of organizational resilience have given rise to six conceptual domains. The domain reflects the substance of the concept and determines which qualities and variables are included in the definition and which are excluded. The six domains include awareness and sense-making domain, change domain, stability domain, behavior domain, performance domain and growth domain. A critical analysis of the conceptual domains reflects contradictions of the domains which can generate confusion of the operationalization of the concept. The stability vs. change domain and performance vs. growth domain are essentially dipolar in nature and at opposite ends. However a clear definition is required for the operationalization of the concept.

As Linnenluecke (2017) pointed out "the literature offers at times contradictory recommendations for how organizations should build resilience. Tensions between the need for organizational stability on the one hand (habits, routines,

consistency, control, and low deviation) and organizational change on the other hand (search, mindfulness, redundancy, openness, preoccupation with failure, imagination, experimentation and variety) have not yet been resolved and require future work". Therefore, the main objective of this paper is to address this gap of contradiction by identifying the causes for such contradictory and attempt to provide a framework to narrow this conceptual gap. Giustinian, Clegg, Cunh & Rego (2018) also reveals that resilience is not a process free of tensions or contradictions. Duchek (2014) describes developing organizational resilience has largely remained a "black box". Existing literature inadequately address the amphibious nature of the concept.

Methods

The following characteristics distinguish the review work: (1) Its focus on organizational level resilience literature; (2) Sources of research from multiple databases (Dimensions, Taylor & Francis Online, Emerald insight databases and google and google scholar); (3) A manual study of extra material that may have gone outside of the first search, reference and citation checking by focusing on widely cited publications to make the review more complete. (4) Scholarly papers in English were considered including journal articles, conference papers, systematic review articles, PhD dissertations and mega articles. Special focus was on conceptual and empirical articles based on meta-analysis. (5) Time constraints were not utilized in the search and included papers that were published up to July 31 2021. (6) The term "resilience" appears frequently in studies relating to management and organizational science, it is typically the case that the concept of "organizational resilience" is not being investigated. So, in order to keep the number of scientific articles under control, the search was limited to abstracts and titles. (7) Articles that address resilience as a major subject in the relevant study and discussed resilience` at the organization level and not in the individual, or articles that mention organizational resilience only as a side concept.

The structure of the approach used for searching (Search terms "Organizational Resilience" OR "Business Resilience" OR "Resilience in Business" OR "Resilience Management"), screening, categorizing, and synthesizing journal articles was designed to reduce bias and increase the validity of findings (Tukamuhabwa, Stevenson, Busby & Zorzini, 2015).

Results

Conceptualization of organizational resilience

The word "resilience" derives from the Latin word "resilire" meaning "to withstand" (which means to leap or jump back). In the academic community there is a plethora of definitions and there is no clear definition of organizational resilience at the moment (Linnenluecke, 2017).The concept has been criticized by researchers as being ambiguous and, as a result, the lack of a consistent definition, the concept's importance for practice and research is diminished (Burnard & Bhamra, 2011). Hillmann (2020) states the amphibious nature of the concept is due to the different applications of the concept in deferent fields and researchers extract some ideas from few or all the disciplines without challenging each other.

Organizational resilience is described in a variety of ways, but they all focus on the organization's survival or dealing with jolts, risks, or changes, and they all have the same core meaning even if they use different words to describe the volatile environment such as shocks, crisis, uncertainty, turbulence etc. The definitions of the concept differ in organizations' response against these uncertainties. As mega articles and systematic reviews attempt to categorize these definitions against various perspectives, this paper does not attempt to immerse in such a review of definitions as it is abundant in literature (Ruiz-Martin, et al., 2018; Hillmann and Guenther, 2020 ; Linnenluecke, 2017). However this paper will critically evaluate the contradicting nature of the concept as the gap is evident in literature.

Organizational resilience is a complex, multifaceted, and multidimensional construct, according to recent research.The many facets model developed by Madni and Jackson (2009) can be applied to view organizational resilience which is one of the most comprehensive perspectives of the concept. Anticipation is required to avoid interruptions, which is made possible by predictive or look-ahead capabilities. As a result, a system that avoids disruption must be able to predict events and take proactive action to avoid the incidence or repercussions of disruption. The system must be strong to withstand disturbances. Shock absorbers, such as resource buffers, enable the system to tolerate a disruption without having to restructure itself to response to the disruption, which is how robustness is achieved. The ability to reconfigure form (i.e., structure) or available capacity is required to adapt to unforeseen change. Finally, recovering

from disruptions entails is being able to restore the system as closely as feasible to its pre-disruption state.

Rahi (2019) summarizes the empirical literature on actions that organizations can take when exposed to a deviation.

1. Event survival
2. Productively responding to the event
3. Thriving after its occurrence
4. Recover from the event
5. Change management strategy after it occurs
6. Organizational operation maintenance
7. Organization function adaptation
8. Winding back to previous status

It can be synthesized that 1, 2, 4, 6, 8 points focus on stability of the organization and the rest focus on the change of the organizations against the turbulence. Denyer (2017) defines organizational resilience as "the ability of an organization to anticipate, prepare for, respond and adapt to incremental change and sudden disruptions in order to survive and prosper". This definition includes the fact that organizational resilience is not only related to sudden events but also it is applicable to day to day operation.

The majority of available research examines organizational resilience from the perspectives of capability, process, function, and outcome (Chen, Xie and Liu, 2021). Duchek (2020) states that to achieve resilience in practice is unknown and the author integrates that the resilience as a unique blend of capabilities with process perspective of resilience.

Therefore he proposes three stages in the resilience process claiming that resilient businesses respond not just to the past (reactive action) or current challenges (concurrent action), but also to the future (anticipatory action). Supardi and Hadi (2020) illustrate the three phases in his conceptual framework for business resilience as proactive phase, responsive & adaptive phase and reactive phase. It can be concluded that the resilience process consists of three stages as pre, current and post in relation to the turbulent event. Process approach enables to understand the interaction and dynamic nature of its elements of the complex concept in order to foster conceptualization of organizational resilience.

Organizations need to build capabilities to manage processes to overcome adversity (Carden, et al, 2018). Scholars specify capabilities required such as

predictive capability, survival capability, adaptive capability, coping capability, and learning capability for each individual phase and synthesis dynamic capability perspective. The theory of dynamic capabilities (DCs) is an extension of the Resource-Based View (RBV), which claims that organizations with VRIN (valuable, rare, imperfectly imitable, non-substitutable) resources can achieve competitiveness (Karman & Savanevičienė, 2020).

This study synthesized and illustrates the phases of organizational resilience process and capabilities and also other contemporary crisis related fields such as Risk Management (RM), Business Continuity Management (BCM). Proactive phase deals with much of the risk management field before the event has occurred while recovery phase is based much on BCM which includes crisis management/ emergency management which mainly deals with after the disruption has occurred (Figure 2).

Phases of organizational resilience

Proactive phase

Anticipatory ability is described as a company's ability to recognize and anticipate threats and opportunities in unstable situations by frequently monitoring, sensing, and using data from multiple sources. In the proactive phase the organization requires the ability to predict, which is concerned with foreseeing threats and potential future developments in order to raise awareness and minimize their vulnerabilities. A resilient organization must be able to predict future events that are beyond the scope of its current operations.

It must be able to assess future events, conditions, or state changes that may have a favorable or negative impact on the organization's ability to function, such as technology innovation, changes in customer needs, new legislation, and so on. However this capability does not mean the organization can anticipate every change which will impact it, but some companies are better at spotting the unexpected and reacting quickly than others (Duchek, 2020). Anticipation is also required to avoid disruption by looking down the line (Madni & Jackson, 2009).

Concurrent phase

Stability capabilities

The stability capabilities means in respect to internal and external changes or disruptions maintaining business stability. It is the organization attempt to be

defensive and consistent. Several abilities are summarized in literature to attain stability such as ability to resist, ability to cope, ability to withstand etc. (Linnenluecke, 2017). All of these concepts clearly pertain to the appropriate management of unforeseen events in order to avoid destruction of the system. These qualities reflect immediate or short-term response in the face of unforeseen situations (Madni & Jackson, 2009).

Adaptation capabilities

No company can remain fully static over time without making changes or adaptations to its functioning business model. Technology, organizational structure, and business processes all require ongoing adaptation in the dynamic nature of the environment. Although resilience is about establishing stability, a resilient organization can also deal with internal change brought on by external pressure (Linnenluecke, 2017). This is about adjusting resources, interpersonal processes, and organizational procedures to deal with the consequences of a disaster.

The concurrent or the ongoing phase which included stability and adaptive elements together represents a contradiction for the organization which gives rise to tension since two demands are at opposite ends and therefore their capabilities are also opposed. The above mention contradiction of demands has been explored scarcely in organizational resilience. Denyer (2017) sates managing the underlying conflicts between these opposing viewpoints necessitates paradoxical thinking - shifting away from "either/or" outcomes and toward "both/and" solutions. Groenendaal and Helsloot (2020) also mention of the tensions between the elements of organizational resilience and elaborates further that adaptability and efficiency are contrary since increased efficiency eliminates sources of variation and idle capacity. Lewis (2000) sates researchers frequently use the word paradox to represent contradictory requests, opposing viewpoints, or seemingly irrational discoveries but emphasis naming a paradox does not always lead to understanding. In organizational resilience literature the contradiction domain has not conceptualized except for few insights and this paper will explore this virgin area.

Reactive phase

Finally, recovering from disruptions entails being able to restore the system as closely as feasible to its pre-disruption state. Because the restoration may not be perfect, the latter may result in some performance degradation (Madni & Jackson,

2009). Stabilization and revitalization procedures are carried out to restore company equilibrium, respond to changes, and maintain or restructure business operations after an event occurs. After overcoming a crisis or adverse event the organization may focus on growth or performance, which are also opposites.

Paradoxical Thinking

"*We cannot solve our problems with the same thinking we used when we created them"* -Albert Einstein-

Contradictory demands are increasingly prevalent as organizations become more global, dynamic and competitive today unlike a few decades ago. Managerial life is full of competing demands. Managers, for example, are expected to boost efficiency while also encouraging innovation, form individualistic teams, and think internationally while acting locally. Companies must be innovative, flexible, and responsive to change while functioning consistently and reliably to succeed and capitalize (Farjoun, 2010).

There is now a plethora of conceptualizations of competing demands, which might be puzzling and these include dilemmas, Trade-offs, dialectics, dualities and paradoxes (Gaim et al., 2018). However this paper will be focusing on the contradiction demands related to paradoxes. When managers perceive tensions between competing demands, they may find themselves divided between two poles of action when attempting to meet both demands at the same time. Tensions develop over resource allocation and prioritization when conflicting demands are regarded to be of equivalent importance for managers and decision-makers.

Organizations must reconcile stability, predictability, and exploitation with change, innovation, and exploration in order to survive and thrive. These imperatives, as well as the practices, processes or systems that sustain them, are widely regarded as mutually exclusive and irreconcilable (Farjoun, 2010).This has been emphasised in many organizational theories including organizational resilience studies except a few insights.

Lewis (2000) sates "Paradox" refers to demands that are contradictory but interconnected, items that appear logical when seen separately but ludicrous and irrational when seen together. Further, he argues that organizations fail to identify these relationships as tensions are perceptual. That is, polarities that are cognitively or socially manufactured to hide the simultaneity of contradictory truths and organization tend to focus on polarization. Over the last 25 years, the

study of paradox in strategy and organizational studies has exploded (Cunha and Putnam, 2017).

Organizational theories are basically incomplete since they attempt to represent a multidimensional reality with a finite, internally coherent assertion (Poole & Van de Ven, 1989). To achieve greater holistic impacts, the paradoxical view supports building a virtuous loop between contradicting demands such as stability and change.

The change and stability elements addressed in organizational resilience are in opposite poles and are simultaneously required when organizations experience an impact. Traditional dualism views stability and change as opposites and separate, two essential but largely incompatible and mutually exclusive elements in an organization, and advocates contingency theories to deal with the paradox tensions. However more recent research has adopted the paradoxical lens to highlight both the contradiction and the interdependence between the two elements (Lin, Qu, Li & Tian, 2020). Smith and Lewis (2011) support this duality viewpoint and propose the paradox theory as an alternative to the contingency theory for explaining tension.

The relationship between stability and change is divided into four categories by Farjoun (2010): exploitation (stability), exploration (change), change enables stability, and stability enables change. Stability is considered as a product of change or its medium in the "change enables stability" and "stability enables change" interactions, indicating the interdependence of stability and change. Elaborating on the above stability facilitates change by providing security and consistency, reserving knowledge and skills, and facilitating commitment and resource allocation for a better implementation of the change. Through various mechanisms such as trial-and-error and exploratory operations, change allows a company to establish a new state of stability. In the real world, firms such as MacDonalds, well known stable organizations change to adjust local trends relating paradoxical coexistence and on the other side of the coin, firms such as Toyota which revolutionized change also rely on institutions, rules and processes for stability (Lin et al., 2020).

Biloslavo, Bagnoli & RusjanFigelj (2013) in their empirical study on paradox reveals the ability to constructively confront the tensions between opposing dualities, rather than choosing one over the other, generating a creative solution to the tensions in the form of a new dynamic model that recognizes dualities as complements rather than forces opposing each other. These findings demonstrate

that stability and change are interdependent rather than independent and opposing organizational aspects, and they provide managers with a fresh viewpoint on the interaction between the two and thereby to increase effectiveness and efficiency of organizations.

Therefore it can be argued both stability and change are required against external impacts and firms should pay attention to change and stability by embracing, comprehending, and utilizing this contradictory relationship in order to achieve their synergistic effect**.** Lewis (2000) develops a paradox framework in order to demonstrate the generation and management of paradox. However he also explains the danger in paradox as organizations tend to get trapped within reinforcing cycles of contradiction and will inhibit changes as there is tendency to cling to the past understanding to avoid recognizing their cognitive and social foibles. Therefore paradox management is essential to capture its potential by revolutionarily rethinking past perceptions and practices.

