9th Students' Research Symposium 2020 (SRS)

SRS PROCEEDINGS

"Embracing Research Challenges and Opportunities in New Normal"

9th Students' Research Symposium 2020

"Embracing Research Challenges and Opportunities in New Normal"

SRS Proceedings

Department of Finance

Faculty of Commerce and Management Studies

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"Embracing Research Challenges and Opportunities in New Normal"

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Message from the Dean of the Faculty of Commerce and Management Studies

I pen down this congratulatory note with immense pleasure on the occasion of the "9th Students' Research Symposium 2020," organized by the Department of Finance, Faculty of Commerce and Management Studies, University of Kelaniya.

The Faculty of Commerce and Management Studies has been a pioneer Faculty at the University of Kelaniya which taken numerous efforts to improve the research culture of its academic members and undergraduates. This symposium provides an opportunity for final year undergraduates of Department of Finance to showcase their presentation and research skills at a common academic forum and disseminate new knowledge to the society at large. The findings of this symposium definitely support to uplift the level of our economy and the level of research skills of undergraduates.

I greatly appreciate the efforts taken by the Department of Finance to enhance the research culture among the undergraduates as well as to uplift the quality of the undergraduates' research by organizing such students' research symposiums. I congratulate all the undergraduates who will be presenting their research articles in the symposium and wish all the success to the 9th Students' Research Symposium 2020.

Dr Narada Fernando
Dean, Faculty of Commerce and Management Studies
University of Kelaniya

Message from the Head of the Department of Finance

It is with extraordinary joy I pass on this message on the ninth Students' Research Symposium (SRS) 2020, organized by the Department of Finance, Faculty of Commerce and Management Studies, University of Kelaniya.

Department of Finance (DFin) believes that the students need to develop research skills in order to excel in the job market, and hence the students have to undertake research in their final year under the supervision of an academic supervisor. SRS is an opportunity for students to present what they have learned through their research experiences to a larger audience consisting of peers and academics. SRS also provides a forum for students to discuss cutting edge research topics in Finance and to examine the connection between research and education. Further, SRS is one of the significant components of the department's promoting research culture. SRS includes a keynote address and presentations by the students. This year's symposium will be hosted virtually.

As the department head, accept this open door to salute the DFin group who organized the conference and appreciate their commitment to making this momentous occasion a triumph.

Prof Ruwan Abeysekera
Head, Department of Finance
Faculty of Commerce and Management Studies
University of Kelaniya

Message from the Coordinator of the Dissertation and Symposium

It gives me immense pleasure to welcome you to the Students' Research Symposium 2020 (SRS 2020) at the Department of Finance, Faculty of Commerce and Management Studies. The Department of Finance initiated the SRS in 2012 as the first ever Students' Research Symposium at the Faculty of Commerce and Management Studies.

This year, continuing its tradition of transcending knowledge for the betterment of business and society, SRS is unfolding for the 9th consecutive year with the theme "Embracing Research Challenges and Opportunities in New Normal" on 21st December 2020 as a virtual symposium. It creates a platform to 118 undergraduates at the Department of Finance to share knowledge and expertise on the business management discipline and their application in various sectors in order to create a positive impact on business and society at large. The keynote speech of the SRS was delivered by Mr. Prabath S. Morawakage, PhD scholar at Griffith University, Australia aligning to the SRS theme.

The success of SRS 2020 depends on the contribution and the commitment of many parties including the organizing committee, university administration, speakers, scholars, researchers, presenters, and the session chairs. While extending a deep sense of gratitude to them, I wish a successful and enjoyable symposium and keep safe.

Mr Daminda Weerasinghe
Coordinator, Dissertation and Symposium
Department of Finance

Factors Affecting to Financial Distress - An empirical study of Listed Manufacturing Companies in CSE

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Abstract

Introduction-- Predicting financial distress remains an important area of focus for researchers due to its vital importance. Financial distress prediction model helps managers to take most suitable strategic decision to prevent future financial distress of a company also financial distress prediction information can be used as an early warning for bankruptcy so then management can take actions. This study attempts to examine factors affecting to corporate financial distress of listed manufacturing companies in Colombo Stock Exchange (CSE). **Design/Methodology/Approach**- This study was conducted using secondary data from annual reports for sample of 29 manufacturing sector firms listed in Colombo Stock Exchange for a period covering 2011-2020. Researcher used E-Views 11 software for data analysis. Financial distress identified as dependent variable while profitability, liquidity, firm size, solvency, and growth as independent variables. **Findings-** The results reveal that solvency and growth of a company has significantly affect to the financial distress while profitability, liquidity, firm size has no significant relationship with corporate financial distress. **Conclusion** – This study fulfills the existing research gap of identifying factors that affect to financial distress for manufacturing sector companies in Sri Lanka. According to research results solvency and growth having significant affect to financial distress.

Keywords: *Financial distress, firm size, growth, liquidity, profitability, solvency*

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1. Introduction

Predicting financial distress has become an important topic for every economy, especially after the great financial crisis of 2008.The major advantage of developing a financial distress prediction model for companies is they can forecast their future financial status by using past and current financial information. According to Beaver (1966) financial ratios as an important tool to forecast financial distress.

According to available literature most of the companies around the world have faced financial distress situations and concept of financial distress is not new to the Sri Lanka. Financial distress refers to the situation where vulnerable financial positions of companies that may lead to reduce reputation in the industry and finally end up with liquidation. Around the world there are number of companies have shut down their operations due to financial distress. Moreover, as per the literature situation is worst in developing countries. Therefore, it is important to predict financial distress in advance. This study helps to identify financial distress in early stages referring company's past and current financial information. Findings of financial distress model may help managers to take appropriate measures to avoid the potential bankruptcies and help to make changes in their strategic decisions.

Empirical research has proved that for given financial profile of a firm the occurrence of bankruptcy increases greatly in times of economic recession (Taffler, 1983). The Asian financial crisis in 1997 had caused most of financially strong companies to be financial distress and companies become wound up. Firms' income and cash

flows declined, thus causing distressed firms to default on their financial obligations. These firms either fall into the category of financial distressed companies or force into bankruptcy when they failed to adapt to the sudden changes in economy downturn. Therefore, it is essential to identify factors that lead to financial distress. The objective of this research is to identify the relationship between financial distress and its independent variables as Profitability, Liquidity, Firm Size, Growth and solvency of listed manufacturing companies of CSE.

2. Literature Review

Financial distress is the situation where company is facing financial difficulties. According to Platt and Platt (2002) defined the financial distress as the stage of financial downturn that occurred prior to the bankruptcy or liquidation. Most of financial distressed companies face common problems of inability or unavailability of a funds to pay their obligations when those are getting matured. According to Brigham and Daves (2003) financial difficulties began when the company cannot meet the payment schedules or when the cash flow projections indicate that the company will soon be unable to meet its obligations. Brigham and Gapenski (1997) presented several definitions of financial distress according to type, namely economic failure, business failure, technical insolvency, insolvency in bankruptcy and legal bankruptcy.

The history of financial distress prediction models can be divided into two main periods. When considering first period which goes from the late 1960s to the late 1980s. These research studies largely relied on discriminant

analysis and logistic regression models as method of building more accurate prediction models. The financial distress models start with the ratio analysis in 1930s thereafter it has evolved with various methodologies and variables later (Bellovary et al., 2007). However, prediction of financial distress become a critical finance and accounting research area since the 1960s because it is important to avoid bankruptcy issues of companies during their operations. Due to globalization of world economy, competition has become one of the basic mechanisms of the market. Currently most of the business organizations with management deficiency and due to poor financial strategies face business failures. Consequently, an enterprise might encounter various crisis and it may finally lead to financial distress and even bankruptcy.

2.1 Studies on prediction of financial distress in Sri Lanka

Many research studies conducted in other countries relating to the prediction of financial distress. However, there are few research available in Sri Lanka related to prediction of financial distress.

Nisansala and Lakshan (2012) provides insights into the roles of corporate governance in financial healthiness. Study found that several researchers have cited bad corporate governance as one of the key factors that leading to corporate failures in developed and developing economies. Research results indicate that an early warning system cannot be completed without incorporating the corporate governance characteristics. Identified reason for that is poor corporate governance can increase the probability of corporate failure even for with good financial

performance. This research results suggest that the outside director ratio, presence of an audit committee, remuneration of board members and CEO duality are significant predictors of corporate failure.

In Sri Lanka, Nanayakkara and Azeez (2015) developed a better financial distress prediction model for the Sri Lankan companies using the z-score model. Multivariate Discriminate analysis was used as the analytical technique and simultaneous estimation method has used to enter the variables in the analysis. Their study has examined four accounting ratios for 134 distressed and non-distressed companies from 2002 to 2011. Results of this study shows that the developed model with accrual based, Cash flow based and market variables as a better predictor of financial distress up to three years prior to distress. Further this study revealed that earnings before interest and taxes to interest expense are able to predict firm's financial distress more accurately compared to the other variables. Also, this study concludes that Retained Earnings to Total Assets, Cash Flow from Operations to Total Debt, and Firm Size also better predictors for predicting financial distress in advance. When conclude the findings of this research study has found that the derived model which consist of four accounting ratios can predict financial distress of quoted public companies in Sri Lanka with 76.9% accurate one year prior to distress. Further, the model has the financial distress predicting ability of 74.6% two years and 67.2% three years prior to distress. This model can be used to assist investors, creditors, managers, auditors, and regulatory bodies in Sri Lanaka to predict financial distress.

Samarakoon and Hassan (2003) investigates the ability of three versions of Altman's Z-score model (Z, Z', Z") of distress prediction developed in the U.S. to predict the corporate distress in emerging market in Sri Lanka.

According to them U.S based Altman Z"-score model has a remarkable degree of accuracy in predicting financial distress in the year prior to distress. Further, this study concludes that the Z- score model is a suitable model in predicting financial distress in Sri Lanka. According to the companies act no 07 of 2007, a company should be satisfied with the solvency test before making any distribution to the shareholders. In satisfying the solvency test it should consider the working capital requirements and the equity position of the company. Therefore, the importance of accounting data in predicting the financial distress is evident owing to the company law in Sri Lanka.

Rajkumar (2015) found that there are financial distressed companies listed in the Colombo Stock Exchange. Further, this study conclude that Edward Altman model and Current ratio are useful tools for investor to predict financial failure of companies.

2.2 Studies on prediction and determinants of financial distress in world

Sharma (2001) tried to provide a comprehensive review of the cash flow failure prediction literature since (Beaver, 1966) pioneering paper. This study used cash flow-based variables as predictors of company failure are not conclusive due to the limitations such as improperly measured cash flow operations, research studies which are not validated using a validation sample. Beaver (1966) proposed univariate approach to analyze financial distress was rarely followed due to one ratio would indicate failure another could indicate non-failure. Selection is based on the ratio of its popularity in the literature, performance ratios in previous research and its proximity to the concept of

cash flow. Using 30 financial ratios which are grouped in to six major groups of cash flow ratios, net income ratios, debt to total assets ratios, liquid asset to total asset ratios, liquid asset to current debt ratios and turnover ratios. Research results are contained five financial ratios that have an error rate below 24%, namely, cash flow/total debt, net assets/total assets, total debt /total assets, working capital/total assets and current ratio. But the weakness of the study is the use of Beaver univariate analysis that cannot be creation of a model simultaneously be used to predict the failure of company (Iramani, 2008).

Thim, Choong and Nee, (2011) chose sample of 101 companies selected randomly from Kuala Lumpur Stock Exchange (KLSE) during the period 2005-2009 where two models are used to analyze the financial distress. According to this study they only used ratios related to Profitability, Liquidity, Firm Size, Growth, Solvency and Risk. Here researcher mainly focus on Malaysian Public Listed Firms and deviate from Z- Score model try to identify relationship between independent variables and dependent variable as long-term debt to total equity ratio and short-term debt to total equity ratio. Findings of this study identified probability of financial distress when changing Profitability, Liquidity, Firm Size, Growth, Solvency and Risk. Results of this study shows firm Size is to be significant and has a positive relationship with financial distress. Interest coverage ratio has positive relationship with financial distress, while growth of firm's operating profits has a negative relationship with financial distress.

Fredrick (2019) attempted to answering the basic research question on what determines financial distress of firms in the manufacturing sector in the country employed the fully modified ordinary least square (FMOLS) on annual

time series data of 18 listed manufacturing companies on the Nigeria Stock Exchange (NSE) between the periods 2010-2017. As per this study dependent variable is financial distress and it measured using Altman's Z score model while independent variables employed in this study are Firm size, Liquidity, Profitability, and Leverage. The study also used a list of control variables such as revenue growth and share price. Results of this study showed that Firm size, Liquidity, Profitability, Leverage, Revenue Growth and Share price are the firm specific determinants of financial distress of firms in the manufacturing sector in NSE.

2.3 Empirical evidence on the determinants of financial distress

According to Damodaran (1997) most of the causes for financial distress of the company is micro factors. One cause is difficulty in cash flow, occurs when the revenue receipts of the company's results of operations are not enough to cover expenses arising from activities of business operations. Apart from that cash flow difficulties can also be due to the fault of management when managing the companies cash operations. Other cause for financial distress is the amount of debt, debt collection policy of the company to cover the costs resulting from the company's operation will create liability for the company to return the amount of debt in future date. When those are become matured at that time company unable to pay it dues creditors take action to perform the confiscation of the company to cover their due amounts. Losses in company operations for several years also can cause to financial distress situation. In this case the operational losses of companies which can give rise to generate negative cash flows in the company. This can occur because the operating expenses is greater than the income earned by company.

2.3.1. Firm Size

Rianti (2018) measured the size of the firm by considering total assets owned by a company. If company getting bigger the access to funds will be easier so that the agency costs will be even greater. Large companies generally have better access to capital markets therefore it is easier to increase fund with lower costs and fewer constraints than smaller companies. This indicate that reliance of internal funds will decrease with the increasing size of the company. Results conclude that firm size has an influence, but it is not significant to financial distress. According to Honjo (2000) small firms have more likelihood to fail than big firms. Reason for that is small firms have poor market experience, limited connection and limited financial resources.

Further, research carried out by Le Clere (2005), Hensher et al. (2007), Slezak (2008) and Tinoco and Wilson (2013) found that firm size has an inverse relationship with financial distress. According to Kristanti et al., (2016) firm size does not determine corporate financial distress.

2.3.2. Liquidity

The choice of liquidity variable was informed by liquid assets theory and credit risk theory. Several studies have concluded that firms with low levels of liquidity are more likely to experience financial distress because cash constrained firms are more vulnerable to exogeneous negative shocks to cash flow (Pranowo et al., 2010).

According to Hendel, (1996) financial distress contributes to likelihood of bankruptcy through affecting the level of liquid assets. Research studies of Elloumi and Gueyee (2001), Turetsky and McEwan (2001) and Nahar (2006) conclude that increase in liquidity lead to decrease in corporate financial distress. Similarly, Thim et al. (2011) study indicates that there is a negative link between liquidity and financial distress. Further Tesfamariam (2014), Gathecha (2016) and Kristanti et al. (2016) indicate that liquidity has a positive link with financial distress. According to Baimwera and Murinki (2014) liquidity had no significant influence on corporate financial distress.

2.3.3. Profitability

Profitability is a ratio that measures how much the effectiveness of management prove that their ability to create profits. According to Bringham and Daves (2013) profitability is group of ratios that shoe the combined effects of liquidity, asset management and debt on operating results. Higher profitability ratio results are often more favorable, but ratio provide much more information when compared to results of similar companies, and their own historical performance of industry average. It helps to measure probability of company tends to financial distress situation. Campbell et al. (2005) concludes the determinants of corporate failure and the pricing of financially distressed stocks by applying dynamic logit model. Further it shows lower profitability will lead to higher level of financial distress also it increases the chance to fall into bankruptcy. However, it implies that there is a negative relationship between profitability and financial distress. Ohlson (1980) and Gombola et al. (1987) Return on Assets is the one of commonly used profitability ratio. Profitability which is measured by Return on Equity has also been

taken as a factor that determines whether a firm will become financially distress. Research study done by Baimwera and Murinki (2014) indicates that profitability negatively affects financial distress. According to Campbell et al. (2011) found that profitability has an inverse link with financial distress.

2.3.4. Growth

Bei and Wijewardana (2012) attempt to extend knowledge of firm growth, financial leverage and financial strength of listed companies in Sri Lanka. Hampton (1993) explained that the means of internal growth of a company is firm's ability to increase sales and expand its own operations. Firm may purchase new plant or machinery to expand its capacity to produce existing products or firm purchases plant and machinery and train its sales force to produce and sell new product. The internal fund derived from retained earnings, depreciation, tax shield and from other non-cash transactions. The outside funds generate by debt and equity both. If the firm generates internal funds are at the advantage of for its internal growth than firms depending on external funds. The firms depending on internal funds have the greater ability to compete with the other firms fin market. The external growth is that it has potentiality to acquire operations of other firms. Yosha (1995) conclude that companies with potentially valuable future growth projects would not raise public debt due to high disclosure costs of revealing sensitive information. Further Mackie-Mason (1990) debates that research and development intensive firms as an example firm with high growth potentials should avoid issuing public debt. Thus, there should be a negative relationship between growth and debt financing. This derives that high growth firms will face lower level of financial distress situations because

they employ less debt financing. According to Morri and Cristanziani (2009) assuming that firms are particular about the future as well as with current financing problems there is a high probability that firms with great expected growth opportunities will maintain a low-risk debt capacity to avoid financing future investments with equity offering or passing the investment. Therefore, this study suggests there is a negative relationship between financial distress and growth of a firm.

2.3.5. Solvency

Solvency is an important measure of firm's financial health. Simply solvency can be defined as ability of a company to meet its long-term debts and financial obligations. Solvency is a one way of demonstrating a firm's ability to manage its operations into foreseeable future. According to James (1996) interest coverage ratio can be used to measure the severity of financial distress. The quickest way to measure a firm's solvency is by checking its shareholders' equity. Khan and Jain (2004) Interest coverage ratio show the capability of the firm to pay interest on borrowed money and its value "1" should be the minimum value of interest coverage ratio. Harris and Raviv (1990) study suggest that the leverage is inversely related to interest coverage ratio and they declare that an increase in debt will cause a higher default probability. Therefore, a high interest coverage ratio suggests a low probability of financial distress as default probability has a positive relationship with the probability of financial distress. Therefore, they suggest that there is a negative relationship between financial distress and solvency.

3. Research methodology

3.1 Research Design

Researcher used the ratio analysis related to firm size, liquidity, profitability, growth and solvency to predict financial distress.

Early studies of prediction of financial distress have used financial ratios to predict the financial distress of the firms. The advantage of financial ratio analysis model is easy access due to their availability in the financial statements of a company. Those are commonly available to the public. With the work of Winakor and Smith (1935) the use of financial ratio to predicting financial distress started in mid 1930s and they used financial ratios to evaluate the financial soundness of a company. According to Subrahmanyam and Wild (2012) Financial ratio analysis can reveal important relationships and be the basis of comparison in finding conditions and trends that are difficult to detect by studying each component that makes up the ratio. Same as other analysis tools ratio analysis are most useful for future orientation.
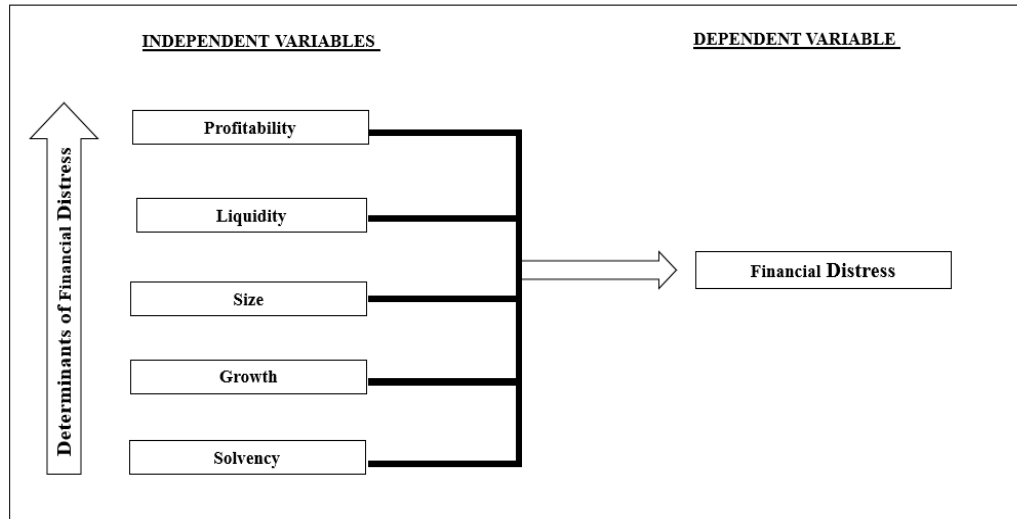
Figure 3.1 Conceptual Framework

Source: Author compiled

3.2 Model Specification

$Y(TD/TE) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$ .... (1)

This study used above model to analyze company's financial distress.

Long Term Debt (LTD)

Short Term Debt (STD)

Debt to Equity Ratio

(Total Debt/ Total Equity)

Debt-equity ratio has been used to measure a firm's level of financial distress

Profitability measured through ROA

X1 = Return on Assets Ratio (ROA)

Liquidity measured through Current ratio

X2 = Current Ratio

Firm Size

X3= Log total Assets

Growth

X4 = Earnings Growth Ratio

Solvency

X5 = Interest Coverage Ratio.

3.3 Hypotheses Development

This study researcher tries to identify relationship between financial distress and its independent variables as Profitability, Liquidity, Firm Size, Growth and solvency. Therefore, following cautious hypothesizes are believed to be relevant for this study.

H_1 There is a significant relationship between profitability and financial distress

H_2- There is a significant relationship between liquidity and financial distress

H_3- There is a significant relationship between size of a firm and financial distress

H_4 – There is a significant relationship between growth of a firm and financial distress

H_5- There is a significant relationship between Solvency and financial distress

3.4 Population and sample selection

This study focused on manufacturing sector firms listed in Colombo Stock Exchange. The total population consist with 38 firms in manufacturing sector. When choosing the sample for this study researcher considered ten years from 2011 to 2020 and IFRS adopted financial statements must have published within these ten years. According to above requirements 29 companies were selected out of manufacturing companies listed in CSE.

3.5 Data collection and Analysis Methods

This study mainly focuses on secondary sources of data and historical data related to ROA, Current Ratio, Assets Turnover, Earning Growth Ratio and Interest Coverage Ratio. Data were collected from published audited annual reports from Colombo Stock Exchange website. Sample data have been regressed using EViews 11 statistical software. Multiple regression analysis and descriptive statistics such as Mean, Standard Deviation, CV used to analyze data. The Autocorrelation, Multicollinearity, Homoscedasticity, Heteroscedasticity and normality of sample data set also tested.

4. Findings and Discussion

4.1 Overview of the sample

The study was conducted with sample of 1450 data points from 2011 to 2020 including 29 manufacturing companies. After obtaining financial statements researcher manually calculate all the ratios using Microsoft Excel Spreadsheet to protect consistency of the sample.

4.2 Descriptive Statistics

Table 4.2.1 Composition of Sample in Manufacturing Sector

	Debt To Equity (Y)	ROA (X1)	Current Ratio (X2)	Log Total Assets (X3)	Earnings Growth Ratio (X4)	Interest Coverage Ratio (X5)
Mean	0.9215	0.09376	2.21593	6.42493	0.940517	6.030793
Median	0.7750	0.08000	1.62000	6.72000	0.79000	5.61000
Maximum	5.8700	0.30000	19.78000	8.96000	5.18000	14.04000
Minimum	0.0100	0.01000	0.13000	3.06000	-2.62000	1.10000
Std. Dev.	0.7764	0.06078	2.27128	1.24823	1.093975	2.971297
Skewness	3.1825	1.34070	4.70975	-0.59534	0.772067	0.508889
Kurtosis	17.4730	4.69077	30.20886	3.54964	5.067978	2.476325
Observations	290	290	290	290	290	290

Source: Compiled by Author, 2020

The mean values of Debt to Equity as Dependent variable and return on assets, Current ratio, log total Assets, Earning Growth ratio and Interest Coverage Ratio as independent variables 0.92, 0.09, 2.21, 6.42, 0.94 and 6.03 respectively. Skewness measures the degree of asymmetry of the data series for Debt to Equity, Return on Assets, Current ratio, log total Assets, Earning Growth ratio and Interest Coverage Ratios as 3.18, 1.34, 4.70, -0.59, 0.77 and 0.50 respectively. According to the results of this study Debt to Equity, return on assets, Current ratio, Earning Growth ratio and Interest Coverage Positively Skewed because there mean values greater than Median. (Mean >

Median > Mode). Log total Assets Negatively Skewed and their Median value greater than mean. (Mode> Median > Mean). As mentioned above Kurtosis for Debt to Equity, Return on Assets, Current ratio, log total Assets, Earning Growth ratio and Interest Coverage Ratios are 17.47, 4.69, 30.20, 3.54, 5.06 and 2.47 respectively which measure the degree of sharpness considering Preakness or flatness of the distribution of the data series. According to the results of this study researcher observed that the Debt to Equity, return on assets, Current ratio, log total Assets, Earning Growth ratios have Leptokurtic distribution because Kurtosis values of these variables are greater than 03 while Interest Coverage Ratio has Platykurtic distribution with Kurtosis value less than 03.

4.3 Unit Root Test

Table 4.3.1 Unit Root Test results

Variable	Probability	Stationarity
Profitability	0.0000	At Level
Liquidity	0.0000	At Level
Firm Size	0.0000	At Level
Growth	0.0000	At Level
Solvency	0.0000	At Level

Source: Compiled by Author, 2020

When using panel data for research it is essential to consider whether the data set is stationery or not. Stationarity is statistical property that describe a series with constant Mean, constant Variance and constant Autocovariance. According to the Unit Root Test results all the variables stationery to the model.

4.4 Correlations Matrix Results

According to initial results of manufacturing sector company's ROA negatively correlated at 5% significant level as a percentage 2.8%. It implies that ROA of manufacturing sector companies having negative weak relationship with Debt-to-Equity ratio. Similarly, Current Ratio and Debt to Equity ratio has 62% moderate negative relationship. Results shows that Log Total Assets and Debt to Equity Ratio has 54% positive moderate relationship. Earning Growth ratio and Debt to Equity Ratio has 63% positive moderate relationship. Similarly, Interest Coverage Ratio and Debt to Equity Ratio has moderate negative relationship of 58%.

4.5 Regression Analysis

Under Descriptive analysis researcher going to test hypothesis which is developed in the methodology. Main purpose of this study to identify factors affecting to financial distress and identify their level of influence. When researcher used panel data it is essential to go with correct model. There are two models called Fixed Effect Model and Random Effect Model. To analyze panel data using regression researcher must choose appropriate model among Fixed Effect Model and Random Effect Model to obtain best estimate results. The best way to select one model among above two is go with Hausman Specification Test.

Table 4.5.1 Correlated random Effects- Hausman test for companies in manufacturing sector (N= 29)

Correlated Random Effects - Hausman Test Test period random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	4.556825	5	0.4723

Source: Compiled by Author, 2020

According to the above results of Hausman Test Probability values are not closed to zero it means probability value not significant at 5%. Therefore, researcher can accept null hypothesis which is Random Effects model is appropriate. As per above conclusion researcher used cross section Random Effect Model is for further analysis. Based on Hausman test Random Effect Model is selected as appropriate model for perform regression analysis. The results obtained from the Random Effect Model summarized in Table 4.5.2

Table 4.5.2 Results of the Random Effect Regression Model on factors affecting to corporate financial distress

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EARNING_GROWTH	0.358462	0.033687	10.64103	0.0000
INT_COVERAGE	-0.079669	0.01614	4.936104	0.0000
LOG_TOTAL_ASSET	0.051449	0.034183	1.505113	0.1334
ROA	-0.555880	0.937089	-0.593199	0.5535
CURRENT_RATIO	0.015706	0.016753	0.937494	0.3493
C	0.751569	0.285578	2.631751	0.0090

<div align="center">Weighted Statistics</div>

Root MSE	0.459374	R-squared	0.648687
Mean dependent var	0.921483	Adjusted R-squared	0.642502
S.D. dependent var	0.776371	S.E. of regression	0.464201
Sum squared resid	61.19700	F-statistic	104.8793
Durbin-Watson stat	0.762396	Prob(F-statistic)	0.000000

Source: Compiled by Author, 2020

Based on the regression results obtained from EViews 11 in Table 4.5.2 this study concludes that there is one Dependent variable which is Debt to Equity Ratio and five independent variables Return on assets, Current ratio, log total Assets, Earning Growth ratio and Interest Coverage Ratio. This study used log values for total assets and

all other ratios calculated using data obtained from audited financial statements. Sample is 29 listed manufacturing companies from 2011 to 2020.According to Table 4.5.2 Earnings Growth Ratio has significant relationship with dependent variable at 5% significant level. Which is the Debt-to-Equity Ratio. When considering coefficient there is 35% positive relationship. Therefore, accept H1 Earning Growth have a significant impact on Financial Distress. When considered about Interest Coverage Ratio it also significant at 5% confidence level. Probability value is 0.0000 which is less than 5%. Which mean Interest Coverage Ratio has significant Debt to Equity Ratio and there is a negative relationship with dependent variable. Therefore, accept H1 Solvency have a significant impact on Financial Distress. In this study Solvency of firms measures through Interest Coverage Ratio. According to the above results Log Total Assets not significant at 5% confidence level. Probability value is 0.1334 which is greater than 5%. Therefore, accept H0 Size of a firm does not have an impact on Financial Distress. Here Size of the firm measures through Log Total Assets. As per the above results Return on Assets not significant at 5% confidence level. Probability value is 0.5535 which is greater than 5%. Therefore, accept H0 Profitability does not have an impact on Financial Distress. Profitability of firms measures through Return on Assets. When considered about Current ratio not significant at 5% confidence level. Probability value is 0.3493 which is greater than 5%. Therefore, accept H0 Liquidity does not have an impact on Financial Distress. In this study Liquidity measures through Current ratio. Researcher fulfilled research objectives as per the above results. Results of the Random affect model confirmed by the literature of past research studies related to identified variables. According to the results of study probability

value of F-Statistic is 0.0000 it measures overall model is significant at 5% confident level. When considering R square of the model it shows independent variables explained 64% of dependent variable. This indicates the Goodness-of-Fit in the model. R^2 value also identified as a Coefficient of determination. The higher R^2 indicate better the model fits data. As per the results R^2 for this study is relatively higher value. Therefore, conclude that model has a good fit.

5. Conclusion and Recommendation

This study conducted to identify factors which affect to financial distress related to manufacturing sector companies listed in Colombo stock exchange. The research gap emanated from the fact that limited research has been conducted related to this area and Prediction of financial distress remains an important area of focus due to its vital importance. To avoid financial distress situation company should be aware about influencing factors in advance. All listed manufacturing companies were selected as a sample to conduct the research covering period from 2011 to 2020. The main objective of this study to identify factors affecting to financial distress. To find out significance of independent variables towards dependent variable researcher select profitability, liquidity, firm size, solvency, and growth as independent variables based on the literature. Based on the results earnings growth is significant variable to financial distress and operating income (EBIT) is used to measure growth of a company. (Yosha, 1995; Mackie and Mason, 1990; Morri and Cristanziani, 2009). Companies with favorable earnings growth ratio indicate a better future performance. Interest coverage ratio is also significant variable to financial distress, and it negatively

correlated with financial distress. Which means company's having higher frequency of interest coverage ratio will lead to reduce Debt to equity ratio. Debt to Equity ratio as dependent variable change according to the nature of company and results will depend on nature of industry. Generally, a debt-to-equity ratio below1.0 would be seen as relatively safe, whereas ratios of 2.0 or higher would be considered risky but this can be vary depending on type of a company. Based on results of this study manufacturing sector companies Profitability, Liquidity and firm Size do not significant to financial distress. Finally, this study helps corporate managers to realize importance of early detections of financial distress to avoid faceting distressed and total lost in corporate values of their firms. Variables of this study helps to identify factors affecting to financial distress and corporate managers can identify their level of influence in advance to take mitigation actions to avoid financial distress.

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Effect of Financial Performance on the Stock Prices: Evidence from Selected Listed Finance Companies in Colombo Stock Exchange

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Abstract

Introduction- This research study focuses to identify and determine the relationship and effect of financial leverage, profitability, market value and asset efficiency with Debt-to-Equity Ratio (DER), Return on Equity (ROE), Earning Per Share (EPS) and Total Asset Turnover (TATO) as the determiners of the finance companies listed in Colombo Stock Exchange during the period 2014-2019 for stock price.

Design/Methodology/Approach- Secondary data collection was done based on selected 20 finance companies using Stratified sampling method from 2014-2019. Regression analysis of panel data which comprising T test, F test, Normality test, Multicollinearity test, Heteroskedasticity test and Serial Correlation test were used to analysis the data. All analysis test was run using E-Views 11.

Findings- Findings revealed that EPS significantly effects for stock prices and ROE negatively significant to stock prices while DER and TATO have not significantly affected for stock prices. DER, ROE, EPS and TATO jointly influence by 61.27% for the stock prices. According to that while other variables influence by 38.73%. R Square is higher than 50% which

Conclusion– The results conclude that the research accomplishes to explain relationship for stock prices and financial performance.

Keywords: *Debt to Equity Ratio, Earning Per Share, Return on Equity, Stock Price, Total Asset Turnover*

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1. Introduction

Corporate organizations of CSE make efforts for create value to shareholders. For this purpose, firms must increase return of shares and also have to build good value for shares. Therefore, with the global competition, companies are focusing their efforts on creating more shareholders according to market sustain and survive (Vora, 2018). According to Puspitaningtyas (2017), Competitive investors need appropriate information for make better investment decisions in stock market. Therefore, investors need fundamental approaches for prefer most profitable listed company shares in stock market. And investors need some basic approaches to analyze stock prices. Investors consider accounting information and financial information for decision making process. Investors take decision with huge risk.

According to Vora (2018), Investing in equity shares is like a taking a risk and investors seek those financial indicators and measures that has significant impact on share price to take investment decisions. With the ever-increasing global competition and need to sustain and survive in the market companies are focusing their efforts on creating shareholders. In the current dynamic business environment, it is crucial for firms to measure & disclosure the value and creating investors. It is not one-time job; firms need to keep the track of the value and create year.

According to Puspitaningtyas (2017), the decision making is a process of selecting best alternative from the various alternatives under the influence of complex risk situations. Investment decision making process will be influenced by various accounting and financial information received. Therefore, rational investor uses financial statements of companies for stock investment decision making. Investors prefer investment decision after the considering and analyzing financial statements of companies. Financial statements help measure relative financial performance of different financial measures.

1.1. Research Problem and Objectives

Rational investors required to come the right place for stock investing in stock market. Stock investing, when done well, is among the most effective ways build long term wealth. Therefore, great stock ideas are looked for some great beginner friendly investment opportunities in stock market. Also, investors go everything when selecting and analyzing stocks in various listed companies in CSE. Corporate organizations exist for the sole reason of creating value to stakeholders specially shareholders. For this reason, firms that can create value are rewarded by the market through generation of greater revenue, which translates to profit and operating cash flow that finally accrues to shareholders (Stewart, 2004). For this purpose, firms try to operate acceptable level of sales, profits and returns.

Investors want to prefer profitable investment decision in the stock market. And, investors required moderate decision-making process as a basic framework for determine fundamental performance of a company. Therefore, research aims to build such an effective approach about financial performance effective to stock prices.

The overall objective of this study is to determine the relationship between financial performance and stock prices for finance companies listed in Colombo Stock Exchange, therefore study focuses on financial ratios that reflect business activities of the companies. Therefore, study focus for measure the collective effect of these independent variables to stock prices.