Lewis (2000) states eastern philosophies emphasize to avoid simple distinctions and as example he illustrates the symbol of Yin and Yang in his paradoxical framework to communicate the message of tensions which leads to reinforcing cycles. The yin-yang symbol represents the interconnectedness and interdependence of paradoxes. The external boundary promotes synergy by forming a coherent whole and the internal boundary distinguishes and emphasizes opposition. No matter how extreme one force gets it retains a portion of the opposite force (Figure 3).

A new conceptualization of organizational resilience

Fundamentals of the new framework

The paradoxical tensions as describe above are most focused internally and ignores the paradox of tensions between opportunities and threats. Many scholars state resilience to be a quality associated with occurrences that may have a detrimental influence on businesses and only some consider these events as opportunities and thereby on the resilient organization to capitalize on such opportunities (Ruiz-Martin, et al., 2018). Therefore in an external turbulence organizations polarized their attention more towards the threat by increasing their defenses and putting more controls and thereby hinder the requirement to explore the opportunities. Gaim et al. (2018) state not all opposites are not paradoxes and specify seven essential characteristics which includes existence of a dyad, contradiction, interrelatedness, complementarily, compatibility, simultaneity, and

push pull forces to categorize as paradox. This paper therefore argues opportunities and threats are essentially paradox and should be managed accordingly.

This study proposes a new framework for organizational resilience by integrating a paradox framework to the organizational resilience process (Figure 3). The framework illustrates the process orient perspective of organizational resilience studies that lead to the dynamic nature of resilience as a result of the organization's engagement with the environment. The three successive stages of resilience process with organization respond to the present, past and future is based on organizational capabilities and is shaped by paradoxical tensions. Wójcik (2020) also highlights the paradoxical nature of dynamic capabilities on content analysis of literature review of over 80 papers. The paradox perspective of organizational resilience enables to understand why resilience conceptualization and operationalization is fuzzy and contradictory.

Management of paradox

Managing paradox of organizational reliance process entails recognizing and utilizing its enlightening potential. The idea is to break out from self-reinforcing cycles by drastically revising previous perceptions and practices. However, harnessing the power of paradox is challenging because breaking free from self-reinforcing cycles necessitates seemingly counterintuitive responses. Lewis (2000) sates organizations tend solve paradox by polarization due to formal logic or reasoning, traditional scientific investigations and inclination to polarize is aided by language. He provides three interrelated methods to manage paradoxes.

1. Acceptance of paradox tensions – This offers a sense of freedom and to learn to live with paradox thereby eliminate, debate and avoid vicious cycles. The main obstacle against such management is if the perception of one polar is efficient and effective over the other.
2. Confrontation of paradox tensions - discussing their conflicts in order to develop a more socially acceptable view or practice. Organization members may be able to break out from paralysis if they can recognize and communicate their underlying logic of the opposites.
3. Transcendence - implies the ability to think in a contradictory manner or paradoxically. This method highlights first order thinking results as part of the problem instead of a solution. Second order thinking, on the other hand, requires critically evaluating underlying assumptions in order to develop a more accommodating perspective of opposites or a holistic approach.

Discussion

In paradox management, tensions are stimulated from the changes in the environment as opportunities and threats and the organization's response must not be polarized and the management of tensions are replaced from either/or to both/and approach of management of paradoxes throughout organizational resilience process which includes concurrent and reactive phases (Figure 3). In a dynamic environment to create a more resilient organization, perception of external and internal contradictions and their management should be through a paradoxical lens in all three phases of organizational resilience. As an example organizational resilience empirical evidence reveals corporate social responsibility promotes organizational resilience (Huang, Chen & Nguyen, 2020). Corporate sustainability challenges polarization or trade-offs and enables paradoxical lens in order to manage contradictory demands simultaneously (Ivory & Brooks, 2018). Carden, et al. (2018) identifies the continuous threat of negative consumer perception on the fast food chain due to health risk but demonstrates the resilience model of McDonald's where corporate social responsibility aided the company to identify threat related to childhood obesity thereby to introduce more healthy foods.

Conclusion

The study was designed to address the much debated and unclear conceptualization of organizational resilience. Although past research consistently emphasized the importance of application of paradox lens to understand and manage contradictions in organizational resilience studies it is seldom. This study develops a new conceptual framework by integration of paradox theory to organizational resilience process to address the research gap of the contradicting nature of the concept thereby to reduce the amphibious nature of the concept.

Paradoxical thinking refers to opposite demands that are contradictory or polarized but are interconnected and such tensions should be managed by both/and approach instead of either/or approach. The anticipation phase consists of opposite tensions of opportunities or threats, the concurrent phase consists of tensions of stability or adaptability, and finally, the reactive phase consists of tensions of growth or performance. Therefore, the new framework conceptualizes organizational resilience dimensions to be managed as a paradox to enhance the understanding of the concept of organizational resilience and thereby facilitate its

operationalization. Therefore this study can be considered as an initial step towards narrowing the gap found in literature.

The current analysis gives information on future research directions that could be pursued. Future empirical studies can be built on this framework and focus on less-explored aspects of the resilience process such as the integration of paradoxical thinking thereby to better understand organizational resilience in the real world. Future research could, for example, shed light on the critical role of organizational knowledge, structure, and culture in the development of an organization's ability with paradoxical lens to deal with unexpected and potentially dangerous situations.

Declaration of Conflicting Interests

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

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APPENDIX

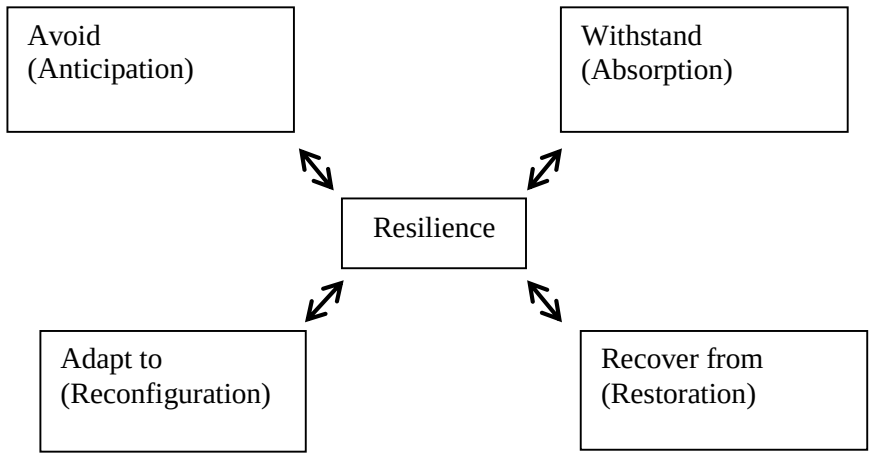

Figure 1: The main facets of resilience

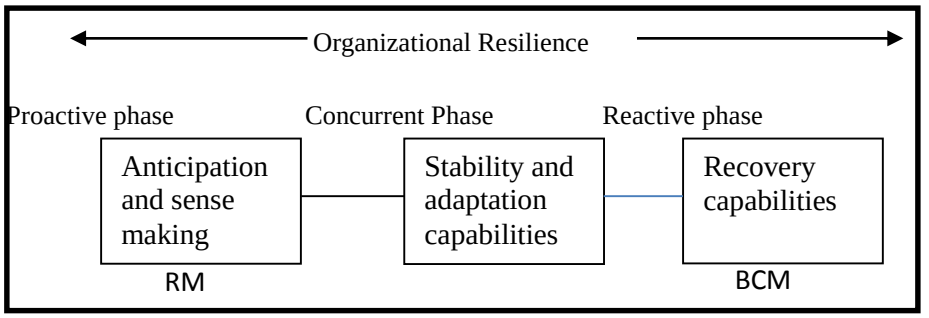

Figure 2 : A Process-capability based approach for organizational resilience

1Note. From “Towards a Conceptual Framework for Resilience Engineering” by, A. M. Madni & S. Jackson. 2009, IEEE Systems Journal, 3(2), p. 188

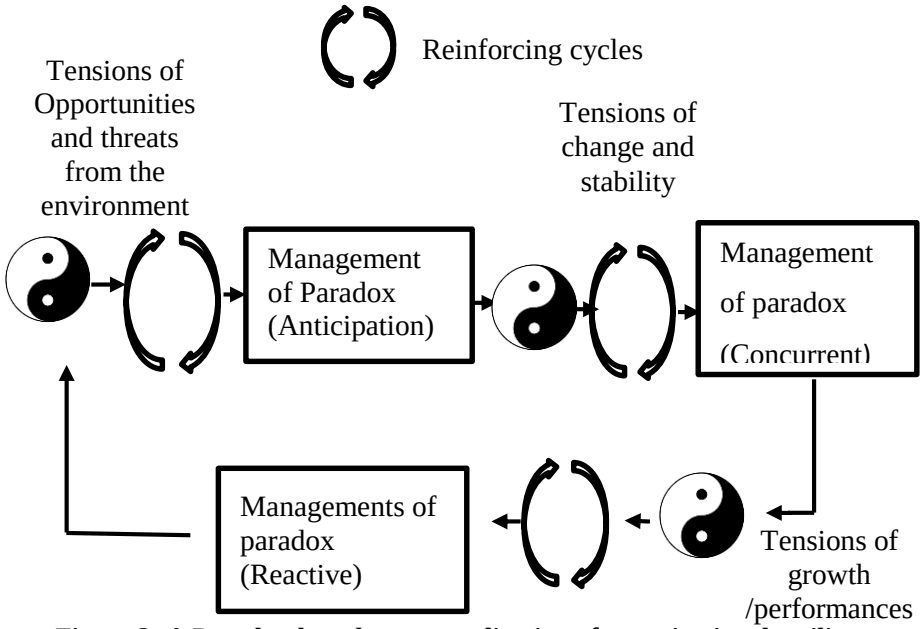

Figure 3: A Paradox-based conceptualization of organizational resilience

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Customers' Technology Know-How and Error-Correction Capability in using Self-Service Technologies

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Abstract

Customers' levels of technology knowledge vary significantly, affecting their performance in Self-Service Technologies (SSTs) and their ability to respond to errors in SSTs caused by service or process failures. Despite the fact that this is a highly practical scenario, scholarly research on the subject is rare. Thus, the purpose of this research is to look into customer technology know-how in SSTs, their corrective actions in the event of SST service/process failures, and differences among customers in terms of service performance, technology know-how, and error corrective capabilities in SSTs. A qualitative approach was used to achieve the research objectives, with semi-structured interviews conducted with 25 SST users from various demographic backgrounds. A non-probabilistic purposeful sampling strategy was used to recruit individuals for the study, with the goal of hiring information-rich cases. Thematic analysis was used to analyze the data. The study identified four types of knowledge that SST users need to effectively complete service transactions: computer knowledge, SST device knowledge, Internet knowledge, and language ability. Furthermore, the study identified numerous mechanisms used by customers to correct errors in SSTs and classified them as 'error preventing' or 'error recovering' mechanisms. Additionally, the study discovered customer performance disparities among SSTs based on their level of technological expertise and error-correcting capabilities. The study divided SST users into three performance categories: 'Full performer,' 'Fair performer,' and 'Poor performer.' The study contributes new knowledge by elucidating the interaction between SST users' technological expertise and error correction capabilities, a phenomenon that is rare in the previous literature, and contributing to the marketing theory by developing a typology to group customers based on customers' level of technological expertise and error-correcting

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capabilities. In the practical ground, it informs SST service providers on how to maximize users' level of expertise while improving the service quality.

Keywords: *Self-service technologies, Technology know-how, Errors in SSTs, SST acceptance*

Introduction

The service sector went through revolutions in the recent past converting service encounters that service employees have traditionally operated in physical service premises into self-service technologies that are technological interfaces operated by customers on their own, mostly without the support of organizational service employees. Thus, SSTs can be viewed as a transformation in the service sector which converts the traditional physical service encounters into technological interfaces. These emerging customers are known as working customers who perform their own service without the support of the organization's service staff. This alteration in the service encounter caused a change in how service providers used to manage interpersonal care in their service premises by replacing it asking customers to do their service transactions on their own (Ding et al., 2007, p. 246). Among such services, Bitner et al. (1997, p. 197) recognize 'self-service' as an extreme where customers are allowed to create a full or a part of the service with low or no interference of the organizational service staff. However, this change provided a convenience to business organizations mainly by reducing labor cost, increasing service process efficiency, reducing workload for employees, and lowering crowd in the service premises. Customers also largely benefitted from superior convenience, efficiency in the service transactions, and further, they feel a sense of empowerment when they perform their service (Hoyer et al., 2010).

Though business organizations introduce self-service technologies, customer adoption is not guaranteed and depends on many reasons (Perera & Galdolage, 2021). Among them, their technology know-how has become a key determinant (Rinta-Kahila & Penttinen, 2021). Customers' level of knowledge and practice of using technologies may support or prevent them from using SSTs in service transactions (Liu & Hung, 2022). Further, customers' technology know-how determines their technology readiness (Park & Zhang, 2022), which shows whether the customer is ready to accept technologies (Hsu et al., 2021). In contrast, customers' anxiety towards using SSTs also mainly connects with their level of technology know-how (Guan et al., 2021).

Kelly et al. (2017, p. 11) found different types of customers in SSTs, including unskilled workers and enforced workers who are not confident about their skills and not willing to work with SSTs. Thus, their role in SSTs is not 'voluntary' and is influenced by someone (enforced roles) (Feng et al., 2019). This type of enforced workers are overly controlled by the organizations (Wang et al., 2018) and forced to do some transactions via self-service technologies without having their willingness (Han et al., 2021). It can cause dissatisfaction, service failures, and customer switching intentions (Ugwuanyi et al., 2021). Therefore, improving customer know-how and making them confident in SST performance become prominent in enhancing voluntary acceptance of SSTs. Further, customers' technology know-how affects their ability to recognize the potential or actual problems related to their SST transactions (Galdolage, 2018). Their knowledge and previous experience in using such technologies will be helpful for them to respond to errors successfully. However, since customers vary in their technology know-how, we cannot expect them to adopt SSTs equally and react similarly to potential SST failures.