2. Literature Review

Some financial literature state that stock price reflects companies' financial performance. The higher the stock price reflect the company's financial performance is also higher. In other words, the higher the financial performance of a company the higher the stock price level in marker (Schaub, 2006). Assessment of financial performance can be done using fundamental analysis, namely through the measurement of financial ratios as an indicator. Investors can use different fundamental financial analysis approaches for determine movement of stock prices. Fundamental analysis can describe the company's conditions and prospects. Financial ratio measurement is an instrument of company performance analysis that shows changes in financial position in certain period and describe the trend of change (Puspitaningtyas, 2012a; 2015; 2017).

Financial leverages the extent to which a business or investor is using the borrowed money. It is important when considering the performance of the business. Business companies with high leverage are at risk of bankruptcy, they are not able to repay the debts. In this research the researcher examines the relationship between debt-to-equity ratio with share prices. If the debt-to-equity ratio is high, the owners contribute relatively little money. Therefore, it is danger signal for creditors. The low debt to equity ratio value will stated that company has a possibility for pay long term liabilities. Therefore, stock prices move in (Asmirantho & Somantri, 2017).

According to Olivia Christina & Robiyanto (2018) concluded research with variables that are return on equity, current ratio, debt to equity ratio and firm size. Research aimed to find out effect of financial performance which consist with return on equity, current ratio, debt to equity ratio and firm. The research has proved the lower debt to equity ratio means well for the company, because the company's financial risk also low. As a result, investors interested to investing in shares of these companies. Furthermore, stock prices also rising and concluded that debt to equity ratio has no significant positive effect on stock price.

Utama & Wikusuana (2018) analyzed the main goal of this study is to determine the effect of financial performance and macro-economic variables for stock prices in Indonesia stock exchange. Research has concluded factors of company's financial performance debt to equity ratio has a positive and insignificant effect on stock returns, this study has showed that debt to equity ratio does not affect investor decisions in investing.

Market value ratios that relate to firm's stock price to earnings and book value per share. Return on Equity reflects the effects of all other ratios and it is the single best accounting measure performance. Investors like a high return on equity and high return on equity are correlated with high stock prices. (Brigham & Houston, 2009)

A profitability ratio is a measure company's performance. It measured after deducted all cost and expenses from all earning within certain accounting period. The most important ratio is the return on equity, which tells how much stakeholders are earning on the funds they provide to the firm. When ROE is high, the stock price also trends to be high, so actions that increase ROE generally crease in stock prices. Other ratio provides information about how well assets such as accounts receivables, inventory, and fixed assets are managed and about the firm's capital structure. Managers use ratios related to these factors to help develop plans to improve ROE. (Brigham & Houston, 2009)

Christina & Robiyanto, (2018) conducted research to analyze the effect of financial performance and firm size on stock prices of manufacturing companies. Based on the study, concluded that return on equity and total asset turnover has a significantly positive effect on stock prices. And stated that the higher return on equity make company's ability to distribute dividends will be even greater. It means that the company can use the capital well, so investors believe that the company will provide a greater profit, and it will affect in increasing of stock prices.

This ratio give investors insight into how efficiently a business is employing resources invested in fixed asset and working capital, it does can reflect how effective company's management. Efficiently, it is advised that are other factors at play that influence the performance of business. In this research total asset turnover ratio was selected to measure financial performance on stock prices. (Asmirantho & Somantri, 2017)

Martani et al, (2009) stated that total asset turnover has negative correlation with stock return, Higher total asset turnover is a benefit for the firm and can give positive effect on stock return. The result of negative correlation of total asset turnover on return might be caused by big firm's domination on high stock return, whereas big firms usually cannot increase their total asset turnover easily. Another factor that caused negative correlation is that stock return is also affected by non-operating profit which is not gained from sales.

3. Methodology

The financial performance behavior in this study is considered using five variables namely financial leverage, profitability, efficiency, and market valuation measured using share prices of listed companies in Colombo stock exchange. Figure 1 presents the conceptual framework of study.
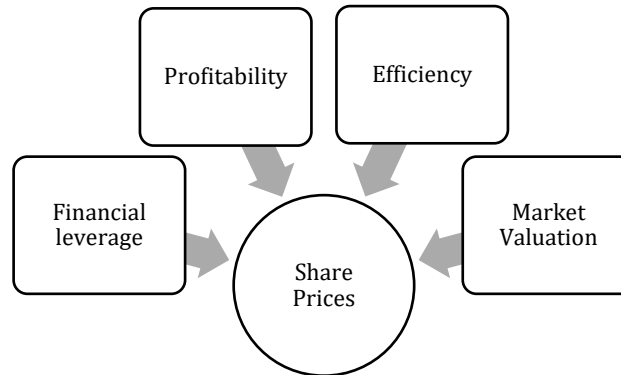
Figure 01- Conceptual Framework

Based on above information framework researcher tries to formulate research hypothesis as follows.

H1: Debt to Equity Ratio, Return on Equity, earning per Share and Total Asset Turnover simultaneously affect to stock prices.

H2: Debt to Equity Ratio has a positive relationship with stock prices.

H3: Earning Per Share has a positive relationship with stock prices.

H4: Return on Equity has a positive relationship with stock prices.

H5: Total Asset Turnover has a positive relationship with stock prices.

Table 3.1- Operationalization of Variables

Variable	Indicator	Measurement	Reference
Share Price	Market Price of Shares	Highest Price + Lowest Price / 2	Iniyama, (2015)
Financial Leverage	Debt to Equity Ratio	Total Liabilities / Total Equity	Gibson (2009)
Market Value	Earning Per Share	Earning after Tax/Net Income	Brigham & Houston (2010)
Profitability	Return on Equity	Earning after interest & Tax/Total Equity	Brigham & Houston (2010)
Asset Efficiency	Total Asset Turnover	Net Sales/ Total Assets	Brigham & Houston (2010)

Source: Compiled by Author, 2020

The data and information for this study collected from Colombo Stock Exchange (CSE), annual reports, and CSE publication. The total listed companies in the CSE contained in 283 companies representing 20 business sectors as at end of December 2019, with market capitalization of Rs. 2,595.841 Bn. The following table refers 20 business sectors of listed companies in Colombo Stock Exchange. Secondary data were collected from annual reports and financial publications of listed companies of Colombo Stock Exchange records in Sri Lanka for the period of 2015 to 2019. According to Stratified sampling method, 3 non-overlapping groups have been selected.

Multiple Regression Model

$Y = \beta 0 + \beta 1 DER + \beta 2 ROE + \beta 3 TATO + \beta 4 EPS$

Y=Stock Prices

EPS   =Earning Per Share

ROE=Return on Equity

DER   = Debt to Equity Ratio   TATO =Total Asset Turnover

4. Findings and Discussions

Based on Table 2 shows that amount of data in this research 120 samples based on the calculation results for the period 2014-2019. The independent variables used in this research are DER, EPS, ROE and TATO. And the independent variable is Stock Price comprises with 120 stock prices. The lowest value (minimum) of stock price is 13.30 and the highest value (maximum) is 255.60. While the average (mean) of 83.56442 with the standard deviation 58.51183.

Table 4.1-Results Descriptive Statistics Analysis

	STOCK_PRICE	DER	EPS	ROE	TATO
Mean	83.56442	6.649337	12.44750	0.161062	0.129572
Median	69.31500	5.844000	8.735000	0.145850	0.081700
Maximum	255.6000	77.08510	61.95000	1.201400	0.924600
Minimum	13.30000	0.002900	0.240000	0.003400	0.000100
Std. Dev.	58.51183	7.614385	12.12155	0.147070	0.143489
Skewness	1.038608	6.642017	1.472914	3.678418	2.810734
Kurtosis	3.381583	62.18523	5.038924	23.66722	12.34821
Jarque-Bera	22.30215	18396.79	64.17557	2406.284	594.9501
Probability	0.000014	0.000000	0.000000	0.000000	0.000000
Sum	10027.73	797.9204	1493.700	19.32740	15.54860
Sum Sq. Dev.	407412.4	6899.485	17484.89	2.573936	2.450109
Observations	120	120	120	120	120

Source: Author Compiled

In the variable of the debt-to-equity ratio (DER) shows the lowest (minimum) of 0.0029 and the maximum of 77.08510. While the average (mean) of the 6.649337 with the standard deviation 7.614385. In the earning per share ratio (EPS) variable the minimum value is 0.24 and the maximum value is 61.95. While the average (mean) of 12.4475 with the standard deviation 12.12155. In the return on equity (ROE) variable the minimum value is 0.0034 and the maximum value is 1.2014. While the average (mean) of 0.161062 with the standard deviation 0.14707. In the variable of total asset turnover (TATO) the minimum value is 0.0001 and the maximum is 0.9246. While the average (mean) of 0.129572 with the standard deviation 0.143489.

Panel data estimation technique is performed for select the best model for the results analysis in this study. Panel data estimation technique is used to determine the best model among common effect, fixed effect or the random effect models.

Table 4.2- Correlated Random Effects: Hausman test results

Test Summary	Chi-Sq. Statistic	Chi-Sq. df.	Prob.
Period random	2.977607	4	0.5616

Source: Author Compiled

Based on the table 3 it shows that probability value of chi-sq is 0.5616. It is more than 5%. Therefore, test can be concluded that the selected model is random effect model.

The normality test on the regression model is used to test whether the regression model is normally distributed or not. A good regression model should be normally distributed. The distribution is said to be normal if the Jarque-Bera value is not significant, meaning that Jarque-Bera value is smaller than two and the probability value is higher than 5%. (Probability > 0.05).
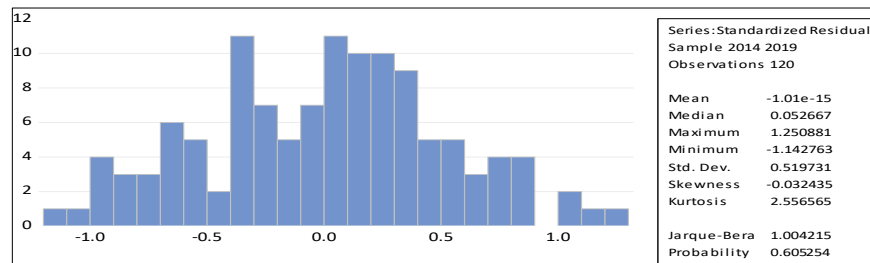
Figure 02- Jar-Que Bera Test Results

Source: Author Compiled

According on above table 4 it can be viewed that the Jarque-Bera value is smaller than two, the value is equal to 1.004215 and probability value of 0.605254 is greater than 0.05. Therefore, it can be concluded that the regression model is normally distributed. For that normality test, log variable of dependent variable has been used for

normality test. Two of autocorrelation probability values higher than 0.05. Therefore, it can be concluded that regression model is not consist with autocorrelation problem.

Table 4.3-Serial Correlation Test Results

Test order	m-Statistic	rho	SE (rho)	Prob.
AR (1)	-1.446133	-139605.772057	96537.293926	0.1481
AR (2)	-0.492851	-5244.087896	10640.310893	0.6221

Source: Author Compiled

Based on the table5, probability value of R2 is 0.075107 and the chi-square value is done by multiply number of observations within probability value of R2 that is 9. 487729. Meaning that LM stat value is 9.01284 (120*0.075107). Based on the results Chi-square value is higher than LM test value. Therefore, it can be concluded that regression model is not comprises with heteroskedasticity problem.

Table 4.4.-Breusch Pagon (BP) LM Test Results

	Weighted Statistics		
Root MSE	2048.304	R-squared	0.075107
Mean dependent var	1140.347	Adjusted R-squared	0.042937
S.D. dependent var	2138.778	S.E. of regression	2092.358
Sum squared resid	5.03E+08	F-statistic	2.334683
Durbin-Watson stat	1.307192	Prob(F-statistic)	0.059712

Source: Author Compiled

Based on the table 6, shows the correlation coefficient between independent variables. DER and EPS of 0.135608, DER and ROE with 0.080045, DER and TATO with -0.1988696, EPS and ROE comprise with 0.100148, EPS and TATO of -0.229233, ROE and TATO with 0.344117. Therefore, it can be concluded that regression model does not combine with multicollinearity problems because of the results of test which all values are lower than 0.4

Table 4.5 - Multicollinearity Test Results

	DER	EPS	ROE	TATO
DER	1.000000	0.135608	0.080045	-0.198696
EPS	0.135608	1.000000	0.100148	-0.229233
ROE	0.080045	0.100148	1.000000	0.344117
TATO	-0.198696	-0.229233	0.344117	1.000000

Source: Author Compiled

Table 7 presents the model summary of the panel data regression test results. Regression model constant value is 41.89795 meaning that if other independent variables are equal to zero, then the stock price increased by 41.89795

Table 4.6 - Panel Data Regression Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER	0.101151	0.466050	0.217040	0.8286
EPS	3.829836	0.296659	12.90991	0.0000
ROE	-54.11863	25.56915	-2.116560	0.0365
TATO	15.73202	27.14101	0.579640	0.5633
C	41.89795	7.304428	5.735966	0.0000

Weighted Statistics			
Root MSE	36.26011	R-squared	0.612738
Mean dependent var	83.56442	Adjusted R-squared	0.599268
S.D. dependent var	58.51183	S.E. of regression	37.03999
Sum squared resid	157775.5	F-statistic	45.48908
Durbin-Watson stat	0.644244	Prob(F-statistic)	0.000000
Unweighted Statistics			
R-squared	0.612738	Mean dependent var	83.56442
Sum squared resid	157775.5	Durbin-Watson stat	0.644244

Source: Author Compiled

The value of the coefficient variable DER is 0.101151 meaning that each increase of debt-to-equity ratio by on unit, share price will increase by 0.10151 when the assumption of other independent variables is fixed value. The value of coefficient variable EPS is positive that is 3.829836 meaning that each increase of earning per share by one unit, share price will increase by 3.829836 when other independent variables have fixed value. The value of coefficient variable ROE is negative that is -54.11863 meaning that each increase of return on equity by one unit, share price will decrease in 54.11863 when other independent variables have fixed value. The value of coefficient variable

TATO is positive that is 15.73202 meaning that each increase of total asset turnover by one unit, share price will increase in 15.73202 when other independent variables have fixed value.

The coefficient of determination (R Square) is 0.612738. This value is described that variation of stock price can be explained by the value of debt-to-equity ratio, earning per share, return on equity and total asset turnover of 61.27%. While the rest of 38.73% is described by other variables not included in this model. And R Square is more than 60% (61%>60%). Therefore, it can be concluded that this model is nicely fitted or good regression model.

Based on table 7 debt to equity ratio has positive effect with coefficient value which is equal to 0.101151 and t test probability value is higher than significant level of 5%. (0.8286>0.05). It concludes that debt to equity ratio (DER) does not affect stock price of listed finance companies in CSE on the period 2014-2019. Therefore, it can be concluded that H1 is rejected. Based on the table 4.11, earning per share ratio has positive effect with coefficient value which is equal to 3.829836 and t test probability value is lower than significant level of 5%. (0.0001<0.05). So, it can be concluded that earning per share (EPS) affect for the stock prices of listed finance companies in CSE on the period 2014-2019. Because of that, H2 is accepted. Return on equity has negative effect with coefficient value which is equal to -54.11863 and t test probability value is lower than significant level of 5%. (0.0365<0.05). Therefore, it can be concluded that return on equity (ROE) affect for the stock prices of listed finance companies in CSE on the period 2014-2019. Meaning that return on equity negatively effect on stock price. Therefore, H3 is rejected. Total Asset turnover has positive effect with coefficient value which is equal to 15.73202 and t test

probability value is higher than significant level of 5%. (0.5633>0.05). Therefore, it can be concluded that total asset turnover (TATO) does not affect for the stock price of listed finance companies in CSE on the period of 2014-2015. Therefore, H4 is rejected.

Based on the above table 7 F statistics is 45.48908 and the corresponding probability value is 0.0001. Probability value is less than 5%. Therefore, it can be concluded that, independent variables can simultaneously effect on depend variable. (stock price)

The results indicate that there is a significant relationship with financial performance and stock prices of listed finance companies in CSE because the F-value 209.2711 is significant with the probability of significant value equal to 0. 0001. Value is lower than the significant level. (0.0001< 0.05).

Table 4.7 -Anova between independent variable and dependent variable

	Sum of Squares	df	Mean Squares	F	Sig
Between Groups	607486.8	4	151871.7	209.2711	0.0000
Within Groups	431801.8	595	725.7174		

Source: Author Compiled

Table 4.8 -Acceptance and Rejection of Hypothesis

Hypothesis	Results (Significant/ Not)	Accepted/ Rejected
H1	Significant	Accepted
H2	Not Significant	Rejected
H3	Significant	Accepted
H4	Significant	Rejected
H5	Not Significant	Rejected

Source: Author Compiled

5. Conclusion

This research is aimed to find out the relation between stock prices and financial performance by talking the 20 listed finance companies at CSE for the period within 120 observations. The key objective of this study was to identify the relationship between stock prices and financial performance and secondary objectives were to identify the real effect of changes in financial leverage, profitability, asset efficiency and market value. The important finding in this research is the earning per share and return on equity ratio mostly affecting to determine the stock prices of listed finance companies in CSE. Therefore, the determinants of the stock prices are earning per share and return on equity. Here the earning per share is positively effect for the stock prices. Meaning that if earning per share

increase, stock prices go up. When earning per share increase of a particular company, that is effect for investors more appreciate about that company and then stock prices goes up because the increasable demand from competitive investors. However, there is a negative relationship between stock prices and return on equity. Meaning that if return on equity increase, stock prices go down. But someone can be recommending this is an opposite of the accounting theory.

The constant value of stock price is Rs.42. Because at the time if no other variables are available in a particular company share price is Rs.42. Stock price of shares of the finance industry was found to be positively and significantly influenced by Earning per share. However, debt to equity ratio and total asset turnover positively influence on stock prices in finance industry. Return on Equity negatively affected for stock prices. However, rational investors should concentrate about Earning per Share before taking investment decisions.

The conclusions of this study have shown some contrasting but results arising from the analysis of financial performance and stock prices.

- Individual investors usually seek the counsel of the stockbrokers before investing on CSE, there is need for local individual investors to be carrying out a fundamental analysis in the decision making for stock investing.

- Listed finance companies on CSE must improve on performance to stimulate better stock prices.

- Other factors other than stock prices should be considered in the investment decision making.

- Competitive investors and prospective investors can be more focused about earning per share as a main factor when investing listed finance companies in CSE. Because in this research study has concluded Earning Per Share (market value) has a positive significance effect on stock prices.

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Impact of Service Quality on Customer Satisfaction with Special Reference to Mobile Telecommunication Industry of Sri Lanka

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Abstract

Purpose – Service quality is crucial for every business organization as it allows companies to differentiate themselves from their competitors and enhance the satisfaction of their customers. The study attempts to examine the impact of service quality on customer satisfaction with special reference to the Mobile Telecommunication Industry of Sri Lanka.

Design/Methodology/Approach- A survey was conducted for data collection through a structured questionnaire distributed to the customers of four main mobile service providers. The study followed the random stratified proportional sampling method to collect data. Descriptive Statistics, Cronbach's alpha, Multicollinearity Test, Pearson's Correlation and Multiple Linear Regression were used for data analysis.

Findings - The study found a positive and significant relationship of network quality, Assurance and Reliability with customer satisfaction. However, Responsiveness, Empathy and Convenience do not have a significant relationship to customer satisfaction of Sri Lankan mobile telecommunication industry.

Contribution - The study fulfils the existing research gap in service quality and customer satisfaction of the mobile telecommunication industry of Sri Lanka. The findings of this study will help the management of mobile service providers to plan their future strategies and enables future researchers to conduct studies related to this area.

Keywords: *Customer Satisfaction, Mobile Telecommunication Industry, Network Quality, Service Quality, SERVQUAL model*

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1. Introduction

Service quality is significant for every business organisation as it allows them to attract more customers to their products. In today's global competitive atmosphere, the quality of the service offered is considered an essential strategy for achievement and survival. According to Parasuraman, 1985, service quality refers to providing a service that meets or exceeds customers' expectations. When determining a business organisation's competitive position, the quality of its service acts as a critical element. Providing quality service helps business organisations to achieve excellence and sustain competitive advantage. Previous researches suggested that service quality is an important indicator of customer satisfaction, and service quality is one of the most important research topics on a large scale in services (Zeithaml 2000; Gallifa & Batalle, 2010). Many researchers have discussed service quality in their studies. As per Kolter &Armstrong, 2016 as cited in (Almomani & Ghaith, 2018), for a service provider to be successful, it should build a strong relationship with its customers through high-quality service. If an organisation fails to offer quality service in a highly competitive market, such organisation has to struggle in the market (Alnsour, Tayeh, & Alzyadat, 2014). Satisfied customers ensure the sustainability of the business organisation as they often stay loyal, are less sensitive to changes in price and have fewer complaints about the service delivered (Almomani and Ghaith, 2018).

Business organisations must be concerned about their customers' satisfaction to have competitive advantages over their rivals. Customer satisfaction plays a vital role in determining an organisation's success and long term

competitiveness (Ojo, 2010). Most of the time, customers compare the service with the service they received earlier from the service firm, and this ratifies the customer satisfaction is a process. As per these definitions, customer's satisfaction depends on whether the actual service they receive meets or exceed their expectations or is below their expectations.

Service quality and customer satisfaction can be identified as interrelated concepts. The ability of service organisations to provide high-quality service to their customers leads to increased customer satisfaction, and thus, conferring to Ismail & Yuan, 2016, service quality acts as a strong forecaster of customer satisfaction. Satisfied customers may retain within the service firm, repeat their purchases, and share the good experience they received from the service firm.

The telecommunication industry can be identified as a rapidly changing and competitive industry in the world. In Sri Lanka, the telecommunication industry has recorded a growth of 17.2% in 2019 comparing to the same of 10.4% in 2018 (Central Bank of Sri Lanka, 2019). Due to the increasing number of customers with the fact that customer satisfaction is an important element for consideration by the management, telecommunication companies must be concerned about the relationship between service quality and customer satisfaction to retain the existing customers and attract new customers to their products. In recent times, social media and newspapers outlined that Sri Lankan mobile telecommunication industry (MTI) customers complain about their service providers' service, which is evidence for the practice gap. A lack of empirical evidence is available between service quality and customer

satisfaction of MTI in Sri Lanka and measurements of service quality show differences from country to country (Hanaysha, 2017, as cited in Darmadasa & Gunawardana, 2017). Thus, the research findings of other countries could not be generalised in Sri Lanka. Scholars are recommended to investigate the impact of service quality on customer satisfaction in various industries since existing empirical evidence is limited to few sectors (Alnsour et al., 2014). There are only a few researches available in Sri Lanka regarding service quality and customer satisfaction, and most of them are related to other industries such as hotels and banks. Therefore, there is a necessity to research the service quality and customer satisfaction of the mobile telecommunication industry of Sri Lanka. Thus, the present study was carried out to fill these gaps by answering the following three questions. What are the factors affecting service quality? How are these factors related to customer satisfaction? What is the significance of each variable of service quality on customer satisfaction? The objective of this study is "To investigate the impact of service quality on customer satisfaction in Mobile Telecommunication Industry of Sri Lanka." Therein, the remainder of the article is organised as follows. The first section contains a literature review that includes theoretical concepts and empirical evidence relevant to the study. The research methodology is explained in the second section. Section three focuses on the analysis of the findings of the study. The final section draws the summary of findings and conclusion, recommendation, and suggestions for future researches.

2. Literature Review

This section mainly focuses on a critical evaluation of the available literature relating to service quality and its impact on customer satisfaction.

2.1. Service Quality

Services become a part of people's lives as every person tends to use services daily.

Quality of the services plays a vital role as the customers measure their satisfaction based on the quality of the service they receive. According to Parasuraman et al., 1985, service quality means the customer's overall judgment of the excellence of service or the difference between one's expectation and actual service they delivered. Service quality is a measurement used to determine how well the delivered service level matches customer expectations. Delivering quality service means meeting customer expectations on a regular basis (Parasuraman et al., 1985). As a result of globalisation and free trade agreements, highly competitive markets within firms were created. Telecommunication services, Banking services, Public Transport Services, Insurance Services and Security Services can be identified as key services people consume. Business organisations need to target their customers ' satisfaction to face the competition successfully and survive within the market. In order to attract and retain more customers to the business, business organisations need to differentiate their offerings and should improve the quality of their offerings (Parasuraman, 1985); (Zeithaml, Parasuraman, & Berry, 1990); (Reichheld & Sasser, 1990).

Consequently, businesses can exploit their resources effectively and achieve a competitive advantage at a local and global level.

2.2. Customer Satisfaction

For a business organisation, delivering a high-quality service is not enough to ensure the profitability and sustainability of their business. Business organisations must be concerned about their customers' satisfaction to have competitive advantages over their rivals. Therefore, customer satisfaction plays a vital role in determining an organisation's success and long-term competitiveness (Ojo, 2010). According to Philip Kotler, customer satisfaction can be identified as an individual's feeling of pleasure or distress, which results from comparing the product's perceived performance or outcome against his/her expectations. Oliver (1981) defined satisfaction as a psychological state that results when the emotions of consumers' expectations are combined with their feelings about the consumption experience. Bitner (1990) define satisfaction as the result of comparing product or service performance with the previous experience the customer has on the way of service to be delivered.

2.3. Service Quality Measurement in Telecommunication Industry – Empirical Evidence

Researchers have done their researches on measuring service quality of the telecommunication industry. Most of the researchers used the SERVQUAL model to measure service quality. Alnsour et al., in 2014 done research on the topic of Using SERVQUAL to assess the quality of service provided by Jordanian Telecommunications Sector. In his

study, he has explored the application of the SERVQUAL approach to assess the quality of service of the Jordanian telecommunication sector and how it can ultimately affect customer loyalty. The study results exposed that the telecommunication companies need to understand the Jordanian customer expectations in the light of the unique cultural traits of these customers. This influences the companies' capacity in fulfilling customer expectations (Alnsour et al., 2014). Loyalty is directly enhanced by achieving service quality and should be one of the main goals for telecommunication companies (Alnsour et al., 2014).

Birgit Leisen & Charles Vance, in 2001, researched the topic of Cross-national assessment of service quality in the telecommunication industry by using evidence from the USA and Germany. In his study, he found that the five-dimensional service concept suggested by the SERVQUAL instrument seems to be the best fitting model of service quality in the USA as well as in Germany (Birgit Leisen & Charles Vance, 2014)

Abu WJ et al., in 2019, researched Using SERVIQUAL to investigate the quality of providing wireless communication services in the United Arab Emirates. His study showed a significant difference between users' expectations and the current level of quality of services in the tangibility dimension of service quality.

The SERVQUAL model was also used by (Lai, Hutchinson, Li, & Bai, 2007) in China's mobile telecommunication to test the communication industry. The study used exploratory and confirmatory factor analysis. The results

presented that the SERVQUAL instrument is a valid means for measuring service quality. Service convenience is identified as an important additional dimension of service quality in China's mobile services sector.

Woo & Fock in 1999, investigated the Hong Kong mobile phone service sector to find out determinants of customer satisfaction with service quality. They carried out an exploratory factor analysis on 20 attributes followed by confirmatory factor analysis. They found four determinants of customer satisfaction: transmission quality and network coverage, pricing policy, staff competence, and customer service.

Negi & Ketema in 2013 carried out research to identify the role of service quality as perceived by mobile users while determining their overall satisfaction. They have added a new dimension to the SERVQUAL model, which is Network Quality Dimension. They have developed a structured questionnaire and collected primary data from 250 mobile subscribers of Ethiopian Telecommunication Corporation. Service quality gaps were computed and found to be negative for all the service quality dimensions, with the highest gap for the added dimension of Network Quality.

A lack of empirical evidence is available between service quality and customer satisfaction of the Mobile Telecommunication Industry of Sri Lanka, and measurements of service quality show differences from country to country (Hanaysha, 2017). Thus, the research findings of other countries could not be generalised in Sri Lanka. According to Shafei & Tabaa, 2016; Alnsour et al., 2014), academics are encouraged to research the impact of service

quality on customer satisfaction in related to different industries since existing empirical evidence is limited to few sectors. There are only limited researches available in Sri Lanka regarding service quality and customer satisfaction, and most of them are related to other industries such as hotels and banking. Therefore, there is a requirement to research service quality and customer satisfaction in the mobile telecommunication industry of Sri Lanka.

Mobile Telecommunication Industry is a rapidly changing industry, and Service quality should be reassessed on a regular basis (William C. Johnson & Anuchit Sirikit, 2002). Therefore, there is an essential performance of researches on a regular basis. Previous researches used only five dimensions of service quality (SERVQUAL Model) which was developed by Parasuraman et al. in 1998. In addition to those five dimensions, the network quality dimension and convenience dimension are also crucial in measuring the service quality of the Mobile Telecommunication Industry. Therefore, future researchers are encouraged to perform researchers by adding these two dimensions to the SERVQUAL model (Negi R. 2009; Lai F et al., 2005).

Nagshineh and Schwartz, 1996; Markoulidakis et al., 2000; Sharma and Ojha, 2014, define network quality as an indicator of network performance regarding voice quality, call drop rate, network coverage and network congestion. Carvalho and Leite, 1999; Gagliano and Hathcote, 1994, define Convenience as flexible and comfortable facilities to suit the customers' needs. In this research, in addition to the five dimensions of the SERVQUAL model,

the researcher will also use these additional two dimensions to measure the service quality of the Mobile Telecommunication Industry of Sri Lanka.

2.4. Service quality dimensions

With referred to empirical evidence on the relationship between service quality and customer satisfaction, the researcher has identified seven service quality dimensions as independent variables and customer satisfaction as the study's dependent variable. Tangibility - Physical facilities, equipment, machines, materials, appearance of personals and information systems of the service firm (Parasuraman, Zeithaml and Berry, 1985) ; Reliability – Ability to provide consistent performance and provide the promised service dependably and accurately (Parasuraman, Zeithaml and Berry, 1985) ; Responsiveness – The ability to solve the problems fast, willingness to help customers, deal with customers' complaints effectively and meet the customers' requirements promptly (Parasuraman, Zeithaml and Berry, 1985) ; Assurance – Assurance define the employees' politeness, knowledge and courtesy of employees to perform the service and their ability to inspire trust and confidence (Parasuraman, Zeithaml & Berry, 1985) ; Empathy – Empathy is the caring, individualised attention the firm provides to its customers (Parasuraman, Zeithaml & Berry, 1985) ; Network Quality - Indicator of network performance in terms of voice quality, call drop rate, network coverage and network congestion. (Nagshineh & Schwartz, 1996; Markoulidakis et al., 2000; Sharma & Ojha, 2014); Convenience - Flexible and comfortable facilities to suit the customers' needs.

2.5. Hypothesis

Based on the above-identified service quality dimensions, the following hypotheses have been developed. H1 - There is a positive impact of Tangibility on customer satisfaction ; H2 - There is a positive impact of Reliability on customer satisfaction ; H3 - There is a positive impact of Responsiveness on customer satisfaction ; H4 - There is a positive impact of Assurance on customer satisfaction ; H5 - There is a positive impact of Empathy on customer satisfaction ; H6 - There is a positive impact of Network Quality on customer satisfaction ; H7 - There is a positive impact of Convenience on customer satisfaction.

3. Methodology

In this research, the researcher used positivism philosophy. Positivism philosophy is a philosophical theory which states that "positive" knowledge is exclusively derived from the experience of natural phenomena and their properties and relations. A deductive approach was used as the research logic. Moreover, the researcher used a quantitative approach in this study. The quantitative approach is also known as the positivist approach, and in this approach, it is believed that the researcher is independent of what is being researched.

3.1. Conceptual Framework

Based on the literature review, this topic was concentrated on the conceptual framework of the impact of service quality on customer satisfaction. This framework emphasised how well the researcher addresses the research problem. Hence it shows the relationship between the dependent variable and independent variables. In this study, the researcher has identified seven independent variables: Tangibility, Reliability, Responsiveness, Assurance, Empathy, Network Quality, and Convenience. The researcher has identified customer satisfaction as the dependent variable. This study follows the deductive approach. Hence the conceptual framework has been developed in line with the theoretical justification and empirical contribution.
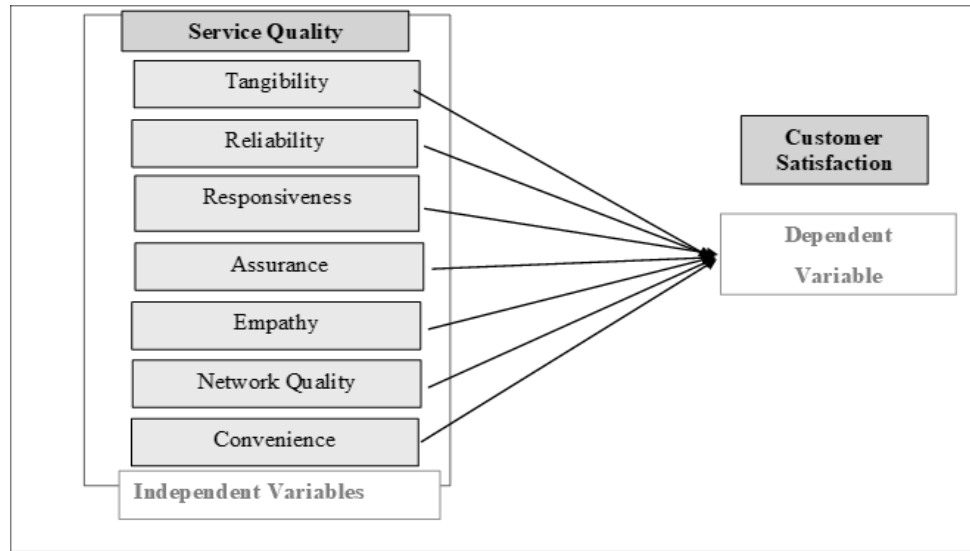
Figure 1: Conceptual Framework

Source: Author's own analysis, 2021

3.2. Target Population and Sampling Frame

The study's target population is all the customers of the mobile telecommunication industry of Sri Lanka; Dialog, Mobitel, Airtel, Hutch. The sample size was selected from G-Power software as 107, and the researcher decided to increase that sample size to 166 samples. Furthermore, the researcher has used the "Random Stratified Proportional Sampling Method" to gather data.

3.3. Data Collection

The researcher has used a standardised questionnaire of SERVQUAL odel with modification of adding six more questions related to Netw3.ork Quality dimension and Convenience Dimension. Respondents were asked to state their perception using a five-point Likert scale ranging from "1 = strongly disagree" to "5= strongly agree". The target respondents were the customers of four main mobile operators of Sri Lanka. The researcher used Random Stratified Proportional Sampling Method and distributed 166 questionnaires. Questionnaires were distributed online by using Google Form.

4. Findings and discussion

4.1. Demographic Data Analysis

The sampling technique used by the researcher is Proportionate Stratified Random sampling, and a structured questionnaire was used to gather data from the respondents. The main survey was conducted using 166 respondents, and the completed questionnaires were taken to conduct a statistical analysis of the study. The demographic analysis of respondents is as follows.

The majority of the respondents are females and are between the age of 18 to 24 years. Most of the respondents are undergraduates, employed and from Western Province. The monthly income of the majority is less than Rs. 25,000.

100% of the respondents use a mobile phone. The survey results show that most of the respondents use Dialog, and most of them use their mobile network operator between 1 year to 5 years.

4.2. Descriptive Analysis of Variables

As per the table below, the number of samples (N) is 166. Tangibility has the highest mean value, while the Responsiveness has the lowest mean value. Customer satisfaction has the highest standard deviation, and Tangibility has the lowest standard deviation.

Table 4.1: Descriptive Analysis

	N	Mean		Std. Deviation
	Statistics			Statistics
		Statistics	Std. Error	
Tangibility (A)	166	3.9232	.05099	.65694
Reliability (B)	166	3.6566	.06778	.87327
Responsiveness (C)	166	3.5919	.05621	.72420
Assurance (D)	166	3.8946	.05725	.73765
Empathy (E)	166	3.6551	.05961	.76799
Network Quality (F)	166	3.6968	.06823	.87910
Convenience (G)	166	3.7671	.06165	.79431
Customer Satisfaction (H)	166	3.7249	.06942	.89440
Valid N (listwise)	166			

Source: Survey data, 2021

4.3. Reliability and Validity Test

Table 4.2: Reliability of the variables

Variable	Cronbach's Alpha	N of items
Independent Variables		
Tangibility	0.759	4
Reliability	0.906	5
Responsiveness	0.775	4
Assurance	0.849	4
Empathy	0.836	4
Network Quality	0.840	3
Convenience	0.746	3
Dependent Variable		
Customer Satisfaction	0.891	3

Source: Authors' own analysis, 2021

As per the above table 4.2, Cronbach's alpha of reliability dimension is 0.906, which is the best. Assurance, Empathy, Network quality and customer satisfaction have 0.849, 0.836, 0.840 and 0.91 of Cronbach's alpha, respectively, which is good. Tangibility, Responsiveness, and Convenience also have more than 0.7 of Cronbach's alpha, which indicates the data set's Reliability is high. The Cronbach's alpha value should exceed the threshold of 0.70 (Hair et

al., 2010). As per the results shown in Table 4.2, the alpha values were above the cut-off values, indicating adequate Reliability.

The validity of the test was measured by using Kaiser Myer Olkin (KMO) test. KMO test is a statistical measure that determines how suitable the data set is for factor analysis. The test evaluated the sample adequacy for each variable in the model. KMO return values range between zero and one (0-1). KMO values less than 0.6 indicate the sampling is not adequate, while KMO values more than 0.8 indicate the sample is sufficient. The researcher has performed KMO and Bartlett's test to determine the sampling adequacy of this study. The results of the test is illustrated in Table 4.3.

Table 4.3: Factor Analysis

Variable	KMO Value	Bartlett's Test of Sphericity Chi-Square	Total Variance Explained	Factor Loading	
Tangibility	.78	159.813	58.275%	Component Matrix[a]	
					Component 1
				AQ1	.685
				AQ2	.793
				AQ3	.813
				AQ4	.756
Reliability	.866	526.880	72.686%	Component Matrix[a]	
					Component 1
				BQ1	.850
				BQ2	.877
				BQ3	.879
				BQ4	.880
				BQ5	.771
Responsiveness	.758	176.816	60.185%	Component Matrix[a]	
					Component 1
				CQ1	.830
				CQ2	.769
				CQ3	.780
				CQ4	.719
Assurance	.781	290.915	69.283%	Component Matrix[a]	
					Component 1
				DQ1	.803
				DQ2	.805
				DQ3	.887
				DQ4	.832

				Component Matrix[a]	
Empathy	.813	253.473	67.677%		Component 1
				EQ1	.812
				EQ2	.851
				EQ3	.835
				EQ4	.792
Network Quality	.723	198.287	75.768%	Component Matrix[a]	
					Component 1
				FQ1	.868
				FQ2	.887
				FQ3	.856
Convenience	.673	116.665	66.476%	Component Matrix[a]	
					Component 1
				GQ1	.830
				GQ2	.848
				GQ3	.765
Customer Satisfaction	.750	283.505	82.175%	Component Matrix[a]	
					Component 1
				HQ1	.909
				HQ2	.902
				HQ3	.909

Source: Authors' own analysis, 2021

As per above Table 4.3, the KMO values of all the measurement items were greater than 0.50. Moreover, the total variance explained of the measurement items was greater than 50%, indicating the appropriateness of the total variation in the items of respective factors. The measurements items were also extracted in one single component of the respective variable. Therefore, all the results of KMO and Bartlett's test indicate the appropriateness of factor analysis.

4.4. Test of Normality

In this study, the researcher used the results of Skewness and Kurtosis to determine whether the data set met the assumption of normality.

Table 4.4: Skewness and Kurtosis

	N Statistics	Skewness		Kurtosis	
		Statistics	Std. Error	Statistics	Std. Error
Tangibility (A)	166	-.220	.188	-.183	.375
Reliability (B)	166	-.490	.188	.122	.375
Responsiveness (C)	166	-.301	.188	.293	.375
Assurance (D)	166	-.424	.188	.117	.375
Empathy (E)	166	-.007	.188	-.458	.375
Network Quality (F)	166	-.408	.188	-.196	.375
Convenience (G)	166	-.061	.188	-.578	.375
Customer Satisfaction (H)	166	-.429	.188	-.087	.375
Valid N (listwise)	166				

Source: Authors' own analysis

As per George & Mallery, 2010, skewness values between -2 and +2 are considered acceptable to prove a normal distribution. As per the survey results, all the values of skewness range between -2 and +2, which indicate the data set is normally distributed. The values for Kurtosis less than three are considered acceptable in order to prove normal distribution. As per the above table results, all the Kurtosis values are below 3, which indicates a normal distribution.

4.5. Test of Multicollinearity

Table 4.5: Test of Multicollinearity

	Collinearity Statistics	
	Tolerance	VIF
A	.491	2.038
B	.332	3.015
C	.244	4.097
D	.284	3.515
E	.289	3.465
F	.388	2.578
G	.357	2.801
a. Dependent Variable: H		

Source: Authors' own analysis, 2021

As per the survey data results, all the variables have a tolerance value of more than 0.1 and VIF value of less than 10. Therefore, it can be concluded that no independent variables highly correlated with each other and the overall model is free from the multicollinearity problem.

4.6. Pearson's Correlation

As per the results illustrated in Table 4.6 below, all the independent variables positively impact customer satisfaction. The significant value for each variable is .000, which are less than .05.

Table 4.6: Summary of Pearson's Correlation

Independent Variables	Dependent Variable	Correlation	
		Coefficient Value	Significance Level
Tangibility	Customer Satisfaction	.556**	.000
Reliability	Customer Satisfaction	.672**	.000
Responsiveness	Customer Satisfaction	.711**	.000
Assurance	Customer Satisfaction	.732**	.000
Empathy	Customer Satisfaction	.728**	.000
Network Quality	Customer Satisfaction	.685**	.000
Convenience	Customer Satisfaction	.653**	.000

Source: Authors' own analysis, 2021

4.7. Regression Analysis

The researcher has used regression analysis to predict the dependent variable by using the data of the independent variables. The outputs of the regression analysis are discussed below.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828[a]	.685	.671	.51302

a. Predictors: (Constant), Tangibility, Responsiveness, Reliability, Assurance, Empathy, network quality, Convenience

Source: Authors' own analysis, 2021

The model summary describes essential information on whether the regression model fits with the observed data and how well it will fit. R-squared enables researchers to measures the proportion of the variation in the dependent variable explained by independent variables for a linear regression model. Adjusted R-squared adjusts the statistic based on the number of independent variables in the model. As per the outputs illustrated in Table 4.7, R^2 value is .685, which implies that 68.5% of the variation in the dependent variable (i.e. customer satisfaction) can be explained by independent variables of the study (i.e. Tangibility, Reliability, Responsiveness, Assurance, Empathy, network quality and Convenience).

Table 4. 8: ANOVA

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	90.409	7	12.916	49.074	.009[b]
	Residuals	41.583	158	.263		
	Total	131.993	165			

a. Dependent Variable: Customer Satisfaction

b. Predictors: tangibility, Reliability, Responsiveness, Assurance, Empathy, network quality and Convenience

Source: Authors' own analysis, 2021

There should be a relationship between the dependent variable and independent variables to perform the regression analysis. If the significance value is lower than .05, the null hypothesis can be rejected, and the alternative hypothesis can be accepted. The null hypothesis is that there is no relationship between the dependent and independent variables, and the alternative hypothesis is that there is a relationship between the dependent variables and independent variables.

According to the output of ANOVA, the significant value is .009, which is less than .05. Therefore, it can be stated that the model is significant, and the alternative hypothesis can be accepted; there is a relationship between the dependent variable and the independent variable.

4.8. Coefficients

Table 4.8: Coefficients [a]

Model		Unstandardised Coefficients		Standardised coefficients	t	Sig.
		B	Std. Error	Beta		
1	Constant	-.298	.257		-1.163	.247
	Tangibility	-.046	.087	-.034	-5.31	.596
	Reliability	.163	.079	.159	2.056	.041
	Responsiveness	.130	.112	.106	1.167	.245
	Assurance	.341	.102	.281	3.357	.001
	Empathy	.148	.097	.127	1.527	.129
	Network Quality	.267	.073	.262	3.661	.000
	Convenience	.075	.084	.067	.897	.371

a. Dependent Variable: Customer Satisfaction

Source: Authors' own analysis, 2021

As per the above outputs, Tangibility has a negative beta value of -.034, Reliability has a positive beta value of .159, Responsiveness has a positive beta value of .106. Assurance, Empathy, Network quality and Convenience also have positive beta values of .281, .127, .262, .067, respectively. Other than the Tangibility, all other independent variables have a positive impact on customer satisfaction.

Moreover, when considering the p-values, Reliability has a p-value of .041, Assurance has a p-value of .001, and network quality has a p-value of .000. All these mentioned p-values are less than .05, and hence it can be stated that Reliability, Assurance and network quality are significant determinants of customer satisfaction in the mobile telecommunication industry.

4.9. Discussion of Findings

Reliability is discussed regarding the performance of a promised service in an accurate and timely manner. The results of this study found that reliability impacts positively and significantly on customer satisfaction. The results are similar to the results of the studies carried out by Alnsour et al. 2014, Negi, 2009. Assurance is discussed regarding the politeness and the knowledge of the service provider's employees, and this deals with the trust and confidence of the service provider. As per the results of this study, Assurance has a significant positive relationship with customer satisfaction. These results are the same as per the results of a study carried out by Ladhari R., 2010. As per the output demonstrated in Table 4.8, network quality has a positive and significant impact on customer satisfaction. The results are consistent with the results of the study carried out by Negi R 2009. Tangibility is discussed on the physical appearance of the mobile service provider. The results found that the Tangibility has an insignificant influence on customer satisfaction, and this is consistent with the results of a study carried out by Seiw-Phaik L, 2011.

5. Conclusion

The main objective of this study is to evaluate the impact of service quality on customer satisfaction in the Mobile Telecommunication industry of Sri Lanka. The researcher has identified three main research questions and this section discusses answers to these research problems.

5.1. What are the factors affecting service quality?

In this study, the researcher has identified seven factors that affect service quality by studying previous literature: Tangibility, Reliability, Responsiveness, Empathy, Assurance, network quality, and Convenience. Overall, by identifying the factors that affect service quality, the researcher has fulfilled the first research objective; to examine the factors affecting the service quality of the mobile telecommunication industry of Sri Lanka.

5.2. How do these factors relate to customer satisfaction?

The researcher has carried out Pearson's correlation analysis and multiple regression to determine the relationship between service quality dimensions and customer satisfaction. In this study, the researcher has developed seven hypotheses which were included in the methodology section. Those hypotheses were tested by analysing the results of Pearson's correlation and multiple regression. As per the results of Pearson's Correlation, all the independent

variables have a positive and significant impact on customer satisfaction. A summary of the results of multiple regression was interpreted in below Table 5.1.

Table 5. 1: Summary of Multiple Regression

Model	Standardised coefficients (Beta)	T	Sig.
Constant		-1.163	.247
Tangibility	-.034	-5.31	.596
Reliability	.159	2.056	.041
Responsiveness	.106	1.167	.245
Assurance	.281	3.357	.001
Empathy	.127	1.527	.129
Network Quality	.262	3.661	.000
Convenience	.067	.897	.371

Source: Authors' own analysis, 2021.

As per the results of the above regression output, Tangibility has a negative impact on customer satisfaction, while Reliability, Responsiveness, Assurance, Empathy, network quality and Convenience have a positive impact on customer satisfaction. By analysing Pearson's correlation and multiple regression results, the researcher has fulfilled the second research objective of this study, which is to examine how the service quality dimensions are related to customer satisfaction.

5.3. What is the significance of each variable of service quality on customer satisfaction?

To determine the significant level, the researcher has taken the outputs of multiple regression. As per the results of the above regression summary Table 5.1, Network quality positively impacts customer satisfaction with a significant level of .000 (which is less than .05). Also, the t-vaue of network quality is recorded as 3.661, and it is the highest t-value of all the variables—higher the t-value, the significance, and the significant impact of network quality on customer satisfaction. The next highest t-value is for the assurance dimension is 3.357. The significant level of Assurance is .001, which is less than .50. The reliability dimension has the third-highest t-value, which is 2.056. The significant value is .041, and it is less than .05. Regression output demonstrates that Tangibility has a negative impact on customer satisfaction. Although Responsiveness, Empathy and Convenience have a positive impact on customer satisfaction, the significant values are more than .05.

Through the analysis of multiple regression, the researcher has accomplished the third research objective of this study: to inspect the significance of each variable of service quality on customer satisfaction. The following table summarises the output of this study.

Table 5.2: Hypothesis Testing

	Hypothesis	Result
H1	There is a positive impact of **Tangibility** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Rejected
H2	There is a positive impact of **Reliability** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Accepted
H3	There is a positive impact of **Responsiveness** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Rejected
H4	There is a positive impact of **Assurance** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Accepted
H5	There is a positive impact of **Empathy** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Rejected
H6	There is a positive impact of **Network Quality** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Accepted
H7	There is a positive impact of **Convenience** on customer satisfaction of the mobile telecommunication industry of Sri Lanka	Rejected

Source: Authors' own analysis, 2021

5.4. Recommendations

The study suggests the management of mobile service providers to pay more attention to the network quality dimension since this is the most critical factor of service quality and a strong predictor of customer satisfaction. They should be concerned about both the voice calls and data services provided by them. Secondly, the management of mobile service providers should be concerned about the assurance dimension. As per the results of this study, Assurance is the second highest dimension that can be used to predict customer satisfaction. In Assurance, they should focus on building trust with their customers. The management can use training sessions to their staff regarding the technical questions raised by customers and thereby they can enhance the service quality dimension, Assurance.

The third highest service quality dimension that affects customer satisfaction is Reliability. It can be recommended to the management of mobile service providers to check whether they solve their customers' problems accurately at the first time and should also check whether they keep their records accurately.

5.5. Suggestions for future researchers

This study was carried out to measure the impact of service quality on customer satisfaction only for the mobile telecommunication industry. Future researchers can be carried out their studies to measure the impact of service quality on customer satisfaction in other industries of the country. The sample size used in this research is 166

samples, which is too small compared to the population and obtained through stratified random proportionate sampling, which can restrict the generalizability of the findings. Future researchers are recommended to use a more significant number of samples to gather data in their studies. Furthermore, this study has taken data of the population at one point, which is known as cross-sectional data. Future researchers are motivated to observe the participants of the study repeatedly over a period of time and recommend carrying out a longitudinal study to obtain more accurate results. This study was used to examine the impact of service quality on customer satisfaction of Sri Lankan mobile telecommunication customers. Since the results can deviate from country to country, future researchers are encouraged to carry out this research in the context of different countries.

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The Nexus Between Economic Growth, Foreign Direct Investment and Environmental Pollution in Sri Lanka

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Abstract

Introduction - Globalization, liberalization and the exchange of capital flows are the most significant features in modern economics that have played a vital role in almost every economy. Meanwhile, in the recent past, the world heavily moves onto several manufacturing industries with highly pollution intensive. Therefore, the study focuses on the bidirectional and multidirectional nexus between these three variables over a long-time horizon.

Design/methodology/approach The sample is based on Sri Lanka covering the period from year 1978 to 2019. Data was collected through secondary data sources such as United Nations Conference on Trade and Development and the world development indicators. The data was tested using time series ARDL regression model.

Findings – Foreign Direct Investments and Gross Domestic Production has a significant impact towards each other's, while, Gross Domestic Production and Carbon Dioxide (proxy for the environmental pollution) and Foreign Direct Investment does not have a significant impact. Form the Bound test it was proven that Gross Domestic Production and Carbon Dioxide does not have a long-term relationship indicating no cointegration.

Conclusion – It is revealed that in the case of Sri Lanka, the significant economic opportunities to support economic development in the host economy are not brought by FDI inflows. It is not feasible to accept FDI inflows as the catalyst for economic growth, however the study offers evidence for a long-term correlation between GDP and FDI inflows. The instability of Foreign Direct Investments inflows and the home country's market cycle has reduced the effect of Foreign Direct Investments inflows on economic development of the country.

Keywords–Economic Growth, Environment Pollution, Foreign Direct Investment

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1. Introduction

In the recent decades, the world's economies have been changing drastically. Globalization, liberalization and the exchange of capital flows are the most significant features in modern economics that have played a vital role in almost every economy. In the near history, the world heavily went into manufacturing industries those were high pollution intensive. Then after identifying the effect of pollution on the environment, the whole world tends to concern about the environment simultaneously achieving economic performance goals. Therefore, the whole world understood the significance of the development with sustainability.

Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, this study is addressing the level of sustainable development achieved by Sri Lanka which is encouraged by Foreign Direct Investment (FDI) inflows. This study is focused on the relationship among FDI inflows, economic growth and the environmental effects in Sri Lanka as a developing country.

The capital inflows from foreign countries to the host economy in order to construct new facilities and for land business are taken into FDI and It is very different from the investments in stock markets. Stock market investments could be withdrawn easily when there are uncertainties in the host economy, but FDI has the characteristic of long lasting since investors cannot easily abandon buildings, lands and facilities. Therefore, FDI inflows are considered

very crucial for economic development. Throughout the period of late 80s and 90s, FDI inflows rapidly came to almost all the territories in the whole world. According to United Nations Conference on Trade and Development UNCTAD, (2013), the portion of the FDI inflows to developing economies had increased to 52% in 2013 from 17% in 1990s as a proportion of world's total FDI. UNCTAD, (2019) shows that Asia has absorbed 39% of global FDI inflows in 2018. The data show that more FDI inflows have been coming for recent two decades. Liberalization that has taken place in those countries was one of the major reasons for that FDI inflows increase and thereby countries themselves lead to a high growth. According to De-Mello, (1997), one of the most important factors that determines FDI inflows is privatization and liberalization in developing economies.

The relationship of these costs and benefits of FDI inflows have been separately identified in the past empirical studies. Chakraborty and Basu, (2002), Ericsson and Irandoust, (2001) and some others have studied the relationship between the economic growth and FDI inflows. The connection between pollution and FDI inflows has been studied by Merican, Zulkornain, Zaleha and Law, (2007). The relationship between the economic growth and pollution has been studied by Coondoo and Dinda, (2002). However, only in very recent studies, these three variables have been linked together (Lee, 2009; Neelakanta, Gundimeda, & Kathuria, 2014)

Previous studies had a huge limitation of only having short and limited time series data. That led to the inability to study the simultaneous impact of these three variables. Pesaran, Shin and Smith, (2001) has developed the bounds test by which the limitations of the work of existing literature can be overcome. It allows to have an integration of

the long run relationships and short run relationships of the given three variables in an empirical foundation. The relationship among economic growth, FDI inflows and environment in Sri Lanka can be studied by applying bounds test by employing data for the given period from 1978 to 2016 in this background.

Measuring the environmental effect is very crucial since there is no exact variable to measure pollution or the effect on the environment. In empirical testing, the researchers have taken air pollution and water pollution as the proxy for the environmental effect since dirty industries' operations cause them both to occur. Combining both these does not mean much more conceptual. However, air pollution is inevitable from economic activities, especially in productions when it is compared to water pollution since one can employ better water management systems. Therefore, arriving at air pollution is a better option for selecting the variable to determine the degradation of environment referring to FDI inflows. There are two categories of air pollution such as local and global air pollutants. Sulfur dioxide (SO_2), carbon monoxide (CO) and nitrogen oxide (NOx) can be recognized as the main local air pollutants. However, carbon dioxide (CO_2) is the worldwide recognized main global air pollutant. Therefore, selecting CO_2 emissions as the proxy of environment is very appropriate in this background because research implications can be drawn far extending to the international environment as CO_2 is in the global recognition. Many developing economies had a sharp growth after formulating macroeconomic policies. The awareness was pointed out to the influences of differences among environmental laws, regulations and executions. In that sense, selection of Sri Lanka is very important and appropriate since Sri Lanka has been ranked as the 88th

highest contributor to the total global carbon dioxide emissions in 2014 (Boden, Andres, & Marland, 2017). It has been a moderate measurable with regard to the population.

However, due to the complexity of the behavior of economic growth, FDI inflows and environment, no such specific relationships can be easily generalized for every country. On the other hand, there are no current researches comprising all these three variables in the Sri Lankan context, therefore, the current study contributes to the literature by examine the nexus between the economic growth, FDI inflows and environment in Sri Lanka.

2. Literature Review

2.1 Theoretical background

The conceptual relationships between economic growth and FDI inflows can be discovered back in early neoclassical growth models. Neoclassical growth models state that FDI inflows bring the capital to the host economy and the increment in the capital stock causes the stimulation of economic growth. Considering the New growth theory, the theory emphasizes that technological improvements accompanied by FDI inflows intensify economic growth in both long term and short term. In fact, FDI inflows bring new technologies and knowledge to host economies. The basic theoretical concept is that FDI inflows stimulate the economic growth. In other words, FDI inflows positively affect economic growth owing to the technology transfer and "knowledge spillovers". In the literature, there are many studies that also ensure this basic concept.

2.2 Empirical evidence

Sufficient amount of literature has been published regarding the given topic throughout the recent decades. Many empiricists have strived to find out the level and aspects of sustainable development throughout the existing literature. Makki and Somwaru, (2004) have studied a sample containing 66 developing economies and came up with evidence that FDI inflows has a significant positive effect on economic growth. In examining for causality for 31 developing economies, Hansen and Rand, (2006) have found that FDI inflows positively affect GDP in the long term in the panel data setting. Hsiao and Hsiao, (2006) have studied some east and southeast countries. In the study the empiricists could find that there is a unidirectional relationship of FDI's impact on GDP.

A study conducted by Faruku, Asare, Yakubu, & Shehu, (2011) has revealed that FDI positively affects GDP in Nigeria and further emphasized that the government needs to formulate strategies to improve FDI incoming. Blomstrom, Lipsey and Zejan, (1994) have recognized that FDI inflows affect significantly positively on economic growth only for the developing economies having higher income but no effects on those having lower income. Borensztein et al. (1998) have studied 69 developing economies. Their results have suggested that FDI inflows have a more significant positive effect on economic growth only if the host economy has an adequate capacity to absorb the advanced technology brought by FDI inflows since FDI is an instrument for transferring the advanced technology.

However, in the literature, there are some studies that have questioned the basic theoretical concept of FDI promoting the economic growth. Carkovic and Levine, (2002) have stated that in developing economies, there is no applicable significant positive effect of FDI on economic growth. Belloumi, (2014) has proposed that in the short term, there seems not to have a causality between economic growth and FDI in Tunisia. Alfaro, (2003) has found that FDI negatively affects the growth in the primary sector, even though positively affects in the manufacturing sector. By analyzing a sample of 28 developing economies, Herzer, Klasen and Lehmann, (2008) have suggested that there could be a negative association between GDP and FDI assuming that a considerable amount of domestic investment is not crowded out by FDI.

On the other hand, the relationship between FDI and economic growth does not have to be unidirectional always. Economic growth may also stimulate FDI inflows due to new market opportunities created by the growth.

In the existing empirical studies, some empiricists have strived to recognize the relationship between environment and economic growth. In examining Granger causality relationship, Liu, (2006) found that there is a long-term association to CO_2 emission running from GDP in Norway. Menyah and Rufael, (2010) have recognized that there is a unidirectional causality to economic growth from pollutant emissions in South Africa. Kim, Lee and Nam, (2010) have provided evidence that there is a mutual, two-way causality between economic growth and CO_2 emission in Korea in testing the nonlinear Granger causality. Saboori, Sulaiman and Mohd, (2012) have found that there is no causality between economic growth and CO_2 emissions in the short term but found a long-term unidirectional

causality relationship to CO2 emissions from economic growth in Malaysia. In the existing literature, a limited number of empiricists have investigated the relationship between FDI inflows and the environment. Merican et al. (2007) studied the relationship between FDI and pollution in the Philippines, Singapore, Indonesia, Thailand and Malaysia by using Autoregressive Distributed Lag (ARDL) approach. In the study, the empiricists have found that FDI inflows have become a cause to increase pollution in the Philippines, Thailand and Malaysia. However, that relationship could not be found in Indonesia since the study has depicted a negative relationship between pollution and FDI inflows. There are very few empirical studies which account for all these variables together.

Taking economic growth, FDI inflows and environmental quality together for the analysis is very important to identify the whole concept working behind the developing economies. That is also very significant to understand the level and trends of sustainable development, especially in developing economies since FDI inflows play a major role in the developing economies. Lee (2009) has investigated the relationship among the given variables in Malaysia by using the bounds test developed by Pesaran, Shin and Smith, (2001) to identify the long term relationships and using the Granger causality test to identify the causal relationships in the long term and short term. The empiricist has found unidirectional Granger causalities moving from FDI inflows to CO2 emissions, from FDI inflows to GDP and from CO2 emissions to GDP in the short term. A unidirectional Granger causality moving from GDP to FDI in the long term has also been found in the study. Neelakanta, Gundimeda and Kathuria (2014) have examined the relationship between economic growth, FDI inflows and pollution for India using ARDL

approach. The results have illustrated that there is a bidirectional Granger causality relationship between FDI inflows and CO2 emissions, a bidirectional Granger causality relationship between FDI inflows and GDP, and a unidirectional Granger causality relationship moving from GDP to CO2 emissions in the short term. On the other hand, the study has depicted unidirectional Granger causalities moving from GDP to CO2 emissions, from FDI inflows to CO2 emissions, and GDP to FDI inflows in the long term. Acharyya, (2009) has found that FDI inflows positively and marginally affect economic growth in the long term in India. The study has also depicted that FDI inflows positively and heavily affect CO2 emissions due to the growth led by FDI inflows in the long run.

Literature regarding the Sri Lankan context, there are very few limited numbers of studies carried out for examining the association between FDI inflows and economic growth. Balamurali and Bogahawatte, (2004) have studied the association between economic growth and FDI in Sri Lanka by using sample of data for the time period from 1977 to 2003. The empirical results have shown that FDI inflows have become a main factor in determining economic growth in Sri Lanka after the year 1977. Furthermore, the empiricists have shown that FDI inflows apply itself an independence impact on economic growth and suggested an equilibrium association between GDP and FDI inflows in the long term. The study has provided evidence for a bidirectional Granger causality relationship between the given two variables. However, in general the empiricists have suggested that FDI inflows have a supportive impact on economic growth in Sri Lanka and promoting FDI inflows may potentially be in effect of stimulating economic growth. Thilakaweera, (2012) has studied the relationship among economic growth, FDI inflows and level of

infrastructure in Sri Lanka for the time period from 1980 to 2011. The empirical results have indicated an association among real per capita GDP, FDI inflows and infrastructure level in the long term. The study has not shown a positive association between GDP and FDI in the long term for the given time period because of the insignificant estimated coefficient while having a negative sign itself. However, the empiricist has suggested that enhancement of income level in Sri Lanka might positively impact on attracting FDI inflows for infrastructure development and thereby in fact a unidirectional causality relationship runs to FDI from the level of infrastructure. Samantha and Haiyun, (2017) have studied the effect led by FDI inflows on economic growth in Sri Lanka for the time period from1978 to 2015 by adopting ARDL approach. The empirical results have indicated that FDI inflows positively, but weakly impact on economic growth in the long run. However, the empiricists have suggested that it alone is not a very important determinant for stimulating the economic growth in Sri Lanka. Furthermore, the empirical results have provided evidence for a unidirectional causation running from economic growth to FDI inflows. Konara and Wei (2017) have found that there are direct positive impacts of FDI even if negative "spillover effects" on local firms in Sri Lanka. Sriyalatha, (2019) has identified that there is a unidirectional causality running to CO_2 emissions from economic growth in Sri Lanka.

The empirical results of the existing literature show complex and mixed relationships among economic growth, FDI and environment across various geographical areas and countries. On the other hand, empirical results in the case of the Sri Lankan context don't show the whole concept taking all the variables together into the study. Therefore,

it is obviously required to empirically observe these relationships, especially in the Sri Lankan context in order to render insights for Sri Lankan policy makers on how to better manage sustainable economic development led by FDI as a developing economy.

3. Methodology

3.1 Data, Population, and the Sample

The data sample consists of the data for the time period from 1978 to 2019. FDI data were collected from UNCTAD. CO2 emission data was collected from EDGAR and GDP data was collected from the world development indicators. All the data was publicly available on the given websites of the related international agencies. Annual data for the given three variables was used in the study. In order to examine their empirical relationships, the study uses a data set of 43 years beginning from 1978 to 2019 which is the time period of the study.

3.2 Empirical Model

In accordance with the existing literature, the ARDL cointegration approach was used to observe the association among the economic growth, FDI inflows and environment in Sri Lanka. Generally, in most cases, macroeconomic variables are stationary either at level or first difference [I(0) or I(1)].Augmented Dickey Fuller Unit Root Test was employed to test the stationarity of the given three variables. Wald statistic or the joint F-statistic provides the basis

for testing the cointegration among the given variables and the bounds test is used in the ARDL approach to check the null hypothesis of no cointegration in the below mentioned equations.

$$\Delta GDP = \beta_0 + \beta_1 GDP + \beta_2 FDI + \beta_3 \Delta FDI + \varepsilon ....\text{Equation 1}$$

$$\Delta GDP = \beta_0 + \beta_1 GDP + \beta_2 CO2 + \beta_3 \Delta CO2 + \varepsilon ....\text{Equation 2}$$

$$\Delta FDI = \beta_0 + \beta_1 FDI + \beta_2 GDP + \beta_3 \Delta GDP + \varepsilon ....\text{Equation 3}$$

$$\Delta FDI = \beta_0 + \beta_1 FDI + \beta_2 CO2 + \beta_3 \Delta CO2 + \varepsilon ....\text{Equation 4}$$

$$\Delta CO2 = \beta_0 + \beta_1 CO2 + \beta_2 GDP + \beta_3 \Delta GDP + \varepsilon ....\text{Equation 5}$$

$$\Delta CO2 = \beta_0 + \beta_1 CO2 + \beta_2 FDI + \beta_3 \Delta FDI + \varepsilon ....\text{Equation 6}$$

$$\Delta GDP = \beta_0 + \beta_1 GDP + \beta_2 CO2 + \beta_3 \Delta FDI + B4 CO2 * FDI + +\varepsilon .... \text{Equation 7}$$

Where,

$\beta0$= Constant variable $\beta1$...n= Coefficient of constant term, FDI = Foreign Direct Investment, GDP = Gross Domestic Production, CO2= Environmental Pollution, ε= Error Term.

3.3 Hypotheses of the study

The following hypotheses were developed for this study in order to examine the relationship among dependent and independent variables.

H1: There is a significant impact from FDI on economic growth

H2: There is a significant impact from environmental pollution on economic growth

H3: There is a significant impact from Economic Growth on FDI

H4: There is a significant impact from Environmental Pollution on FDI

H5: There is a significant impact from Economic Growth on Environmental Pollution

H6: There is a significant impact from FDI on Economic Environmental Pollution

H7: There is a significant impact from Environmental Pollution and FDI towards Economic Growth.

4. Data analysis and discussion

4.1 Descriptive Analysis

As per the above table 1 outcome of GDP, among 41 observations the average value and the middle value of the series is 92.34 and 56.00 respectively. The highest and the lowest values are 466 and -175 respectively. Also, the standard deviation of this series is 126.28 and can see that the data series is not much deviated from the mean.

There is a positive skewness of 1.26 and GDP has a Leptokurtic distribution with a value of 4.73 and it's higher than 3.

According to table 4.1 outcome of FDI, among 41 observations the average value and the middle value of the series would be 0.88 and 1.00 respectively. The highest and the lowest values are 23 and -40 respectively. Also, the standard deviation of this series is 10.12 and can see that the data series is deviated from the mean. There is a positive skewness of 8.59 and FDI has a Leptokurtic distribution with a value of 8.59 and it's higher than 3. Environmental pollution (CO_2) variable is consist of 41 observations, the average value and the middle value of the series would be 0.013and 0.010 respectively. The highest and the lowest values are 0.14 and -0.10 respectively. Also, the standard deviation of this series is 0.05 and can see that the data series is not much deviated from the mean. There is a negative skewness of -0.084 and CO_2 has a Leptokurtic distribution with a value of 3.79 and it's higher than 3.

Table 1: Descriptive statistics

	GDP	FDI	CO2
Mean	92.34	0.88	0.013
Median	56	1	0.01
Maximum	466	23	0.14
Minimum	-175	-40	-0.1
Std. Dev.	126.28	10.12	0.05
Skewness	1.26	-1.31	-0.084
Kurtosis	4.73	8.59	3.756

Source: Authors' analysis, 2021

4.2 Unit Root Test

Stationarity were tested using Augmented Dickey-Fuller test (ADF) test.

- • H0: Variable is stationery (Not Unit root)
- • H1: Variable is not stationery (unit root)

As per the results of the table 2, the P-value of GDP was 0.00002 that means it's less than 0.05 and the null hypothesis is accepted and alternative hypothesis would be rejected. similarly, in FDI and CO2 P-values were 0.00010 and 0.0000 respectively, which means its stationery under the significance level of 95% and P-value is less than 0.05. Therefore, can accept the null hypothesis and accept the alternative hypothesis.

Table 2: Unit Root Summary Results

Variable	P-Value	Stationery Level	Null Hypothesis
GDP	0.00002	1st Level	Accepted
FDI	0.0001	1st Level	Accepted
CO2	0.0000	1st Level	Accepted

Source: Authors' analysis, 2021

4.3 Optimum ARDL Model Estimation

When selecting the optimum number of lag in ARDL model should select the determined by using lowest Schwarz Information Criterion (SIC) and Akaike info criterion (AIC). The following table would indicate the summary of optimum lags of all models of this study

Table 3: Optimum Lag Summary

Model	Equation	No of Lags	AIC	SIC
1	GDP = C+FDI	4,0	11.661	11.922
2	GDP = C+CO2	4,4	12.227	12.662
3	FDI = C+GDP	4,2	6.723	7.067
4	FDI = C+CO2	4,3	7.339	7.726
5	CO2 = C+GDP	1,0	-3.107	-2.98
6	CO2 = C+FDI	1,2	-3.231	-3.018
7	GDP = C+CO2+FDI	4,0,0	11.715	12.02

Source: Authors' analysis, 2021

4.4 Regression Analysis

As per the table 4 there is a positive relationship between Gross Domestic Production (GDP) and foreign Direct Investment (FDI) and which is significant at 1% level. The model 2 shows a positive relationship between Gross Domestic Production (GDP) and Environment Pollution (CO_2) but the variable is insignificant. As per the Model 3 there is a positive relationship between Foreign Direct Investments (FDI) and Gross Domestic Production (GDP) and it is significant at 5% level. The model 4 shows a negative relationship between Foreign Direct Investments (FDI) and Environment pollution (CO_2) but the impact is not significant. The model 5 shows a negative relationship between Environment pollution (CO_2) and Gross Domestic Production (GDP) indicating an insignificant impact. The model 6 shows a negative relationship between Environment pollution (CO_2) and Foreign Direct Investments (FDI) but FDI have an insignificant impact towards CO_2.

The model 7 shows a negative relationship between Environment pollution (CO_2) and Gross Domestic Production (GDP), while there is a positive relationship between Foreign Direct Investments (FDI) and GDP. Therefore, CO_2 have an insignificant impact towards CO_2 and FDI has a significant impact towards GDP.