Though technology know-how is a highly practical aspect that hinders or enhances customers' acceptance and use of self-service technologies (Tyagi & Lodewijks, 2022), the scholarly attention given to understanding this phenomenon is very rare (Mohanty & Singh, 2021). Therefore, recognizing the major elements of technology know-how that need to use SSTs, how customers solve possible errors in SSTs, and recognizing disparities among customers based on their technology know-how and error correction capability become critical. Therefore, this study aims to achieve following objectives,

1: Explore elements of technology know-how which is vital to perform SST transactions

2: Explore customers' error corrective mechanisms for SST service/process failures

3: Understand differences among customers' based on their level of technology know-how and error corrective capabilities at SSTs.

This paper presents the theoretical background of the study first and subsequently discusses the methodology of the study. Next, it provides the findings, followed by a discussion. In the end, the theoretical and practical contributions of the study are discussed, along with the limitations and future research directions.

Literature Review

The literature review section begins by outlining self-service technologies, including definitions, types, benefits, and drawbacks for both customers and organizations. Next, the literature on technology know-how in SSTs is followed by scholarly discussions on customer reactions to SST failures.

Self-Service Technologies

Self-service technologies are characterized as "technologies, provided by an organization, specifically to enable customers to engage in self-service behaviors" (Hilton & Hughes, 2013, p. 3; Hilton et al., 2013, p. 862). Meuter et al. (2000, p.50) gave a similar explanation of SSTs as "technological interfaces which enable customers to produce the service independent of direct service employee intervention." Electronic kiosks, the internet, telephones, and mobile devices provide platforms for self-service transactions (Castro et al., 2010). SSTs include a range of technological interfaces (Safaeimanesh et al., 2021), from well-known Automated Teller Machines (ATMs) to cutting-edge platforms like aircraft self-check-in (Kelly et al., 2017). Artificial Intelligence (AI) and Augmented Realities (AR) are now being applied to enhance the customer experience in using self-service technologies (Bigne, 2021).

Customers can use self-service technology to create and consume services or parts of services without directly interacting with the company's workers (Galdolage, 2021a). The roles of customers and enterprises are constantly changing due to technological advancements (Ugwuanyi et al., 2021), and currently, there is an emphasis on producing more value, which is a precondition for becoming competitive (Saarijärvi et al., 2013). Customers do service-related activities that would otherwise be performed by the firm's staff (Galdolage, 2021b), resulting in cost savings for service providers (Ding et al., 2007). Aside from that, SSTs offer advantages such as increased efficiency, increased customer satisfaction and loyalty, service standardization and differentiation through technology (Meuter & Bitner, 1998), increased speed of service delivery, opportunities for customization and precision (Berry, 1999), cost reduction and productivity, etc. (Dabholkar, 1996). Furthermore, incorporating SSTs into the service encounter helps organizations to change staffing levels in response to changing demand situations (Curran et al., 2003). Encouraging customers to produce services in SSTs also allows service providers to focus on priorities by avoiding many clerical jobs, basic and routine tasks (Castro et al., 2010).

On the other hand, customers benefited from better control over service delivery, time and cost savings, reduced waiting time, locational advantages (Galdolage, 2020a), enjoyment, and increased personalization (Beatson et al., 2006; Meuter & Bitner, 1998). Customers like SSTs because of the low cost of self-service (Safaeimanesh et al., 2021), increased control over service outcomes such as time, or the simple enjoyment of the activity (Antwi et al., 2021), and convenience (Dabholkar, 1996; Hsieh, 2005). Customer benefits include efficiency, spontaneous enjoyment, flexibility (Bitner et al., 2000), high performance, and convenience (Galdolage, 2021c). SSTs provide a more consistent service environment (QianTing et al., 2021), allowing customers to better understand what they can expect (Curran et al., 2003). Customers experience feelings of accomplishment, increased self-efficacy, and enjoyment when they use SSTs instead of interpersonal interactions (Meuter et al., 2005). Some SSTs (e.g., kiosks at airports) provide the service in multiple languages, allowing customers to obtain it while understanding it in the language they are most comfortable with (Castro et al., 2010). SSTs are user-friendly and provide greater accessibility to people with disabilities (for example, online transactions) and contribute to national prosperity and individual quality of life (Castro et al., 2010).

Most businesses have accepted SSTs to complete more tasks with the least effort (Park et al., 2020), because clients collaborate with machines transforming their role from primarily passive to active (Hilton et al., 2013). SSTs are now used to perform more complex non-routine work, despite the fact that they were originally only allowed to perform routine and straightforward transactions. However, SSTs that are well-designed enable people with little experience to perform even very complex tasks quickly (Quinn et al., 1990). As a result, people's technological knowledge would play a significant role in how well they perform in SSTs (Rosenbaum & Wong, 2015).

Technology know-how

Even if the firm gains short-term value from self-service technologies, forcing all customers to accept them may cause problems (Ple & Cáceres, 2010). Therefore, business organizations should have a good understanding of customers' willingness to accept self-service technologies. Hilton et al. (2013) emphasize the importance of people's technological knowledge and abilities in determining which SSTs they use, while Meuter et al. (2005) note that customers' ability in doing trials is also important. Similarly, Liljander et al. (2006) and Meuter et al.

(2003) claim that the user's state of mind, as well as their ability and willingness to do the required tasks, have an impact on consumer evaluations of SSTs.

Customers' perceptions of technology's ease of use play a role in technology acceptance (Chang & Chen, 2021) and use in general and SSTs in particular (Venkatesh & Bala, 2008). In the UTAUT model, Venkatesh et al. (2003) place 'ease of learning' and 'perceived ease of use' under 'effort expectancy'. According to Curran and Meuter (2005), the ease of using technologies and learning to use them is particularly crucial in adopting SSTs. Dean (2008) demonstrates that the older generation has reduced trust towards SST transactions due to a lack of abilities in performing at technological interfaces. Venkatesh et al. (2003) also demonstrate the impact of age on 'effort expectancy' (which includes 'ease of use' and 'ease of learning') on technology adoption. Liljander et al. (2006) investigate technical readiness in SST acceptance and discover that users and non-users of SSTs have varying levels of readiness, which may vary with their level of technology know-how. As Galdolage (2021d) points out, rich information and step-wise clear guidance given in many SST platforms support the customer learning process in performing self-service transactions via technological platforms.

Further, as Galdolage (2020b) noted, gathering knowledge in SSTs is mainly self-directed. Therefore, customers' willingness and ability to self-learning how to use SSTs would increase their choice of SSTs over traditional service encounters (Chang & Chen, 2021). In the literature, it has been found that users' technology anxiety connected with lack of technology know-how has a detrimental impact on their use and ratings of self-service technologies (Meuter et al., 2003). According to Wang et al. (2016), individuals' anxiety and lack of trust in technology, explain dissatisfaction and willingness to utilize SSTs.

Customer reactions to SST failures

There is evidence of increased consumer frustration when working with technology-based systems (Parasuraman, 2000). SST problems are commonly attributed to "technical failures," "personal faults," or a combination of them (Snellman & Vihtkari, 2003). Technology and process failures were found as the key elements that lead to consumer complaining behavior and dissatisfaction, which is higher in SSTs than interpersonal interfaces (Meuter et al., 2000). In SSTs, the lack of regular physical interactions with clients (Galdolage, 2020a) leads to a lack of knowledge of their needs (Kristensson et al., 2008). Lack of abilities in performing in SSTs is cited by Reider and Voss (2010) as a reason for

avoidance (Zhang & Lu, 2021), which can result in higher costs and time spent, as well as reliance on others. According to Zhang et al. (2018), failures through negatively valenced engagement behaviors develop from rude employee actions, disinterest, confrontation with corporate representatives, technology failure, the lack of complaint channels, and customers' desire for revenge.

On the other hand, Mick and Fournier (1998) demonstrate how it's possible to have both positive and negative thoughts about new technologies at the same time. Nijssen et al. (2016) discovered that less-advantaged individuals (those with poor self-efficacy, education etc.) have a negative relationship with the company. Fan et al. (2016) also found that customer reactions to SST failures vary depending on the degree of anthropomorphism related to SST devices (adding motivations, human-like traits intentions, behaviors to non-human agents, and emotions), the person's sense of power, and the existence of other users. From the customer's perspective, Dong et al. (2008, p. 126) define service recovery in co-creation as "the degree to which the customer is involved in taking actions to respond to a service failure" and recognized three sorts of service recoveries on the premise of parties concerned as, customer recovery, joint recovery and firm recovery. As Heidenreich et al. (2015) point out, customers seem overly accountable for failures in highly co-created services, making them feel guilty, which they can alleviate by actively participating in recovery measures, and customers blame themselves in SST failures (Harris et al., 2006).

Customer complaints are crucial in service recovery (Saldanha et al., 2022). According to Snellman and Vihtkari (2003), people are more towards providing reactions in service failures, though Shin et al. (2017) emphasize the necessity of proactive customer engagement in service failure prevention. According to Hilton and Hughes (2013), service professionals are required to execute 'self-service recovery' jobs in SSTs since they demand different knowledge and abilities. Featherman and Hajli (2016), note that SSTs have been linked to dangers, while Hanks et al. (2016) discovered that people are hesitant to complete certain actions when they are approached via SSTs. Problems with deliveries, website designs, customer support issues, payment issues, and security issues were identified as service failures in online commerce (Holloway & Beatty, 2003). Self-service technologies have been identified as a possible hazard in terms of creating loyal customers, which could damage social relationships. As Fernandez-Sabiote and Roman (2016) note, some customers are happier with traditional channels than with online/company websites.

Methodology

Literature on customer interactions with self-service technologies is underexplored, and particularly, very little scholarly work is available on customers' technology know-how and its link with their ability to correct errors at SSTs. Aligning with the research objectives aimed at exploring customer technology know-how and their error-correcting ability at self-service technologies, exploratory research work was carried out with qualitative inquiries (Malhotra & Birks, 2007; Sekaran & Bougie, 2016). The study was conducted in the United Kingdom, specifically in the East Riding Yorkshire region. The selection of the developed context is backed by the fact that having more self-service technology options compared to the developing countries. The purposive sampling technique was used to recruit SST users as the participants for the study with the intention of hiring information-rich cases (Abrams, 2010; Palinkas et al., 2015; Patton, 2002). The sample size is rarely fixed for qualitative studies (Robinson, 2014), because qualitative researchers are typically unsure of the level of theoretical saturation at the beginning (Silverman, 2010). This study was limited to 25 respondents since information saturation was achieved at that level. Semi-structured interviews were conducted with some flexibility in probing to ensure the sufficiency and the quality of data collection (Rowley, 2012). All the interviews were conducted in a non-contrived setting (Sekaran & Bougie, 2016), providing more convenience to the participants.

As Creswell (2013) suggests, an interview guide was prepared with the intention of making the interview process focused, easy, and smooth. The interview guide consists of questions that focused on respondents' know-how in using SSTs and their capabilities to correct errors in SSTs. Further, it focuses on obtaining customer insights/feelings on their experience in the ability to match their know-how in managing situations where they face SST failures. The interviewing process resembles an informal conversation, which took 30 minutes to 45 minutes per subject. All the interviews were audio-recorded and later transcribed into word documents with prior permission from the respondents. Data collection and analysis occurred simultaneously, such that the researcher transcribed and analyzed the finalized interviews while continuing the data collection process. Ideas that appeared during the analysis were documented in memos and stored chronologically. As suggested by Lacey and Luff (2009), data were analyzed using the thematic analysis technique, following six stages: data transcription, data organization, data familiarization, data coding, topic generation, rigor

assurance, and as the final step, built valid arguments comparing the findings with available literature (Aronson, 1995).

Findings

Customers' Know-how in performing with SSTs

The study first attempted to understand the key areas of know-how which is needed to perform services via self-service technologies. Because know-how in using SSTs results in the level of success of service performance at SST context.

According to respondents, general knowledge of computers, basic knowledge of the internet, fundamental understanding of SST devices, and language capability are recognized as required to perform successfully in SSTs. Participants disclosed that a reasonable understanding of these key areas is needed to perform in many SSTs. Further, the study recognized that the younger generation is prepared and capable of using self-service technologies while considering SSTs as an acceptable social trend that changes the future direction. However, few respondents, especially elderly participants, revealed that technologies are uncomfortable since they haven't the needed skills and knowledge. Further, they were afraid of SST transactions and always suspicious towards SSTs. The following quotations stipulate evidence for the key areas of know-how which is needed to perform in SSTs.

Knowledge of computers: As respondents pointed out, many of the SSTs, even self-service kiosks, have screens that are similar to computer screens. Apart from that, most of the technology-based self-service options are available on online platforms. Therefore, having basic knowledge of the computer would help customers to perform well in the SST context.

One respondent pointed out the significance of having basic computer literacy to perform in self-service machines.

> *All are on computer screens… if you have a fundamental understanding of computers, that is enough. The other thing is if you know computers, you can do many things on your own. You can pay your bills; you can order your food, you can reserve a hotel or air tickets, you can channel a doctor… for everything you should have at least a bit of understanding on the computer. (38 years, male)*

Some respondents' view was the inability to perform computers prevented them from trying SST options. Particularly, the older generation still prefers to visit traditional service encounters managed by service employees rather than using SSTs.

> *Sorry. Actually, I lack in computer work. It isn't very pleasant for me to work with machines. It's actually embarrassing for older people like me when happens to do everything with machines. Because we haven't been brought up with computers like you. (67 years, female)*

Knowledge of SSTs: As respondents show, many SST devices commonly available, particularly interactive kiosks, have the same or similar options. If a person is familiar with using one type of SST machine, he can apply the same knowledge to perform in similar types of SSTs. As respondents mentioned, SST performance mainly consists of a series of instructions to follow and insert information, credit/debit card, or money on request to the relevant places. Knowing the nature of self-service machines would help them to perform in similar settings.