Table 4: Regression analysis summary

Models	Coefficient	Prob.	R-squared	Durbin-Watson stat
Model 1: FDI on GDP (M1)	6.6279	0	0.7075	2.3143
Model 2: CO2 on GDP (M2)	498.3263	0.199	0.5849	2.1888
Model 3: GDP on FDI (M3)	0.059174	0	0.9126	2.4704
Model 4: CO2 on FDI (M4)	-30.52406	0.248	0.8465	1.9888
Model 5: GDP on CO2 (M5)	-1.93	0.7601	0.0926	1.9762
Model 6: FDI on CO2 (M6)	-0.00107	0.1927	0.2937	1.9494
Model 7: CO2 and FDI on GDP (M7)				
DCO2	-9.19243	236.8628	-0.0388	0.9693
DFDI	6.6268	1.3664	4.84962	0.0000

Source: Authors' analysis, 2021

Those previous empirical reviews on various countries have improve the understanding about the nexus between economic growth, foreign direct investments and environment pollution. In order to promote rapid economic growth, nations are increasingly becoming more interconnected and are opening up to free markets as a result of

globalization. Economic and technical forces drive foreign production expansion, which is encouraged by trade policy liberalization and expanded flows of FDI. Therefore, many countries are adopting liberal economic policies to promote more capital inflows from developed countries, particularly the least developed countries (Bengoa & Sanchez-Robles 2003).

Today, in the context of technology transition and business networks that can result in productive development and revenue internationally, the value of FDI has increased. In developed countries, FDI inflows have also risen remarkably over the past few decades. Global buyers benefit from the effective utilization of their money and services by FDI, while recipients are supposed to benefit from technological security and become active in foreign trading networks (Louzi & Abadi, 2011). Therefore, the question inevitably emerges as to whether these inflows of FDI have any influence on local growth, and vice versa. Therefore, this problem requires an empirical investigation (Figlio and Blonigen 2000). Since one of the indicators of the extent of growth is the gross domestic product (GDP), this analysis aims to examine the relationship between FDI and GDP in Bangladesh.

Brems (1970) added that FDI has historically been treated as an addition to the capital stock of the host country, according to the Solow-type conventional neoclassical growth model, hence increasing growth (Kotrajaras 2010). In the neoclassical development model, however, Solow (1956) regarded technical progress and labor as exogenous, and so FDI only raises the level of income, so it does not have a long run growth effect if it does not increase productivity because long-term growth can only be improved by technological and population growth, and

that means if FDI has a positive influence on technology, then it can (Miankhel, Thangavelu & Kalirajan 2009). Hoang, Wiboonchutikula and Tubtimtong (2010) have explained that under its commitment to capital accumulation, FDI can only influence the amount of revenue without affecting the long-term growth rate since, from a neoclassical viewpoint, under the presumption of declining returns to capital.

In the long run, GDP positively impacts FDI inflows. That means that GDP describes FDI inflows primarily in the long run. Economic growth offers optimistic signs on developing and sizeable opportunities for global companies. It is very likely for multinational firms to recover the fixed cost by benefiting from "economies of scale" as the host economy grows larger. The presence of adequate infrastructure, such as transport, electricity supply and telecommunications, promotes FDI inflows to increase the competitiveness of investments and reduce transaction costs. FDI inflows, on the other hand, are stimulated by public expenditure on human resources and technology. Provided that the volume of infrastructure and education spending is considered part of GDP, GDP growth tends to provide the resources needed for infrastructure funding and the production of human capital. Education achievements are also constructively influenced by better living conditions and rapid economic development. Therefore, in the local sector, the skills needed are more available to international companies. Human resources and infrastructural growth occur only with the economic development of the nation and impact FDI inflows favorably.

This analysis indicates no link between either FDI inflows and CO2 emissions, or GDP and CO2 emissions. CO2 emissions, on the other hand, are often explained by a country's energy usage, such as fuel consumption. Evidence for a high association between energy use and economic growth is given in the current literature (Ferguson, Wilkinson & Hill, 2000). In this research, however the evidence does not support that form of relationship. On the other hand, the report does not have proof that Sri Lanka is getting FDI inflows linked to dirty industries.

It is clear that the common belief that FDI is an economic growth engine could be wrong. Therefore, macroeconomic strategies should be developed by Sri Lankan policymakers in order to invest in emerging technology, schooling for the citizens of the country and its infrastructure. It is less constructive to encourage economic growth following "incentive schemes" offered under the categorization of (UNCTAD, 1996) such as "financial incentives", "fiscal incentives" and other incentives" to create a conducive atmosphere in order to catch more and more FDI inflows as there is a long-term partnership between FDI and GDP in Sri Lanka. To promote economic development, energy consumption should be carried out in a more thoughtful way. Environmental management is very important because of sustainable progress. The Sri Lankan authorities should take the requisite measures to resolve environmental problems and safeguard the environment, as environmental conservation does not in the long run, conflict with economic growth.

4.5 Bound Test

The study adopt the ARDL bound testing process, which is very successful even for various stages of integration and limited sample sizes of 30 to 80 observations, unlike other conventional co integration strategies. On the other hand, conventional approaches to co-integration are susceptible to small sample sizes. The ARDL bound research approach also takes endogenous repressors into account and also offers accurate estimates of the long-term and true significance of t-statistics (Harris & Sollis, 2003).

Table 4.6: Bound Test Results Summary

Variables	F-Stat	Lower Bound	Upper Bound	Decision
GDP and FDI	9.45	3.62	4.16	Cointegration
GDP and CO2	0.62	3.62	4.16	No cointegration
FDI and CO2	9.99	3.62	4.16	Cointegration

Source: Authors' analysis, 2021

If the Bound test F stat is higher than lower and upper bound, that there is cointegration and if the F-stat is less than lower bound which would lead to no cointegration. The following hypothesis of bound test can evaluate,

H0: There is no co-integration among Real GDP & FDI

GDP and FDI variable F-stat is 9.45 while upper bound is 4.16 under the significance level of 95%. Which means it's higher than the upper bound and will lead to a Cointegration. Therefore, can reject the null hypothesis and accept the alternative hypothesis.

H0: There is no co-integration among Real GDP & environmental pollution(C02)

GDP and CO2 variable F-stat is 0.62 while lower bound is 4.16 under the significance level of 95%. Which means it's lower than the lower bound and will lead to a no-cointegration. Therefore, can accept the null hypothesis and reject the alternative hypothesis.

H0: There is no co-integration among FDI & environmental pollution(C02)

FDIand CO2 variable F-stat is 9.99 while upper bound is 4.16nder the significance level of 95%. Which means it's higher than the upper bound and will lead to a Cointegration. Therefore, can reject the null hypothesis and accept the alternative hypothesis. Therefore, only GDP-FDI model and FDI – CO2 model has long term relationship, while GDP-CO2 model does not have a long-term relationship as per the results of Bound test.

5. Conclusion and Recommendation

The study only offers evidence for a long-term correlation between GDP and FDI inflows. The data does not support the beneficial impact of FDI inflows on economic growth in the long term. The findings of the analysis affirm the results (Vijayanathan, Chellakumar & Arul, 2014) and partly confirm with the results of Rajapakse (2016). Therefore, it revealed that in the case of Sri Lanka, the significant economic opportunities to support economic development in the host economy are not brought by FDI inflows. It is clear that, it is not feasible to accept FDI inflows as the catalyst for economic growth. Pursuant of (Lee, 2009). In the long run, FDI should not be assumed to function with the needs of the host economies. The political causes, the inconsistency and instability of FDI inflows and the home country. The above causes can contribute to the termination of operations of international firms, such that interruptions in the policies and preparations for economic development can take place.

Due to many reasons, such as war and insurgency, political instability, lack of law and order regulation, regulatory barriers, inadequate infrastructure, less trained labor force, high borrowing rates and less transparent trade policy, the perspective of both the local and foreign market sectors towards Sri Lanka's investment environment seems to be weak. The background of investment in Sri Lanka needs to be improved by the construction of infrastructure such as ports, highways, railways and telecommunications, the deregulation of economic activities and the preservation of a consistent commercial agenda, a stable labor market, an effective regulatory system and a tariff

structure (Rajapakse, 2016). A stronger collection of policies should be developed by policy makers if they plan to accomplish economic growth by consuming further FDI inflows.

Future studies could be conducted basing on all developed countries as a whole (Panel ARDL approach). Therefore, those empirical results can be more generalized to the entire set of developing countries. Empiricists, on the other hand, can observe short-term interactions as well.

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Effect of Credit Risk Management on Financial Performance: Evidence from Commercial Banks in Sri Lanka

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Abstract

Introduction – Credit risk is the primary focus of any risk management approach in commercial banks, which is defined as the risk of loss due to debtors' non-payment of a loan or a line of credit which may include either the principal and interest, or both. With the banking systems' increased involvement in all facets of the economy, the impact of credit risk on a bank's profitability has been the foremost focus of many researchers. Therefore, in this study the objective is to identify the impact of credit risk management on financial performance of commercial banks in Sri Lanka.

Design/methodology/approach – The investigation was performed using panel data regression for a sample of 12 out of 26 licensed commercial Banks of Sri Lanka during 2011-2019. Descriptive statistics, correlation matrix and panel regression analysis were used to analyze the collected secondary data.

Findings – The results suggested that non-performing loan, Capital Adequacy have significant negative impact on Return on Equity while the Cost Per Loan Asset has positive impact on Return on Equity.

Conclusion – This study has laid some groundwork to explore the impact of credit risk management on financial performance of Sri Lankan commercial Banks. Accordingly, based on above findings, it is recommended the Sri Lankan commercial banks to develop credit risk management policies and strategies to increase the financial performance.

Keywords: *Capital adequacy, Cost Per Loan asset, Commercial bank, Credit risk management, financial performance*

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1. Introduction

1.1. Background of the study

Risk is the "combination of the probability of an event and its consequences which can range from positive to negative" (Institute of Risk Management, 2002). A bank is a commercial or state institution that provides financial services, including issuing money in various forms, receiving deposits of money, lending money and processing transactions and the creating of credit (Campbell, 2007). Banks are risk machines which takes risk, transfer, and embedded risk. A bank has several types of risks called Credit risk, Market risk, Liquidity risk, Operational risk, Reputation risk, Country risk, Strategic risk, Legal and documentation risk. Risk Management has interpreted all the process involved in identifying, assessing, and judging risks, assigning ownership, taking actions to mitigate or anticipate them, and monitoring and reviewing to avoid or reduce risks (Eduljee, 2000).

Risk management is the human activity which integrates recognition of risk, risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources (BOCEAN, 2008). Risk management become important for global banks as Risk Management assume, manage, transfer and advice on risk and furthermore, Risk Management is useful to banks because of high leverage on banks, asset liability mismatch, systematic influence, backbone of payment and settlement system, volatile value of collateral (Bhattarai, 2017).

Credit particularly remains the primary source of revenue for any bank around the world. However, the probability of default borrowers' loan commitments has been an increasing concern for those banks particularly for unsecured bank loans which is categorized as the credit risk (Bhattarai, 2017). Banks grant loans to the customer with an expectation of receiving the capital together with an interest. A loan facility is considered as performing, if the payment of both capital and interest are paid accordingly with agreed repayment terms. The risk poses a significant exposure not only to the banks (lenders) but also to the entire economy.

The adoption of credit risk management is becoming a significant factor for every commercial bank and around the world as the credit risk is the potential loss that arises from customers and counterparties failing to meet their contractual obligations. According to Chijoriga (1997), credit risk is the most expensive risk in financial institutions and its effect is more significant as compared to other risk as it directly threatens the solvency of financial institutions.

With the increased involvement of banking systems in all parts of a modern economy, the impact of credit risk on a bank's profitability has been the main focus of many researchers. In financial institutions this is one of the group key risk exposures, stemming from loans and advances portfolio, financial guarantees, letter of credit and acceptance issued and made on behalf of the customers (Annual report of people's bank- 2019). Banks need to manage the credit risk inherent to the entire portfolio as well as the risk in individual credits as transactions (Sinkey , 1992).

As per the study conducted by Kolapo, Ayeni, and Oke (2012), credit risk management has a significant impact on the profitability of banks. Hence, the credit risk as a significant factor that affect the financial performance, the attention of many researchers around the globe has been drawn to credit risk management phenomena in the banking sector (Sinkey , 1992). Nevertheless, the attention paid on this in context of Sri Lanka is minimal with the dearth of researches in this area. Therefore, there exists a vacuum in identifying the significance of credit risk management on financial performance. Hence, the researcher focuses on bridging the empirical gap through the findings of this study. Accordingly, the broad research question of this study can be set forth as,

"*Does credit risk management affect the financial performance of Sri Lankan commercial banks?*"

1.2. Research objectives

Based on broad research question, following research objectives of study are as follows,
1. To identify the relationship between credit risk and financial performance of commercial banks in Sri Lanka.
2. To identify the impact of credit risk on financial performance of commercial banks in Sri Lanka.
3. To identify the most influential factor of credit risk on financial performance of commercial banks in Sri Lanka.

The remainder of the paper is structured as follows. Section 2 reviews previous literature Credit risk, credit risk management and its impact on financial performance. Section 3 discusses the research methodology. Section 4 discusses on findings and Section 5 brings the conclusion and recommendations.

2. Literature Review

This section brings the findings of previous researches and theoretical background of the financial performance of commercial banks along with the relationships between financial performance of commercial banks and Credit risk determinants.

Financial performance is company's ability to generate new resources, from day - to- day operations, over a given period. Performance is gauged by net income and cash flows from operations and portfolio is a collection of investments held by an institution or a private individual (Apps, 1996). Profitability is a major indicator of banks' ability to generate positive cash flows and maintain sustainable earnings flows. When considering the banks' profitability CAMEL model is most important factor. Capital adequacy, Asset quality, Management quality, Earnings, and Liquidity indicate the factors of CAMEL model. Out of those factors, the asset quality has been extensively used for determining the bank profitability. Asset quality always played a crucial role in overall bank performance and has been an important factor in determining credit and liquidity risks in banks in different countries. The study conducted by Saif-Alyousf, Saha, and Md-Rus (2017) has determined that the CAMEL factors affected the profitability of Saudi banks. The study has shown Low asset quality increases NPL and thus reducing banks' profitability. Then, they also found that Saudi domestic banks were performing better than foreign banks during the period of their study.

Risk is the "combination of the probability of an event and its consequences which can range from positive to negative" (Institute of Risk Management, 2002). Risk disclosures are important and significant part of risk management as per Basel Committee on Banking Supervision (Allini, Manes, & Hussainey, 2016).

Companies use several types of incentives for risk disclosures, such as decreasing the cost of capital (Linsley & Srives, 2006) and strengthening their reputation, increasing legitimacy and reducing stakeholders' uncertainty (Oliveira, Rodrigues, & Craig, 2011). Companies also have incentives to decrease risk disclosures harmful to their competitive position (Woods, Dowd, & Humphrey, 2008). However, Investors benefit from effective risk disclosures as they can compare expected returns with associated risks, thus maximizing the utility of their portfolio-investment decisions (Beretta & Bozzolan, 2004;Linsley & Srives, 2006). Nevertheless, when risk disclosure is generic, and qualitative rather than practical, its utility is limited (Abraham & Shrives, 2014).

An appropriate credit risk management system, which includes risk identification, risk assessment, risk control and monitoring, would require precise guidelines and strategies to manage credit portfolios to determine the entire process of loan allocation, appraisal, supervision, and collection (Greuning, Bratanovic, 2003).

Credit risks are identified and monitored by different methods such as physical inspection by bank managers, analyzing financial statements, audits, and risk surveys (Al-Tammi,Al- Mazrooei, 2007). Fatemi and Fooladi (2006) reported similar findings in US-based financial institutions that suggested identifying counterparty default risk is

the most important parameter for modelling credit risk. In addition, risk identification was found to impact the cost of capital in case of banks in Ghana where their banks were suffering from a high credit risk due to problems of borrower identification, insufficient collateral, and high frequency of default.

All in all, different types of researchers have studied the impact of credit risk management on bank profitability and pointed out that there is a statistically significant relationship between credit risk management and bank profitability. Li and Zou (2014) found that there is a significant and positive relationship between credit risk management and bank profitability in Europe. Moreover, as large financial institutions, commercial banks face many potential sources of risk, including liquidity risk, credit risk, market risk, regularity risk, foreign exchange risk and political risk (Campbell, 2007) while the credit risk being the most important risk all financial institutions are exposed (Grey, Cassidy & RBA, 1997).

Using a sample of Chinese commercial banks over the period 2000-2005, Sufian and Habibullah (2009) investigate the impact of credit risk on bank profitability. Their results suggest that credit risk has a significant and positive impact on the profitability of Chinese state-owned commercial banks (SOCBs) and joint-stock commercial banks (JSCBs). In addition, Sufian (2009), uses 4 SOCBs and 12 JSCBs to examine the determinants of bank profitability during2000-2007 in China with a focus on the credit risk and liquidity risk under a fixed – effects model. The results show that Chinese commercial banks with greater levels of credit risk and liquidity risk have higher profitability.

Saiful (2017) reports that effective management of credit risk is a pivotal element in the all-encompassing approach to risk management of banks and is crucial to the long-term success of banks. the results of the study show that credit risk management and enterprise risk management have a positive influence on bank performance in Indonesia. Hakim and Neaime (2005) noted that credit risk variable was a good predictor of profitability across all banks in their study of banking systems in Lebanon and Egypt. The study showed that a high ratio of loans to assets shows banks commitment to additional risk and should result in an increased profitability, so far as higher assumed risk results in higher return. And the study suggested that liquidity risk was insignificant across all banks and seems to have no statistically significant relationship with profitability.

Ndoka and Islami (2016) found that high Non-Performing Loan (NPL) affected the bank profitability and thus, they should be monitored periodically where they suggested that banks should enhance credit analysis of the borrower's capacity and the process of loan administration. Moreover, Charles and Kenneth (2013) recommended that for banks to earn sustainable interest income streams, appropriate credit risk strategies to be instituted. Banks were also recommended to facilitate the functioning of credit bureaus which could ensure that financial creditworthiness of lenders are analyzed when loan requests are made.

The total operating expenses and the total loan portfolio of a commercial bank will be contributed to the bank performance through the credit risk management. Cost per loan asset (CLA) is the average cost per loan advanced

to customer in monetary term. CLA indicator is important when measuring the credit risk of a bank time to time. Purpose of this indicator is to indicate efficiency in distributing loans to customers. (Apps, 1996).

Olusegun (2015) found that the impact of the antecedents such as loan and advance loss provision, total loan and advances, non-performing loan and total asset on Return on Equity (ROE) and Return on Asset (ROA). The return on assets (ROA) is a ratio that measures company earnings before interest & taxes (EBIT) against its total net assets. The ratio is considered an indicator of how efficient a company is using its assets to generate before contractual obligation must be paid.

3. Methodology

3.1 Research design

The research focuses on the effect of credit risk management on the financial performance of commercial banks in Sri Lanka and its design involves selection of samples, population, survey design, collection of data, secondary data collection, conceptual framework of the research, hypotheses development, operationalization, analysis of research, and data presentation which helps to answer the formulated questions and also to test the research hypotheses.

The overall study Focuses on the Licensed Commercial banks in Sri Lanka to generalize the findings. Twelve number of banks have been selected as the sample for the study covering the period of 2011 to 2019. Secondary sources

were used to collect the data including annual reports and websites where the collected data were analyzed through the E-Views 11 student version software.

3.2 Population and Sample

3.2.1. Population

The population refers to the entire group of people, events, or things of interest that the researcher wishes to explore (Sekaran, 2013). The relevant population of this study is the Licensed Commercial Banks (LCB) in Sri Lanka.

In Sri Lanka by the end of 2019, Sri Lankan banking sector includes 26 licensed commercial banks including 13 branches of domestic banks and 13 foreign banks. Foreign LCBs were excluded from the study because of several reasons. First reason is the difference in the banking operation and accounting format compared with the domestic commercial banks mainly due to multi-currency transactions while second being the unavailability of the financial data.

3.2.2. Sample

A sample is a subset of the population. It comprises some members selected from it. In other words, some, but not all, elements of the population form the sample (Sekaran, 2013a). The sample of this study is Twelve (12) Licensed Commercial Banks. Sample is consisted with two state banks and eight local banks which represent about 50% of LCBs sector asset (CBSL 2019).

3.3 Conceptualization

The researcher aims to explore the broad research question as formulated in the problem statement, *"Does credit risk management affect the financial performance of Commercial Banks in Sri Lanka?"*. Accordingly, the hypotheses will be developed based on the previous literature on which the conceptual framework will be developed.

3.3.1 Hypotheses Development

3.3.1.1 Impact of Capital Adequacy on Bank Performance

Previous researches considering capital adequacy as a determinant of profitability of banks have shown that a high capital adequacy ratio should signify a bank that is operating over-cautiously and ignoring potentially profitable trading opportunities (Goddard, Molyneux, and Wilson 2004), implying a negative relationship between equity to asset ratio and bank performance. Similarly, banks with higher equity to asset ratio will have less requirements of external funding and thus, higher profitability (Pasiouras and Kosmidou, 2007). Various studies suggest that banks with higher levels of capital perform better than their undercapitalized peers. Staikouras and Wood (2003) claimed that there exists a positive link between a greater equity and profitability among EU banks. Abreu and Mendes (2001) also trace a positive impact of equity level on profitability. Goddard et al. (2004) supports the prior finding of positive relationship between capital/asset ratio and bank's earnings. Thus, the first hypothesis can be formulated as,

H1: There is a significant impact of Capital Adequacy on Profitability

3.3.1.2 Impact of Non-Performing loans on Bank Performance

The lack of risk management has led to increased non-performing loans that threatens the bank profitability (Haneef & Riaz, 2012). Stuti and Bansal (2013), specified that the best indicator for the healthy banking industry in a country is its level of Nonperforming assets (NPAs). Nonperforming loans reflects the performance of banks and deterioration in the ratio of Nonperforming loans shows enhancement in the asset quality of public sector banks and private sector banks. Non-performing Assets are threatening the stability and demolishing bank's profitability through a loss of interest income, write-off of the principal loan amount itself. Michael, Vasanthi, and Selvaraju (2006) emphasized that NPL in loan portfolio affect operational efficiency which in turn affects profitability, liquidity and solvency position of banks. Thus, the second hypothesis can be formulated as,

H2: There is a significant impact of Non-Performing Loans on Profitability

3.3.1.3 Impact of Cost per Loan Assets on Bank Performance

Cost per loan asset (CLA) is the average cost per loan advanced to customer. It is calculated dividing total operating costs by total amount of loans. The empirical studies show the diverse results about the effect of cost per loan asset (CLA) on bank profitability. Paudel (2012) has found negative but statistically insignificant association between cost per loan asset (CLA) and bank performance (ROA) in Nepal whereas in Nigeria, Kurawa and Garba (2014) have

found significant positive association between cost per loan asset (CLA) ratio and bank's profitability. However, banks that are efficient in managing their expenses (costs), holding other factors constant, earn high profits. Thus, the third hypothesis can be formulated as follows.

H3: There is a significant impact of Cost per Loan Assets on Profitability

3.3.2 Conceptual Framework

With the main objective of the study being to assess the effect of credit risk management on the financial performance of commercial banks in Sri Lanka, the conceptual framework was developed to test the relationship between variables. Aligning with the objective of the study and based on the hypotheses developed above, the conceptual framework of this study can be depicted as follows.
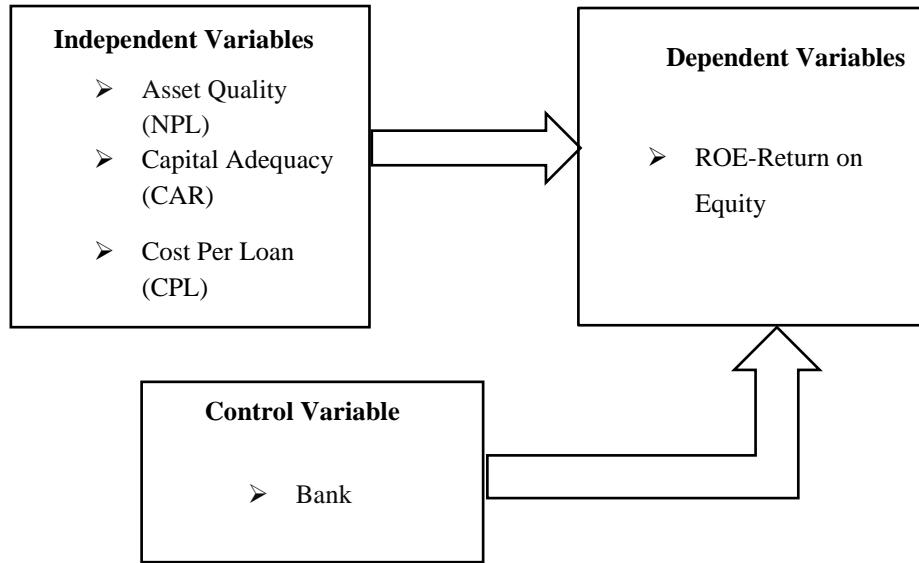
Figure 1: Conceptual Framework.

Source: Author Compiled

3.4 Variables of the Study

3.4.1 Operationalization

The operationalization table of the research was developed by assigning variables as per the concept, covering dimension of each variable and the relevant indicators measured using data derived from the annual reports. The following table represent the operationalization model of this study.

Table 3.1: Operationalization

Variables	Proxy	Definition	RATIO
	Return On Equity **(ROE)**	The Return on Equity (ROE) is a ratio that measures the company's Net income attributable for shareholders against its total equity	Net Income/Total Equity*100
Independent variables (Credit Risk Management) Capital Adequacy	Capital Adequacy Ratio **(CAR)**	CAR is a ratio that measures the total capital of bank articulated as a percentage of its risk weighted credit coverage (Kolapo, Ayeni, & Oke, 2012)	(Sum of the bank's tier 1 capital+ tier 2 capital)/ Risk weighted asset
Asset Quality	Non-Performing Loan Ratio **(NPLR)**	As for NPLR it is a measure of Asset quality of a bank, relevant with banks loans.	Total NPL/Total Advances *100
Loan Quality	Cost Per Loan Asset (**CLA)**	CLA is the average cost per loan advanced to customer in monetary terms. The function of this is to point out efficiency in distributing loans to customers (Kolapo et al., 2012). .	Total Operating Expenses/Total Loans*100
Control Variable- Bank size	**Total Assets**	Natural Logarithm of Total Assets	

Source**:** *Author Compiled*

3.5 Data Collection Methods

This study uses the secondary and quantitative data which was published by the commercial banks in Sri Lanka by using annual reports, and web sites over the period of Nine (9) years. Data on banks specific factors were extracted from annual reports mainly income statement, balance sheets, notes to the financial statement and from the 10-year summaries.

3.6 Data Analysis and Data Presentation

The research will conduct the descriptive Statistics, correlation Analysis, and regression Analysis as the mode of analysis. The sample data are regressed using STATA to find the descriptive and the correlation among all the variables that would affect the performance of Sri Lankan commercial banks.

4. Findings and Discussion

As previously stated, the study employs regression models with the purpose of testing the formulated hypothesis. Table 4.2 provides the summary of the descriptive statistics of the variables in the study.

4.1. Descriptive Statistics

Table 4.2: Descriptive Statistics

	ROE	NPL	CAR	CPL	BSIZE
Mean	15.85639	3.607593	15.55139	13.96763	11.46441
Median	16.01000	3.400000	14.81500	12.42828	11.51726
Maximum	42.90000	8.010000	26.90000	112.4766	12.38294
Minimum	1.000000	0.890000	10.80000	0.931539	10.16125
Std. Dev.	8.332724	1.547478	3.155605	11.83375	0.524443
Skewness	0.661776	0.642302	1.287379	5.651927	-0.355100
Kurtosis	4.239246	2.879552	4.848685	45.99972	2.368054
Obs.	108	108	108	108	108

Source: Author compiled

The mean values of Return on Equity, Non-performing Loan, Capital Adequacy, Cost per Loan Asset, and Bank size are respectively 15.85639, 3.607593, 15.55139, 13.96763, 11.46441. Maximum values of Return on Equity, Non-performing Loan, Capital Adequacy, Cost per Loan Asset, and Bank size are respectively 42.90000, 8.010000, 26.90000, 112.4766, 12.38294 and while the minimum values of Return on Equity, Non-performing Loan, Capital Adequacy, Cost per Loan Asset, and Bank size are respectively 1.000000, 0.890000, 10.80000, 0.931539, 10.16125.

4.2 Correlation Matrix

The Pearson's correlation was used to identify the association between Credit Risk Management and Financial performance of Sri Lankan Commercial Banks.

Table 4.3: Correlation matrix

Correlation Probability	ROE	NPL	CAR	CPL	BSIZE
ROE	1.000000				

ROA	0.511739				
	0.0000				
NPL	-0.150012	1.000000			
	0.1212	-----			
CAR	-0.294059	0.206751	1.000000		
	0.0020	0.0318	-----		
CPL	0.480431	0.091713	0.340117	1.000000	
	0.0000	0.3452	0.0003	-----	
BSIZE	0.479554	-0.096664	-0.461854	-0.090529	1.000000
	0.0000	0.3196	0.0000	0.3515	-----

Source: Author compiled

According to the table 4.3 above, the values on the diagonal indicate 1.0000, reflecting that each variable is perfectly correlated with itself. The highest correlation with ROE is for CPL (0.480431). The correlation is positive which implies that as the value of CAR and CPL increases, the profitability of the bank increases. On the other hand, NPL and CAR are negatively correlated with the bank profitability where the correlation between NPL and ROE is insignificant. The values indicate that when the value of Non-Performing Loans ratio and Capital Adequacy ratio increases, the performance of the bank decreases.

4.3. Regression Analysis

The authors used the Hausman specification test to determine the compatibility of either the random or the fixed effect model with this work. Hausman test result shows the probability value of 0.0775. So, the results will provide the evidence that the random effect model is appropriate where the null hypothesis is accepted rejecting the alternative hypothesis.

After selecting appropriate estimates for regression analysis, Panel EGLS (Cross section random effects) model can be used to examine the relationship and statistical impact between, dependent variables (Return on Equity) and independent variables (Capital Adequacy, Non-performing Loans, Cost per Loan Asset) also control variable (Bank size). Following table shows the panel regression results with random effects and the model summary, respectively.

Table 4.4: Panel EGLS-ROE (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NPL	-0.479454	0.232348	-2.063521	0.0419
CAR	-0.616934	0.152135	-4.055165	0.0001
CPL	0.319406	0.056726	5.630691	0.0000
BSIZE	3.621554	0.878843	4.120819	0.0001
C	-25.50054	10.63196	-2.398479	0.0185

Source: Author compiled

$$ROE = -25.50054 + 0.377721ROE\,(-1) - 0.479454NPL - 0.616934CAR + 0.319406CPL + 3.621554\,BSIZE + U_i$$

Table 4.5: Model summary-ROE

Model Summary	
R-squared	0.705125
Adjusted R-squared	0.688743
Durbin-Watson stat	1.766653
F-statistic	43.04278
Prob(F-statistic)	0.000000

Source: Author compiled

According to the results obtained, the overall model is significant 1% level with a F Statistic of 43.04278. R square is 0.705125 which shows the variance of dependent variable explained by independent variables. Accordingly, it implies that 70.51% of variation in ROE is explained by the credit risk management of Sri Lankan Commercial Banks.

If the coefficients are 0, then it can be concluded that the ROE will be -25.50054. The coefficient $\beta_1=-0.479454$ expresses that if the NPL increases by 1 percent, ROE will also be decreased by 0.47. The coefficient $\beta_2= -0.616934$ expresses that if the CAR increases by 1 percent, ROE will also be decreased by 0.61. The coefficient $\beta_3= 0.319406$ expresses that if the CPL increases by 1 percent, ROE will also be increased by 0.31 The T-test is used to determine whether each of the individual independent variable is significantly related to the dependent variable. In this model, a T-test can be conducted to determine the significance of each of the individual parameters. Higher the t- value, higher the influence of the variable. Accordingly, all the independent variables have a significant influence on ROE with t-statistic being above 1.96 and probabilities being significant at 1% level. All in all, with a t-statistic of 5.630691, it is identified that the cost per loan asset as the most influential credit risk factor on the bank profitability.

Table 4.6: Results of hypothesis testing

Variable	Accepted or rejected
H1: There is a significant impact of Capital Adequacy on Profitability	Accepted
H2: There is a significant impact of Non-Performing Loans on Profitability	Accepted
H2: There is a significant impact of Cost per Loan Asset on Profitability	Accepted

Source: Author compiled

4.4 Discussion on findings

The significant negative impact of Capital Adequacy on Return on Equity was found in this study with a coefficient value of -0.616934. Thus, results of regression accepted the alternative hypothesis that there is a significant impact of capital adequacy on Return on Equity. The findings of the study are in line with the findings of Goddard, Molyneux, and Wilson (2004), that states a negative relationship between equity to asset ratio and bank performance.

The significant negative impact of Non-Performing Loan on Return on Equity was found in this study with coefficient value of -0.479454. Therefore, results of regression accepted the alternative hypothesis that there is a significant impact on Non-Performing Loans on Return on Equity. The findings are in line with Michael et al. (2006)

who emphasized that NPL in loan portfolio affect operational efficiency which in turn affects profitability, liquidity and solvency position of banks. Moreover, these results are in line with the previous research (Ndoka & Islami, 2016) findings that mentioned as NPL increases by 1 unit, profitability as measured by ROA will reduce by 0.2869 units and the variable ROE by 0.018582 units. Hence, findings suggested that banks should enhance credit analysis of the borrower's capacity and the process of loan administration. It was also found that high NPL affected the bank profitability and they should be monitored periodically.

The significant positive impact of Cost per Loan Asset on Return on Equity was found in this study with coefficient value of 0.319406. Therefore, results of regression accepted the alternative hypothesis, there is a significant impact on Cost per Loan Asset on Return on Equity. However, Paudel (2012) has found negative but statistically insignificant association between cost per loan asset (CLA) and bank performance (ROA) in Nepal whereas in Nigeria, Kurawa and Garba (2014) have found significant positive association between cost per loan asset (CLA) ratio and bank's profitability. However, banks that are efficient in managing their expenses (costs), holding other factors constant, earn high profits. But as per authors findings, CPL has a significant impact on bank financial performance. Moreover, the bank size as a control variable also have a significant positive impact on the profitability of the bank with a positive coefficient of 3.621554 and a t-value of 4.120819 at a 1% significance level.

5. Conclusion

5.1. Summary of the findings

This study has laid some groundwork to explore the impact of credit risk management on financial performance of Sri Lankan commercial Banks upon which a more detailed evaluation was carried out. The results suggested that non-performing loan, Capital Adequacy have negative impact on Return on Equity while the Cost per Loan Asset has a positive impact on Return on Equity.

The first objective of this study is to identify the relationship between credit risk management and financial performance of commercial banks in Sri Lanka. Hence, with the correlation analysis, the first objective was achieved. The second objective is to identify the impact of credit risk management on financial performance of commercial banks in Sri Lanka. Hence, Regression Analysis was performed for achieving this objective. Finally, the third objective is to identify the most influential factor of credit risk on financial performance of commercial banks in Sri Lanka. Accordingly, the cost per assets loan asset is the most influential towards the profitability of the banks with a higher t-statistic.

As per the findings, the study recommends that commercial banks to pay attention to maintain Basel III accord in proper manner. As increase of NPL ratio causes to enhance the loan loss provisions, the authorities to take the possible strategic initiatives to write off through the profit of the banks. This impact has denoted that profitability

of banks fairly affected by credit risk within the commercial banks in Sri Lanka. Hence, banks should increase the skills of recovery departments to maintain NPL rate at 5%. It can be recommended that commercial banks should pay attention on their loan portfolio. As per authors findings, CPL has significant impact on bank financial performance. Hence, it is important to maintain low cost per Loan Asset to gain a high profit for the bank.

5.2 Suggestions for future studies

This research heavily relied on secondary data that was obtained from the commercial banks' annual reports and also used the Colombo Stock Exchange website. Hence, Future researchers should try to incorporate the views of the executive managers of the Commercial Banks.

The research also did not collect data on all 26 Commercial Banks in Sri Lanka. That did not have continuous data for the nine years from 2011 to 2019. And also Licensed specialized Banks did not take into the sample of this study. Hence, future researchers should also consider the Licensed Specialized Banks to investigate the impact of credit risk on banks profitability. And to increase independent variables such as loan provision to total loans, loan provision to total assets, bank default rate.

This study confined to Sri Lankan context only. Therefore, it is suggested to consider the cross-country discussion also for this study. Then, they can gain a better result for the impact of credit risk management on financial performance of commercial banks.

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The Effect of Financial Innovation on Licensed Commercial Banks Performance in Sri Lanka

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Introduction –Technology change and competitiveness has spurred financial innovations and the innovation in the financial sector has developed the commercial banking sector in Sri Lanka. This study attempts to identify the effect of financial innovation on financial performance of licensed commercial banks in Sri Lanka.

Design/Methodology/Approach – This study incorporated with bank performance through financial innovation whereas financial innovation variable comprises with mobile banking, internet banking, number of ATM's and number credit cards. The study follows the purposive sampling method to collect secondary data from 10 licensed commercial banks during the period of 2011 to 2019.

Findings - Based on the analyzed result every dependent variable contains stationarity and model residuals are normally distributed whereas analysis has followed a fixed effect model and it includes mobile banking is positively significant towards financial performance of commercial banks whereas internet banking and number of ATM's are negatively significant towards financial performance of commercial banks.

Conclusion - The result emphasizes that the overall model is statistically significant, and researcher conclude that there is a relationship between financial innovation and commercial bank performance hence different financial innovations affect differently towards commercial bank performance.

Keywords: *Automated Teller Machine, Credit cards, Financial Performance, Internet banking, Mobile banking*

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1. Introduction

Financial innovation is defined as the creation or designing of new financial products, better processes, efficient systems and institution alliances. Financial innovation has become more significant particularly a result of three major trends those are intense competition among local and international, fragmented and demanding markets, and diverse and rapidly changing technologies (Clark, K.B., Wheelwright, S.C., 1992). Developments of financial system together with information technology have shifted entire commercial banking system in to a new development era.

According to the Tidd & Hull (2003), Liberalized domestic regulation has accelerated international competition, rapid innovations in new financial instruments, and the explosive growth in information technology to evolve these changes. Due to that reason firms must change in order to survive.

Liberalization policies have been established in Sri Lanka in 1977 by allowing market forces to operate in the financial market and similarly opened the doors for foreign banks to start bank branches in Sri Lanka. Due to this, number of domestic and foreign bank was established their bank branches during last three decades and continues its business. As a result, a dramatic change can be seen within the Commercial Banking system by financial sector innovation. These changes mainly explained by variety of bank products, services and bank marketing and

establishment of new banking institutions and also developments of distributional channel system, payment and settlement system.

Though adding new distributional channels incur significant costs to the bank, on the other hand cutting as much as possible in the back office, banks have realized that the key to profitability is through revenue enhancement (Cainelli, G. , Evangelista, R., & Savona, M., 2004). Platform automation of branches and phone center employees and in the newest distribution channel like internet and mobile banking are the primary revenue-enhancing innovations at the present. Kalakota and Winston (2009), who arguably indicated that e-payment systems are getting central to online business process innovation, as companies search for ways to serve customers faster and at lower cost.

According to Schumpeter (1934), who has categorized innovation into two major categories are product and process innovations. Product innovations consists of the creation of a new good which more adequately satisfies existing or previously satisfied needs (Schumpeter, 1934). Product innovation strategies adopted by the commercial banks were credit cards and unsecured loans. Process innovation refers to the introduction of new business processes leading to increased efficiency or market expansion like process innovation include office automation and use of computers with accounting, RTGS, mobile and internet banking and client data management software.

Eventually the ultimate objective of those firm level innovations is to establish cost effective operating system with the close corporation of its stakeholders, enhancing performance of commercial banks in Sri Lanka. Many researches have examined the effects of financial innovation on the financial performance of commercial banking sector but most researches are available for international context. So, the need for the research is to examine the effect of firm level financial innovation on the financial performance of licensed commercial banks in Sri Lanka.

The importance of this study will add more knowledge on the concept of financial innovation particularly product and process innovation and give more empirical findings on the relationship between financial innovation and performance of commercial bank sector in Sri Lanka for new researchers. The results of the study will help to bank managers to make decision and it will be helpful for policy makers whose involve in making policies for banks and financial services.

1.1 Research Problem

Despite the undeniable importance of financial innovation in explaining commercial banking performance, the effects of financial innovation on licensed commercial bank performance according to the Sri Lankan context is questionable. Few studies have been carried out by Malak (2013); Joseph, A. & Mark, K. (2003); Muia (2017); Nyathira (2009); Shihadeh, Azzam, Hannon, & Jian (2018) on the contribution of financial innovation to the financial performance in the banking sector internationally. Therefore, the problem arises, how does and what extent do financial innovation impact on financial performance?

1.2. Objective of the Study

This study aims to evaluate the effect of financial innovation, particularly product and process innovation on financial performance of licensed commercial banks in Sri Lanka. Therefore, the problem statement of the study is, "To determine whether there is a significant effect of financial innovation on financial performance of licensed commercial banks in Sri Lanka."

This is study identifies the effect of financial innovation on performance of licensed commercial banks in Sri Lanka and the study limits its' analysis to 10 licensed commercial banks in Sri Lanka including government commercial banks over the period of 2011 – 2019. Following limitations can be seen relevant to this study.

I.   The research identifies only domestic licensed commercial banks in Sri Lanka.

II.   The research is limited to the 2011-2019 time period.

III.   The research identifies only firm level innovations particularly product and process innovation.

2. Literature Review

2.1. Theoretical Literature Review

In this paragraph it reviews theories relevant to this study. This study will be guided by four innovation theories. These includes Constraint - induced Financial Innovation Theory, Circumvention Innovation Theory, Regulation Innovation Theory, Transaction Cost Innovation Theory.

2.2.1 Constraint Induced Financial Innovation Theory

Silber (1983) has developed the theory of advanced constraint-induced financial innovation which has stated that the key reason of doing financial innovation is to maximize profit of financial institution.

2.2.2 Circumvention Innovation Theory

Kane (1981), who is the originator of circumvention innovation theory, has pointed out that government form of regulations and controls in financial sector, Therefore, financial innovation is mostly stimulated by the expectation of earning profit and circumventing government regulations.

2.2.3 Regulation Innovation Theory

Regulation innovation theory was introduced by Scylla et al (1982), who has argued that financial innovation from his point of view related to historical development of economy. Scylla et al has (1982), further described the difficulty to have space of financial innovation in the planned economy with strict control and in the pure free market economy, so any change brought about by regulation reform in financial system can be regarded as financial innovation.

2.2.4 Transaction cost innovation theory

The transaction cost innovation theory has been developed by (Hicks, D. & Niehans J., 1983). They outlined that the reduction of transaction cost is the dominant factor of financial innovation and they have further explained that financial innovation is the response of the advance in technology which caused the transaction cost to reduce.

2.3 Review of Empirical Literature

Schumpeter (1934), who is usually credited with the initial concept that innovations can cause competitive advantage which will be exploited by innovative firms. According to this, a substantial body of research suggests that the association between firm level of innovation and financial performance should be positive. For instance, a study done by Stavins (2011) in US on community banks, studied the effect of consumer characteristics on the utilization of payment instruments. It has shown that consumers are varied on how they used payment options based on gender, size of transactions and occupation. The study further established that community banks that adopted many payment options did better than their peers. This shows that innovation provides firms with commercially superior products, better mechanisms to deal with environmental uncertainties, and an increased ability to make new resource configurations (Stavins, 2011).

According to Hayashi & Klee (2003), Financial innovations can be grouped as new products (such as securitized assets), new services (such as internet banking and mobile banking), new processes (such as RTGS, CEFT), or new organizational forms like agency banking and internet-only banks. Recent service innovations primarily relate to enhanced account access and new methods of payment – each of which better meets consumer demands for convenience and ease. A study carried out in Australian corporate banking sector proposed that having innovative and differentiated products made commercial banks attract more corporate clients (Cainelli, G. , Evangelista, R., & Savona, M., 2004). Cohen (1995), in his study within the British banking sector found that Automated teller

machines (ATMs), significantly enhanced retail bank account access and value by providing customers with around-the-clock access to funds. Over the past decade, remote access has migrated from the telephone to the personal computer. Online banking, which allows customers to monitor accounts and originate payments using "electronic bill payment," is now widely used.

Ngigi Carolyne Nyathira (2012), who has examined the effects of financial innovation particularly payment and settlement system on performance of commercial banks in Kenya in 2012, obtaining secondary data published in central banks' annual reports for all 43 registered commercial banks for a period of 4 years. Independent variables used by researcher were RTGS transaction throughput for the year and Automate Clearing House throughput (ACH) for the year while dependent variable was consolidated profit after tax and exceptional items for the year of all banks. The researcher has found out that there is a positive relationship between RTGS transaction throughput and commercial bank's performance, a negative significant relationship between Automated Clearing House throughput and commercial bank's profitability and it further identified that two independent variables are negatively correlated.

Ngari et al (2014), identified the relationships between credit cards, mobile banking, influence of internet banking and agency banking on the performance of commercial banks in Kenya. This study was done obtaining 40 commercial banks registered under the central bank of Kenya for the period 2008-2012. Secondary data has been obtained from published financial statements whereby the independent variables were credit cards, internet

banking, mobile banking, and agency banking and the dependent variable was financial performance to run this study. Finally, study has been found out that some banks in Kenya had adopted some financial innovations such as credit cards, mobile, internet and agency banking and indeed financial innovations had great impact on the financial performance of the banks.

Financial innovation within the banking system has been spurred on by the forces described by particularly in terms of latest distribution channel systems, like internet and mobile banking (Noyer, 2007). When the industry has provided more ways for consumers to access their accounts, they have to bear significant costs on each institution. A requirement to combat these costs resulted a major cost savings period, where many banks successfully got much of the cost out of the back office. These cost savings came largely through back-office automation, which is a technological innovation that has recently been accomplished.

According to Noyer (2007), financial innovation has not only created new opportunities for the sector participants, but also enabled new market participants to arise, introducing new products to the financial market. These developments have increased the range of financing and investment opportunities available to economic agents besides changing the role of banks with expanded diversification choices in terms of portfolio and sources of financing. Such developments affect the speed and strength of the channels of monetary policy mechanism in the economy. As financial markets become more liquid and complete, changes in official interest rates are more readily transmitted to the entire term structure and more generally to financial asset prices. The primary revenue-

enhancing innovations occurring today are in platform automation for branch and phone center employees, and within the newest distribution channel, internet and mobile banking. While these innovations have aspects in common, they each serve different needs within the distribution strategy of economic banks (Mansury, M. A & Love J. H , 2008).

Yin and Zhengzheng (2010), who has done research in China with the expectation of analyzing the operational changes due to technology innovations. In his study it shown that if banks adopted to processes innovations which can be more profitable. When a bank adopts streamlined operations like using internet banking, it may result low operational costs. Thus, the commercial bank may save on costs hence improving on its performance. Thus, it's a process whose effect on performance of commercial banks need to be determined.

Francesca and Claeys (2010), carried out a study with an aim of examining the role of online banking services in contributing to the strategic goals. The study was carried out among 60 large banks operating in the European Union. The study revealed that those banks that had a goal of increasing their market share were likely to adopted financial innovations such as internet banking because they could reach more customers. However, the performance of banks that solely dependent on internet was noted to be low because the banks had spent a lot of money in venturing to internet banking and subsequent labour cost savings could not be sufficient to recoup the initial capital outlay. For this reason, it is important for banks to prudently decide on which financial innovations to adopt.

DeYoung, Lang, & Nolle (2007), has explained that internet adoption improved U.S. community bank profitability basically via deposit related charges. After that Hernando & Nieto (2007), found that online banking was associated with lower costs and higher profitability for a sample of Spanish banks. Both papers have been concluded that the internet channel is a complement to, rather than a substitute for, physical bank branches. Further it has described that any implementation of internet banking, requires investment to be made on information technology by internet banking service providers. In addition to that, study has been concluded that to be succeed in such investments, bank customers must see value in the technology since they might be unlikely to use it much. In some areas, things have not moved as quickly as some anticipated in turning these benefits into reality in the banking sector, and many bank customers still hesitate in switching to web-based service transactions.

Nyangosi and Aora (2011), conducted a study with the aim of examining the impact of information technology and banking performance in Kenya. The study adopted a descriptive research design and had a population of all commercial banks in Kenya. The study established that the use of internet banking and mobile banking had been adopted by most banks. The study has found that use of ATM and mobile banking led to service excellence and thus improved the performance of financial institutions. Further, the study revealed that information technology is an important development in the banking sectors.

According to Nader (2011), who has pointed out that the fact that commercial banks adopted mobile and internet banking, was not a reason enough to expect more profits. This study had sought to establish the profitability of

banks in the Saudi for a period of 10 years. The study tested contradicting results for the various aspects of financial innovations. It stated that use of mobile banking and Automated teller Machines (ATM) had a positive effect on profitability of commercial banks in Saudi Arabia. On the contrary, availability of these services did not necessarily indicate a chance of more profits. Thus, the study implies that financial innovations may or may not lead to improved financial standings. This instant study seeks to establish the effects of financial innovations on total income and return on assets of commercial banks in Kenya.

Scholnick (2006), who has noted that the use of ATMs increases transactions of the large commercial banks hence more business is realized but this is not so for the small banks. It is crucial to note that when the transactions with the bank increases, the income of the bank may increase due to charging of transaction costs. However, some of online banking services are free of charge. A study of the impact of information technology on the banking industry was carried out by (Shirley, J.H. & Sushanta, K.M., 2006). The study had a general objective of establishing the effects of information technology on the profitability of commercial banks. The study had a target population of 68 US banks and data was collected over a period of 20 years. The study found out that adoption of IT to service delivery may increase the profits due to cost savings. However, the study also found out that the profitability depended on the network effect which if too low would lower the profits of the banks. Thus, the study was not conclusive on the effect of innovations due to technology adoption.

Malhotra and Singh (2010), who has carried out a study with the aim of establishing the impact of internet banking on financial performance of commercial in India. The study had a keen interest in establishing whether the period of adoption of internet banking had an impact on performance. Specifically, the study sought to establish whether, banks that had adopted internet banking for longer periods had superior performance over those that had adopted banking for a shortest time period. A multiple regression model was used and 82 banks were selected. The study found out that there was no statistically significant difference among those banks that had adopted internet banking for a longer time than those which had recently adopted internet banking. Further, the regression model established that their internet banking had no positive effect on financial performance of commercial banks in India.

Financial innovation can be critical in overcoming the two main challenges that financial intermediation faces in developing countries the high costs and the high risks (Gitonga, 2003). For instance, mobile banking relies to a greater extent on variable rather than fixed costs, which implies that even customers who undertake small and few transactions are viable or bankable relative to banking through conventional channels. Second, trust between customer and service provider can be built much more easily by mitigating the risk from the customer's and the provider's viewpoint. Financial innovation can thus be critical in helping reduce the large share of population that is currently unbanked.

3. Methodology

This study investigates the effect of financial innovation on performance of licensed commercial banks in Sri Lanka. It is based on secondary data collected from annual reports. Data collection has been done manually from banks annual reports of selected 10 licensed commercial banks for the period 2011 - 2019. The researcher has analyzed the data by multiple regression analysis using E-Views 10 software. The population of this study is 26 licensed commercial banks in Sri Lanka. To perform the study, 10 licensed commercial banks has been selected using purposive sampling method.

3.1. Conceptual Framework

As per the conceptual framework, it defines that the impact of mobile banking, internet banking, credit cards in use and number of ATM's as independent variables and Return on Equity and Return on Asset as dependent variables.
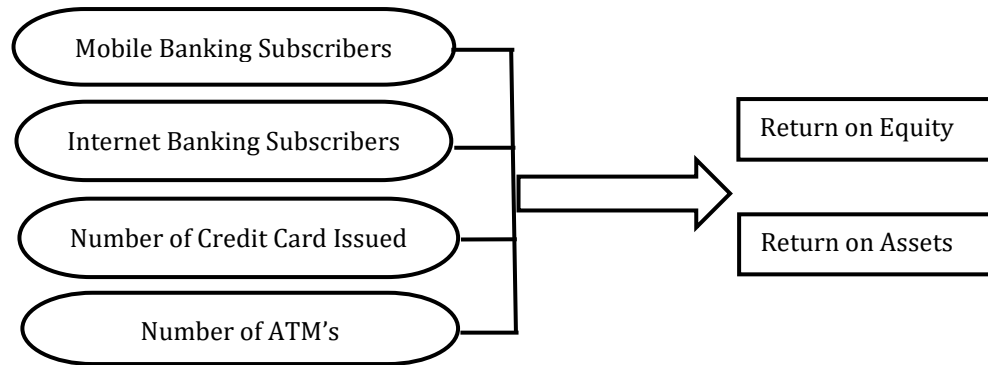
Figure 3.1 – Conceptual Framework

Source: Author Compiled

3.2. Model formulation

The following econometrics models will be used to test the said hypothesis for achieve the research objectives.

$$Y_{1it} = \alpha_i + \beta1X1_{it} + \beta2X2_{it} + \beta3X3_{it} + \beta4X4_{it} + \mu_{it} \qquad (1)$$

$$Y_{2it} = \alpha_i + \beta1X1_{it} + \beta2X2_{it} + \beta3X3_{it} + \beta4X4_{it} + \mu_{it} \qquad (2)$$

Where: α_i = intercept

Y_{1it} = Return on Equity

Y_{2it} = Return on Assets

$X1_{it}$ = Number of mobile banking subscribers of the year

$X2_{it}$ = Number of internet banking subscribers of the year

$X3_{it}$ = Number of credit cards in use of the year

$X4_{it}$ = Number of ATM's of the year

$\beta1, \beta2, \beta3, \beta4$ = coefficients of independent variables

u_{it} = error term

3.3. Hypotheses Development

Based on conceptual framework and varied findings on the relationship between financial innovation and financial performance following statements are made in order to test how these variables are interrelated in the case of commercial banks performance in Sri Lanka.

01. H1: There is a significant association between mobile banking and ROE

02. H2: There is a significant association between internet banking and ROE

03. H3: There is a significant association between number of credit cards and ROE

04. H4: There is a significant association between number of ATM's and ROE

05. H5: There is a significant association between mobile banking and ROA

06. H6: There is a significant association between internet banking and ROA

07. H7: There is a significant association between number of credit cards and ROA

08. H8: There is a significant association between number of ATM's and ROA

3.4. Instruments used for data analysis

Quantitative approach was considered as the suitable approach for the study because numerical and secondary data was employed. The multiple regression analysis was carried out by the using E- views 10 econometrics computer software.

4. Findings and Discussion

4.1 Descriptive Statistics

Table 4.1 – Descriptive Statistics

	ROE	ROA	LMB	LIB	LCC	ATM
Mean	0.164103	0.014906	10.03765	10.27273	11.02452	325.7111
Median	0.164600	0.014558	10.01391	10.37642	11.29990	235.0000
Maximum	0.312000	0.021084	11.67617	12.56459	12.86502	1033.000
Minimum	0.045150	0.008596	8.235891	7.107425	7.745003	31.00000
Std. Dev.	0.065711	0.003985	1.164050	1.689002	1.361931	253.1602
Skewness	0.249694	0.042948	-0.017946	-0.422451	-1.035863	0.721183
Kurtosis	2.986802	1.982224	1.614444	2.173676	3.514271	2.492262
Jarque-Bera	0.935857	3.912172	7.203956	5.237519	17.08697	8.768317
Probability	0.626298	0.141411	0.027270	0.072893	0.000195	0.012473
Observations	90	90	90	90	90	90

Source – Author Compiled

Skewness is a term in statistics used to describe asymmetry from the normal distribution in statistical data, skewness has a zero skewness in normal distribution, but in reality, data points may not be perfectly symmetric.

When considering the skewness of LMB, LIB and LCC variables are negatively skewed, while ATM, ROE and ROA are positively skewed.

The standard deviation is the most common measure of dispersion, or how spread out the data around the mean. A large standard deviation indicates that the data points can spread far from the mean and small deviation indicates that the data set is around the mean. In this research, all the independent and dependent variables have a low standard deviation, which emphasize that data set is closely around the mean.

4.2 Correlation Analysis

Table 4.2 – Correlation matrix

	ROE	ROA	LMB	LIB	LCC	ATM
ROE	1.0000	0.6254	0.2563	0.4180	0.3592	0.4260
ROA	0.6254	1.0000	-0.0545	-0.0534	-0.0771	0.1561
LMB	0.2563	-0.0545	1.0000	0.6212	0.4650	0.6086
LIB	0.4180	-0.0534	0.6212	1.0000	0.6057	0.6316
LCC	0.3592	-0.0771	0.4650	0.6057	1.0000	0.5001
ATM	0.4260	0.1561	0.6086	0.6316	0.5001	1.0000

Source – Author Compiled

The graph shows how the independent and dependent variables are correlated to each other. In order to get a prior understanding related to the correlation between the variables the above study is assisting. Accordingly, there is a

positive impact of mobile banking, internet banking, number of credit card and number of automated teller machines on return on equity. As well as above graph indicates that there is a negative relationship between return on assets and internet banking, mobile banking, number of credits while it shows that return on assets and number of automated teller machines have a positive relationship. According to obtained results there is no any significant correlation between independent variables (no multicollinearity) since probability values are less than 70%. Therefore, all the variables have been continued for multiple regression.

4.3. Multiple Regression Analysis

As stated in the methodology, two dependent variables used to measure the financial performance of licensed commercial banks in Sri Lanka. Therefore, it used two separate models to run the regression for those variables.

Model 01: Return on equity

Model 02: Return on assets

After running the Hausman test for both models, results showed that fixed effect model is suitable for all the models.

4.4 Regression Result

Table 4.3 – Regression outcome

	Model – 01		Model – 02	
Coefficients and Significance of the independent variables				
	Coefficient	Prob.(t-stat)	Coefficient	Prob.(t-stat)
C	0.110025	0.2490	0.028164	0.0003
LMB	0.028271	0.0292	0.002035	0.0340
LIB	-0.018827	0.0266	-0.001604	0.0022
LCC	-0.001825	0.8277	-0.001250	0.0994
ATM	-0.000178	0.0013	-1.05E-05	0.0385
Overall significance of the model				
F-statistic	24.43332		6.613679	
Prob(F-statistic)	0.000000		0.000000	
Goodness of fit in the model				
R-squared	0.840321		0.530800	
Adjusted R-squared	0.805929		0.450542	
autocorrelation in the model				
Durbin-Watson stat	1.950217		1.758569	

Source – Author Compiled

In terms of fitness of the model, the coefficient of multiple determinations R^2 indicates 84.032%, 53.08% respectively for both models. Probability value of F-statistics reveals that overall model is significant at 5 percent level hence probability value of F-statistics indicates 0.00000 for both models. The estimated Durbin Watson

statistics are 1.950217 and 1.758569 respectively. Since the value is approximately closer to 2.00, it is accepted that there is no autocorrelation among the successive values of the variables in the autoregressive model. From regression result shown in the table 03 which indicates that all the independent variables (other than credit cards) under both models are statistically significant to the model since Prob. (t-statistic) are less than 0.05.

Moreover, beta values indicate the strength of the impact of each individual independent variable to the dependent variable. Beta coefficient of mobile banking indicates positive relationship on financial performance of licensed commercial banks in Sri Lanka for both models and internet banking, No. of credit cards, No. of ATM's indicates negative relationship on financial performance of licensed commercial banks in Sri Lanka under both models.

5. Conclusion

5.1. Conclusion of the study

This study investigated whether licensed commercial banks in Sri Lanka can accelerated their performance by enhancing financial innovation. From this research, it is found that mobile banking has a positive significant effect on financial performance while internet banking has a negative significant effect on financial performance of licensed commercial banks in Sri Lanka. The results of current study in line with the previous empirical studies carried out by other researchers.

Daniel Mwangi Kamau & Josphat Oluoch (2016), stated that increase in mobile banking subscribers have a positive significant effect on return on assets. According to the Makur Peter Malak (2014) established that mobile banking has positive significant effect on return on equity also. Humphrey (1994) has concluded that ATMs offer easy and convenient services to customers, but the cost for this service is slightly higher. When the number of ATMs increased, ultimately it reduces the cost of each depositor transaction. Further it revealed that, when the number of ATM transactions executed by customer increases, the amount of total costs was relatively equal to or slightly higher than previous costs. Ultimately it revealed that ATM's have and negative significant effect on performance of commercial banks. Akhisar et al. (2015), examined the effect of electronic banking services as innovation tools on bank performance while gathering relevant data from 23 countries for the period of 2005 to 2013. The performance measurements used in their study were ROA and ROE. By using dynamic panel data models, the study found that internet banking has a negative effect on financial performance of commercial banks. According to Fadil Shihadeh, Jian Guan, Azzam Mohammed Tayaseer & Ihtisham ul haq (2018), have revealed that number of credit cards issued have an insignificant effect on performance.

Mobile banking is a service provided by a bank to their customers, allowing to execute financial transactions remotely employing a mobile device which uses software, usually called an app. So, it is easy for operating mobile application because its' appearance is easy to understand. Similarly, nowadays mobile phone usage also at the top.

Due to that reason, there is a positive trend that people tend to subscribe mobile banking. Ultimately it creates efficiency to the bank and generates fee income also from some particular transactions like CEFT.

However, internet banking has a lengthy process to execute a transaction compared to mobile banking. Normally, people do not like to follow lengthy process and it is harder to remember because it used by people who are in different age level. Internet banking has become failure in some extent because customer don't have a sufficient knowledge to operate it. Due to that reason expected result of internet banking on financial performance would not be received.

Further the current study found that number of ATM's have a negative significant effect financial performance of licensed commercial banks in Sri Lanka. Frequency of using ATM has been reduced due to the arrival of alternative channels. In addition to that, Processing time and service quality of ATM's is lower in some extent. Then people tend to innovative alternatives to execute their transactions. Ultimately it does not provide expected result on performance. As well as can be identified another issue regarding the installation of ATMs. If an ATM was set up in a particular area in which population density is at a lower level, it does not create expected performance on particular investment.

Further this study revealed that number of credit card issued does not have a significant effect on financial performance of licensed commercial banks in Sri Lanka. The common reason to buy a credit card by customers is

to get purchase related benefits, offers and discounts other than that people do not use their credit card frequently. Due to this it may not provide a significant impact on financial performance. At present credit card market is adversely affected by fraudulent activities. Then banks have to implement mitigating actions to reduce risk arising from credit card business. Ultimately banks have to bear significant cost on those action also. Again, it can be identified that NPA issue relate with credit cards. Ultimately it may not provide expected results on performance. The main objective of the study is to identify whether there is any impact of independent variable on dependent variables. The objectives are successfully achieved as the researcher identified significant relationship between the independent variables and dependent variables.

5.2 Recommendation

The study recommends a mix result in relation to the effect of financial innovation on commercial banks performance. Since all the financial innovations don't have a positive impact on performance. But the study has established a positive relationship between mobile banking and performance of commercial banks in Sri Lanka. For this reason, it is important that commercial banks to develop mobile banking platform. Mobile banking enables commercial banks to cut down on costs since customers do not have to travel to the banking halls for financial services.

Contrary to the above that internet banking has a negative effect on commercial bank performance. This can be attributed to the fact that adopting internet banking involves high cost in IT and modern technology. In addition to

that people are moving fast to mobile banking from internet banking. So, at the present mobile banking has popular among people than internet banking. So, it will be another reason for showing negative relationship between internet banking and commercial bank performance.

Further this study revealed that ATM's have a negative effect on commercial bank performance. Implementing of ATM's also expect huge investment on that. If an ATM set up in an area in which population density is low, it doesn't create expected performance on particular investment. So, it is must to identify by banks to set up their ATMs at correct location also.

Generally, banks earn considerable profits from credit card business, especially if these cards are used outside the issuing country. In this study, the effect of credit cards was insignificant when ROE and ROA are used as performance indicators. This study used the number of credit cards issued even when they were unused by customers. Instead of using number of credit cards issued, it is better to take total active cards in use currently.

Government through the financial sector regulatory authorities should encourage banks to engage in financial innovation but at the same time closely regulating such developments to assure on the integrity of more so the payment systems. Ultimately, this will enhance effective and efficient delivery of services by the financial sector to all sectors of the economy. In addition to that the awareness of customers on these innovations to execute banking services is more important because it takes huge investment on financial innovation. If the opportunity taken by

customers from these innovations are less, the investment made on financial innovations by bank will not be effective. So, customer adoption on these innovations are must to take the expected performance from innovations.

5.3 Suggestions for Future Researchers

This study mainly concentrated on establishing the relationship between financial innovations and financial performance of commercial banks in Sri Lanka. There is also need to carry out similar tests for a longer time period of time and on quarterly on country level innovation like RTGS. This will identify more precise and diverse information on the changes in the independent variables along the years. Ultimately, the scope of the research will be broader, and it will give clear indication of financial innovation on the economy as a whole.

In addition to that, there is need for categorization of commercial a comparative study between listed and none listed commercial banks. Further, there is need to evaluate the qualitative influences of commercial banks innovation.

Similar study to be carried out among specialized finance companies and banks and all financial institutions to identify the impact of financial innovation on these institution since are geared towards taking deposit from members.

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Impact of Loan Portfolio Diversification on Performance of Licensed Commercial Banks in Sri Lanka

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Abstract

Introduction: The empirical studies provide mixed evidence on the relationship between loan portfolio diversification and loan portfolio concentration with the bank performance. This research study is one of the research that has been carried out in the Sri Lankan context with the objective of, determine the impact of loan portfolio diversification on performance of licensed commercial banks in Sri Lanka.

Design/ Methodology/ Approach: Nonprobability sampling technique is used to select 10 banks out of 26 licensed commercial banks in Sri Lanka for the period of 2010 to 2019. Data were analyzed by using correlation and fixed effect panel regression model. The independent variables of product wise diversification and sector wise diversification calculated from the measurement of Hirschman Herfindahl Index. Return on asset has taken to measure the bank performance and Interest Rate Spread, Capital Adequacy, Liquidity and Bank Size are used as control variables for identifying the model.

Findings: There is a significant negative impact on product wise loan diversification on bank performance and significant positive impact on sector wise loan diversification on bank performance. Further, control variables of interest rate spread, and bank size have a significant negative relationship with bank performance while Capital Adequacy has a significant positive relationship with bank performances.

Conclusion: According to the product wise loan diversification bank can earn more profit from concentration strategy while under the sector wise loan diversification bank performance can be improved by following diversify strategy.

Key Words: *Bank Performance, Hirschman Herfindahl Index, Loan Portfolio Diversification, Loan Portfolio Concentration*

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1. Introduction

Banks play an important role by mobilizing savings, reducing cost of financial transaction, and diminishing credit risk in the economy. There are two portfolio Diversification strategies in the real world, and they are Loan Portfolio Diversification (LPD) and Loan Portfolio Concentration (LPC). Loan Portfolio Diversification (LPD) aims to provide loans into different sections while Loan Portfolio Concentration (LPC) focus to provide specialized areas.

This study identifies the LPD in Sri Lankan banking industry. In other words, how banks manage their lending to obtain more profit. This study diversifies loans under both product and sector wise diversification. Return on Asset take as the performance measurement which is more effective and accurate to catchup the profits and evaluate interest rate spread those previous studies rarely used. Finally, to contribute to the policy makers and managers how diversification is used in making portfolio decisions.

1.1. Research Problem

LPD decisions impact to the bank performance through the changes of interest rates and credit risk. Performance is affected by loan portfolio decisions in different ways as higher the accumulation of unpaid loans and the lower the performance. Therefore, every commercial bank in Sri Lanka aims to reduce credit risk. A key issue to ensure advancement must be how to make sure banks successfully balance their LPD and to be stable and still supply the economy with adequate performance. Based on the available literature straight forward assessment of the impact

of LPD on performance of licensed commercial banks cannot be made. And also, there are few researches available relating to this area and those studies also provide different argument within their scope.

1.2. Research Question & Objectives

1.2.1. Research Question

- Does LPD affect performance of licensed commercial banks in Sri Lanka?

1.2.2. Objectives

- Assess the impact of Loan Portfolio Diversification on performance of Licensed Commercial Banks in Sri Lanka under the Product wise loan diversification.

- Assess the impact of Loan Portfolio Diversification on performance of Licensed Commercial Banks in Sri Lanka under the Sector wise loan diversification.

2. Literature Review

Loan Portfolio Diversification is a mechanism used by commercial banks to mitigate credit risk. Some banks diversify their loans portfolio while some other banks tend to concentration their loan portfolios. This is treated as a major strategy of loan portfolio management which captures the risk of the interrelationship of individual loans as a portfolio. The key principle in banking business is to diversify risk exposures as defined by the Basel Committee on Bank Supervision, 1991. Portfolio theory called traditional banking theory states diversified banks can reduce

risk by minimizing the cost of monitoring. Monitoring cost can be reduced by mitigating the agency problem between bank owners and bank creditors. According to Portfolio theory LPD increases bank performance by reducing credit risk through improving monitoring incentives (Kumanayake et al., 2019). (Winton, 1999; Tabak et al., 2011) explain banks that are not diversified properly may be more susceptible to the economic volatility of the sectors in which they concentrate their activities than banks that are well diversified.

LPC focus only on a few selected sectors which bank can enjoy a competitive advantage (Kurincheedaran, 2015). This is supported by Corporate Finance theory. As per most of the research results they highlighted that concentration helps to mitigate agency problem and reduction of firm value. And also (Kurincheedaran, 2015) mention increasing LPD lead towards allocating resources to inefficient divisions. Therefore, this becomes poor investment decisions that affect firm value negatively. The findings of (Atahau & Cronje, 2019) show that concentration increase bank returns and the positive effect of concentration on return tends to be more significant for domestic owned banks. Banks, by being specialized in a few sectors, develop the ability to better screen their borrowers, which reduces the problem of adverse selection and allows for a better assessment of collateral value.

Performance can be defined as the way in which a bank utilizes resources to achieve the objectives. There is a strong relationship between bank performance and credit risk of a bank (Githaiga, 2013). Better bank performance can be expected from mitigating credit risk. Banks need to get possible steps to mitigate credit risk to safeguard the assets of the bank and protect the investor's interest. Bank performance can be measured through bank specific

factors and macroeconomic factors. Bank specific factors refer to individual bank characteristics which affect the bank performance. Those factors affect to the internal management decisions. Macroeconomic factors are the variables which are beyond the control of the bank, however, affect to the profitability (Kumanayake et al., 2019).

3. Methodology

3.1 Research Design

3.1.1 Dependent Variable

LPD measured by using the Hirschman Herfindahl Index (HHI) which was used by (Shim, 2018). HHI is calculated as the sum of squares of exposures as a fraction of total exposures of product diversification and sector diversification. According to the product diversification Overdraft, Term loan, Pawning, Trading, Leasing, and other loans have been taken to calculate HHI. Under the sector wise diversification Agriculture, Manufacture, Construction, Trading, Infrastructure, and other loans have been carried out to calculate HHI.

$$\text{HHI Product} = \left(\left(\frac{OVR}{TOL} \right)^2 + \left(\frac{TER}{TOL} \right)^2 + \left(\frac{PAW}{TOL} \right)^2 + \left(\frac{TRA}{TOL} \right)^2 + \left(\frac{LEA}{TOL} \right)^2 + \left(\frac{OTH}{TOL} \right)^2 \right) \qquad (1)$$

$$\text{HHI Sector} = \left(\left(\frac{AGR}{TOL} \right)^2 + \left(\frac{MAN}{TOL} \right)^2 + \left(\frac{CON}{TOL} \right)^2 + \left(\frac{TRA}{TOL} \right)^2 + \left(\frac{INF}{TOL} \right)^2 + \left(\frac{OTH}{TOL} \right)^2 \right) \qquad (2)$$

Where TOL denotes total loans of each bank. The loan portfolio diversification is then calculated by one minus Loan HHI. According to (Stiroh, 2002) HHI diversification value of 1 indicates absolute concentration where only one loan is granted while value 0 represents a perfectly diversified portfolio.