> *Obviously, it's easy to use. If you say it's such a challenging task, I ask you to try it once. Then definitely you will realize that there is nothing in there. Just what you need is practice. Most of the machines are the same. You have to tell the machine correctly what you want and then follow instructions. If you want to buy something, choose it, put money or card, get the product and balance back. I haven't seen anything different than that. Maybe what you do is a bit different, let's say in airports. But again, a similar procedure. (38 years, male).*

> *I don't like to work with machines. I forget many things there. There are lots of mistakes if I do it with machines. It's a burden for other people to help me. I prefer counters. Even if I forget to get my balance, they remind me. (62 years, female)*

Knowledge of the Internet: Knowledge of the internet and online platforms also gives advantages to people who perform in SSTs, mainly online-based self-service technologies. Their ability in choosing correct online platforms, browsing relevant information, searching suitable options, providing requested information, updating and uploading information helps them to perform online-based self-service transactions properly.

As far as I know, today, the whole world is connected. If you are not, you will be out-of-the-way. Personally, I believe that now everybody enjoys the internet. They can connect with everything simply from their smartphones, Ipads, computers, laptops in a simple second. It's actually inspiring you and quite clever. (22 years, female)

Today everything is online. We (the current generation) are confident with how to use these new technologies. (38 years, male)

Knowledge of language: As respondents point out, SST users' language capability also can be a matter in using SSTs. If they are not fluent in the language that machines use to communicate (mainly English), they won't be able to follow instructions properly, which leads to potential problems. However, some of the respondents appreciate that some SSTs provide the service in many languages such that the customer can choose their familiar language.

English is not my mother tongue. Sometimes it's a bit hard for me to understand what it asks me to do. If I can take some time, I can leisurely understand it. However, we need to do it quickly. So, I feel like I won't be able to do it properly. (42 years, male)

The following figure (figure 01) summarizes the main elements of Technology know-how that needs to perform in SSTs.

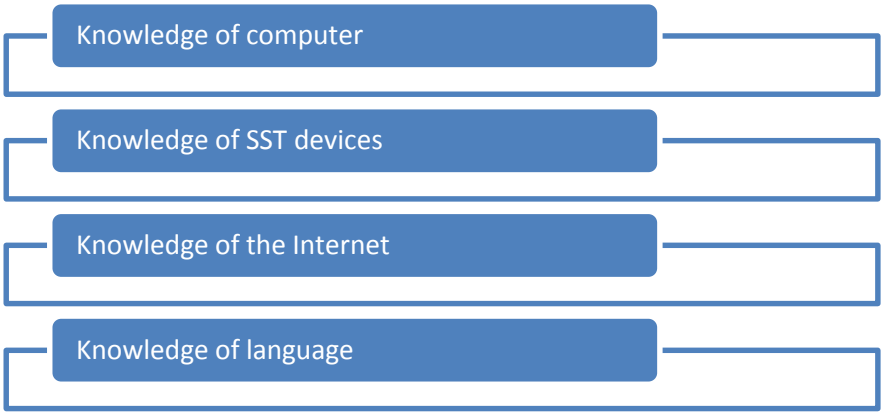

Figure 01: Elements of Technology know-how needed for SST transactions

Customer error-corrective mechanisms in SSTs

Next, the study focused on exploring mechanisms that customers use to correct errors that occur in SSTs.

As respondents declared, SST users employ a wide range of strategies to remedy problems in SSTs. All of these techniques were grouped together under two broad categories: ‘preventing errors' and ‘recovering errors.' Responding to warning signals and alarms in SSTs is recognized as a widely acknowledged error-prevention measure. Apart from that, they get multiple actions to recover the failures after errors occur. According to some of the respondents, their negligence and carelessness led to unanticipated failures. However, the vast majority of respondents were disappointed with service organizations' insufficient recovery skills as well as the amount of time it took them to implement corrective measures after a disaster.

Preventing errors: In order to avoid service-related accidents, many SSTs assist in the "preventing of errors" by seeking consumer approval of the transaction at various stages throughout the transaction. Clients are also frequently informed of potential difficulties and provided warnings so that they can identify and avoid errors as soon as they are made. According to the responders, many SSTs frequently display future faults and issue warnings so that users can detect and respond to such indicators early enough to stop errors from occurring. The following are some of the examples provided by the respondents.

> *This has happened to me numerous times. Typing the wrong PIN into an ATM machine. Fortunately, it revealed that I had entered the incorrect pin number. Then, in a flash, I make the necessary adjustments. As far as I'm aware, most ATMs give you three chances to use them. Your card will be trapped in the machine if you do not reply to their warning and continue in the same manner. (38 years, male).*

> *Of course, I'm the one who's at fault. I ran through a long list of PIN digits in my head without double-checking them. My card became trapped in the machine at the end of the process. (36 years, male).*

Recovering errors: Here, the potentials for 'recovering errors' at the same time the incident occurred or within a limited time frame are acknowledged. Respondents demonstrated that SSTs have the capacity to recover errors by simply canceling the process or if errors arise, fixing them through various

mechanisms by contacting the service provider. Many customers shared their experiences on how they recovered from service failures confronted by them while few respondents were unhappy with organizations' recovery efforts by stating it as a big hazel. They pointed out the necessity of service employees to support customers, especially when they face problems with SSTs, rather than giving other auto-generated messages on how to go through recovery steps.

> *We do not want to instill an unwarranted fear of machines. Because even if failures occur, there are still numerous ways to recover from them. Numerous gadgets or electronic interfaces, such as webpages, include buttons for canceling, exiting, or deleting. You can cancel the transaction at any time without paying and continuing with it. Additionally, they have assistance lines or hotlines. I once made an unintentional transfer of funds to an incorrect account. I discovered it two months later when my banker informed me that I had not made the installment payment. When I checked my account history, I discovered that I had transferred to another account. Then I informed the bank, and they rectified the situation. However, it took some time. (45years, male).*

> *I've had some awful experiences with certain companies. I despise it when we are unable to reach staff people for assistance. They took an unusually long time to resolve a straightforward issue. Their response was also limited to emails, and I had to write numerous times before they addressed my issue. (55 years, male).*

As the study discovered, SSTs assist customers in identifying and avoiding potential difficulties with their SST transactions (preventing mechanisms). Additionally, SST users can recover from SST-related errors using a variety of error recovery mechanisms. As illustrated in the following image (figure 2), SST users' error-prevention and recovery abilities will aid in the smooth execution of transactions.

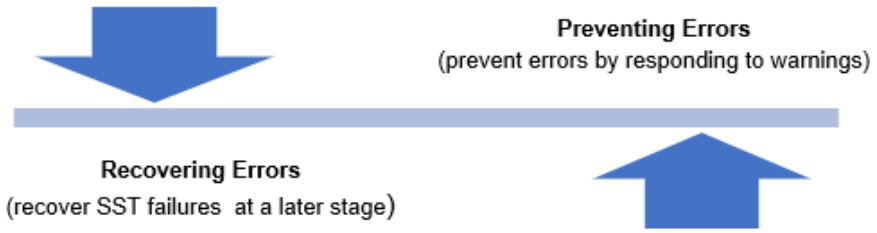

Figure 2: Error Corrective Mechanisms for smooth SST transactions

Customer classification based on technology know-how and error-correcting capability in SSTs

Additionally, the interviews focused on eliciting customers' experiences when attempting to match their know-how in SSTs in the face of SST failures. Respondents shared both positive and negative experiences with utilizing their IT expertise to resolve SST issues. By analyzing such customer experiences, the study attempted to classify them in to groups based on their technological proficiency and capacity to resolve issues at SSTs. As the study found, customers' technology know-how and error-correcting capability go hand-in-hand and show positive relationships. According to the customer responses that they shared on their experience and level of capabilities in performing at SSTs and their ability to correct SST failures, they were classified into 'Full performers,' 'Fair performers, ' and 'Poor performers.'

Full Performers: SST users with a high level of technology expertise are able to fix potential problems in their SST-related transactions through the use of adequate error prevention and correction procedures. This category of clients was named as 'Full Performers.' They are believed to have a high level of technological skill and are competent in managing transactions in many SST contexts. They favor SSTs because technology simplifies their efforts and advances their lives. They asserted that SSTs were unmatched by others in terms of convenience and independence, which they would be willing to embrace even more advanced versions of SSTs in the future.

> *I use technology to do nearly everything. It's easy. It makes everything very convenient. I think I can perform many SSTs. The knowledge application part is quite similar. You need to have the skill to work on machines. Once you get*

it, it will be part of your life. Life will be very hard without SSTs. (45years, male)

Fair Performers: SST users who are average in technology know-how and error preventing and recovering skills in SSTs were named as 'Fair performers.' They are capable of performing SSTs, while occasionally getting support from other parties on problems related to SST performance. They have a fair amount of understanding of using different SSTs and can work with SSTs with a little guidance.

I am not very good or very bad at working with machines. I can follow others and do accordingly. Sometimes I am a bit afraid to do my own, but if someone is there to see that I am on the right track, I can learn and do it. (36 years, Female)

Poor Performers: According to the study, customers who lack technological knowledge and are incompetent in error correction at SSTs were labeled as "Poor performers." It is preferable for them to have traditional physical service encounters that are managed by service workers. They rely on SST unless they have no other choice available to them. They were identified as being apprehensive about using SSTS.

When faced with a choice, I always choose the human alternative. Machines are not to be trusted. I'm not familiar with how to operate them. I'm not interested in learning them either. If something goes wrong in there, who is going to be held responsible? I don't want to call them and run around town if something goes wrong what is important to me. I prefer to meet with staff. They are going to do the right thing. (62 years, Female)

The following figure (Figure 3) summarises the classification of customers based on Technology know-how and error-correcting capability at SSTs

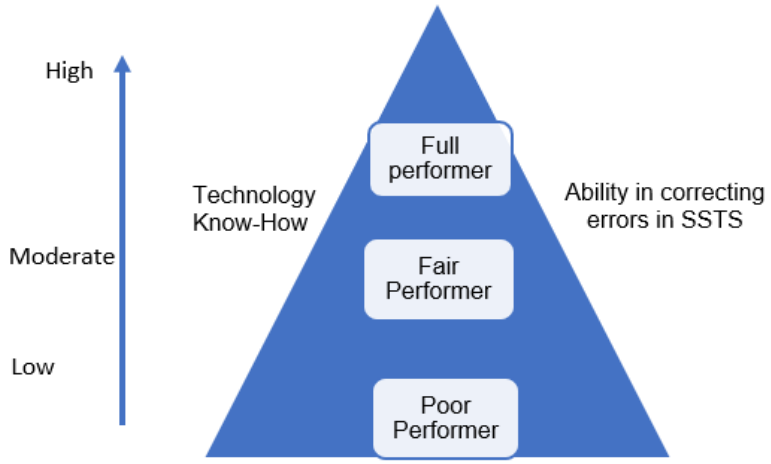

Figure 3: Classification of SST users based on technology know-how and error-correcting capabilities.

Discussion

This study found that general knowledge of SST devices, internet knowledge, computer knowledge, and language capability are all critical factors in deciding customers' ability to perform at SSTs successfully. Similar to the findings of this study, Hilton et al. (2013) discovered the importance of 'consumer knowledge and skills in the selection of SSTs, and thus they highlighted the role of taking this into account early in the design process. Meuter et al. (2005, p.63) emphasize the importance of consumers' capacities in SST trials, citing "individual difference" as one of the primary characteristics influencing the influence of consumer preparation. Furthermore, the findings of this study are consistent with those of Liljander et al. (2006) and Meuter et al. (2003), who have noted the significance of the individual's state of mind as well as their 'abilities and willingness' in consumer evaluations of self-service technology. Dabholkar (1996, p.39) defines 'ease of use' in self-service technologies as "ease of using the touch screen in terms of how easy or straightforward it would be to use this option," confirming our findings about the conceptual parallels between 'ease of use' and 'ease of learn' with 'technology-know-how.' Both acceptability of technology in general (Venkatesh & Bala, 2008) and SSTs, in particular (Lee & Oh, 2022), are thought to be influenced by customers' technology know-how

(Tavitiyaman et al., 2022) and perceived simplicity of use (Meuter et al., 2000; Weijters et al., 2007).

Further, this study identified ‘error correction’ as an essential aspect in SSTs, which is described as ‘preventing errors by following precautions and/or getting recovery activities after the occurrence.’ Here, ‘preventing' and ‘recovering' errors were identified as aspects in ‘correcting' failures in SST transactions. Warning messages, alarms, and cancellation procedures in SSTs have all been identified as critical error-prevention strategies. Recovery of errors through various procedures such as self-recovery or informing the service provider was also considered as crucial. Customers' non-responsiveness to early warnings, is recognized as leading to unanticipated failures. When compared these study findings with literature, Shin et al. (2017), emphasize the importance of proactive customer contacts in preventing service failures rather than focusing on recovering service failures through reactive efforts. In addition, Hilton and Hughes (2013) point out that service professionals are required to execute ‘self-service recovery' jobs in SSTs since they require specialized knowledge and abilities. ‘Failures with technology,' ‘personal faults,' and a mix of both are recognized as major causes of SST failures (Snellman & Vihtkari, 2003). Similarly, technology and process failures have been identified as important contributors to customer complaints (Meuter et al., 2000) and dissatisfaction (Hsu et al., 2021), which is higher in SSTs than interpersonal interfaces (Chen et al., 2021). According to Fan et al. (2016), customer responses to SST failures range based on the level of anthropomorphism related to SST machines (adding human-like traits, motivations, intentions, emotions, and behaviors to non-human agents), persons' sense of power, and the prevalence of other users. According to Dong et al. (2008, p. 126), actions made to mitigate or repair harm are referred to as service recovery defining it as "the degree to which the customer is involved in taking actions to respond to a service failure," and there are three types of classification in recoveries, depending on the involved party: firm recovery, joint recovery, and customer recovery. According to Heidenreich et al. (2015), customers in highly co-created services appear to be overly liable for failure, which makes them feel terrible, and they can assuage this guilt by actively engaging in recovery measures (Ozuem et al., 2021).

Conclusion

The study identified four main types of technology know-how: general knowledge of computers, knowledge of the internet, knowledge of SST devices

and language capability as important to successfully perform in self-service technologies. Further, the study found two main ways of correcting errors in SSTs: 'preventing errors' and 'recovering errors' which SST users can use to correct the failures in SSTs. Finally, it developed a typology that classified customers into three groups: 'full performer', 'fair performer' and 'poor performer', based on their technological know-how and error-correcting capacities in SSTs.

Theoretical and Practical Contributions

This study fills the theoretical gap by addressing an issue that has rarely been discussed in scholarly discussions. Doing so, it enriches the literature surrounding Self-Service Technology, specifically the areas in technology know-how and error correction in SSTs. As Corley and Gioia (2011) suggest, this study contributes to 'scientific utility' in a variety of ways by introducing new knowledge and generating new models/typologies for the SST environment. As given above (in the findings and conclusion), the study identified four main types of technology know-how and two main ways of correcting errors in SSTs. Finally, it adds to the theory-building by outlining a typology for consumers based on their technological expertise and error-correcting capabilities in SSTs.

On practical grounds, SST service providers can use this understanding to design and deliver superior customer experience through their SSTs. Specifically, this study found that customers' general understanding of SST devices, internet knowledge, computer knowledge, and language capability as important in performing with SSTs. Based on this, the study recommends that businesses assist customers in improving their technological knowledge by increasing awareness of simple ways to interact with the company's technological interfaces, promoting few-step processes with easy-to-remember strategies with visual demonstrations (e.g., click-choose-confirm-pay), and promoting the benefits of using self-service technologies. Furthermore, this study urges service organizations to consider their customers' technical knowledge, particularly while designing SSTs, so that ordinary consumers (not just technology professionals) may use them with minimal effort.

Finally, in self-service technology, 'error prevention' and 'error recovery' are regarded as critical 'error correcting' activities. As a result, the study concludes that businesses assist customers' error-prevention measures by making people aware of potential errors through warning messages, red lights, underlining warnings in red, emphasizing important information/conditions in an eye-

catching way, obtaining confirmation for critical information again and again, and inquiring the customer. Finally, even if the consumer goes through all of these steps, if he or she does not want to pay and continue the service transaction, there must be a simple way to "cancel" or "exit" the procedure with no strings attached. If the customer/organization is unable to avoid failures, the next step should be to provide adequate recovery techniques, such as simple apologies, prompt responses to calls/emails, reimbursements, product-to-product interchangeability, and so on, as soon as possible. Businesses should also validate the customer's preferred service recovery technique. This is due to the fact that many service organizations use a "product-to-product" defect recovery technique; however, this takes time, and the customer may prefer to purchase a similar product/service from a different service provider for immediate satisfaction.

Limitations and Future Research Directions

This study was a qualitative inquiry limited to exploring customers' technology know-how and error correction capabilities at SSTs. Therefore, future researchers can empirically test these findings by developing scales and statistically valid results. Since the study was limited to developed cotext, future researchers can consider developing countries or conduct a comparative analysis. Further, this study investigated general SSTs; thus, future researchers can focus on specific types of SSTs and explore customer experience in detail. Additionally, future researchers can concentrate on customer learning in SST, which enhances their know-how and experiences in performing with self-service technologies.

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

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Holistic Approach in Introducing Proper Legal Framework to Regulate Data Protection and Privacy in Sri Lanka

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Abstract

Data protection and privacy law have never been important as they are today. Data protection and privacy ensure that data is safeguarded from unlawful access by unauthorised third parties and misappropriation of the same. A successful data protection strategy will be helpful to prevent data loss, theft, or corruption of data. It is evident that information and communication technology is developing daily and privacy issues or the threats against personal data of the persons also equally increasing. Responsibility of a government to provide effective privacy and data protection laws/policies cannot be disregarded at any point. Until very recent Sri Lanka did not have a separate legislation to deal with data protection and privacy and it was identified as a major lacuna in our law. At present, in addition to the Personal Data Protection Act No. 09 of 2022 there are several other legislations that may be applied to regulate certain aspects of data protection and privacy. In this research, researcher is aiming to assess whether existing legal framework on data protection and privacy in Sri Lanka is adequate and effective. This will be done by comparing the Sri Lankan legal framework with UK and Singapore, countries that are known as pioneers of data protection and privacy. Ultimate goal of the researcher is to contribute towards assurance of data protection and privacy right of the individuals in Sri Lanka.

Keywords: *Data protection, Privacy, Information Communications Technology, Personal data*

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Introduction

Primary aim of this research is to assess the effectiveness of the data protection and privacy law in Sri Lanka compared to the UK and Singapore and to make suggestions on how to establish a comprehensive data protection and privacy regime in Sri Lanka. Data protection and privacy laws primarily ensure that your data is safeguarded from unlawful access by unauthorised third parties and misappropriation of the same. Though the term data protection and privacy are often used concomitantly there is a significant difference between these two norms. Data privacy deals with ability to access to data and data protection provides tools and policies that are available to restrict interdependent (Rouse 2021).

Data protection and privacy laws are increasingly becoming crucial to Sri Lanka too, mostly due to the rapid digitalisation. Moreover, data protection and privacy has become more vital due to the emergence of e-governance and e-commerce. Sri Lanka's e-commerce industry generated USD 400 million by year 2020. Today most of the businesses will be conducted through digital platforms therefore having a robust data protection and privacy measures would secure data and alongside it will improve the business and consumer confidence. A successful data protection strategy will be helpful to prevent data loss, theft, and corruption of data. Data privacy is also a guideline on how data need to be collected or handled, it may vary according to the sensitivity and importance of data concerned. Data privacy ensures that sensitive/important data can be accessed only by authorised persons. Data protection includes both prevention of unauthorised access as well as the protection against loss caused by natural or human-created reasons (Nadkarni, 2016).

Prior to the so-called information revolution, information and data of the individuals were only stored in traditional filing cabinets or in similar places. Other than the owner of said data third parties could not easily gain access to such data. However, with the emergence of computer technology people started storing their data in computers concurrently with the development of internet/computer networks personal data became much more widespread. Said developments increased the potential of data and privacy invasion (Rowland et al., 2012).

Development of technology has no territorial boundaries. But responsibility of a government to provide effective privacy and data protection law/policy cannot be disregarded. Apparently, mere recognition of data protection and privacy is not adequate it can be labelled as a mere "dead letter" as legislation and judicial

findings have only a marginal effect (Koops, 2014). Sri Lanka is a country which didn't have a separate statute to regulate data protection and privacy until very recent. Thus, some laws and regulations applicable to certain aspects of data protection and privacy could be found within several piece of legislations which are industry specific e.g. – Intellectual Property Act No. 36 of 2003, Computer Crimes Act 2007 etc.

In addition, remedy against breach of individual privacy can be found within the Roman Dutch law it is the Sri Lankan common/residuary law which form an action against injury (wrongful aggression upon the person, dignity or reputation) under *actio injuriarum* (*Nadarajah v Obeysekera (1971) 52 NLR76*). Nonetheless this action is very restrictive as there are many requirements to be fulfilled to succeed a particular claim (*Sinha Ratnatunga v The State (2001) 2 SLR 172).* Arguably absence of proper law to deal with privacy/data protection have adversely affected on individuals/entities in Sri Lanka as it is detrimental to the development of e-commerce and international trade/investment (Senarathna, 2020).

There are three main risk factors attached to the privacy and data protection. First one is the risk of injustice cause due to the significant inaccuracy of personal data; e.g. – function creep, unjust inference. The second risk is, one may control another person over by collecting his/her personal data. Finally unauthorised invasion of data can be identified as a threat to the personal dignity of the persons. (Senarathna, 2020). It is conclusive that unless there is an effective law to deal with data protection and privacy deterrence of aforesaid risk factors would be a difficult task.

Significance of the study

The study intends to assess whether prevailing legal framework on data protection and privacy in Sri Lanka is adequate and effective and to provide suggestions on how to establish a comprehensive data protection and privacy regime in Sri Lanka. This will be done through comparing the Sri Lankan legal framework with UK and Singapore since these two countries has been recognised as having an effective data protection and privacy laws. Apparently providing an equal and universal privacy and data protection framework is not an easy task, but it is essential to provide at least a basic and minimum protection (Bainbridge, 2007).

This study is particularly important to Sri Lankan context as it recently enacted Personal Data Protection Act No. 09 of 2022 which is primarily aiming to

safeguard the personal data of the persons. This study will further contribute towards the development of the legal framework on data protection and privacy in Sri Lanka since Personal Data Protection Act No. 09 of 2022 is a newly enacted legislation and its effectiveness is yet to be tested. Analysis planned to be done between UK and Singapore laws will be helpful to identify the gaps of the Sri Lankan law and in giving the recommendations of the researchers in order to formulate an effective data protection and privacy law in Sri Lanka. Ultimate goal of the researchers is to contribute towards assurance of data protection and privacy right of the individuals in Sri Lanka and to fill the gaps in existing law.

Scope and Limitations

This research will be mainly limited to the Sri Lankan law on data protection and privacy. Researchers will primarily analyse the Sri Lankan law with two other jurisdictions, (UK and Singapore), in order to bring an additional comparative point of view to this study. Principal purpose of this study is to assess the effectiveness of the Personal Data Protection Act No. 09 of 2022.

Literature Review

In this section, researchers evaluate the available literature within the selected field of study in order to identify the existing research gap and to determine how this research study should address the said gap. Moreover, another key aim of this chapter is to assess how knowledge has been evolved within the selected field of study.

Importance of data protection and privacy laws

Recent inventions and business methods calling attention to take steps for protecting persons and for securing their right referred as "right to be let alone". Privacy can be identified as an essential part of every individual's life as invasion of privacy can cause mental pain and distress which would be greater than the mere bodily injury. Therefore, providing a legal remedy for such injury would treat wounded feelings of the persons as a substantive cause of action as invasion of privacy constitutes a legal injuria and it demands a redress. Arguably unwarranted invasion of individuals privacy must be prevented as far as possible (Warren and Brandies, 1890). After introducing the first generation of computers which were able to store and manipulate data, issues relating to the data protection and privacy significantly increased (Rowland et al., 2012). Later on, safeguarding

data protection and privacy was identified as a fundamental right in major international human rights legislations such as Universal Declaration of Human Rights (UDHR) and International Covenant on Civil and Political Rights (ICCPR) (Stefan et al., 2019).

The growing need for data protection and privacy in Sri Lanka

EU General Data Protection Regulation (GDPR) introduced new changes to the data protection laws, for an example it requires companies not having any physical existence in EU to comply with GDPR regulations if it offers goods or services to EU countries and at the same time if personal data transfers outside the EU controller of such data must ensure that a similar protection is given to the said data like in EU. So that it is important for every country including Sri Lanka to have an effective domestic legislation to protect data and privacy which is synonymous with existing international standards (De Soyza, 2017). During past few decades Sri Lankan government paid more attention towards strengthening the legal framework for use of information technology in various fields through the enactment of some important legislations like Electronic Transactions Act of 2006 and Computer crimes Act of 2007 these two legislations provide the laws and relevant legal procedures for effective and correct use of technology". Nevertheless, many academics contended that in addition to enacting these regulations government should take immediate steps to improve the standards of information technology usage specially in connection to the data protection and privacy.

As digitalization generates more data, it heightens the need of having adequate and effective data protection and privacy laws. This need has become more crucial with the emergence of e-governance and e-commerce in Sri Lanka (www.ips.lk). Since Sri Lanka didn't have a specific data protection and privacy legislation until very recent people always attempted to protect their data and privacy via manual forms such as storing them in isolated computer systems, but effectiveness of such measures obviously doubtful. Thus, with the enactment of Personal Data Protection Act No. 09 of 2022 it is be believed that this position would be changed.

Data Protection and Privacy in UK and Singapore

UK is one of the first countries to implement GDPR in local law. UK introduced its own version of EU GDPR which is known as UK GDPR under its European Union Withdrawal Agreement in 2020. The UK's GDPR is supplemented through the DPA 2018 (Carey and Treacy, 2015). Despite of existence of a specific law to deal with data protection and privacy in UK, Warwick Ashford suggested that it is not an end point but it is just the beginning. Since data protection and privacy aspects are an evolutionary process as no business, industry, or technology stand still (Ashford, 2018).

Singapore enacted the Personal Data Protection Act in 2012 which provides a baseline standard of protection for personal data of the persons. It basically imposes nine data protection obligations on organizations operating in Singapore (Benjamin, 2017). Key rationale behind the implementation of data protection laws and regulations in Singapore is to; (i) protect the privacy interests of the individuals and (ii) to advance the economic interests of Singapore (Chesterman, 2012).

As per the data of the United Nations Conference on Trade and Development (UNCTAD) most of the countries around the world (137 out of 194 countries) including UK and Singapore have their own laws and regulations to deal with data protection and privacy (www.unctad.org, 2021). Sri Lanka is a country which did not have a separate legislation to deal with data protection and privacy until very recent. Apparently above discussed literature establishes the importance of having an effective legal framework to deal with data protection and privacy. Thus, none of the literature assess the effectiveness of Personal Data Protection Act No. 09 of 2022 as it is a very recent enactment.

Methodology

In this section, researchers describe the methodologies as well as the data collection methods involved in this research. Accordingly, researchers adopt a qualitative research approach together with doctrinal research method and comparative and international research methodology. Furthermore, in this section researchers aim to outline the said data collection methods and methodologies and also clarifies the rationale behind choosing aforesaid methodologies and data collection methods.

Research problem

Every day a vast amount of data will be collected, stored and transmitted across the globe due to the impact of the technology. Undoubtably rapid development of the technology and innovation have increased the need of having an effective data protection and privacy law for a country. Similarly, as we can see data has also become incredibly important asset at present therefore most of the time data of individuals are vulnerable to theft, loss, corruption or to similar threats. Sri Lanka is a country which didn't have a consolidated /separate legislation to deal with data protection and privacy until very recent. Thus, some of the provisions that are indirectly applicable to data protection and privacy could be found within several other piece of legislations which are industry specific.

Absence of a proper legal framework to regulate data protection and privacy in Sri Lanka had already caused multiple adverse impacts such as; violation of rights of the persons (collection of personal data without the knowledge/consent, misuse of data), loss of direct/indirect foreign investments etc. This was identified as a major gap or lacuna in the Sri Lankan law. Therefore, academics argued that it is essential to provide an effective solution to this problem with immediate effect, as a result government of Sri Lanka enacted the Personal Data Protection Act No. 09 of 2022. However, the effectiveness of this statute is still doubtful. Hence in in this research, researchers are aiming to assess the effectiveness of the existing legal framework in Sri Lanka on data protection and privacy comparatively to the UK and Singapore experience.