3.1.2 Dependent Variable

This study measures the performance of the bank by using return on asset (ROA). Authors (Chen et al., 2013) have used ROA to measure firm performance by taking the ratio of net income to total assets. Hence, researcher measured the ROA by dividing net income from total asset.

3.1.3 Control Variables

Interest Rate Spread: IRS identified as the differences between Lending Rate and Deposit Rate. Hence, study gets the IRS from the difference between average weighted lending rate and average weighted deposit rate.

Capital adequacy: The relationship between bank capitalization and bank credit risk could either be positive or negative. Therefore, to measure the capital adequacy researcher used the ratio of total equity to total assets.

Liquidity: In this study the ratio of net loans to total assets is used to measure the liquidity of the banks performance which (Francis, 2013) also used in the previous study.

Bank Size: BSIZE is another determinant of performance which is measured from the logarithm of total assets.

3.2. Conceptual Framework

Independent Variables   Dependent Variable
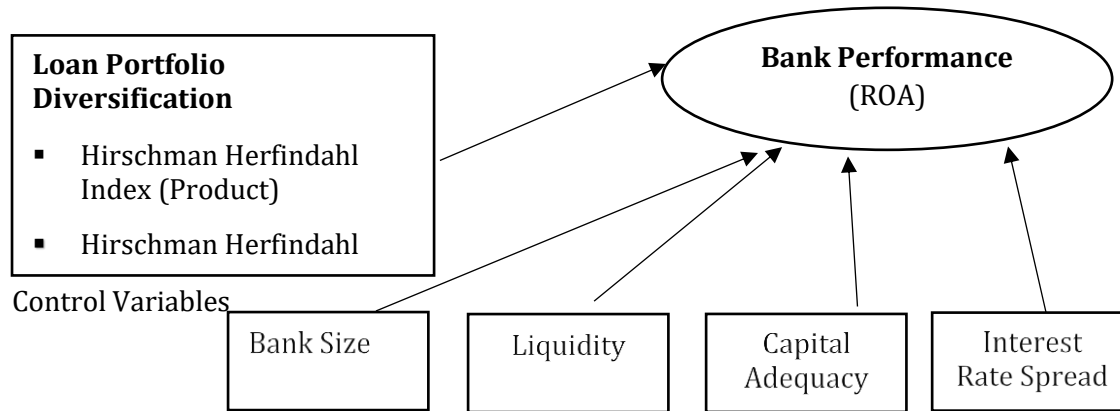

Figure: 3.1 Conceptual Framework

Source: Author Compiled

This study focuses on all the licensed commercial banks in Sri Lanka from 2010 to 2019. The researcher has used non probabilistic sampling technique for selecting the sample. Hence, ten systemically important banks are selected as the sample out of 26 licensed commercial banks. This study uses the data available in the annual reports of the selected banks and other secondary data are collected from the CSE website and the Central Bank of Sri Lanka (CBSL) website.

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3.3 Data Analysis

The study used quantitative method to determine the impact from the data obtained. Data analyzed using multiple linear regression technique which specified in equations 3 and study follows the HHI to measure the extent of LPD which most of the past studies used.

$$ROA = \alpha + \beta 1 HHIPRODUCT + \beta 2 HHISECTOR + \beta 3 IRS + \beta 4 CAP + \beta 5 LIQUIDITY + \beta 6 BSIZE + \varepsilon \qquad (3)$$

Where, ROA is Bank performance, HHIPRODUCT is Product wise diversification, HHISECTOR is Sector wise diversification. IRS is Spread of interest landings and Deposits, CAP is Total Equity to Total Asset, LIQUIDITY is Total Loans to Total Assets and BSIZE is Logarithm of Total Asset.

Based on all the evidence of empirical studies, this study aims to test the following hypothesis for the study.

H1 - There is a significant impact of Product LPD on commercial banks performance.

H2 - There is a significant impact of Sector LPD on commercial banks performance.

H3 - There is a significant impact of IRS on commercial banks performance.

H4 - There is a significant impact of CAP on commercial banks performance.

H5 - There is a significant impact of Liquidity on commercial banks performance.

H6 - There is a significant impact of BSIZE on commercial banks performance.

4. Findings and Discussion

4.1 Descriptive statistics

Table 4.1: Descriptive Statistics

Description	ROA	HHI Product	HHI Sector	IRS	CAP	Liquidity	BSIZE
Mean	1.29	0.64	0.67	5.78	14.83	65.71	26.66
Median	1.27	0.68	0.71	5.65	14.51	67.47	26.67
Maximum	2.27	0.79	0.80	8.57	26.90	87.65	28.51
Minimum	0.18	0.06	0.38	4.80	10.90	20.20	24.16
Std. Dev.	0.41	0.13	0.10	1.04	2.51	10.14	0.99
Skewness	0.32	-1.50	-0.98	1.78	1.66	-1.75	-0.23
Kurtosis	3.68	6.09	3.13	5.56	7.92	9.08	2.30
Observations	100	100	100	100	100	100	100

Source – Author Compiled

Descriptive statistics have included measure of central tendency, dispersion, and normality. Skewness measures the "degree of asymmetry" of the data series. According to the results of this study HHI Product, HHI Sector, Liquidity and BSIZE are negatively skewed while ROA, IRS and Capital Adequacy are positively skewed. Kurtosis

measures the "degree of sharpness" or in other words, measures the Preakness or flatness of the distribution of the data series. According to the results of this study ROA, HHI Product, HHI Sector, IRS, CAP and Liquidity have Leptokurtic while BSIZE has a Platykurtic distribution since that variable Kurtosis value is less than 03.

4.2. Test for Normality

Normality should prove from the data set to rely on the model output. In this study the researcher has used Jarque-Bera statistic to identify the overall normality in the model. The hypothesis of the test is as follows.

H_0: Data normally distributed
H_1: Data not normally distributed
Rule of Thumb: Reject null hypothesis when p <0.05

The probability value of this study 31% is above the 5% significant level which leads to the acceptance of the null hypothesis. That indicate data normally distributed in the analysis.

4.3 Test for Unit Root

For testing the Unit Root of the variables can develop hypothesis as below.

H_0: Variable is not stationery (Unit root)
H_1: Variable is stationery (No unit root)
Rule of Thumb: Reject null hypothesis when p < 0.05

Table 4.2: Unit Root Tests

Variable	P value	t-statistics
ROA	0.0008	-3.1543
HHI Product	0.0000	-0.7335
HHI Sector	0.0000	-8.2328
IRS	0.0000	-18.5557
CAP	0.0000	-3.9694
Liquidity	0.0000	-9.4550
BSIZE	0.0000	-4.5588

Source – Author Compiled

According to the results of LLC test, all the variables are significant at 5% level. Therefore, null hypothesis can be rejected, and it will emphasize that there is no unit root in the whole data set. All variables are stationary.

4.4 Correlation Analysis

The correlation matrix for the variables in this analysis is provided in the below table thus each of the variable coefficient was carried out with the intention of defining essential relations between the variables under consideration in terms of distribution.

Table 4.3: Correlation Analysis

	ROA	HHI Product	HHI Sector	IRS	CAP	Liquidity	BSIZE
ROA	**1**	-0.2172	0.1321	0.1361	0.4516	-0.1347	-0.1823
HHI Product	-0.2172	**1**	-0.2760	-0.2710	-0.2910	0.4398	-0.0026
HHI Sector	0.1321	-0.2760	**1**	-0.0473	-0.0457	0.0513	0.1480
IRS	0.1361	-0.2710	-0.0473	**1**	0.0453	-0.3893	-0.3601
CAP	0.4516	-0.2910	-0.0457	0.0453	**1**	-0.1650	-0.2534
Liquidity	-0.1347	0.4398	0.0513	-0.3893	-0.1650	**1**	-0.1006
BSIZE	-0.1823	-0.0026	0.1480	-0.3601	-0.2534	-0.1006	**1**

Source – Author Compiled

According to the result, all other variables show values between 0 to 0.8 that means there are no strong relationship among variables and there are no strong multicollinearity.

4.5 Interpretation on Final Output

Table 4.4: Hausman Test Output

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross sections Random	67.403551	6	0.0000

Source – Author Compiled

Hausman Test is used to select appropriate model between the Fixed Effect Model and Random Effect Model.

According to the results of the Hausman Test, Chi squire probability value of 0.0000 is less than 5% significant level. Therefore, researcher has rejected the null hypothesis and accepted the alternative hypothesis which indicate Fixed Effect Model is the most appropriate for the case of ROA.

Table 4.5: Fixed Effect Model Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.67217	2.405063	7.347902	0.0000
HHI PRODUCT	-1.007197	0.331013	-3.042768	0.0031
HHI SECTOR	1.731901	0.574128	3.016576	0.0034
IRS	-0.199910	0.041461	-4.82161	0.0000
CAP	0.058508	0.015109	3.872395	0.0002
LIQUIDITY	-0.002327	0.004557	-0.510551	0.6110
BSIZE	-0.617063	0.084162	-7.331845	0.0000

Root MSE	0.243205	R-squared	0.641101
Mean dependent var	1.287711	Adjusted R-squared	0.577011
S.D. dependent var	0.408008	S.E. of regression	0.265358
Akaike info criterion	0.330176	Sum squared resid	5.914869
Schwarz criterion	0.747003	Log likelihood	-0.508811
Hannan-Quinn criter.	0.498874	F-statistic	10.00326
Durbin-Watson stat	1.979771	Prob (F-statistic)	0.000000

Source – Author Compiled

The independent variable HHI Product obtains a -1.007197 coefficient with a P value of 0.0031 that less than 0.05 which indicates it has a significant negative impact on bank performance. The independent variable HHI Sector obtains a probability value of 0.0034 which is less than 0.05 and the coefficient value is 1.731901. Therefore, it indicates it has a significant positive impact on bank performance. The results of the control variable IRS exhibit 0.0000 P value which less than significant level of 5% with the coefficient of -0.199910 that define IRS has a significant negative impact to the commercial bank performance. CAP has a positive statistically significant impact to the ROA since it consists with a 0.058508 of coefficient and 0.0002 of p value which is less than 5% level. Liquidity has a negative statistically insignificant impact on ROA, its coefficient includes -0.002327 and p value of 0.6110 is exceed the 5% critical level. BSIZE variable has a negative significant impact over ROA hence, its coefficient indicates -0.617063 and 0.0000 of p value which is less than 5% confidence level.

The R-squared of this model was 0.641101 which means that the independent variables explained around 64% of the variations in the performance of the licensed commercial banks in Sri Lanka. The Adjusted R^2 value obtains 0.577011 which indicates, there is 57.70% chance that the model can be enhanced with the addition of new factor. Durbin-Watson value of 1.979771 indicate model is silent from serial correlation. The probability value of F-statistic shows as 0.0000 which is less than 5% critical level. Therefore, it can be concluded as the overall model is significant at 95% confidence level.

4.6 Test for Multicollinearity

If independent variables are highly or perfectly correlated that is called multicollinearity. Hence, examine whether multicollinearity exists in the study or not the researcher used Variance Inflation Factor [1/ (1- R squared)] and Tolerance (1/VIF). If the VIF is less than 5 or Tolerance is more than 0.2 it indicates no multicollinearity exist among independent variables. According to the collinearity diagnostic, the VIF value of 2.786299 is less than 5. This indicates that the assumption of multicollinearity is fulfilled in this study. Model is silent.

4.7 Residual Analysis

According to the LR test if the P value is higher than 0.05 researcher accept the null hypothesis which explain residuals are homoscedastic. Based on the study LR test P value of 0.1977 is higher than the critical level which define residuals are homoscedastic.

4.8 Hypothesis Testing

Models	Probability	At 5% significance level	Acceptance
H1	0.0031	Significant	Accepted
H2	0.0034	Significant	Accepted
H3	0.0000	Significant	Accepted
H4	0.0002	Significant	Accepted
H5	0.6110	Insignificant	Rejected
H6	0.0000	Significant	Accepted

Source – Author Compiled

Based on the results, all the developed hypothesis (H1, H2, H3, H4, and H6) can be accepted except H5. Because it shows an insignificant impact on bank performance. Therefore, rejected the fifth hypothesis.

Most of the past studies have used HHI for measure the diversification of the banking sector. If the HHI exceeds 0.5 that denotes market is highly concentrated. According to this study descriptive statistics, HHI values of all commercial banks exceeds 0.5. Therefore, it seems all banks are concentrated.

According to fixed effect panel regression model the final equation form can be given as bellow.

ROA= 17.67217 – 1.007197 HHI Product + 1.731901 HHI Sector – 0.199910 IRS + 0.058508 CAP – 0.002327 Liquidity – 0.617063 BSIZE   (4)

When compared to product wise diversification, there is a negative significant impact on bank performance. If bank increase the loan portfolio that would lead to decrees the bank performance. But when considering the sector wise diversification there is a positive significant impact on bank performance. If banks increase their loan portfolio that would lead to increase the bank performance. As per the IRS there is a significant negative impact on bank performance which indicate that bank can increase the performance by decreasing the IRS. According to the analysis Capital Adequacy of the bank has a positive significant impact on bank performance. Hence, if banks increase their Capital Adequacy that would lead to increase the bank performance. This study used liquidity as a

control variable and that indicate a negative insignificant impact on bank performance. Banks could be at a higher risk of bankruptcy if they increase the loan to asset ratio. Bank size has a negative significant impact on bank performance. The negative economies of scale and higher exposure of risky activities could be the reason for this negative impact. If bank increase the BSIZE that would lead to decrease the bank performance.

5. Conclusion

There are a smaller number of literature available in Sri Lanka relating to the link between loan portfolio diversification and commercial banks performance. Therefore, researcher undertake an empirical investigation to find out the impact of loan portfolio diversification on the performance of licensed commercial banks in Sri Lanka. This study analyzed the diversification and performance impact for 10 licensed commercial banks over the sample period of 2010 to 2019 by using different economic analysis and methodological approaches. In this study ANOVA model is analyzed by using the cross-sectional data series. Descriptive statistics and linear regression model are the statistical techniques conducted in this study. Main objectives of the study are to identify whether LPD impact performance of licensed commercial banks in Sri Lanka under product wise diversification and sector wise diversification. From the finding above, that is achieved, as the overall model is significant at 5% significant level.

A main finding of this study is that the product wise loan diversification, lead to poor performance on licensed commercial banks in Sri Lanka. According to the product wise loan diversification this study agrees with the

Corporate Finance Theory. In Sri Lankan context under sector wise diversification high diversified loan portfolio base lead to increase the performance of licensed commercial banks. According to the sector wise loan diversification this study agrees with the Traditional Banking Theory. The result of control variable IRS show a negative significant impact on the commercial bank performance and the Capital Adequacy show a positive significant impact on the bank performance. Liquidity shows a negative impact on the commercial bank performance with an insignificant impact. That exhibit the impact is not conclusive. Considering the results of the control variable BSIZE, there is a significant negative impact on the commercial bank performance. It means when the bank size is changing, the commercial bank performance also changes. Findings of this study provide a guidance to managers about the LPD and bank performance. When preparing regulatory frameworks for encouraging banks performances policymakers should carefully focus about to specialize or diversify their credit portfolios. Increased knowledge regarding this topic will enable bank managers and regulators to make more informed decisions and as a result contribute to financial stability and sound economic development. According to the results when bank focusing more about the product wise diversification, commercial banks need to limit their loan portfolio diversification into appropriate level to enhance their performance. On the other hand, when banks focusing more on sector wise diversification they should need to be increase the loan portfolio up to a specific level to enhance their performance. Therefore, from a policy point of view, bank loan portfolio should be carefully evaluated.

Further research can be done incorporating other determinants of commercial bank's profitability like return on equity (ROE) and return on capital employed (ROCE) etc. In Sri Lanka there is no any previous research had found conducted when considering all area of loan portfolio diversification such as product wise diversification, sector wise diversification, geographical wise diversification and currency wise diversification.   Hence, further, researchers can be focus about all the diversification areas. The study recommends to do further studies in the banking industry by using macroeconomic variables like GDP growth. Finally, study suggest for focusing impact of loan portfolio decision on bank cost efficiencies which has not been addressed in this study.

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Impact of Exchange Rate Volatility on Sri Lankan Bilateral Demand of Imports

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Abstract

Purpose - The value and importance of imports of the Sri Lankan economy has been increasing according to statistical patterns of Sri Lanka. The exchange rate volatility is one major factor that has an impact on the demand for imports in a country. This research has been carried out to identify the impact of exchange rate volatility (long-run influence) on Sri Lankan bilateral demand of imports.

Design/Methodology/Approach- Monthly data has been used for the study for the period of 2013 to 2019. GARCH and standard deviation techniques were used to measure the exchange rate volatility of USD/LKR exchange rate and exporter currency exchange rates. The autoregression distributions lag (ARDL) bound test approach was the model that has been used to estimate the long-run effect of the volatility clustering.

Findings - According to the findings of China, Indian, Japan, the UK, Singapore, Hong Kong, and the USA country models, the error terms are highly significant at 5% and 10% levels. Thus, it indicates that there is a long-run impact from exchange rate volatility on-demand on Sri Lankan bilateral imports.

Contribution - The study fulfils the existing research gap in exchange rate volatility and Bilateral demand of imports of Sri Lanka. The findings of this study will help the country to plan their bilateral demand of imports when exchange rate volatility exists and enables future researchers to conduct studies related to this area.

Keywords: *ARDL approach, Bilateral imports, Exchange rate, GARCH effect, Volatility clustering*

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1. Introduction

The historical evidence provided where Sri Lanka has been used as a trading hub in world trade since ancient times. Not only Sri Lanka's geographical location which is situated in between the sea and silk road, but the richness of natural recourses also led to attracting the attention of traders towards Sri Lanka. The importance of exports and imports of the Sri Lankan economy is increasing based on recent exports and imports statistical patterns. According to Central Bank of Sri Lanka (CBSL) statistics in 2019, Sri Lanka's exports and imports values were recorded, USD million 10,939 and 18,153 respectively. While discussing imports and exports the one most predominant factor which cannot be forgotten is the exchange rate, as the exchange rate of a currency has a direct impact in determining the prices of exports and imports of a country. Even though the exchange rate volatility will lead to a change in the prices of exports and imports, Sri Lankan imports have the highest statistical value and the highest number of products when compares to exports. Hence throughout the study, consideration was given to the impact of exchange rate volatility on bilateral imports demand in Sri Lanka. As per the CBSL, the total volume and the total value of imports from 2009 to 2019 have increased drastically by evidencing that the Sri Lankan bilateral imports are playing a significant role in the Sri Lankan economy. However, more than 50% of the Sri Lankan imports had imported majorly from, India, China, Singapore, Japan, Hong Kong, the USA, and the UK and those imports are highly diversified than the other countries.

In recent past years, the role of imports in the Sri Lankan economy has improved and is expected to increase further. Therefore, identification of exchange rate volatility impact on Sri Lankan demand of imports will provide benefits for different parties including policymakers, financial institutions, and other imports organizations. Majorly, this study will help to design effective international trade agreements and to make effective decisions regarding the balance of payment, government budgets, and exchange rate policies. Further, in terms of the financial institution and import organizations, this study will assist them to identify the Sri Lankan consumers' sensitivity to exchange rate risk.

1.1. Evolution of Sri Lankan exchange rate regimes

Sri Lankan exchange rate regime has evolved from time to time from a fixed exchange rate regime to an independent floating exchange rate regime and at present, the CBSL is practicing an independent floating exchange rate regime system to control the Sri Lankan exchange rates. The exchange rates in independent floating exchange rate regimes are sensitive to changes in the foreign exchange rate markets' supply and demand and it defines as the exchange rate volatility or exchange rate risk. Therefore, exchange rate volatility directly impacts the Sri Lankan trade and the importers and exporters, i.e., the parties who are engaging in international trade.

1.2. Exchange rate volatility and trade

Initially, theoretical papers explained that if any mechanism is absent to reduce the risk of exchange rate volatility, it will lead to reducing the volume of international trade. Ethier (1973) specified that the traders' uncertainty about

the impact of firms' revenue from exchange rate volatility will course to reduce trade. Baron (1976) explained the same by specifying that the risk-averse firms will reduce trade and reduce the risk exposure of the firm due to exchange rate volatility. Thus, it can conclude that the exchange rate volatility will negatively affect trade, and exchange rate volatility will lead to reducing the trade. However, in contrast to that, Sercu and Vahulle (1992) and Grauwe (1988) stated, that there is a positive relationship between the exchange rate volatility and risk-loving trades. Moreover, Willett (1986) specified that exchange rate volatility does not have a significant effect on trade due to not much of a difference between the behaviors of international risk and domestic risk by indicating that the exchange volatility does not have a significant impact on trade. Regarding the above facts, it can be noticed that many researchers have illustrated a mixed relationship between the exchange rate volatility and international trade. Therefore, this study has been carried out to identify whether there is an impact from exchange rate volatility on Sri Lankan bilateral demand of imports.

2. Literature Review

As discussed earlier, the relationship between exchange rate volatility and international trade can be categorized mainly into three forms as negative, positive, and insignificant relationships. Concerning the negative relationship between international trade and exchange rate volatility theories, Clark (1973) explained exchange rate volatility and risk-averse exporter behavior. He elaborated that the exchange rate volatility will reduce the trade due to the uncertainty about the future exchange rate translated into future export receipts in domestic currency. Further, he

specified that the risk-averse exporter maximized expected utility by reducing the exchange rate risk exposure through reducing the sales. By following the same findings, Baron (1976) has illustrated the same impact of exchange rate volatility on trade by using two situations including the exporter invoiced in foreign currency and the exporter invoiced in domestic currency. In 1978 Hooper and Kohlhagen (1978)have explained the relationship from the perspective of exporter and importer. As of that, an increase in exchange rate volatility will lead to an increase in the variance of profits of both importer and exporter. Therefore, the importer's demand curve will shift downward and the exporter's supply curve will shift leftward. That will lead to a reduction in the quantity demanded of imports and prices conversely, which will lead to a reduction in the quantity exported and ultimately lead to increase export prices. However according to this model, if the importer bears the risk of exchange rate volatility, it will lead to a reduction in the price and reduce the demand of an importer. Further, if an exporter bears the risk of exchange rate volatility, it will lead to an increase in price due to the premium price charged by the exporter.

Moving to the positive relationship between international trade and exchange rate volatility theories, Grauwe (1988) has highlighted the relationship by using income and substitution effects which are working in opposite directions. According to his findings, a sufficient risk-averse exporter will increase exports when increasing the exchange rate volatility risk due to increases of expected marginal utility of exporter revenue (substitution effect). Also, a very risk-averse exporter will increase exports when increasing the exchange rate volatility due to worry

about the worse possible outcome and avoid the decline of the firm's revenue (income effect). Additionally, Viaene and de Vries (1992) explained that the forward spot exchange rate volatility can affect the volume of trade through the effect of the forward exchange rate. Therefore, changes in prices partly or fully will be offset by the changes in forwarding exchange rates. This will make an opportunity to earn profits for both importers and exporters. Therefore, exchange rate volatility will lead to increase trade. Not only the positive and negative relationship Willett (1986) has demonstrated an insignificant relationship between international trade and exchange rate volatility due to the lack of differential increase in international risk relative to the domestic risk.

When considering the type of exchange rate, bilateral and effective exchange rates can be used either as nominal or real terms. If the impact of exchange rate uncertainty on the demand of imports is to be measured for the economy, effective exchange rates should be used either in nominal or real terms. If the impact of exchange rate uncertainty on the demand of imports is to be measured for individual traders, bilateral exchange rates should be used either in nominal or real terms. Bahmani-Oskooee and Hegerty (2007) have carried out the impact on demand of imports by categorizing into three ways an aggregate data used studies, bilateral data used studies and sectorial data used studies. According to that, in bilateral data used studies; bilateral exchange rates have been used either in nominal or real terms, in sectorial data used studies, bilateral data has further been disaggregated into sectorial wise due to different levels of risk faced by different types of sectors and bilateral exchange rates either in nominal or real terms has been used in sectorial data used studies as well as in bilateral data used studies. Exchange rate volatility

measuring techniques have evolved reflecting the new advances in econometric techniques. Discussing the exchange rate volatility measurement techniques, in early empirical studies, the most famous and mostly used volatility measurement technique is the standard deviation measurement (Akhtar & Hilton, 1984) (Gotur, 1985) (Lastrapes & Koray, 1990) (Koray & Lastrapes, 1989). However, the validity of the standard deviation technique has been criticized due to many reasons. Therefore, as a substitution the ARCH and GRACH base volatility measuring techniques have been introduced. The ARCH and GRACH model is the most used modern time series techniques in modern empirical studies to measure the exchange rate volatility (McKenzie & Brooks, 1997) (Caporale & Doroodian, 1994) (Jiranyakul, 2013) (Hakan, Hidayet, & Murat, 2012)and (Aftab, Syed, & Katpe, 2017).

As this study is focused on identifying the impact of exchange rate volatility on the demand for imports, it was brought to the attention that there is empirical evidence for negative, positive, and insignificant relationships. Akhtar and Hilton (1984) have identified a significant negative impact of exchange rate volatility on both USA and Germany import demand. They have used a polynomial distributed lag method in their ordinary least square (OLS) to estimate the effect of exchange rate volatility and used standard deviation measurement to capture the exchange volatility Following the findings, Lastrapes and Koray (1990) also have explained the same negative relationship by using time series vector error correction (VAR) model. The study has used aggregate monthly data of import, export, money supply, T-bills rates, income, and consumer price index of the USA from 1973 to 1987. Caporale and Doroodian (1994) have used the OLS method to estimate bilateral exchange rate volatility between UAS and Canada.

They used GRACH measurement to capture the exchange rate volatility. They set import volume as a function of income and real exchange rate and results showed a significant negative relationship between bilateral exchange rate volatility and USA demand for Canadian import. Alhayky and Senanayake (2010) have used the time series model to estimate the impact of bilateral exchange rate volatility on China and Sri Lanka aggregate trade flows (exports and imports). In this study, they used another panel data model to estimate the impact of bilateral exchange rate volatility on China and Sri Lanka 23 sectors trade flows. They set import volume as a function of income, relative prices, and exchange rate volatility. The results showed a significant negative relationship between the bilateral exchange rate volatility and import demand in both aggregate and sectoral data models. Further, Hakan, Hidyet, and Murat (2012) and Jiranyakul (2013) have used ARDL bound test approach to estimate the impact of exchange rate volatility on Turkey's demand of imports and Thailand demand of imports respectively. They used the GARCH technique to capture the exchange rate volatility and set the real imports as a function of relative price and real GDP. The results showed a significant negative relationship between the exchange rate volatility demand of imports in both the short-run and long-run.

Moving to the empirical evidence for the positive relationship between exchange rate volatility and demand of imports, McKenzie and Brooks (1997) has used ARCH at the rate of change measurement to capture the exchange rate volatility and set import volume as a function of Income, prices, nominal exchange rate, and real exchange rate. They used monthly data of two countries throughout 1973- 1992 and tested their model separately using real

exchange rates and nominal exchange rates. In both situations, results showed a significantly positive relationship between exchange rate volatility and demand for imports. Apart from the empirical evidence for positive and negative, it can also be noticed that there is an insignificant relationship between exchange rate volatility and demand of imports. While Lastrapes and Koray (1990) have used the VAR model, Bahmani-Oskooee and Hegerty (2007) have used the Granger method of co-integration to estimate the effect of exchange rate volatility. Even though Lastrapes and Koray (1990) set import volume as a function of money supply, Bond yield, Prices, income, and nominal exchange rate as variables of the UK, France, Germany, Japan and Canada Bahmani-Oskooee and Hegerty (2007) has set import volume as a function of income, relative prices, and exchange rate volatility of Greece, Korea, Pakistan, Philippine, Singapore, and South Africa. At the end of the study both the results showed a weak relationship between bilateral exchange rate volatility and import volume between countries.

3. Methodology

The arguments of Anderton and Skudelny (2001) and Cushman (1986) have been used to create the initial model to identify the impact of exchange rate volatility on Sri Lanka's bilateral demand of imports.
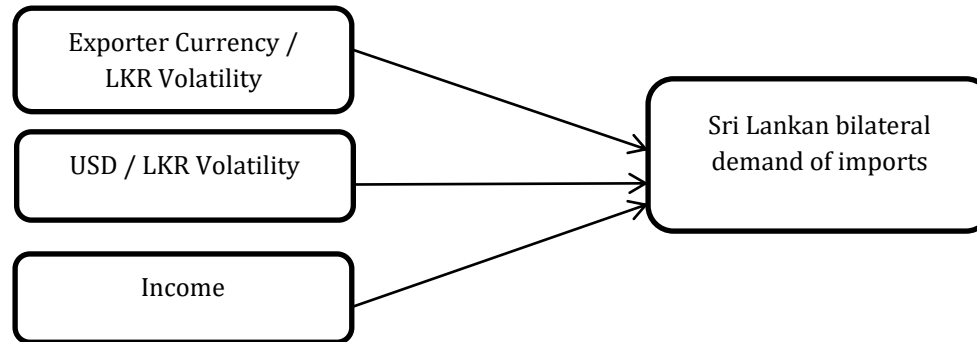
3.1. Conceptual Framework

Figure 1: Conceptual Framework

Source: Author Compiled

3.2. Model Development

The model was developed under the assumption that Sri Lankan imports are invoiced in either USD or exporter currency. Therefore, the exchange rate volatilities of USD/LKR and exporter currency/LKR can have an impact on Sri Lankan bilateral demand of imports. Further, to improve the significance of the statistical model, income has been introduced as a control variable. This study is expecting to identify the impact of exchange rate volatility on the bilateral demand of imports for the countries of India, China, Japan, the UK, Singapore, Hong Kong, and the USA.

1. SL demand on: Income & INR/LKR volatility & USD/LKR volatility Indian imports

2. SL demand on: Income & RMB/LKR volatility & USD/LKR volatility Chines imports

3. SL demand on: Income & YEN/LKR volatility & USD/LKR volatility Japanese imports

4. SL demand on: Income & GBP/LKR volatility & USD/LKR volatility UK Imports

5. SL demand on: Income & SGD/LKR volatility & USD/LKR volatility Singapore imports

6. SL demand on: Income & HKD/LKR volatility & USD/LKR volatility Hong Kong imports

7. SL demand on: Income & USD/LKR volatility & USD/ LKR volatility USA imports

According to the model developed in the theoretical framework, import value is set as a function of income, exporter currency/LKR volatility, and USD/LKR volatility.

$$Mx = a0 + a1Y + a2 \, X /LKR \text{ volatility} + a3 \, USD/LKR \text{ volatility} \qquad (1)$$

Where "Mx" is representing imports from country "X", "Y" is income as a proxy of the index of industrial production. "X/LKR volatility" is used as a measure of uncertainty in bilateral NER (Nominal exchange rate) between exporter currency and LKR, and "USD/LKR volatility" is used as a measure of uncertainty in bilateral NER between USD and LKR. The impact of income should be positive because income increases will lead to an increase in the ability of spending on imports and vise-versa. According to the results of previous studies, currency exchange rates volatilities may have a negative, positive, or insignificant effect on the demand for imports.

When developing the hypotheses, theoretical arguments regarding exchange rate volatility and international trade have been used. As of that, there could be positive, negative, and insignificant relationships between exchange rate volatility and demand of Sri Lankan imports.

H1 = Exporter currency/LKR exchange rate volatility does have an impact on Sri Lankan bilateral demand of imports.

H2 = USD/LKR exchange rate volatility does have an impact on Sri Lankan bilateral demand of imports.

3.3. Model Design

Even though Sri Lanka is trading with many countries, 54% of imports out of total imports from 2014 to 2019 period were imported from seven countries including India, China, USA, UK, Japan, Singapore, and Hong Kong. Therefore, monthly data of NER, monthly industrial production index of Sri Lanka in LKR has been used for the analysis. Thus, a sample size of 84 data sets has been collected from 2013 to 2019. All the required secondary data was gathered from numerous sources such as the Central Bank of Sri Lanka, World Bank, World Integrated Trade Solution, and International Trade Center. In order to estimate the overall model, the Auto Regression Distribution Lag (ARDL) bound test approach will be used as it would identify the long-run and short-run relationships between variables. Also, Generalized Autoregressive Conditional Heteroskedasticity (GARCH) technique has been used to measure the

volatility of the exchange rate. But then again, Standard Deviation (SD) will be used for the variables that did not have a GARCH effect.

4. Findings and Discussion

Before running the model, the Augmented Dickey-Fuller (ADF) test has been carried out and identified all the variables including imports, USD/LKR exchange rate, Export Currency/LKR exchange rate, and Industrial Production Index (IPI) is stationary "at level" and "1st difference" forms. Further, the Cumulative Sum of Recursive Residuals (CUSUM) test, Breusch-Pagan- Godfrey Test, Correlogram Q statistic tests also have been performed to identify the stability of the parameters, heteroskedasticity, and serial correlation of all the models respectively.

As per table 1, there is a GARCH effect in the USD/LKR exchange rate as the p-value is 0.037 which is significant at the 5% level. When discussing the exchange rate volatility impact on Sri Lankan demand on imports, the Chinese imports, RMB/LKR exchange rate's GARCH term is highly significant as the p-value is 0.001. Therefore, it can conclude that there is a GARCH effect in the Chinese exchange rate. Also, as there is a GARCH effect both in the RMB/LKR exchange rate and USD/LKR exchange rate researcher created exchange rate volatility with respect to GARCH models.

Table 01: GARCH Model and ARDL Model Results of Imports

Country Import	GARCH Model – P-value		ARDL Model	
	Export Currency/LKR	USD/LKR	Error Correction	Beta Value
Model 1- China	0.0001	0.037	0.002	-0.93
Model 2 - India	0.2898	0.037	0.014	-0.73
Model 3 - Japan	0.5102	0.037	0.0746	-0.59
Model 4 - UK	0.6384	0.037	0.0000	-1.10
Model 5 - Singapore	0.2139	0.037	0.0000	-1.00
Model 6- Hong Kong	0.5510	0.037	0.0002	-1.007
Model 7-USA	0.0378	0.037	0.0004	-0.719

Source: Author Compiled

Thus, the long-run effect of volatility clustering can be tested using the ARDL model. According to the ARDL model probability of error correction term is 0.002 with a negative beta value of -0.93. As the result is significant with a negative beta value there is a long-run effect from RMB/LKR exchange rate volatility clustering and USD/LKR exchange rate volatility clustering to Chines imports. Moving to Indian imports, IND/LKR exchange rate volatility variable is created by using the standard deviation technique since there is no GARCH effect in the IND/LKR exchange rate as the GARCH term is highly insignificant (0.2898). However, since there is a GARCH effect in the

USD/LKR exchange rate researcher created USD/LKR exchange rate volatility with respect to the GARCH model. Hence, the long-run effect of volatility clustering has been tested using the ARDL model. According to the ARDL model, there is a long-run effect from IND/LKR exchange rate volatility clustering and USD/LKR exchange rate volatility clustering to Indian imports as the error correction term and beta value is 0.014 and -0.73 respectively.

According to the Japanese imports, the YEN/LKR exchange rate volatility variable is created by using the standard deviation technique as there is no GARCH effect in the YEN/LKR exchange rate (0.5102<0.005). Also, as per the ARDL model, there is a moderately long-run effect from YEN/LKR exchange rate volatility clustering and USD/LKR exchange rate volatility clustering to Japan imports as the p-value is significant at 10%. When explaining the exchange rate volatility impact on Sri Lankan demand on UK imports, the GARCH model probability of the GBP/LKR, the GARCH term is highly insignificant as the P-value is 0.6384. This indicates that there is no GARCH effect in GBP/LKR exchange rate. As the volatility clustering of USD/LKR is identified earlier, only the GBP/LKR exchange rate volatility variable is created by using the standard deviation technique since there is no GARCH effect in GBP/LKR exchange rate. According to the ARDL model, the probability of error correction term is 0.0000 with a negative beta value of -1.10. The significant P-value with a negative beta value is indicating that there is a long-run effect from GBP/LKR exchange rate volatility clustering and USD/LKR exchange rate volatility clustering to UK imports.