Research Questions

a) Why Sri Lanka was reluctant to introduce a specific law to deal with data protection and privacy?
b) Why data protection and privacy is important to Sri Lankan context?
c) To what extent prevailing laws on data protection and privacy in Sri Lanka is adequate to provide solutions for the emerging issues arising from the rapid development of technology?
d) What are the lessons that Sri Lanka can learn from the UK and Singapore's experience on data protection and privacy?
e) What are the suggestions that can improve the effectiveness of data protection and privacy regime in Sri Lanka?

Hypothesis

Unless there is an effective legal framework which is in line with international standards, dealing with problems associated with data protection and privacy would be problematic. Therefore, as a developing country Sri Lanka also need to have an effective legal framework which is in line with international standards to regulate data protection and privacy.

Objectives

a) To examine the efficacy and adequacy of existing laws concerning data protection and privacy in Sri Lanka.
b) To examine successful mechanisms relating to data protection and privacy and significant international standards.
c) To collect UK and Singapore's experience on data protection and privacy.
d) To recommend new strategies that can be adopted in to Sri Lankan context to provide an effective and efficient data protection and privacy strategy.

Research data

Researchers are using a qualitative research method in order to have a comprehensive research approach to the study. Data for this study will be gathered from both primary and secondary sources. Reviewing the said primary and secondary sources will be helpful to identify the gaps of the present legal framework on data protection and privacy in Sri Lanka. Moreover, this research will be based on doctrinal and comparative methods. Doctrinal method will be used to answer the first two research questions and Comparative and International Research Methodology will be used to answer the last three research questions.

Primary and secondary data

Primary data may include; statutes, international conventions, regulations and case law etc. by analysing these data researchers will be able to enter into their final conclusions and provide suggestions on establishing an effective data protection and privacy regime in Sri Lanka based on UK and Singapore's experience. In addition, researchers are aiming to use secondary data such as; books, scholarly articles, law journals, websites… as these are the pre-existing

works relating to the selected subject matter, these secondary data will provide a basic guidance to this study.

Qualitative and quantitative data

As this research will be conducted in a critical and analytical manner, researchers will adopt the qualitative research methodology. Unlike the quantitative data, which deals with the numbers and figures, qualitative data is more descriptive in nature. By using the qualitative research approach researchers are aiming to collect appropriate data to conduct this research and establish research objectives.

Data collection system

Data selection is the process of determining the appropriate data/sources as well as suitable instruments to collect data. Data for this research will be primarily gathered from direct observations and documents and pre-existing records (qualitative data) as it will allow the researchers to adequately answer the concerned research questions. (sir is it okay to delete this section?? As it is similar to the previous section??

Method of data analysis

Doctrinal Method (Black Letter Approach)

By using the doctrinal research method, researchers will analyse the existing legal materials such as statutes, case law, textbooks, journal articles etc. and attempt to identify the existing gap in the data protection and privacy regime in Sri Lanka. Thereby researchers will be able to incorporate new elements of law into the existing legal system (Hutchinson and Duncan, 2012).

Comparative and International Research Methodology

Cross-national comparative research method requires a sound knowledge and understanding of both national and international contexts. Use of comparative and international research methodology will be helpful to understand the variances of different legal approaches in connection to a particular question, also it will be helpful to understand the gaps in knowledge and to suggest new perspectives. Accordingly this approach will be helpful to understand the gaps of the Sri Lankan law compared to UK and Singapore.

Sri Lankan Legal Framework on Data Protection and Privacy

In Sri Lanka there are several legislative provisions that can be applied to certain aspects of the data protection and privacy. Said legislations consist of; Constitution of Sri Lanka (1978) (Article 14A (2)), Computer Crimes Act No. 24 of 2007 (s3 – 10, s19, s22, s24), Electronic Transactions Act No. 19 of 2006 (s2), Right to Information Act No. 12 of 2016 (s5 (1) (a)), Banking Act No. 30 of 1998 (s77), Telecommunication Act No. 25 of 1991 (s49, S52), Intellectual Property Act No. 36 of 2003 (s160). In this section, applicability of these laws towards the data protection and privacy will be assessed.

As mentioned previously data protection and privacy increasingly becoming relevant to Sri Lanka due to the rapid rise of digitalization. As digitalization generates more data, it heightens the need of having an adequate and effective data protection and privacy laws (Abeysekara, 2017). This need has become more vital with the emergence of e-governance and e-commerce in Sri Lanka. Although there are multiple legislations dealing with electronic transactions, cyber-crimes and consumer protection there is no specific/separate law that regulates data protection and privacy this can be identified as a major gap.

Key statutes, regulations, directives and bills

In order to amend or introduce a new law, analyzing the existing laws and identifying its flaws is always a must. Therefore, primary aim of this section is to assess the adequacy and effectiveness of the existing Sri Lankan legal framework on the data protection and privacy.

Constitution of Sri Lanka (1978)

Constitution of Sri Lanka did not recognize neither right to information and right to privacy originally, subsequently, right to information was guaranteed under the 19th Amendment to the Constitution. Simultaneously, Right to Information Act No. 12 of 2016 was enacted. At present right to privacy is protected in Sri Lanka only as a delictual matter under the concept of *Actio Injuriarum* or in other words right to privacy is concerned as a private law issue and this area is still evolving through case law. *Actio injuriarum* is an independent remedy available against wrongful aggression on persons, their dignity or reputation and it is arguable that *actio injuriarum* is not adequate enough to deal with modern aspects of data protection and privacy issues.

Nadaraja v. Obeysekara in this case court attempted to elaborate the term "invasion of privacy" and it was emphasized that prevention of others interference on someone's space is the purpose of privacy law. However, absence of proper judicial interpretation on right to privacy also shows the State's lack of intention to protect right to privacy. Altogether entrenchment of the right to information without ensuring the right to privacy has created number of social issues ((1971) 52 NLR 76). Differently to the Sri Lankan approach more than 90 countries around the world have recognized both right to information and right to privacy concomitantly.

Moreover, Article 14A of the Constitution (19th Amendment) refers to certain privacy concerns within the context of restrictions imposed on the right to information. Accordingly, Article 14A (2) of the constitution restricts right to information of the persons subject to limitations prescribed by law to uphold the interest of the national security; to safeguard territorial integrity, public safety, for the purpose of preventing crimes, protection of health, morals, privacy of persons. However, this is not a direct provision where right to privacy is expressly granted and expounded as fundamental right of the citizens of Sri Lanka.

Apparently, Article 14A (1) merely ensures right to access to information by persons without ensuring their right to privacy this can result in severe violations of privacy of the persons (De Soyza, 2017). If government or an administrative arm of the government infringe any fundamental right of the citizens such actions can be questioned by invoking the exclusive jurisdiction of the Supreme court as set out in the Article 17 read with Article 126 (1) but this is not possible since right to privacy is not a fundamental right under the Constitution of Sri Lanka and privacy aspect is merely recognized as an exception to the right to information (Marsoof, 2008).

Universal Declaration of Human Rights (UDHR) was the first international instrument which attempted to recognize right to privacy as a separate fundamental human right. Subsequently International Covenant on Civil and Political Rights (ICCPR) also recognized the right to privacy, family, home and correspondence from arbitrary and unlawful interference and it ensures that everyone should have protection of the law against unlawful interferences. Both right to information and privacy plays important roles and it is noteworthy that under human rights law no right can gain greater weight than another. As a member of UDHR and ICCPR Sri Lanka also could adopt a similar approach to protect these rights simultaneously (Sooriyabandara, 2016). However, these

Conventions are not directly enforceable in Sri Lanka until the enactment of a separate legislation to that effect.

Key statutes on data protection and privacy in Sri Lanka

Though there are multiple statutes that are indirectly applicable to data protection and privacy in Sri Lanka few key statutes will be discussed herein. These statutes were specifically selected as they at least consist of few provisions which may indirectly applicable to data protection and privacy and restricts/prohibits unlawful access to data stored in computers, illegal invasion of data, illegal interception/transmission of telecommunication contents and protection of confidential data.

Computer Crimes Act No. 24 of 2007

This Act deals with the identification of computer crimes and also it provides the procedure for the investigation and prevention of computer crimes and matters incidental and connected therewith (Computer Crimes Act No. 24 of 2007, S1). Accordingly, S3 to s10 deals with the key substantive offences recognized under the Computer Crimes Act of Sri Lanka. S3 of the Act stipulates that unauthorized access to a computer as an offence. As per s4 doing any act to secure unauthorized access in order to commit an offence also recognized as crime. Additionally, to the S3 and S4, S5 addresses another important aspect of computer crimes, which is the causing a computer to perform a function without a lawful authority. E.g. – modification, corrupting, falsification, deletion or alteration of data stored in a computer. It is arguable that if a person accessing into a computer with the intent of stealing, modifying data of another offender violates the data protection and privacy too (Abeysekara, 2015).

S10 of the Computer Crimes Act provides another strong protection to the user's information collected by service providers. In addition, s19 of the Act also somewhat relevant to the certain aspects of data protection and privacy as it empowers investigators to give directions to responsible persons to preserve related data for a specific period of time. Further s22 of the Act directs the police officer who conduct a particular search under this Act to issue a complete list of items and data including the data and time of such seizure. Altogether s24 enable the maintenance of confidentiality of the information that has been collected during the course of investigations (Computer Crimes Act No. 24 of 2007, s19, s22).

It is clear that Computer Crimes Act of Sri Lanka do not directly deal with the data protection and privacy, thus several provisions of the Act have some sort of application to the data protection and privacy. Thus, existence of such provisions is not adequate or effective enough to deal with data protection and privacy requirements of a country. Computer Crimes Act been enacted for the primary purpose of criminalizing the unlawful access to a computer, computer program, data or information. Data processing and transportation of personal data will not be directly governed by the Act. Therefore, it is always recommendable that most effective way to deal with a particular legal matter is to have a separate piece of legislation or regulations rather than referring to several legislations which are not directly deal with a matter concerned.

Electronic Transactions Act No. 19 of 2006 (ETA)

Digital laws primarily regulate the use of electronic data and digital documents for official and personal transactions (Electronic Transactions Act No. 19 of 2006, s2). The main purpose of ETA is to regulate e-transactions. Though this Act is applicable to any data or communications made in electronic form, Act doesn't define what shall be considered as personal data and it contains no provision in relation to data protection and privacy. Even though Sri Lanka adopted a progressive approach towards the regulation of e-transactions gaps in connection to the data protection, privacy and consumer protection still remains the same and it is detrimental to the effective enforcement of the law on e-transactions as well (Ariyaratna, 2016).

Right to Information Act No. 12 of 2016 (RTI)

RTI provides an absolute right and grant effect to the citizens constitutional right to access to information under the s3 of the Act. However, this right been granted subject to certain limitations specified in the s5 of the RTI Act (Greenleaf, 2017). S5 (1) (a) can be recognized as a vital provision which is directly affecting to the data protection and privacy. This section stipulates that disclosure of personal information which does not have a relationship with any public activity or interest or which will allow the unwarranted invasion of privacy of the individual unless there is a considerable public interest which is justifiable or unless the person concerned consent to such disclosure in writing… access to information shall be refused (Right to Information Act No. 12 of 2016, s5 (1) (a)). It is apparent that this provision is seeking to strike a balance between right to information and data protection and privacy.

Banking Act No. 30 of 1998

Financial service companies including banks and non-bank financial institutions process large amount of personal data without any doubt. S77 of this Act impose privacy obligations on directors, managers, officers and other persons employed in the licensed commercial banks/licensed specialized banks… accordingly they shall sign a declaration before undertaking their duties to observe a strict secrecy (subject to exceptions) in respect of all the transactions of the bank, its customers and the state of accounts of any person including other incidental matters (Banking Act No. 30 of 1998, s77). At present, financial institutions are increasingly becoming susceptible to data/privacy breaches by the criminals due to the importance of the data they store.

Telecommunication Act No. 25 of 1991

S49 of this Act stipulates that a telecommunication officer or any other person who performs the official duties in connection to telecommunication services commits an offence if he; (a) willfully destroys, secrets, alters or does any other act other than his duties or intentionally modifies /interfere with the contents of the messages which has been received for the transmission/delivery… (b) omits to transmit/intercept or detains any message. (c) other than pursuance of his duties or as directed by the court disclose the contents of any message or any parts of the contents of any message to a person other than to who the message is addressed (Telecommunication Act No. 25 of 1991).

S52 of the Act stipulates that any person who intrudes without lawful authority (a) contents of a message or its usages information… (b) with the intention of interfering any message or its usage information. (c) with the intention of unlawfully learning the contents of the message or its usage information… commits a punishable offence under this Act. Moreover, willful interception of telecommunication transmission, interception and disclosure of contents of a message.… also being recognized as an offence. Further s54 recognizes interception and disclosure of contents of a message by telecommunication officials as an offence (Telecommunication Act No. 25 of 1991, s52, s54). It is clear that aforesaid provisions are also closely linked with the data protection and privacy concerns.

Intellectual Property Act No. 36 of 2003

Particularly S160 of the Sri Lankan IP Act deals with the unfair competition and undisclosed information. S160 (6) (a) stipulates that; any act or practice in the course of industrial or commercial activities that results in disclosure of the undisclosed information without obtaining the consent from rightsholder of that information and when someone act contrary to the honest commercial practices it amounts to an unfair competition (www. [iesl.lk], 2021). As explained in the s160 (6) (b) disclosure, acquisition or use of undisclosed information by others without the consent of the rightful holder may result in; (i) industrial/commercial espionage. (b) breach of contract. (c) breach of confidence. (iv) inducement to commit any of the aforesaid acts. Seemingly these provisions can be applied to protect data/privacy of the organizations as well as individuals who holds valuable data (*Douglas v. Hello Ltd & Ors*).