As per the Singapore imports and Hong Kong imports, the export currency rates of SGD/LKR and HKD/LKR's GARCH term are insignificant as the p-value is 0.2139 and 0.5510 respectively. Hence both the exchange rates the volatility variable are created by using the standard deviation technique. Also, as per the ARDL model, it was brought to the attention that there is a long-term effect from SGD/LKR and HKD/LKR exchange rates volatility clustering and USD/LKR volatility clustering to Singapore imports and Hong Kong Imports. Lastly, according to the exchange rate volatility impact on Sri Lankan demand on USA imports, it was discovered that there is a GARCH effect in the USD/LKR exchange rate. Thus, it could create the exchange rate volatility with respect to the GARCH model. Correspondingly, the long-run effect of the volatility clustering has been tested using ARDL Model. As the error correction term is 0.0004 and the beta value is -0.719 there is a long-run effect from USD/LKR exchange volatility clustering to the USA imports.

5. Conclusion

The Importance of imports in the Sri Lankan economy has been gradually increasing according to the recent import statistics. However, more than 50% of Sri Lankan imports are coming from the countries such as China, India, Japan, UK, Singapore, Hong Kong, and the USA. One of the most predominant issues that all the importers, financial institutions, and policymakers are facing is exchange rate volatility. According to the available literature, exchange rate volatility has a significant (positive or negative) or insignificant impact on the demand for imports. Therefore,

the main objective of this study was to identify the impact of exchange rate volatility on Sri Lankan bilateral demand of imports.

The imports invoices are assumed to be invoiced either in USD or exporter currency. According to the literature, it was found that Cushman's (1986) theory, exchange rate volatility of more than two currencies can affect to offset the trade patterns of bilateral trade flows. Hence, the exchange rate volatility of USD/LKR and the exchange rate volatility of exporter currency /LKR both were used to develop the model. Also, the Income was introduced as a control variable for the final model and the industrial production index has been used to measure the proxy income. Further, GARCH and standard deviation techniques have been applied to identify the exchange rate volatility whereas, the ARDL technique was applied to test the overall model. According to the analysis, the volatility clustering was presented in all the exchange rate variables including RMB/LKR, IND/LKR, YEN/LKR, GBP/LKR, SGD/LKR, and HKD/LKR. However, the GARCH effect has only appeared in USD/LKR and RMB/LKR exchange rate variables. In those variables, the exchange rate volatility variables are created with respect to the GARCH model. The export exchange rates of IND/LKR, GBP/LKR, YEN/LKR, HKD/LKR, and SGD/LKR, the exchange rate volatility variables are created with respect to the standard deviation. Further, according to the ARDL model results, all the countries' error terms are highly significant at 5% and 10% levels. Therefore, the study can reject the hypotheses of which the exporter currency/LKR exchange rate volatility does have an impact on Sri Lankan bilateral demand of imports, and USD/LKR exchange rate volatility does have an impact on Sri Lankan bilateral demand of imports.

Thus, this indicates that there is a long-run impact from exchange rate volatility on-demand on Sri Lankan bilateral imports.

Even though the objective of the study has been satisfied, this research has given it's focused only on a specific set of countries. Also, this study has not considered, the differences of countries' trade agreements and tax policies as the trade agreements and tax policies may offset the actual impact of the exchange rate volatility on the demand of imports. By considering all the limitations, the same study could be examined further by analyzing the impact of exchange rate volatility on the demand of sectorial imports.

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The Impact of Working Capital Management Practices on the Profitability: A Comparative Study between Listed Capital Goods and Material Sector Companies in Sri Lanka

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Abstract

Introduction – The documented evidence indicate that Working Capital Management Practices (WCMP) have a significant impact on the firm's profitability. However, the WCMPs vary between industries. Accordingly, this study investigates whether the impact of WCMP on the profitability is different between CG sector and Material sector taking evidence from mid-cap and small cap the companies listed in the Colombo Stock Exchange.

Methodology – This study has selected 16 listed companies from CG Sector and Material Sector. The data are collected using annual reports from 2014 to 2019. The Regression includes ROA as the dependent variable and the Working Capital measures as independent variables. Further, the model controls for size, sales growth and debt. Moreover, sector wise ranking is used to identify the industry wise differences of WCMP.

Findings - The findings show that the WCMP has a statistically significant and a marginal impact on ROA. Further, the profitability of Material Sector is more negatively responsive to Debtors Conversion Period (DCP) and more positively responsive to Creditors Conversion Period (CCP). Furthermore, the Cash Conversion Cycle (CCC) is more negatively responsive to the profitability of CG Sector. According to sector wise ranking analysis, Material Sector manage the WCMP better overall due to the

Conclusion – Material Sector is more responsive to DCP and CCP. Therefore, the managers should provide more attention towards better management of debtors and creditors. The CG sector required to pay attention towards the overall working capital management. Therefore, the managers should ensure the better working capital management practices are in place.

Keywords: *capital good sector, material sector, profitability, working capital management*

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1. Introduction

There are four aspects to a company's financial management decision, including the investment decisions, financing decisions, dividend decisions and working capital decisions. Generally, working capital is the difference between current asset and current liabilities. Working capital often changes its form, sometimes referred to as circulating capital. Working capital can take many forms as Gross and net working capital, fixed working capital and variable working capital. Gross working capital is the investment in the company's current assets. Net working capital is the difference between current assets and current liabilities. These two concepts of working capital are equally important from a management perspective (Pandey, Gupta, & perera, 1997). WCM is the process of adequately managing short-term assets and liabilities to maintain the business for the foreseeable future without liquidity problems. WCM is important because it affects on the company's liquidity and profitability (Paul & Mitra, 2018).

1.1 Need for and Importance of the Study

Effective working capital management practices (WCMP) are decisive factors that determines the company's existence and its bankruptcy (Paul & Mitra, 2018). Effective WCMP helps maintain smooth operations, thereby increasing the company's earnings and profitability. Therefore, understanding the relationship between WCMP and profitability of the firm is important. Since, there is an undeniable importance of an efficient WCMP. Many management efforts are expanding to bring the current level of assets and liabilities to optimal levels.

This study investigates whether the WCMP impacts on the profitability of Material sector and CG sector firms. Further, this study compares the two sectors and identifies whether there are differences in the responsiveness of profitability to the WCMP. This study compares the CG sector and the Material sector while focusing on mid and small cap firms. The Material sector firms provide the inputs to the CG sector firms. However, the WCMP of large real estate or construction firms will not be comparable with the WCMP of the Material sector firms due to rigid and long-term focused business nature. On the other hand, the WCMP of Multinational Material sector firms will not be comparable with CG sector firms due to the differences in the business models and operations become much more salient. Therefore, by eliminating large firms from the both sectors, the two sectors become more comparable as the WCMP of mid and small cap Material and CG sector companies become more similar.

1.2 Research Question

- Is there any impact of working capital management practices on profitability in capital goods sector and material sector?

- Is there any significant industry differences in working capital practice in capital good sector and material sector?

1.3 Objectives of Research

- To identify whether there is any impact of working capital management practices on profitability in capital goods and material sector.

- To identify whether there are industry differences exist in working capital management practices in capital goods sector and material sector.

- To rank the industries base on the working capital management practices.

2. Literature Review

Findings from similar past researchers provide strong evidence for conducting new research on related area.

2.1 Theoretical review

If the company wants to achieve the optimum performance in day-to-day operations, it must always stay close to the optimal working capital finance and avoid possible deviation (Altaf & Ahmad, 2019). Banos-Caballero, Garcia-Teruel, & Martinez-Solano (2016) argued that when companies run out of their optimal working capital, profitability decreases. If the company has not enough working capital for day-to-day operation, it could lead to liquidity problems and shortages.

2.1.1 Components of working capital

Two concepts of working capital are gross working capital and net working capital. Gross working capital is a combination of a company's current assets that can convert into cash within one year or less and net working capital calculated by subtracting current liabilities from a company's total current assets.

2.1.2 Types of Working Capital

There are two types of working capital, permanent and temporary types. Permanent working capital is the minimum working capital required to cover all existing liabilities for a business. The need for additional working capital arising from the seasonal demand of the product or any other special event is called temporary working capital. Baños-Caballero et al. (2016) argued firms with a lower percentage of working capital requirement financed with short-term debt are the most profitable for the company.

2.1.3 Factors determining working capital requirements

The general factors that influence a company's working capital decisions can be classified into two groups, internal factors and external factors. Internal factors include the nature of the business, the size of the business, the company's product policies, credit policy and the growth and expansion of the business. External factors include Business fluctuations, changes in technology, infrastructure, import policy and taxation policy.

2.1.4 Working capital management

WCM is the decision relating to short term financing and working capital. WCM tries to confirm the company has sufficient cash amount against to its short-term debt obligations and operating expenses. Charitou, Lois and Santoso, (2012) identified that there is a negative relationship between WCM and company profitability. Importance of WCM to profitability, measured by the cash conversion cycle (CCC), and its components (inventory, accounts receivable and accounts payable) of SMEs (Tauringana & Afrifa, 2013). If the company manage properly cash, account receivables and inventory, it can be increased the profitability of the company (Raheman & Nasr, 2007). Further, collecting debtor's money is called receivable management. Although the process of debt collection may seem simple, it must be managed well. Accounts receivable are collectible accounts. Research by Raheman and Nasr (2007) supports managers can create value for their shareholders by reducing the number of days accounts receivable within the company, therefore, it is best to manage accounts receivable. Inventory management is the process of ordering, storing and using raw materials, component and finishing products. There is a negative relationship between inventory days and profitability of the company, and which indicates that mismanagement of inventory with sudden drop in sales will lead to excess capital requirement far than profitable operations (Lazaridis & Tryfonidis, 2006). Research by Masadeh, Khasawneh and AL Salamat (2018) supports High inventory volumes are profitable to manufacturing and production industries. Low inventory volumes are profitable in retail industries. The process of collecting and managing cash flows is known as cash management. In the business,

companies have many inflows and outflows. They must be carefully managed to meet payment obligations, plan for future payments, and maintain adequate business stability. Effectively managing liabilities in a business organization is an important business process. Accounts payable is the amount that the organization has to pay its suppliers or sellers on the goods and services received. Effective managing account payable is important for organization. There is a negative relationship between accounts payable and profitability, and less profitable companies have to wait longer to pay their bills (Deloof, 2003). But according to the research by Dong and Su (2010), more profitability firms wait longer to pay their bills. Cash conversion cycle is the time (measured in days) taken to convert a company's cash flow into investment sales for inventory and other resources. It is calculated as follows:

$$\text{CCC = Average collection period + Inventory turnover in day} - \text{Average payment period (1)}$$

2.2 Review of Empirical Study

Jayarathne (2014) conducted a study regarding impact of WCM on profitability by selecting 20 listed manufacturing companies in Sri Lanka. Data collected for five years period (2008- 2012). Independent variables; Number of days of Accounts receivable, inventory, accounts payable and cash conversion cycle. Dependent variable was ROA. Control variables; Firm size, sales growth and debt ratio. Analysis has been done through Pooled ordinary square regression analysis method. Findings of this research; positive relationship with profitability (ROA) by firm size (β

= 5.690), account payable days (β =0.040, p < 0.05), sales growth (p < 0.01). Negative relationship with profitability (ROA) by account receivables (β = -0.093, p < 0.01), number of days inventories (β =-0.064, p<0.000), CCC (β =-0.048, p<0.001). On similar study, Paul and Mitra (2018) identified in India steel industry, positive relationship with profitability by borrower's days, quick ratio, debtor turnover ratio. Negative relationship between profitability and ICP. Multistage sampling technique was used to take the sample of 35 companies out of 576 steel companies and data collected period is 2000-2016. ROA was the dependent variable. Independent variable: Current ratio, Quick ratio, Debtors turnover ratio and finished goods turnover ratio. Prior to application of the panel data regression, the test of multi-collinearity and the unit root test was carried out. Nimalathasan (2010) examined the impact on WCM and profitability with randomly selecting 10 manufacturing companies in CSE. Time period is 2003-2007. The researcher found; CCC and ROA are negatively correlated (-0.127), ICP and ROA are negatively correlated.

Tauringana and Afrifa (2013) explored the importance of WCM to the profitability of the business, targeting small and medium-sized businesses. Panel data used from 2005-2009 period with 19 questionnaire response based on a sample of 133 alternative investment market. The results of this study; accounts receivable and accounts payable management important for the company's profitability, inventory, CCC is not important for company profitability in SMEs. Singh, Kumar, & Colombage (2017) conducted a study of WCM and firm profitability by using meta-analysis with set of 46 direct research articles and proved that WCM negatively related to profitability, as well as

conducted a detailed subgroup study and confirmed CCC and the profitability were negatively related. WCM primarily contributes to operating profit ability rather than to a firm's value. Tran, Abbott, & Yap (2017) has been able to study how Working Capital impacts profitability. They studied the impact of working capital on the profitability of small and medium-sized businesses in Vietnam. It was selected a sample of 200 Vietnamese manufacturing SMES listed on the HSE with financial statement available years from 2010-2012 and after integrating them into the global economy, the purpose of his study is to identify an analytical relationship between WCM and the Profitability of Vietnam enterprises. According to this study, efficient WCM is the key to achieving maximum profitability. Bhatia & Barwal (2015) studied "efficiency of working capital management practices and the effect on the profitability of the firm: A study of real estate sector of India". Six listed real estate firms have been taken to consideration and secondary data collected from 2009 to 2013. Independent variables; current ratio, liquid ratio. Current asset to total asset ratio, current liability to total assets ratio, inventory to current assets ratio, debtors' turnover ratio, collection period, debtors to current asset ratio and working capital turnover ratio. Dependent variables; return on asset and net profit margin. Ratio analysis was done individually to study working capital practices. Correlation and regression analysis were used. Profitability is significantly related to current and liquid ratios. The 79% variability in ROA can be explained by the difference in the current ratio and 92% variability can be explained by liquidity ratio. Net profit margin is negatively dependent on current liabilities to total asset ratio and 53% variability can only be explained by this ratio.

2.3 Identification of knowledge gap

In general, the literature review indicates that WCM has significantly effect on firm's profitability. But WCMP differs between industry to industry. The comparative study of WCMP on industry to industry is rare. Most of CG sectors' companies depends on material sectors' companies that is due to that required materials of CG sector are provide by the material sector. Therefore, Debtors and creditors will be created between these sectors. This study will fill the knowledge gap through comparison how WCMP effect on profitability between these two sectors.

3. Methodology

3.1 Variable choice

The study identified the independent variables; ICP, DCP, CCP and CCC used to measure WCMP and control variables; firm size, sales growth and debt ratio and dependent variable is ROA to measure the firm's profitability following Jayarathne (2014).

Table 3.1: Measurement of variable

Variables	Method of computation
ROA (profitability)	Profit Before Interest and Tax (PBIT)/Total Assets
DCP (debtor conversion period)	(Average of accounts receivable/Sales) *365
ICP (Inventory conversion period)	(Average Inventory/Cost of Goods Sold) *365
CCP (Creditor conversion period)	(Average of accounts payable / Cost of goods sold) *365
CCC (Cash Conversion period)	(DCP) + (ICP) – (CCP)
SIZE (Firm size)	Natural Logarithm of total assets.
SGR (Sales growth)	Current year sales - Previous year sales)/Previous year sales
DEBT (Debt ratio)	Total liabilities/Total assets

Source – Authors Compiled
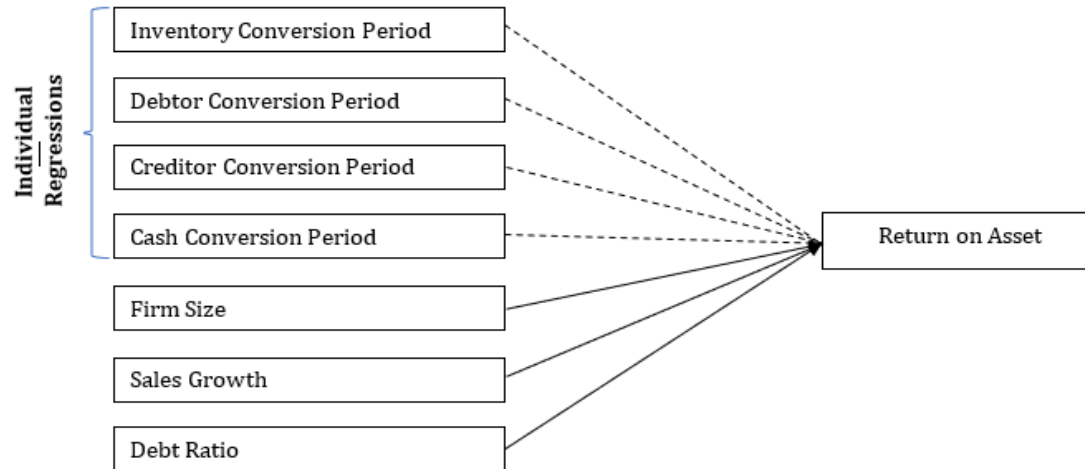
3.2 Conceptual framework

Figure 1: Conceptual Framework

Source – Authors Compiled

3.3 Population, Sample & Study Period

The population of this study is listed thirty CG sector and twenty-three material sector companies in Sri Lanka. The sample of this study comprises eight mid-cap and small-cap companies each from both sectors in order to run the regression to achieve primary objective of this study and the same sample is used for the sector wise ratio analysis to achieve secondary objective of this study. The sample period is six years from 2014 to 2019.

3.4 Hypotheses

There are four hypotheses in this study. To test those hypotheses, there are four model but regress those four models for Material and CG sector separately. Hypothesis and corresponding model are illustrated bellow.

H_11: There is significant relationship between ICP and ROA.

Model 01: $ROA_{it} = \beta_o + \beta_1 ICP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$

H_12: There is significant relationship between DCP and ROA.

Model 02: $ROA_{it} = \beta_o + \beta_1 DCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$

H_13: There is significant relationship between CCP and ROA.

Model 03: $ROA_{it} = \beta_o + \beta_1 CCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$

H_13: There is significant relationship between CCC and ROA.

Model 04: $ROA_{it} = \beta_o + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$

3.5 Methodology

OLS Regression analysis used to analysis whether there is impact of WCMP on profitability in CG sector and material sector. The major assumptions in OLS model were tested through correlation analysis, variance inflation factor, Jarque - Bera test, Durbin Watson value. E-views 11 and StataMP 13 are the main statistical software were used to analysis the data. Sector wise ratio analysis used to identify industry differences exist in working capital management practice.

4. Findings and Discussion

At the initial stage, Redundant fixed effect likelihood ratio and Hausman test were performed to identify suitable model for regression. OLS regression assumption was tested through correlation matrix (multicollinearity), VIF (multicollinearity), Jarque-Bera test (Normality), Durbin Watson value (Autocorrelation). The second part of this section discusses sector wise ranking analysis for achieving the second objective of this study.

4.1 Impact of working capital management practices on profitability

4.1.1 Inventory Conversion Period on Return on Asset

Therefore, following same regression model was performed for sector for examining impact of ICP on ROA. Model 1.1 for Material. Model 1.2 for CG-sector.

Model 1.1: $ROA_{it} = \beta_o + \beta_1 ICP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (1)

Model 1.2: $ROA_{it} = \beta_o + \beta_1 ICP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (2)

Table 1: Regression Model 1.1 and 1.2

Independent Variable	Dependent Variable = ROA			
	Model 1.1		Model 1.2	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.216832	0.8013	0.247803	0.1325
ICP	-0.000637	0.0473	-0.000838	0.0104
SIZE	0.059197	0.5269	0.004646	0.7499
SALES_GROWTH	0.055392	0.4764	-0.004702	0.9007
DEBT	-0.382858	0.0018	-0.233722	0.0129
F-statistic	5.024137	0.000105	10.01842	0.0000
R-squared	0.605547		0.753766	
Durbin-Watson stat	1.771521		1.879502	

Source – Authors Compiled

As per the redundant fixed effect-likelihood ratio result, cross-section F-Values are 4.7408 (P-value 0.0007) and 5.8798

(P-value 0.0001) respectively. Therefore, panel regression method is preferred over pool model in both sectors. As per

the Hausman test result, corresponding p values of Chi-Square Statistic were 0.0155 and 0.0070. Therefore, the fixed

effect model suitable than random effect in both sectors. According to output from regression, there is negative relationship between ICP and ROA (β =-0.000637, $p < 0.05$) and (β = -0.000838, $p < 0.05$) in material and CG sector respectively. Therefore, it can be concluded that ICP has a greater significant negative impact on ROA in CG sector than material sector. In material sector $R2 = 0.60$ and in CG sector $R2 = 0.75$ were found. Models 1.1 and 1.2 were consistent with all assumption in OLS; no autocorrelation (DWV; 1.17715, 1.8795), normality (Jarque-Bera test; 0.66, 0.93), no multicollinearity (mean VIF; 1.6, 1.16).

4.1.2 Debtor Conversion Period on Return on Asset

Therefore, following same regression model was performed for sector for examining impact of DCP on ROA. Model 2.1 for material. Model 2.2 for CG sector.

Model 2.1: $ROA_{it} = \beta_o + \beta_1 DCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (1)

Model 2.2: $ROA_{it} = \beta_o + \beta_1 DCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + ROA_{i(t-1)} + u_{it}$ (2)

Table 4.2: Regression Model 2.1 and 2.2

Independent Variable	Dependent Variable = ROA			
	Model 2.1		Model 2.2	
	Coefficient	Prob.	Coefficient	Prob.
C	0.144040	0.8795	2.592480	0.0009
DCP	-0.001972	0.0395	-0.000656	0.0148
SIZE	0.028737	0.7809	-0.234865	0.0032
SALES_GROWTH	-0.050247	0.3420	0.040963	0.1603
DEBT	-0.412925	0.0048	-0.294529	0.0069
ROA (-1)			-0.222787	0.1508
F-statistic	3.689234	0.001438	18.50194	0.000000
R-squared	0.529913		0.891576	
Durbin-Watson stat	2.288731		2.104151	

Source – Authors Compiled

As per the redundant fixed effect-likelihood ratio result, cross-section F-Values are 3.5000 (P-value 0.0058) and 7.2551 (P-value 0.0001) respectively. Therefore, panel regression method is preferred over pool model in both sectors. As per the Hausman test result, corresponding p values of Chi-Square Statistic were 0.0018 and 0.0000. Therefore, the fixed effect model suitable than random effect in both sectors. According to output from regression, there is negative relationship between DCP and ROA (β =-0.001972, $p < 0.05$) and (β = -0.000656, $p < 0.05$) in material and CG sector respectively. Therefore, it can be concluded that DCP has a greater significant negative impact on ROA in material sector than CG sector. In material sector $R2 = 0.52$ and in CG sector $R2 = 0.89$ were found.

Models 1.1 and 1.2 were consistent with all assumption in OLS; no autocorrelation (DWV; 2.2887, 2.104), normality (Jarque-Bera test; 0.56, 0.77), no multicollinearity (mean VIF; 1.43, 1.48).

4.1.3 Creditor Conversion Period on Return on Asset

Therefore, following same regression model was performed for sector for examining impact of CCP on ROA. Model 3.1 for material. Model 3.2 for CG sector.

Model 3.1: $ROA_{it} = \beta_o + \beta_1 CCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (1)

Model 3.2: $ROA_{it} = \beta_o + \beta_1 CCP_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + ROA_{i(t-1)} u_{it}$ (2)

Table 4.3: Regression Model 3.1 and 3.2

Independent Variable	Dependent Variable = ROA			
	Model 3.1 Coefficient	Prob.	Model 3.2 Coefficient	Prob.
C	0.457317	0.6065	0.257082	0.0005
CCP	0.00600	0.0489	0.000988	0.0390
SIZE	-0.017761	0.8527	-0.009835	0.0209
SALES_GROWTH	-0.004168	0.2843	0.039480	0.1651
DEBT	-0.491501	0.0003	-0.207489	0.0203
ROA(-1)			-0.096181	0.4200
F-statistic	4.573013	0.000246	17.65209	0.0000
R-squared	0.582866		0.886947	
Durbin-Watson stat	2.291728		2.126148	

Source – Authors Compiled

As per the redundant fixed effect-likelihood ratio result, cross-section F-Values are 6.2049 (P-value 0.0001) and 6.6352 (P-value 0.0001) respectively. Therefore, panel regression method is preferred over pool model in both sectors. As per the Hausman test result, corresponding p values of Chi-Square Statistic were 0.0000 and 0.0000. Therefore, the fixed effect model suitable than random effect in both sectors. According to output from regression, there is positive relationship between CCP and ROA (β =0.00600, $p < 0.05$) and (β = 0.000988, $p < 0.05$) in material and CG sector respectively. Therefore, it can be concluded that CCP has a greater significant positive impact on ROA in material sector than CG sector. In material sector $R2 = 0.58$ and in CG sector $R2 = 0.88$ were found. Models 3.1 and 3.2 were consistent with all assumption in OLS; no autocorrelation (DWV; 2.2917, 2.1261), normality (Jarque-Bera test; 0.52, 0.73), no multicollinearity (mean VIF; 1.25, 1.74).

4.1.4 Cash Conversion Period on Return on Asset

Therefore, following same regression model was performed for sector for examining impact of CCC on ROA. Model 4.1 for material. Model 4.2 for CG sector.

Model 4.1: $ROA_{it} = \beta_o + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (1)

Model 4.2: $ROA_{it} = \beta_o + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 SGR_{it} + u_{it}$ (2)

Table 4.4: Regression Model 4.1 and 4.2

Independent Variable	Dependent Variable = ROA			
	Model 4.1		Model 4.2	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.044380	0.9623	0.218960	0.4034
CCC	-0.000508	0.0163	-0.001121	0.0046
SIZE	0.044981	0.6591	0.000926	0.9687
SALES_GROWTH	-0.004919	0.2298	-0.070875	0.1900
DEBT	-0.482955	0.0006	0.075639	0.6067
F-statistic	4.488871	0.000289	5.840001	0.000024
R-squared	0.578344		0.640862	
Durbin-Watson stat	2.332508		2.032548	

Source – Authors Compiled

As per the redundant fixed effect-likelihood ratio result, cross-section F-Values are 5.9658 (P-value 0.0001) and 6.6422 (P-value 0.0000) respectively. Therefore, panel regression method is preferred over pool model in both sectors. As per the Hausman test result, corresponding p values of Chi-Square Statistic were 0.0003 and 0.0023. Therefore, the fixed effect model suitable than random effect in both sectors. According to output from regression, there is negative relationship between CCC and ROA (β =-0.000508, $p < 0.05$) and (β = -0.001121, $p < 0.05$) in material and CG sector respectively. Therefore, it can be concluded that CCC has a greater significant negative

impact on ROA in CG sector than material sector. In material sector R2 = 0.57 and in CG sector R2 = 0.64 were found. Models 4.1 and 4.2 were consistent with all assumption in OLS; no autocorrelation (DWV; 2.3325, 2.0325), normality (Jarque-Bera test; 0.56, 0.59), no multicollinearity (mean VIF; 1.23, 1.39).

4.3 Sector wise working capital practices ratio analysis

Table 4.5: WCMP Ranking Position

	ICP		DCP		CCP		CCC	
	Material Sector	CG Sector	Material Sector	CG Sector	Material Sector	CG Sector	Material Sector	CG Sector
Industry Average	106	124	63	80	54	30	122	170
Rank	1	2	2	1	1	2	1	2

Source – Authors Compiled

According to above table, industry average has been taken mean value of component of working capital; ICP, DCP, CCP and CCC throughout 2014-2019. Finally, based on ICP, CCP and CCC, it is found that material sector is the better sector than CG sector and based on DCP, CG sector is the better sector than material sector.

5. Conclusion

This study attempted to assess the effect of WCMP on profitability through regression analysis using a six-year (2014-2019) dataset on eight material companies and eight capital good companies listed in CSE. The findings show that the WCMP has a statistically significant and a marginal impact on ROA. As per the regression analysis, ICP has higher significant negative relationship with ROA in both industries. This relationship is consistent with (Paul & Mitra, 2018), (Nimalathasan, 2010). Besides, Further, the profitability of Material Sector is more negatively sensitive to Debtors Conversion Period (DCP) and more positively sensitive to Creditors Conversion Period (CCP). Furthermore, the Cash Conversion Cycle (CCC) is more negatively sensitive to the profitability of CG Sector. According to sector wise ranking analysis, Material Sector manage the WCMP better overall.

Further, the Material Sector is more sensitive to DCP and CCP. Therefore, should provide more attention towards better management of debtors and creditors. The CG sector required to pay attention towards the overall working capital management. Therefore, the managers should ensure the better working capital management practices are in place.

Future study can be done on comparison for the impact of WCMP on profitability selecting companies from other various sectors as per GICS with different WCM ratio can be used to measure WCMP. Various kind of ratio calculation can be used to measure the WCM in companies such as current ratio, liquid ratio, current asset to total

asset ratio, current liability to total assets ratio, inventory to current assets ratio, working capital turnover ratio est. The future research can use those ratios to measure the WCM practice.

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Predictability of Stock Return using Financial Ratios: Evidence from CSE FMCG sector

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Abstract

Purpose – This study aims to check the suitability of using financial ratios to predict the stock returns of FMCG sector in the Colombo Stock Exchange, Sri Lanka.

Design/Methodology/Approach – The study uses four financial ratios from multiple areas naming profitability, liquidity, solvency, and market valuation with a sample of 30 listed FMCG companies for a period of six years from 2014 to 2019. The data were analyzed using multiple regression model to understand the predictability of the stock return.

Findings – The results indicate profitability, liquidity and market valuation ratios can predict the stock return in the short term and the long term. The return on assets, current ratio and price earnings ratio had significant predictability on stock returns, while debt to equity ratio did not show any significant results owing to the companies being in the mature stage of their product lifecycle.

Conclusion –Investors can adopt a financial ratio model including profitability, liquidity and market-based ratios as a primary model to predict their stock returns before moving on to sophisticated fundamental analysis models.

Keywords- *Financial ratios, stock returns, multiple regression model, FMCG, predictability.*

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1. Introduction

The Securities Exchange takes a significant place in deciding the state of an economy (Panji Anogara, 2008). Organizations use financial exchange to raise funds to increase liquidity at a lower cost. The funds raised by the financial exchange are funded into different industry group sectors of the economy including construction, finance, hotels, etc. The investors use it to invest in companies with desirable characteristics to earn dividend and profits from trading securities. The stakeholders must be knowledgeable about the stock prices to optimize their decisions. Mishkin and Eakins (2003) point out that a stock is a security that speaks to a portion of possession on the profit and resources of the enterprise. Investors earn profits by means of capital appreciation and dividend yield. Investors must be provided with sufficient returns in exchange for their funds. The Greatest corporate worth will result in increasing benefit for investors (Husnan, 2012). Gitman and Zutter (2012) characterizes stock return as: "The complete increase or loss from a stock trading over a given timeframe". Investors must be skilled to recognize potential investment companies. The ways to identify these companies include technical analysis, market analysis, ratio analysis, etc. In the present study the main focus will be given to the ratio analysis. The company ratios will be evaluated based on solvency, liquidity, profitability, activity, and market valuation.

Schrempf (2010) indicated that economy generally improved after models were created to predict the stock returns. Farkhan and Ika (2013) emphasized that liquidity, solvency, efficiency affects the stock return. Various empirical examinations had been led on the advanced economies like the UK and USA, yet the investigations done

in Sri Lankan setting are immeasurably lower than the desires. The effects of liquidity, profitability, solvency hadn't been investigated enough in the Sri Lankan context. Many studies were conducted by Samarakoon (1998), Perera and Thrikawala (2010) noting that investment decisions were enhanced by evaluations conducted on financial ratio analysis. Wijesundera et al (2015) investigated Predictability of Stock Returns Utilizing Financial Ratios: Empirical Evidence from Colombo Stock Exchange. The results explain that ROE, EPS, MV/BV had shown positive relationship with stock returns. The present study aims to predict stock returns using financial ratios for the companies listed in the FMCG sector in the Colombo Stock Exchange (CSE).

Accordingly, the study aims to examine the effects of financial ratios for the prediction of stock returns in the FMCG sector in Colombo Stock Exchange by employing financial ratios in profitability, liquidity, solvency, and market valuation.

2. Literature Review

As the competition increases and with dynamic environmental changes satisfying the shareholders had been an increasingly difficult challenge for the organizations. In this background, a lot of emphasis had been given to the stock market return in financial literacy. In investor's point of view, they should be able to give themselves the best chance to get an appropriate return. This could be done through the assessment of the firm performance of the

company. This is accomplished with accounting methods. Lewellen (2004) noted that it could be used to appraise the stock returns.

The most important concepts that need to be addressed in the study are financial ratios and stock returns. The empirical study of the stock prices dates to 1950s by the Markowitz (1952,1959). It paves the way for recent researchers like (Davis, 2001) to conduct business and finance research. Dugalic (2008) noted that investment decisions are enhanced when companies past data like balance sheet, industry outlook, dividend declaration are used.

Lev and Thigarajan (1993) depict four fundamental factors commonly influencing the estimation of basic stocks: venture quality; winning force; present and future possibilities; profits; and capitalization rates or multipliers, or discount rates. Abarbanell and Bushee (1998) find noteworthy connections between indicators of accounting fundamentals, future winning chances, and anomalous returns. Based on the research conducted by Ritchie (1996, p 223-224) the steps involved in the fundamental analysis include assessing the impact of the macroeconomic factors such as inflation rates, exchange rates, money supply, and economic growth. The fundamental analysis determines whether the stock prices are overpriced or underpriced. Wang, (2007) Tian, (2018) Li, (2009), Tamimia, (2011) proved that financial ratios are capable of predicting stock returns.

The introduction of the financial ratios dated back to the 1900s.Horrigan (1965) noted that the financial ratios are a mere product of advancement of the accounting techniques in the US (Delen, 2013). Ratios can be categorized into profitability, debt, liquidity, and valuation based on the proxies in them.

Firm performance is routinely appraised using ratio analysis. It may also cause an information redundancy problem because two similar ratios are assessed.   It leaves to choosing the ratios on a subjective basis to review the firm performance of the company (Malhotra and Malhotra, 2008). A Financial ratio is interpreted as both the elements of the fraction which are numerator and denominator taken from the financial statements of the organization according to (Horrigan, 1968). Financial ratios show the financial elements with fractions to each other.

Farkhan and Ika (2013) noted the relevance of the debt, profitability, market ratio on stock return in the Indonesian food and beverage industry. The results of this study were that ROA and PE had significant results with stock return and CR, total asset turnover, and debt to equity ratio did not show any significant association with the stock return. A similar study conducted by Hermawan (2012), noted the significance of the debt, market, and profitability towards the stock return in the Indonesian banking industry. The study conducted by Reynald (2006) noted that EPS showed significant results with stock return.

Gibson (1987) acknowledged that Chartered Financial Analysts were more interested in financial ratios of the basic elements of the financial statements.   Financial ratios help in break down and decipher the financial statements of

non-benefit establishments of advanced education (Woelfel, 1987), dispatching organizations (Wang and Lee, 2010), Airline industry (Teker, Teker, and Güner, 2016), Hospitality industry (PetroskaAngelovska and Ackovska, 2016), Municipal government (Drew Joseph and Dollery Brian, 2016), IT organizations (Dulababu, 2017), FMCG organizations (Bansal and Singh, 2017), Electricity industry (Sueyoshi, 2005) and some more.

Lucey (1998) noted that financial ratios act as an indicator of future trends of the organization, and they are presented for implementation of plans and policies. Kane (1997) emphasized that there is a significant relationship between the financial ratios and stock return in times of economic recession. Matsumoto et al. (1995) and Gibson (1987) as found out that valuation, productivity, and leverage proportions are the most utilized classes by research analysts following equities listed on the Mexican stock trade. Lewellen (2004) researched on the relationship between financial ratios and stock returns.