Personal Data Protection Act No. 09 of 2022

With the intent of modifying the existing data protection framework in Sri Lanka government introduced the Personal Data Protection Act No. 09 of 2022 (PDPA).. This Act is attempting to fill a long-standing gap in Sri Lankan data protection and privacy regime. Said Act primarily aims to ensure following aspects; (a) to protect the personal data given to the entities. (b) to grant rights to the data subjects. Followings are the key features of this Act; (i) regulating the processing of personal data. (ii) rights of the data subjects will be strengthened. (iii) it will regulate the dissemination of unsolicited messages using personal data. (iii) designation of the data protection authority. (iv) to provide a legislation to deal with the matters incidental to the processing of personal data.

Generally, it provide measures to protect the personal data of the individuals held by banks, telecom operators, hospitals and other similar data processing/aggregating entities. Alongside this Act is not applicable to the personal data processed solely for someone's personal, domestic or household purposes (S2 (3) of PDPA 2022). This legislation primarily intends to balance the interests of the enterprises relying on personal data processing and also the interests of the individuals whose personal data will be processed. As per the S4 of the Act data controllers are obliged to process personal data in compliance with the obligations specified in the Act. Moreover s6 (1) of the Act require data controllers to define the purpose of personal data processing. Also, they are obliged to ensure that personal data will be processed only for; specified, explicit

and legitimate purposes (S6 (1) (a) (b) (c) PDPA 2022). SS7 – 11 further specifies the other important data protection obligations of the data controllers.
Accordingly, it's clear that, PDPA 2022 attempts to ensure the transparency and accountability of such processing activities. Part II of the Act deals with the rights of the data subjects. This can be identified as another crucial feature as it will be helpful to strike a balance between rights and obligations of the data controllers and data subjects. Some important rights of the data subjects can be listed as follows; where the processing is done subjected to the consent of the data subjects, data subjects are entitled to withdraw the consent given to the controllers, object to the processing of data as stipulated in S14 (1). Right to rectification is ensured under the S15 of the Act. As per this section data controllers are obliged to rectify or complete inaccurate/incomplete data. Furthermore, right to erasure also safeguarded through S16 of the Act under certain circumstances.
Part III of the Act is applicable to the data controllers and processors. Several obligations being imposed on entities collect/process personal data referred as data controllers and processors, they are required to designate/appoint Data Protection Officer in order ensure the compliance with the provisions of this Act (S22 (1) PDPA 2022). Concurrently data controllers must ensure the security/confidentiality of personal data by adopting suitable technical/organizational measures. Also, they must always consider about transparency obligations underlined in the Act (Data Protection Bill (2019), s22). PDPA 2022 further aims to govern data breach incident. Under the S23 (1) of the Act when there is a personal data breach, controller shall notify the Authority. Part V of the Act deals with the aspects relating to "Data Protection Authority" specifically about its establishment, objectives, powers etc. Apparently, Data protection Authority is responsible for all the aspects incidental to the personal data protection in Sri Lanka including the implementation of the provisions of the proposed Act. Another crucial functionality of Data protection Authority is it is capable of issuing directives to the entities that fails to comply with the provisions of the proposed Act, and it can impose administrative penalties (S32 of PDPA 2022).

It is clear that when drafting this Act committee had followed best practices adopted by various international standards such as; OECD Privacy Guidelines, APEC Privacy Framework, EU General Data Protection Regulation etc. After considering the rapid technological developments and other associated matters (digital strategies adopted by the government and the private sector) it can be argued that Data Protection legislation is urgently required for Sri Lanka.

Criticisms against the Personal Data Protection Act No. 09 of 2022

Despite of the afore discussed plus points some critics questions the effectiveness of ***Personal Data Protection Act No. 09 of 2022***. Main criticism against the Act is inclusion of vague clauses. Apparently, critics contend that this legal uncertainty can discourage flow of the foreign investments into the country. Next this Act does not contain a provision which facilitate data transfers with the consent of users similar to the GDPR which provides derogations when data subjects give their explicit consent. Moreover, the Sri Lankan government is capable of setting up or appointing anybody statutory or otherwise as the Data Protection Authority (S28 (1) PDPA 2022).

Though PDPA 2022 do not prevent government from establishing an independent Data Protection Authority government will obviously have a significant control over this Authority and it is likely to dilute its legitimacy as an independent expert body. E.g. – government can issue directions to the Data Protection Authority in connection to the discharging of its functions, this shows the lack of independence of this authority. Which is contrary to the principles set out in the EU GDPR as it suggests that supervisory authority set out by the member States must be an independent public body.

Another problem attached to the Act is it impose obligations on both data controllers and processors. Hence data processors are bound to comply with the conditions of processing set out in the five Schedules of the Bill. Failure of the data processors to comply with the provisions of the Act result in data processors being penalized. Under the GDPR data processors will not be subjected to such penalties. Critics contend that these aspects are against the international standards and it will increase the regulatory burden of the data processors and also it will impact on investments in data processing and outsourcing industry in Sri Lanka.

Furthermore, the proposed Act requires data controllers to conduct Data Protection Impact Assessments (DPIA). DPIA's need to be done when data processing is likely to result in high-risks to the rights and freedoms of the data subjects. DPIA's also should be conducted in connection to profiling and large-scale processing of sensitive personal data. This can be seen as a particularly a broad requirement which will convert DPIA into a precautionary tool which will delay the delivery of innovative products and services (S24 (1) PDPA 2022). In addition, PDPA 2022 classifies data into two identical categories as personal data and special categories of personal data. However, it's been criticized as it is somewhat problematic.

Yet PDPA 2022 is not effective. Nevertheless, there are several ancillary legislative provisions that can be applied to certain aspects of the data protection and privacy. Apparently, said legislations and policy frameworks are inadequate and doesn't provide an effective protection to the data and privacy. Therefore, there is no guarantee for the people living in Sri Lanka regarding the safety of their personal data and their personal data is likely to be misused without their knowledge and/or consent. Hence introducing a specific legislation to ensure data protection and privacy of the persons can be deemed as a crucial requirement.

PDPA 2022 to can be identified as a major step relating to the data protection and privacy in Sri Lanka as it consists of following aspects as discussed in the above sections; extra territorial scope, data classification, lawful grounds for data processing, obligations of data controllers and processors, cross-border data flows, rights of the data subjects etc. It can be suggested that followings factors also must be taken into the account when enforcing this legislation; including a specific exception to ensure that Right to Information Act will not be overridden in any case of inconsistency, impartial data protection authority without governmental intervention, removal of the financial data and personal data relating to offences/criminal proceedings and convictions from the special categories of personal data to ensure further access to information (Madushani, 2021).

UK and Singapore Standards on Data Protection and Privacy

Usually, the protection of data and privacy requires a holistic approach which is a combination of legal, administrative and technical safeguards. In this section, researchers will assess the effectiveness of the data protection and privacy laws of UK and Singapore. The primary purpose of this section is to identify their best practices and emerging trends on data protection and privacy that can be adopted into the Sri Lankan context.

Data protection and privacy in UK

UK recently passed a legislation to supplement the data protection requirements which is in line with the EU General Data Protection Regulations (GDPR). Data Protection Act (DPA) 2018 came into force on 25th May 2018 by repealing the Data Protection Act 1998 and EU Data Protection Directive 95/46/EC which regulates the collection and processing of personal data across all the sectors of economy. DPA 2018 primarily specifies the application of GDPR into UK. Though UK voted to leave European Union in 2016 under the withdrawal

agreement among UK and EU, they agreed to continue the application of GDPR until the end of the implementation period. Subsequent to this transition period GDPR was incorporated into the UK law as the UK GDPR. UK GDPR can be deemed as the domestic law (O'Donoghue et al., 2021).

Data Protection Act 2018 (DPA)

DPA 2018 can be split into six key parts; (a) general processing. (b) law enforcement processing. (c) intelligence service processing. (d) data supervisory authority UK. (e) information commissioner's office (ICO). (f) enforcement and (g) supplementary and final provisions. Under the DPA 2018 everyone is responsible for using personal data subject to the strict rules known as "data protection principles". Accordingly, everyone is obliged to make sure that information will be used; fairly, lawfully and transparently, to use information for specified, explicit purposes, in a limited manner or only for what it is required for, to keep data for no longer than it is necessary, moreover to handle data by ensuring appropriate security, protecting against unlawful/unauthorized processing, access, loss, destruction or damage (www.gov.uk/data-protection, 2021).

Under DPA 2018 individuals has a right to find out what information the government and other organizations store about you. This right include followings as well; to know how your data will be used, to update the incorrect data, to erase data, to stop/restrict processing of your data, object how your data is processed under certain instances. In addition to aforesaid rights when a particular organization is using your personal data for; automated decision making without any human involvement or profiling for predict or behavior individuals can exercise aforesaid rights. It is clear that DPA 2018 simply regulates how data can be lawfully collected, processed and used in UK (www.gov.uk/data-protection, 2021).

UK General Data Protection Regulation (GDPR)

Enactment of UK GDPR can be seen as a progressive step since its provisions were articulated based on domestic requirements. It is arguable that rather than blindly following the international standards countries must always attempt to adapt their own version of law based on their economic, social and political standards without disregarding the international best practices. UK's post Brexit version of GDPR is substantially similar to the EU regulation and it also places similar obligations on data controllers and processors (Carey and Treacy, 2015).

The UK GDPR is supplemented through the DPA 2018. DPA 2018 applies the provisions of GDPR to certain matters those are outside its regulation scope including; processing by public authorities, moreover it set out data processing regimes for law enforcement processing and intelligence processes. Hence, it's clear that DPA 2018 and UK GDPR exists concurrently.

UK GDPR is applicable to UK organizations that collect, store or otherwise process the personal data of the persons residing in UK and non-UK organizations that offer goods/services or monitor the behavior of the UK residents. This measure ensures that both UK organizations and non-UK organizations will strictly adhere into these data protection laws. Organizations functioning in UK should adhere into these two data protection laws; (a) DPA 2018 and UK GDPR if they process only domestic personal data. (b) DPA 2018, UK GDPR and EU GDPR if these organizations offer good/services and monitor the behavior of the EU citizens. This clearly shows that even if UK has their own domestic law to regulate data protection, application of EU GDPR into certain aspects still effective.

Similarities of UK GDPR and EU GDPR can be listed as follows; **(a) accountability and governance** – data controllers must demonstrate their compliance with law by adopting following measures; keep a detailed record of all data protection regulations, carrying out data protection impact assessments regarding high-risk processing operations, implementation of technical/organizational measures etc. (General Data Protection Regulation Art 5 (2)). **(b) six data processing principles;** data controllers are required to follow six data processing principles – **(i) lawfulness, fairness and transparency** - they are obliged to process personal data lawfully/fairly and transparently and collect data only for legitimate purposes (Data Protection Act 2018, s35: General Data Protection Regulation Art 5 (1) (a)).

(ii) purpose limitation - adequate/relevant and limit to what is necessary (Data Protection Act 2018, s36: General Data Protection Regulation Art 5 (1) (b)). **(iii) data minimization** – accurate, relevant and limit to what is necessary (Data Protection Act 2018, s37: General Data Protection Regulation Art 5 (1) (c)). **(iv) accuracy** – processed personal data must be accurate and up to date if personal data is inaccurate/misleading they should be rectified or erased (Data Protection Act 2018, s38: General Data Protection Regulation Art 5 (1) (d)). **(v) storage limitation** – personal data shall not be kept stored for any longer than it is necessary for a specific purpose. Data controllers can delete the unnecessary data (Data Protection Act 2018, s39: General Data Protection

Regulation Art 5 (1) (e)). (vi) **integrity and confidentiality (security)** – personal data processed for any of the law enforcement purposes must be processed in a manner that ensures security of the personal data using appropriate technical and organizational measures (Data Protection Act 2018, s40: General Data Protection Regulation Art 5 (1) (f)). These data protection principles indeed prevent/minimize possible data breaches.

Under UK GDPR data subjects are given following rights – right to be informed, right to access, right to rectification, right to erasure, right to object etc. (www.gov.uk, 2021). Unless data subjects are given such rights enforcement of the obligations imposed under DPA 2018 and UK GDPR would not be fruitful. Furthermore, UK GDPR permits the transfer of personal data in certain circumstances. E.g. – where destination country provides an adequate level of data protection primarily through Standard Contractual Clauses (SCCs) and complying with an approved certification mechanism. It is another viable measure which ensure that data of the UK personals will be protected outside the country. These are only few key features of the UK GDPR. Apparently, there are multiple benefits of GDPR compliance including; building the trust of customers, reducing the risk of data breaches, increasing privacy and information security etc.

EU General Data Protection Regulation (GDPR)

Some crucial aspects of the EU GDPR will be discussed herein to determine the similarities and variances between the EU GDPR and UK GDPR. Article 2 of the EU GDPR explains its general scope as; processing of personal data wholly/partly by automated means or processing personal data other than by automated means. As per Art 4 of the EU GDPR any treatment of data will be considered as processing including; collecting, organization, structuring, erasing of data. It's clear that EU GDPR interprets its scope in a broader manner in order to ensure high level of protection (Arts 2, 4).

Although it has data protection in its name EU GDPR is equally concerned about the data privacy as well (Clifford et al., 2018). The primary aim of EU GDPR is to harmonize data privacy laws across Europe in order to protect sensitive data of EU citizens (Voigt and Bussche, 2017). Apparently, followings are the basic principles of EU GDPR; (a) lawfulness, fairness and transparency. (b) purpose limitation. (c) data minimization. (d) accuracy. (e) storage limitation. (f) integrity & confidentiality. (g) accountability. (h) lawfulness. It is clear that EU GDPR is

more concerned about rights of the individuals before business interests (IT Governance, 2017).

Criticisms against data protection and privacy laws in UK

UK has been recognized as one of the world's most progressive data protection and privacy regimes. Thus, it still contains several retrograde elements including some gaps and contradictions. First criticism is the provisions of the DPA 2018 grants an unacceptable power to alter the provisions of the GDPR. E.g. – conditions relating to the processing of personal data. However, UK government had justified this as giving flexibility to deal with changing circumstances. Moreover DPA 2018 does not provide adequate safeguards in connection to the exceptions to the prohibition set out in Article 22 of the GDPR or the automated decision making without the human intervention. E.g. – need of transparency in connection to automated decision making.