The considered study used Price to Earnings Ratio, Debt to Equity Ratio, Dividend Per Share and Net Profit Ratio to assess the impact to stock return on 30 companies listed in the FMCG sector of the Colombo Stock Exchange from 2014-2019.

Beaver and Morse (1978) scholars measured the correlation among beta, accounting plans, beta, and PE. The results confirmed companies with lower earnings growth potential had high PE. This is an indicator showing that the investor speculates current profitability as a short-term trend.

A similar study conducted by the Nikbakht and Polat (1998) confirmed the relationship between the PE and expected growth potential of profitability.   Enow & Brijlal (2016) conducted the research based on Johannesburg Stock Exchange from 2009-2013.The results concluded that dividend per share, price-earnings ratio and earning per share significantly determines the share price movements. Kothari & Shanken (1997) investigated the US market for the association between the stock return and financial ratios. The results confirmed that dividend yield and book value to market value had significant association with stock returns. Christos, et al., (2005) choose Greek financial exchange for the investigation and the results confirmed that GARCH model displayed those correlations between the variables were significant.

According to Constand, Freitas & Sullivan, (1991), the PE ratio is considered as a measurement scale to gauge the company's performance. The research conducted by Qayum (2019) found out that PE did not show any resemblance to the stock returns.

Yongyoot (2008) examined the relationship between 12 financial ratios and the stock return in Thailand considering the PE ratio as an investment ratio. The considered study uses PE as an investment performance measurement scale. Srinivasan (2012) investigated the determinants of stock prices in Indian Stock Exchange. The results were concluded that earnings per share and price-earnings ratio are significantly determining share prices.

Trevino & Robertson (2002) emphasized the relationship between the PE ratio and the stock market return is significant for the long-term relationship but in the short-term the relationship is insignificant. Some studies brought opposing results illustrating that the relationship is insignificant such as a study of Ahmed (2003) who used regression analysis for the S&P 500 Index to study the correlation coefficient between the variables. Asri (2002a, 2002b) acknowledged the low PE effects in the Indonesian stock market.

Anup & Suman (2010) conducted the study to examine the relationship between the capital structure and the firm value and the results proved that there is a positive relationship between the variables. Abor (2007) concluded that the long term and debt ratio negatively impacted the firm performance through the study of using microfinance institution.

According to the research conducted by Utari Dewi, Purwanti Ari (2014) liquidity is the obligation of fulfilling responsibility when it's due. This task could be achieved if the current assets are far more than the debts the company had incurred. Liquidity makes the sales of the stocks far easier with smooth and low-cost access to the liquid assets of the venture. Yongyoot (2008) had categorized the current ratio as a liquidity ratio in the study of Predictive power of financial ratios to stock return in Thailand. Tehrani and Tehrani (2015) investigated using 10 financial ratios as the independent variables, explaining a positive relationship between the current ratio and the stock return. Conversely, the research conducted by Jussi (2020) had stated that there is no significant relationship between the liquidity ratios and the stock return.

Delen et al. (2013) studied the impact of liquidity ratios to predict the relationship with the stock return. Öztürk & Karabulut (2018) took the current ratio, net margin, and earnings per price to measure the statistical relationship. The research conducted by Roen (2013) showed that the current ratio showed a significant association with stock returns. A similar study conducted by Nailul (2019) showed that the current ratio had a negative impact on stock returns.

Lakshan et al (2013) developed a model to predict corporate failures in Sri Lanka.The results indicated an estimated level of accuracy of corporate failures is 77. 86% before one year of corporate failure. Another similar study carried out by Vijitha (2014) concluded that the accounting information is constituent of value thus it had significant impact on the share price.

Wijesundera (2015) conducted the study of the ability of past accounting data in the creation of a resilient value portfolio using variables such as ROE, EPS, MV/BV. The results showed those variables resemble a positive relationship with the stock return.

3. Methodology

Ramazan (2000) noted that financial data are considered over accounting data because they are more resistant to inflation and can withstand moderating variables like firm size. The present study uses descriptive and causal research design to conduct the research. The reason for using descriptive design is to study the relationships

between the variables. Furthermore, it also collects data from the annual reports of listed companies in Colombo Stock Exchange. Quantitative research methods are used for the data analysis and interpretation.

3.1. Conceptual Framework

The stock return is determined by the current ratio, return on assets, debt to equity, and price-earnings ratio. The conceptual framework as described by Wijerathna (2015) is adopted in this study.
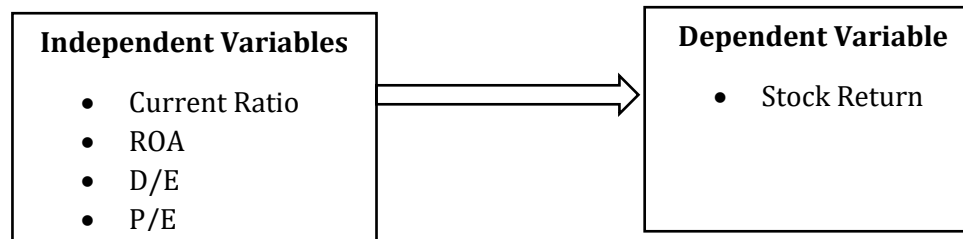
.

Figure 1: Conceptual Framework

Source – Authors Compiled

3.2. Population and Sample

The population consists of 289 listed companies over 20 industry group sectors in Colombo Stock Exchange (CSE). The sample data is collected from 30 highest capitalized FMCG sectoral listed companies as given by LMD 100 2018/19.

Purposive sampling method is being used in this study. The considered sector is selected as the FMCG sector of the CSE which includes 52 companies. The 30 companies are selected by the researcher based on the below-mentioned criteria.

1.The top 30 companies based on the market capitalization

2. The considered company must not be delisted from the CSE.

3. The company must be listed before 01.01.2010

The considered financial ratios are extracted from the company annual reports.

Different countries use different methods to analyze the collected data. The data are analyzed using descriptive statistics, multiple regression and correlation matrix to find the predictability of the financial variables has on the stock returns. The Stata package is used as the econometric software to analyze the data.

The multiple regression model is assumed to test the predictability between the variables. Wijesundera (2015) noted that the abovementioned process is adopted to increase the predictive power of the financial ratios. The model adopted is as follows:

$$SR_{it} = \beta_0 + \beta_{i1} PE_{it} + \beta_{i2} ROA_{it} + \beta_{i3} CR_{it} + \beta_{i4} DE_{it} + \varepsilon_{it} \qquad (1)$$

Whereas,

SR_{it}= in time period t, the return of ith stock,

β_0= the estimated constant,

β_{i1}= for PE the ith stock predictable coeffic11ient,

β_{i2}= for ROA the ith stock predictable coefficient,

β_{i3}= for CR the ith stock predictable coefficient,

β_{i4}= for DE the ith stock predictable coefficient,

PE_{it} = is ith stock PE factor in period of time t-1,

ROA_{it} = ROE factor of ith stock in period of time t-1,

CR_{it} = CR factor of ith stock in t-1-time period,

DE_{it} = DY factor of ith stock in t-1-time period

ε_{it} = error terms.

The individual regression model for the hypothesis testing is drafted from Lewellen's (2004) regression model which was used comparably for financial ratios and stock returns. This was disagreed by Omran and Ragab (2004) that the initial model can be devised into measuring multiple independent variables, hence multiple regression.

The focused study appraised the consistency of the ROA, PE, CR, DE against the stock returns the modified regression model is as follows:

$$SR_{it} = \beta_0 + \beta_{i1} PE_{it} + \beta_{i2} ROA_{it} + \beta_{i3} CR_{it} + \beta_{i4} DE_{it} + \varepsilon_{it}$$

Statistical testing was carried out to examine whether the model had violated classical model assumptions namely: Multicollinearity, Heteroscedasticity, Autocorrelation and Stationarity. All the assumptions were satisfied based on the analysis findings.

4. Findings and Discussion

4.1. Descriptive Statistics

The Stock Return had a mean or average of -0.6683 thus corresponding to the negative returns earned in the last few years. The standard deviation is the highest recorded which is 1.2441. the observations of ROA are comparably more spread out than the rest of the variables. the Jaq – Bera test which gained a coefficient of 0.2660, confirming ROA is normally distributed. Based on the Jaq – Bera test readings, the conclusion can be made that ROA and PE are normally distributed and the remainder of the variables are not normally distributed.

4.2. Regression Analysis

The predictability of the variables is compared using p-values against 5% significance level. The p-values of DE were higher than 5% (0.067), showing that it does not predict stock returns. Furthermore, other remaining variables of ROA, PE, CR significantly predicts stock returns. PE and DE had a negative relationship against the stock returns, while CR and ROA had a positive relationship with stock returns. Omran and Ragab (2004) found out that DE had a negative coefficient against stock returns. Hakki (2017) and Farkhan (2016) further confirmed the significant negative relationship with stock returns. The positive significance of the CR is affirmed by IG Ulupui Train (2009) which may have occurred due to differences in the data set. ROA significance is supported by previous literature including Hakki (2017), Nurah et al. (2016), Al Khalayleh (2001), Farkhan Ikka (2016), etc. The coefficient value proves this conclusion. The table displayed R- Squared at R-squared at 0.1222 which designated that the dependent variables explain 12% of the variation in the stock returns. A similar study conducted by Roen (2013) achieved R squared value of 35%. The scholar further noted that the low level of explanation of the stock return is due to excluding the size variable in the model. Ferson and Harvey (1994) noted that stock return is highly impacted by the country's interest rate and GDP growth rate.

Based on the data output the final multiple regression equation can be developed as follows:

SR= -0.564517 - 0.1343118PE+ 0.0884439ROA+ 0.2382235CR -0.1251931DE+ei_t (2)

The significance of the following coefficients are as follows:

- The value of constant at -0.564517 states if the dependent variables CR, PE, DE, and ROA increase by 1 point the Stock Return decreases by 0.56, keeping all the other variables constant.

- The PE coefficient of -0.134 states that if the PE changes by 1 point, the stock return plummets by 0.134.

- CR coefficient of 0.2382235 asserted that the 1-point increase in the CR increases the stock return by 0.23.

- DE coefficient of -0.1251931 declared that the stock return lessens by 0.12 in the case of 1-point elevation of the DE.

- ROA and stock return had a positive relationship with stock return variating by 0.08 in the case of 1 point upward trend in the ROA.

The first research question is answered as return on assets has a significant relationship with the stock returns. This conclusion aligned with studies conducted by Nurah (2016), Martikainen (1993), Wijaya (2015), etc. The underlying reason behind this judgment is that when a company's earning capacity increases, it simultaneously grows the efficiency at which assets are turnover, which ultimately resulted in the increasing firm value. The conclusion made from the association of the DE and Stock return is there is no significant correspondence among the variables. This is further approved by the studies conducted by Farkhan Ikka (2016), Nurah (2016), etc.

Furthermore, the companies in related are in the mature stage of their lifecycle. The investors know that the companies can withstand solvency issues in the long term because they had survived for a long time in the market.

The PE showed significant predictability on stock returns. Emamgholipour et al. (2013) displayed that PE ratio had a significant positive relationship towards stock return. Shen (2009) deciphered that when the PE is higher, the resultant stock returns tend to be negative in short and the long term. The final research question is solved by concluding that there is significant predictability by the current ratio on stock return. This statement is upheld by the studies conducted by Nadya et al. (2017), Alexakis et al. (2010), etc. Kalayci and Karatas (2005) showed that liquidity ratios had a significant positive relationship with stock returns deciding that the ability of the company to pay off the short-term obligations increases the future profitability and desirability of the stocks.

Although the PE, CR, and ROA had a significant relationship with stock returns other financial ratios could be exercised to predict the variation of the stock returns, including the Book to market ratio (Chan, Hamao, and Lakonishok, 1995), dividend yield (Lewellen 2004), etc.

5. Conclusion

The present study had concluded that the DE, CR, ROA had significant predictability in deciding the fate of stock returns in the food and beverage sector in the Colombo Stock Exchange. Muhammad (2018) noted that investors tend to invest in stocks that have par or above ROA against the industry's average. The remainder of the ratio which

is DE had an insignificant negative linkage towards the stock return. The multiple regression model pointed out that the abovementioned ratios can predict the stock return variation up to 12%. This value is arguably lower for a prediction model in which the reasons may be assigned to the sample selection, macroeconomic factors, etc. When making an investment decision, investors must consider other financial ratios such as book value to market value, earnings per share, profit margin, etc. Furthermore, they should consider the external factors, including inflation rate, exchange rate, political stability when providing funds to the companies.

Kheradyar et al. (2011) noted that the combination of the financial ratios is a contributing factor in predicting the stock returns. It further enhances the predictability of the stock returns. So, the selection of the financial ratios is crucial in increasing the probability of predicting stock returns.

The main findings of the present study were that CR, ROA, and PE significantly predict the stock return in the food and beverage sector in the Colombo stock exchange. The preceding ratios could predict 12% of the variation of the stock return. This finding can be further exploited by the adoption of more variables to the model, contributing more noticeable results.

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Impact of Electronic Banking on Operational Performance of Commercial Banks in Sri Lanka

Prabodhi, W. A. D[1] and Buddhika, H.J.R.[2]

Abstract

Introduction- Information and Communication Technology (ICT) is essential for financial markets for faced and sustain the competition. However, a limited number of studies have been conducted in Sri Lanka to determine the impact of e-banking on banks' profitability in Sri Lanka. This study critically investigated the effect of e-banking on operational performance in Sri Lanka.

Design/Methodology/Approach- The secondary data gathered during the year 2014 to 2019 concerning fee and commission income on internet banking, number of branches, number of ATMs, from the published annual reports of ten selected banks systematically. Regression analysis processed to determine the effects of electronic banking on profitability. The descriptive statistics, Pearson correlation were used for the data analysis through E-Views 11 statistical software.

Findings – Based on the results, the fixed-effect model found a significant positive relationship among IB (Internet Banking) on ROA, negative significant with ROA and BN (Branch Netwok), ATMs. Also, the insignificant relationship between ROE and IB. CIT (Cost to Income ration) and IB have negative significant, and other variables are a significant relationship with CIT.

Conclusion: Results proved that; e-banking has significantly contributed to the banks' operational performance in Sri Lanka.

Key Words: *E-baking, branch network, operational performance, profitability, Efficient*

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1. Introduction

Over the last few decades, the banking industry has experienced a dramatic change resulting from ICT adoption. Financial institutions, including banks, have moved from traditional paper and manual operations to electronic operations such as electronic banking (Salehi & Alipour, 2010). However, the latest techniques of E-banking are said to provide effective services and reduce operating cost. Implementing E-banking involves substantial risk and a cost regarding how banks should integrate E-banking with existing service successfully. This study investigates how the expansion of e-banking affects the profitability and efficiency of the bank by analysing the data of companies under the banking sector in the Colombo Stock Exchange in Sri Lanka.

1.1. Need for and importance of the study

The study gives a better understanding of how electronic banking facilitates efficiency through electronic payment processing and reduced cost of operations (Jayasiri et al., 2016a).

The study gives a better knowledge of the issues under investigation and sharpened research skills and fills the previous studies' gaps.

It explains how E-banking can give them a better way to access capital due to its short payment processing period and increased efficiency in payment and accounting processes.

1.2. Problem Statement

Electronic banking has a strong impact on overall performance of banking, because it improves efficiency and effectiveness of the banks (Olorunsegun, 2010). According to (Sumra et al., 2011), e-banking increases the cost to the customers since it includes the bank charges commissions and service charges for e-banking. The banks in Nigeria has decreased the adoption for e-banking due to high cost of ICT (Oyewole et al., 2013). Furthermore, e-banking creates a high cost associated with software research & development, amortization of purchase software, data processing, promotional expenses, and employee training (Sullivan, 2000).

The banks with e-banking facilities can outperform their counterparts in profitability (Malhotra & Singh, 2009). E-banking is gradually creating a cashless society (Aduda & Kingoo, 2012). E-banking has a strong impact on overall performance of banking, because it improves efficiency and effectiveness of the banks (Olorunsegun, 2010). And only a limited number of studies have been conducted in the Sri Lankan context to identify the impact of e-banking on banks' profitability in Sri Lanka. Lack of evidence about the Sri Lankan context and the lack of consensus of the findings in internationally available literature puzzles the bankers and policy makers on the impact of e-banking on the operational performance of Sri Lankan banks. Therefore, this study sought to fill the gap assessing the impact of E-banking on commercial bank operations, also, to outline the bottlenecks confronting commercial banks in utilizing E-banking in Sri Lanka.

1.3. Research Questions

I.   R01- Identify the relationship between E-banking and facility and the efficiency of commercial banks in Sri Lanka?

II. R02- Identify the relationship between E-banking and profitability of a commercial bank in Sri Lanka?

1.4. Objectives of the Study

I.   To determine the impact of electronic banking on the operational performance of commercial banks in Sri Lanka.

II. To determine the relationship between E-banking and the Efficiency of commercial banks in Sri Lanka.

III. To determine the relationship between E-banking and the Profitability of commercial banks in Sri Lanka

2. Literature Review

2.1. The Concept of Information and Communication Technology (ICT)

Information Communication Technology in the form of innovation in which information can be stored, created, shared, or exchanged information and used for communication. Banking System development and sustainability essential for the adoption and use of ICT (Steven, 2002). The adoption and use of ICT are essential to the development and sustainability of banking. In the research of information and communication technology (ICT)

service innovation and its complementary strategies on customer loyalty toward ICT service providers, personalization is one of the critical strategies (Aduda & Kingoo, 2012). The adoption and use of ICT are fundamental to the development and sustainability of banking.

2.2. The Concept of E-Banking

Daniel (1999) defines electronic banking as the distribution of information and services by banks to clients through various delivery platforms that can be used with a PC or other gadgets. (Salehi & Azary, 2009) define E-banking as a process that involves an electronic association between customers and banks to prepare, manage, and control the customer's financial transactions by the bank. The Cambridge Dictionary defines E-banking as using the internet to organize, examine, and make changes to your bank accounts and investments electronically, or the use of the internet by banks to operate accounts and services.

2.3. Sri Lankan E- Banking Status

Sampath Bank first introduced electronic banking in 1988. They started by networking all their branches, allowing their customers to access their accounts at any branch. ATMs enable customers to withdraw money from ATMs (Jayasiri et al., 2016b). Banking practices in less developed nations are not the same as in developed nations (Kundi & Shah, 2009). Although the internet banking spread has been lower than most detects expected, and expansion has been stabilizing (Sullivan, 2000).

2.4. E-Banking Products and Services in Sri Lanka

2.4.1. Internet Banking

Internet banking includes bank transactions such as balance inquiries, account transfers, bill payments, and some even offer online credit applications over the internet using a PC without going to banks (Steven, 2002). Applications in developed and developing countries are considered an essential part of various studies on the impact of Internet banking on banks' work (Akhisar et al., 2015), (Hasan et al., 2002), (DeYoung, 2001) and (Gutu, 2014). Internet banking, as measured by the ratio of internet banking revenue generated from the internet to the amount of non-funded bank revenue (electronic card services income) (Njogu, 2014). In (Mwangi, 2013) states that ATM , mobile Banking and internet baking's fees and commission as a ratio of net bank income have used fees and commission as independent variables.

2.4.2. Branch Network

There were numerous limitations and difficulties with bank branches at the age of use of pre-ICT. The total number of accounts processed manual affiliates with dedicated staff members were limited (Maldeni & Jayasena, 2009). Network affiliates are described as automation and geographically different from the bank in the broad area of the network structure to facilitate the exchange of customer data (Abor, 2005). This system provides fast inter-industry banking, thus reducing the time and distance of restrictions. Banking services can facilitate through electronic

banking systems; banks must change the behaviour of their traditional clients by increasing their investment in advertising and electronic banking instruments to reduce visits to physical branches (Shahabi & Razi, 2019).

2.4.3. Automated Teller Machines (ATM) Services

The electronic card consists of a debit card linked to a local bank and a credit card, which usually related to a local and international bank (Ngango et al., 2015). ATMs, the management factors of banks, are closely related to various banking services, the establishment of good relations between the client and the bank (Hway-Boon & Yu, 2003). In addition, the ability of ATMs to continue operating even after bank hours ensures continuous performance (Adams, 2019). The number of ATMs installed by banks has a positive impact on their profitability by reducing labour and operating costs; electronic banking services can negatively affect the profitability of banks in the short term, which may be due to their investments in infrastructure and training; however, these services will have a positive impact on long-term profitability (Siam, 2006) and (Holden & Karsh, 2009a). In (Shahabi & Razi, 2019) states the number of ATM transaction as an independent variable.

2.5. E-banking Theories

2.5.1. Technological acceptance theory

The technology adoption model (TAM), introduced by (Davis, 1989) is one of the most cited models that researchers have used to study the underlying factors that motivate users to adopt and adopt a new information system.

2.5.2. Innovation Diffusion Theory

The dissemination of the theory of innovation developed by Rogers in 1962 explore factors that affect an individual or organization to adopt a new Technology. Rogers identified several innovative features that are vital influences on adoption behaviour.

2.6. Electronic banking profitability and efficiency

E-banking services enable maximizing profits (Karimzadeh & Reza Sasouli, 2013), (Sumra et al., 2011) and (Shahabi & Faezy Razi, 2019). (Gakure & Ngumi, 2013) found that ATMs, Online banking and point of sales increase the profitability of a commercial bank in Kenya. (Kaur & Kaur, 2008) stated that banks can efficiently deliver a product and service without opening new branches thanks to the improvement of electronic banking. (Aduda & Kingoo, 2012) investigate a strong positive relationship between overall bank performance and electronic banking in terms of bank performance and efficiency, customer retention and satisfaction.

2.7. Electronic Banking and Operating Costs

Electronic banking increases the bank's operating costs due to software research and development costs, amortization of purchased software, data processing costs, advertising costs and training costs for Employees who are required to provide such services (Sullivan, 2000). (Oyewole et al., 2013) also stated that the productivity of banks in Nigeria declined in the year of e-banking due to the high cost of IT. (Sumra et al., 2011) stated that banks

can cover implementation costs in a matter of months without waiting years because e-banking increases profits in a short period.

3. Methodology

3.1. Research Design

This research is studying according to "descriptive research design" because it is hoped to describe the quantitative data of commercial bank's operational performance through this research study. This study searches the relationship between electronic banking and the operational performance of commercial banks in Sri Lanka.
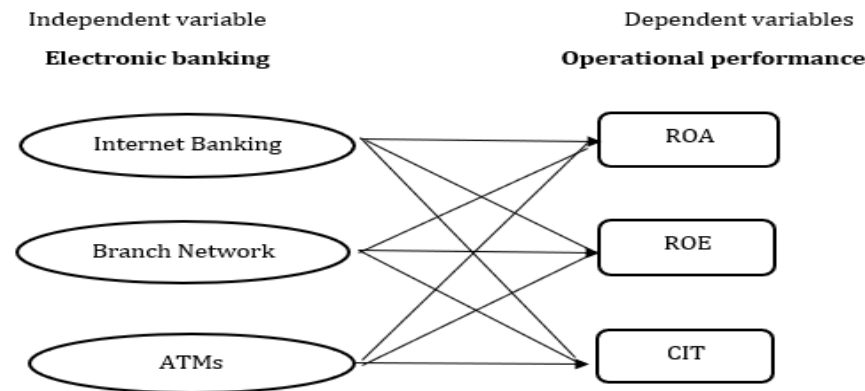
3.2. Conceptual Framework

Figure 1: Conceptual Framework

Sources: Author Compiled

Table 3.1: Literature base to the conceptual framework

Variables	Studies/year	Measurement scale
Independent variables		
Internet Banking	(Njogu, 2014)	Fees and commission
Branch Network	(Holden & Karsh, 2009b), (Shahabi & Faezy Razi, 2019)	Number of Branches
ATMs	(Shahabi & Razi), (Holden & Karsh, 2009b)	Number of ATMs
Dependent variables		
Return on Assets	(Bougatef, 2017), (Tan et al., 2017)	Net income/Aver. assets
Return on equity	(Bougatef, 2017), (Tan et al., 2017)	Net income/ aver. equity
Cost to income ratio	(Bougatef, 2017)	Operational expenses/ operational income

Source: Author complied

3.3. Population and Sample

As this research based on the Sri Lankan context, the population interested in this study consist of 26 commercial banks represented the public listed companies in CSE. In this study, the sample selected from a stratified sampling method, represent the high value of assets base on 10 commercial banks were studied (Nakamura, 1991). Thus,

only ten commercial banks were examined: 79% of the target population. This study, sample consists of the BOC, PB, HNB, NTB, COMB, NDB, SAMP, DFCC, SEYL, and PAN ASIA.

3.4. Data Collection

The secondary data was collected using published and available annual report of the commercial banks in the period of 2014 to 2019. Even in 2015, Sri Lanka still has a less acceptable level of online banking. These studies are trying to determine the causes of this mentality upside down (Jayasiri et al., 2016b). Further, this study referred to each sampled bank website for more detail. (Maiyo, 2013) and (Shahabi & Faezy Razi, 2019) stated the data collection for 05 years. Therefore, the study, data covered the period of 2014 to 2019.

3.5. Data Analysis

For analyzing the data, the statistical application "E-views 11.0" is used. Based on the secondary data, descriptive statistics and multiple regression will measure the relationship between these variables. That data is transformed into a logarithm (Jimoh, 2019).

The multivariate regression equation was,

$$\text{Model 1 ROA} = \beta0 + \beta1\text{LogIB} + \beta2\text{LogBN} + \beta3\text{LogATMs} + \acute{\varepsilon} \qquad (1)$$

$$\text{Model 1 ROE} = \beta0 + \beta1\text{LogIB} + \beta2\text{LogBN} + \beta3\text{LogATMs} + \acute{\varepsilon} \qquad (2)$$

$$\text{Model 1 CIT} = \beta0 + \beta1\text{LogIB} + \beta2\text{LogBN} + \beta3\text{LogATMs} + \acute{\varepsilon} \qquad (3)$$

The following hypothesis developed based on the study variables.

H1: There is a significant impact of internet banking on a return on asset.

H2: There is a significant impact of branches network on return on assets.

H3: There is a significant impact of ATMs on return on assets.

H4: There is significant impact of internet banking on a return on equity.

H5: There is significant impact of branch network on return on equity.

H6: There is significant impact of ATMs on return on equity.

H7: There is a significant impact of internet banking on the cost to income.

H8: There is a significant impact branch network on the cost to income.

H9: There is a significant impact of ATMs on the cost to income.

4. Finding And Discussion

4.1. Test in Normality

Table 4.1: Result of the normality

	Skewness statistic	Kurtosis statistic	Jarque-Bera	Probability value
ROA	-0.021530	2.700167	0.229385	0.891640
ROE	-0.070237	3.058618	0.057922	0.971454
CTI	0.359642	3.810177	2.934392	0.230571

Source: Author complied

The test of normality carried out for the component's identification from the component's analysis. For the examination of normality, the skewness and kurtosis were calculated (Eze & Egoro, 2016). As cited in table 1.1, it can be concluded that with the statistics generated under the skewness and kurtosis test, all statistics of skewness were nearly 0, and kurtosis have been less than 3 for the variables are ROA, ROE, and CTI. Also, JB is very close to zero. So, the researcher can be concluded that data usually is distribute.

4.2. Test in Stationary

Table 4.2: Result of the unit root

Levin, Lin & Chu t* (at level)			
De. Variables	Probability	In: Variables	Probability
Return on assets	0.0000	Internet banking	0.0000
Return on equity	0.0167	Branch network	0.0002
Cost to income	0.0000	ATMs	0.0000

Source: Author complied

According to the test, under the Levin, Lin & Chu method probability value is less than 0.05 its' at the level also. It concludes that all variables are stationary.

4.3. Model Specification

This study result shows a probability value of ROA, ROE, and CTI which is less than 0.05 and requires continuing with the fixed effect, multiple regression model. If the probability value is less than 0.05, it must continue the analysis with the a fixed effect model (Ali & Puah, 2019).

Table 4.3: Model summary

	R²	Adj R²	D.W stat	F-stats	P-value
ROA	0.728021	0.658579	1.816968	10.48395	0.000000*
ROE	0.623208	0.527006	1.679105	6.478101	0.000001*
CTI	0.821965	0.776509	1.753845	18.08270	0.000000

Source: Author complied

The finding in table 1.3 shows that the R^2 is more than 62%, and the Adjusted R^2 value is more than 52% in all models. On that mean, there was a positive relationship between all determinants of electronic banking and operational performance. Durbin Watson test value is nearly 2 it indicates that presence the of autocorrelation (Eze & Egoro, 2016).   F-statistic show that the overall table is statistically significant.

4.4. Regression Analysis:

Table 4.4: Summary of the regression result

	Coefficient (β)		
	ROA	**ROE**	**CTI**
(Constant)	0.100839	0.874692	-0.361523
Internet banking	0.001699	0.012868	-0.032616
Branch Network	-0.00793	-0.129291	-0.116865
ATMs	-0.014740	-0.047738	0.410052

Source: Author complied

According to the table 1.4, ROA has significant positive impact on Internet banking and also significant negative

r₍ ROA = 0.1008 + 0.0017logIB – 0.0079logBN – 0.0147ogATMs + μ (1) p between ROE and internet banking

and a negative relationship between BN and ATMs. CTI has negative significance with IB and BN. And the positive

significant relationship with ATMs also. Therefore, regression models is build as follows,

ROE = 0.875 + 0.0129logIB – 0.1293logBN – 0.0477logATMs + μ (2)

CIT = -0.3615 – 0.0326logIB – 0.1169logBN+ 0.4101logATMs + μ (3)

Table 4.5 Summary of the hypothesis testing

Hypothesis	Sig.	Decision
H1: There is a significant impact of internet banking on return on asset.	.0127	Accepted
H2: There is a significant impact of branches network on return on assets.	.0021	Accepted
H3: There is a significant impact of ATMs on return on assets.	.0063	Accepted
H4: There is a significant impact of internet banking on return on equity.	.3330	Rejected
H5: There is a significant impact of branch network on return on equity.	.0111	Accepted
H6: There is a significant impact of ATMs on return on equity.	.6467	Rejected
H7: There is a significant impact of internet banking on the cost to income.	.0194	Accepted
H8: There is a significant impact branch network on the cost to income.	.0240	Accepted
H9: There is a significant impact of ATMs on the cost to income.	.0003	Accepted

Source: Author complied

4.5. Correlational Matrix

Table 4.6: Result of multicollinearity

	ROA	ROE	CTI	IB	BN	ATMs
ROA	1.00000					
ROE	-	1.00000				
CTI	-	-	1.00000			
IB	0.311169	0.309469	-0.02594	1.00000		
BN	0.592423	0.460506	-0.14416	0.663140	1.00000	
ATMs	0.593569	0.562533	0.017271	0.411172	0.779569	1.00000

Source: Author complied

As the result shown in table 1.6 there are relatively low data correlations among the independent variables. These low correlation coefficients show that there is no multicollinearity problem, thus enhancing the reliability for regression analysis due to the coefficient is less than 0.8.

4.6. Descriptive Analysis

Table 4.7: Result of descriptive

Statistic	ROA	ROE	CTI	Internet Banking	Branches	ATMs
Mean	0.013450	0.165340	0.491467	20.22056	5.552784	5.271094
Median	0.013500	0.163450	0.490500	20.77970	5.578768	5.283460
Maximum	0.019000	0.374000	0.642000	22.24211	6.762730	6.606298
Minimum	0.005000	0.063600	0.359000	13.13231	4.001333	4.204387
Std.div	0.003100	0.052852	0.078725	2.008397	0.872390	0.741078
Skewness	-0.35453	1.103122	0.076641	-1.75925	-0.15433	0.463352
Kurtosis	2.913685	6.095861	2.074835	6.048063	1.534110	2.035932
Jarque-Bera	1.275590	36.12967	2.198565	54.17652	5.610279	4.470524
Prob:	0.528456	0.000000	0.333110	0.000000	0.060498	0.106964

Source: Author complied

According to table 1.7 ROA have a mean of 0.013450 while the median of the variable shows a value of 0.013500. The deviation from the mean value of 0.003100. The argument is that variables are normality distribute since there is not a crucial gap between the mean and standard deviation. The maximum value and the minimum value are 0.019000, 0.005000 respectively. Similarly, the mean value of ROE is 0.165340 with a standard deviation of 0.052852 and mean value of Cost to income (CTI) is 0.491467, and the deviation is 0.078725. The maximum values are 0.374000, 0.642000 and minimum values are 0.063600, 349000 respectively.

The minimum value of internet banking is 13.13231, maximum value of 22.24211, that max. Value represented the Sampath bank in 2019. Further, mean is 20.22056 and Standard deviation is 2.008397. The data were not normality due to commercial banks' performance are high in some banks, and some are less performance in this sector(Nakamura, 1991). The branch network of the commercial banks has a mean of 5.552784 while the median is 5.578768. The maximum and minimum values of the branches are 6.762730 and 4.001333. In contrast, the total number of observations is 60 of all the study variables.

5. Conclusion

Electronic banking allows you to process payments and transactions faster and easier than it used to be. Customers can access funds and transfer funds between accounts, pay bills and shop 24 hours a day using electronic means such as ATMs, mobile phones, or computers. E-banking has also improved the relationship between bank performance and operational performance. Further, this study discovered that BOC is the highest performing bank in Sri Lanka. CB has recorded the second-highest performance. The findings suggest that banks with extended branch network have higher profitability and efficiency. The significant relationship with all dependent variables. This study found that internet banking has a slow impact with ROE due to impaired unavailability of infrastructure and lack of supportive legislation for internet banking (Nyangosi et al., 2009) and ATMs of the bank has an insignificant relationship with ROE due to some bank performances are high. Some are low (Nakamura, 1991).

However, the ROA and CTI highly significant with internet banking, ATMs, and branch network. Hence, the banking and ATMs of banks have affected Sri Lankan banking sector by building it more profitability.

Therefore, these symptoms reflected that number of ATMs of bank has positively affected bank performance. According to these findings, this study discovered a significant positive impact of internet banking, branch network and ATMs, on the operational performance of commercial banks in Sri Lanka.

5.1. Recommendation

Commercial banks must invest heavily in technology, as this will significantly contribute to the introduction of e-banking technologies, which will affect the operational performance of commercial banks. This study discovered that e-banking increases bank performance by offering value-added products and services through ICT. Therefore, the bank can be acquired appropriate technology by focusing on their needs and goals rather than developing technology because other banks have it. Commercial banks must continue to invest in e-banking, impacting banks' operating performance, which operating costs and increases profits. Internet banking is becoming a more popular instrument in Sri Lanka. Therefore, if the banks take remedial actions to develop internet banking, it positively affects bank performance. The branch network on e-banking is also a vital factor to improve the bank performance.

Additionally, the study can further expand to evaluate whether e-banking has helped improve bank performance, especially in rural areas. Further, this study found that the number of ATMs has affected the operational

performance of commercial banks. However, the intensity of the incremental bank performance not considered through this study. Hence, it is vital to carry out further studies on this matter in due course

5.2. Limitation of the Study

Sri Lanka's financial market consists of capital markets, the insurance industry, and the banking sector. However, this study is limited only to the banking sector. We have therefore concluded that the investigation is limited to commercial banks operating in the country.

The study used secondary data that may be general and inaccurate and cannot help companies decide on curable issues. Information and data may not be very accurate, and the source of the data must be adequately verified.

5.3. Direction of the further research

The study was conducted based on Sri Lanka commercial banks. A future scholars can use the model for other financial market or other banking sectors in other countries.

This study was limited to commercial banks. It can be learnt to accept and use ICT by microfinance organizations and other financial institutions.

The study found a small value between online banking and efficiency of service delivery, as seen by the central bank. An investigation consisting of should be conducted for a longer period and the size of a larger sample.

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