It is also arguable that DPA 2018 is quite comprehensive and covers wide range of subject matters hence it is complex. DPA 2018 does not clearly explain what will happen to the personal information of the persons or what they should do when their personal information been misused or there is no sufficient judicial remedy against data breaches. National security concerns have exempted wide range of bodies from data protection oversight. Moreover DPA 1988 grants unfettered powers to the intelligence agencies to transfer personal data across borders without adopting appropriate safeguards. Apparently DPA 2018 is not welcomed by all, according to critics this legislation requires increased transparency and accountability from organizations also more stronger rules to protect loss of data and theft including serious sanctions and fines against those who deliberately/negligently misuse data (Ashford, 2018).

Data Protection and Privacy in Singapore

Sub-Committee for Technology & Law Reform Committee of the Singapore Academy of Law showed three primary reasons for introducing a data protection law in Singapore; (a) to protect the interests of the individual data subjects in view of the fundamental nature of privacy rights. (b) to provide standards of conduct for data users. (c) to adhere into international data protection standards (Law Reform Committee, 1990). Personal Data Protection Act (PDPA) provides a baseline standard of protection for personal data of the persons. Equivalent to UK,

Singapore's legal framework on data protection and privacy is also focusing on their domestic requirements.

PDPA 2012 regulates how personal data is handled, it simply set out an overreaching data protection framework in relation to collection, use, disclosure and protection of personal data by private sector organizations. There are two major legislative purposes to the PDPA.; to recognize the individual's right to data protection and to develop trust in data protection in Singapore. More importantly it imposes nine data protection obligations on organizations operating in Singapore, that are enforceable through a private action or public enforcement (Benjamin, 2017).

In addition, Model Data Protection Code (2002) intended to facilitate two distinct functions; (a) operational function – which is to establish minimum acceptable standards for data protection. (b) facilitative function – to promote the harmonization of data protection rules among different sectors. However, it was emphasized that this Model Code consist of several shortcomings in relation to its scope, processes and enforcement (National Internet Advisory Committee, 2002). At present Model Code 2002 and PDPA 2012 is applicable to the private sector and other pre-existing legislation and internal rules are applicable to the public sector (patchwork laws such as common law, sector specific legislations and various other self-regulatory or co-regulatory codes (Chesterman, 2012).

Key principles underpinning the PDPA 2012 will be discussed herein. **(a) consent;** organizations must obtain the consent of the individuals before collecting, using or disclosing personal data for a particular purpose unless said act/s subject to an exception (Personal Data Protection Act 2012, s13 – 17). **(b) purpose limitation;** organizations may collect use, disclose personal data only for specified purpose/s (Personal Data Protection Act 2012, s18 – 20). **(c) deemed consent;** an individual is deemed to consent to collection, use or disclosure of his/her personal data if said individual provides personal information to a particular organization voluntarily. **(d) withdrawal of consent;** individuals are capable of withdrawing their consent at any time in connection to collection, use or disclosure of their personal data (Personal Data Protection Act 2012, s18 – 20).

(e) reasonableness; organizations are allowed to collect, use or disclose personal data if the data was collected would be considered appropriate. **(f) accuracy;** organizations shall always take reasonable steps to ensure that the collected personal data is accurate (Personal Data Protection Act 2012, s23). **(g) protection obligation;** organizations are obliged to protect personal data in its

possession/control (Personal Data Protection Act 2012, s24)**. (h) retention limitation obligation;** this limits the power of an organization to retain personal data if retention is no longer required (Personal Data Protection Act 2012, s25). **(i) transfer;** organizations are bound not to transfer personal data outside the Singapore if such personal data cannot be protected effectively (Personal Data Protection Act 2012, s26). All these principles attempt to prevent/minimize possible personal data violations.

Additionally, to the framework set out in the PDPA 2012 there are some other sources that deals with the data protection and privacy in Singapore but PDPA serve as the key statute. In Singapore banks are regulated by Banking Act 2008 which contain rules on banking secrecy. The primary rule that deals with the banking secrecy is the s47 (1) which specifies that customers information shall not be disclosed by any of the bank/its officers to any other person unless expressly provided in the Act (Banking Act 2008, s47 (1)). E.g. – to safeguard the interest of the bank or public, implied/express consent of the customer etc. (*Susilawati v American Express Bank Ltd [2007] SGHC 179*). Human Biomedical Research Act 2015 also contain provisions to protect the privacy of the research subjects (Human Biomedical Research Act No 29 of 2015).

Enforcement Mechanisms

Singapore introduced an institutional framework consisting two regulatory bodies to deal with data protection and privacy; **(a) The Personal Data Protection Commission (PDPC)** – PDPC mainly deals with the administration of PDPA 2012 or in other words it is Singapore's Data Protection Authority (Personal Data Protection Act 2012, s7), **(b) Data Protection Appeal Panel (Appeal Panel)** – the appeal panel is an independent appellate body to directions/decisions of PDPC may be appealed. These enforcement mechanisms primarily focus on achieving legislative purposes.

Criticisms against Data Protection & Privacy laws in Singapore

There are multiple criticisms against the data protection and privacy regime in Singapore. Some critics argue that safeguards offered through the PDPA 2012 are far weaker than how it appears. Apparently PDPA facilitates the collection, use and disclosure of personal data though it is against such acts. Another criticism against PDPA is obligations on collection, use and disclosure of personal data are not applicable to certain classes of actors such as public agencies/government etc.

"Data anonymization" can be recognized as another issue associated with the PDPA.

Data anonymization means the conversion of personal data into data not referable to identify any individual. PDPA approach allow organization to have two parallel sets of personal data and its problematic (Benjamin, 2017). Moreover, PDPA is not applicable to the business application information or PDPA expressly excludes business contact information. (Personal Data Protection Act 2012, s4 (5)). Business contact information exclusion can be recognized as ostensibly a broad approach and another problematic area of PDPA.

In this section researchers primarily assessed the effectiveness of the data protection and privacy laws of UK and Singapore. Similar to many countries around the world UK have passed a legislation (DPA 2018) which is designed to supplement the data protection requirements in line with the EU GDPR. UK is one of the first countries to implement GDPR in local law which is known as UK GDPR. Thus, still there are certain criticisms against the data protection and privacy regime in UK.

In the same section data protection and privacy laws in Singapore also been assessed. Singapore enacted PDPA 2012 and it provides a baseline standard of protection for personal data of the persons. In addition, Singapore has a sector-specific regulatory framework. When compared to the UK's legal framework Singapore's data protection and privacy regime seems to be slightly unique. While GDPR and PDPA 2012 bear some similarities and differences UK GDPR is more like a copy of EU GDPR. After considering the legal frameworks prevailing in UK and Singapore, it is apparent that there is a huge gap/lacuna in Sri Lankan law in relation to the data protection and privacy.

Hence it can be suggested that Sri Lanka should consider the legal standards that have been adopted by both UK and Singapore in articulating its data protection and privacy law/s. By observing the legal standards adopted by UK and Singapore Sri Lanka can develop its own data protection and privacy framework which is suitable for Sri Lanka's economic, social and cultural needs. Moreover, Sri Lanka can take into account the criticisms presented against data protection and privacy regime in UK and Singapore before articulating the Sri Lankan legal framework on this subject matter as it will be helpful to minimize the possible flaws.

Findings and Recommendations

Findings

According to the facts presented in the previous sections, it appears that providing an equal and universal privacy and data protection framework is not an easy task. However, it is essential to provide at least basic/minimum standards relating to the data protection and privacy. The lack of a comprehensive legislation pertaining to data protection and privacy in Sri Lanka has always been a matter of concern. This concern has been particularly expressed by academics, professionals and individuals and more importantly the foreign investors and firms that are doing business in Sri Lanka.

Undoubtably existence of an effective and efficient data protection and privacy legal framework will ensure the security of the data of the persons from unauthorized collection, usage, transfer, and from disclosure. Differ to the Sri Lankan approach most of the countries around the world including UK and Singapore have enacted separate legislations to regulate data protection and privacy primarily to meet their domestic requirements. Apparently Sri Lanka was reluctant to introduce a proper law to regulate data protection and privacy mainly due to the existing economic, social and political factors.

Since there was no specific statute to regulate data protection and privacy in Sri Lanka until very recent several other data protection and privacy enabled legislations such as; Computer Crimes Act No. 24 of 2007, Telecommunication Act No. 25 of 1991, Banking Act No. 30 of 1988 Intellectual Property Act No. 36 of 2003 etc. were applied to regulate certain aspects of the data protection and privacy and said legislations could ensure protection of data and privacy up to some extent. However, these legislations are incapable of providing an effective protection to data/privacy since main objective of these legislations is not to protect data/privacy.

As mentioned in the previous sections there is an inseparable connection between the data and privacy. Privacy is important to protect personal or commercial data from the unauthorized access. Privacy is recognized as a fundamental human right in many international human rights treaties. E.g. - Article 12 of the UDHR and the Article 17 of the ICCPR. Thus, Sri Lankan constitution do not recognize right to privacy as a fundamental right. Though existence of right to privacy is important in multiple ways. One of the main significances right to privacy is it

can automatically protect data of the persons and organizations as no one can arbitrarily interfere or collect the data of the others without authority.

In Sri Lanka there is no balance between the right to privacy and right to information. As there is a legislation on right to information but right to privacy is not specifically recognized. Government of Sri Lanka had a great power to collect and control data of persons and organizations while citizens of the country are incapable of protecting their data and privacy until the enactment of Personal Data Protection Act No. 09 of 2022 also individuals/entities were incapable of bringing actions against those who violates data protection and privacy rights due to the non-existence of proper legal framework (Marsoof, 2008). Thus, it is also noteworthy that Personal Data Protection Act No. 09 of 2022 is a very recent enactment therefore no one can guarantee its effectiveness.

Thus, Personal Data Protection Act No. 09 of 2022 can be identified as a comprehensive legislation. But it still lacks the international consistency in relation to the regulation of certain aspects of privacy. Moreover, it is likely to further restrict international trade and investment. It is also suggestable that creation of legislation blindly following other jurisdictions or international standards is not an effective solution but countries should identify their specific needs and articulate their own laws while learning lessons from the experiences of other countries.

Based on these findings this study concludes that as a country which deals with the modern technological developments Sri Lanka need to have an effective legal framework to deal with data protection and privacy compared to UK and Singapore.

Recommendations

Based on the above findings following recommendations can be made;

(a) Government must take immediate steps to enforce Personal Data Protection Act No. 09 of 2022 as it can be identified as a legislative priority.
(b) It is essential to ensure that individuals are capable of bringing actions against data violations under the Personal Data Protection Act No. 09 of 2022 in an effective manner. Unless there is such definite enforcement mechanism assurance of compliance would be challenging and legislation would become a mere piece of paper.

(c) Government must ensure the independence of the Data Protection Authority, so that its members need to be appointed by an independent body rather than the government itself.
(d) Data protection obligations should be applicable to organizations of all sizes and across all industrial sectors. More precisely data protection and privacy obligations need to be applied without any categorization based on the nature, size or business place of the organizations.
(e) Imposing obligations on data controllers and processors to implement organizational and technical measures in order to make data processing principles more effective. E.g. – organizations can use Data Protection Impact Assessment (DPIA) which is a privacy related impact assessment to identify and analyze how data privacy is likely to be affected via certain actions or activities.
(f) It is essential to strike a balance between the interests of the data subjects, data users and the wider community. This can be done by placing them on equal footing yet priority must be always given to the rights of the data subjects.
(g) Cross-border transmission of personal data of the Sri Lankan nationals shall be done only with the consent of the data subjects and only if the recipient country has adequate laws to protect personal data and privacy of the persons. As if a particular country do not have adequate and effective laws/regulations to protect data and privacy of the individuals securing personal data outside the country would be problematic.
(h) Sri Lanka must recognize right to privacy of the persons as a basic/fundamental right as existence of Right to Information Act No. 12 of 2016 without right to privacy is controversial. Further recognition of right to privacy is crucial when ensuring data protection since these two concepts exist simultaneously in certain circumstances.

Conclusion

It is conclusive that data protection and right to privacy is uncontroversial in countries like UK and Singapore as they have given proper attention to ensure said rights. However, Sri Lanka has a different perception on data protection and privacy when compared to UK and Singapore. Until very recent Sri Lanka did not value the importance of data protection and privacy, best practical example is Sri Lankan Constitution do not recognize privacy as a fundamental right of the persons and even though Personal Data Protection Act No. 09 of 2022 was enacted recently it is yet to be enforced. In contrary countries like UK and

Singapore has given more attention towards the data protection and privacy as they always intents to promote the rights of their citizens (Erbelding, 2019). Arguably Sri Lanka was reluctant to introduce adequate and effective law to regulate data protection and privacy due to numerous reasons such as; political issues, funding issues, inability of proper enforcement of laws due to human and technical resource restrictions, inadequate IT infrastructure, incapability or unwillingness to handle cross-border requests for data etc. As a result, data protection and privacy was protected through indirect and ineffective means. But use of inappropriate mechanisms to regulate data protection and privacy cannot be approved as it is obviously detrimental to the rights of the interested parties. Hence it is conclusive that Sri Lanka must enforce Personal Data Protection Act No. 09 of 2022 with immediate effect to safeguard data protection and privacy of the persons.

This research study provides a basic guideline to the policymakers in Sri Lanka on how prevailing data protection and privacy regime need to be improved as non-existence of specific/separate law to deal with data protection and privacy can be identified as a considerable gap in law. Notably primary aim of the researchers was to identify the adequacy and effectiveness of the existing Sri Lankan law on data protection and privacy compared to UK and Singapore. In addition, researchers focused on establishing the need of specific/separate legislation to deal with data protection and privacy based on the experience of UK and Singapore. The future researchers will be able to evaluate the effectiveness of the Personal Data Protection Act No. 09 of 2022 ***Sri*** Lanka which is supposed to be enforced in near future.

Declaration of Conflicting Interests

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

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