

IMPACTS OF SUSTAINABILITY REPORTING ON FIRM FINANCIAL PERFORMANCE OF LISTED MANUFACTURING COMPANIES IN SRI LANKA DURING PRE-AND POST-COVID 19

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ABSTRACT

Although Sustainability Reporting (SR) is not a mandatory requirement in many countries as well as Sri Lanka, many companies use them. Considering the firm's financial performance is the best way to analyze its performance. The relationship between firm financial performance and sustainability reporting of the manufacturing sector has not consistently been identified by Sri Lankan researchers. Then, there is a need to further investigate this area to be carried out to recognize the factual impact of SR. This study fills the gap of previous studies and will contribute to the existing literature by identifying the significant relationship between firm financial performance and SR. Considering the lack of usage of the GRI guidelines and the quality of sustainability reporting of Listed manufacturing companies in Sri Lanka, the study will develop a sustainability scoring model to measure SR. Return on equity (ROE) and Return on Assets (ROA) will be used to measure the financial performance of the organization. All the listed manufacturing companies which disclose sustainability reporting are considered as the sample of the study. Since Sri Lanka faced Covid-19 during the year 2020 onwards, the analysis will be divided into 2 phases the "pre-Covid-19 period" from 2015 to 2019 and the "post-Covid-19 Period" from 2020. The researchers focus on secondary data collection techniques to gather data and required data will have collected through annual reports and sustainability reports. The study will use some statistical methods to analyze quantitative data which is collected from manufacturing companies listed in CSE. Data will be analyzed using descriptive statistics, Pearson correlation, and panel data regression analysis. Mean, standard deviation, and tables will be used to discuss the findings, according to the descriptive analysis. Regression analysis was used to test the relationship between environmental, economic, and social disclosures and firm financial performance. The findings of this research help to take decisions of the stakeholders of manufacturing companies in Sri Lanka. Finally, such information will help investors, decision-makers, regulators, policymakers, and scholars to improve their knowledge about sustainable reporting practices.

Keywords: *Covid-19, Global Reporting Initiative, Return on Equity, Return on Assets, Sustainability Reporting*

1. INTRODUCTION

Although GRI guidelines are not mandatory disclosure requirements, most of the sustainability reports are based on the GRI standards and ensure the accuracy and completeness of reporting. Financial performance measures are the best way to analyze firm performance. This research focuses on the firm financial performance of listed manufacturing companies in Sri Lanka. Manufacturing companies are companies that produce finished goods and services from raw materials. Through reporting on economic, environmental, and social performance, many manufacturers communicate their sustainability progress. While the disclosure of sustainability reporting is growing, there is little literature that investigates the effect of sustainability reporting on manufacturing sectors on their performance (Buallay, 2020). The study investigated; sustainability report disclosures positively affect the manufacturing sector's financial performance. The literature on the impact of sustainability reporting on the firm financial performance of the manufacturing sector in Sri Lanka is very little. The study of Dissanayake (2016) provides evidence that the decision to disclose sustainability-related information is not necessarily related to financial performance. The study used nine listed manufacturing companies and other listed companies. It is mentioned that further investigation into this area is important and longitudinal analysis is important for future research. Silva (2019) found that sustainability disclosures of the financial sector in Sri Lanka create no impact on Return on Equity (ROE) and Return on Assets (ROA). A cross-sectional analysis of different industries is recommended for this study. Instead of investigating the cross-sectional analysis, here focus on the manufacturing sector because it is a very important sector in a country. Furthermore, there are no unified opinions in the academic world regarding the relationship between organizational financial performance and the state of sustainability reporting in manufacturing companies.

Then, there is a need to further investigate this area to be carried out to recognize the factual impact of sustainability reporting. This research focuses on identifying the relationship between sustainability reporting on the firm financial performance of listed manufacturing companies in Sri Lanka. The manufacturing sector significantly contributes to Sri Lankan economy. This study uses a comparison study of Covid-19 on sustainability reporting and firm financial performance. A comparison study with Covid-19 was not done on previous researchers in Sri Lanka. Further, the study uses panel data analysis to obtain more results. This study fills the gap of previous studies and will contribute to the existing literature.

Stakeholders of manufacturing companies in Sri Lanka can take decisions depending on the relationship between sustainability reporting and firm financial performance. Similarly, it is going to assist investors, decision-makers, regulators, and policymakers in making relevant decisions. Identifying how companies record sustainability reporting during the post Covid-19 period, and finding out above mentioned relationship is important.

The problem statement is "What is the relationship between sustainability reporting and firm financial performance of listed manufacturing companies in Sri Lanka during post-Covid-19?"

By focusing on the problem statement, the main research questions can be defined as follows.

1. What is the relationship between firm financial performance and sustainability reporting during pre-Covid-19?
2. What are the measurement systems to measure sustainability reporting?

The main objective of conducting this study is to identify the relationship between firm financial performance and sustainability reporting of listed manufacturing companies in Sri Lanka during the period pre- and post-Covid-19.

Other objectives of the research are as follows,

1. To find out the relationship between firm financial performance and sustainability reporting of Listed Manufacturing companies in Sri Lanka during the period of pre-and post-Covid-19.
2. To develop a measurement system to measure sustainability reporting using GRI in Sri Lanka.

This study contributes to the existing literature by identifying the significant relationship between firm financial performance and sustainability reporting during the post-Covid-19 and there is a comparison with pre-Covid-19. In Sri Lankan context, there is no consistent result about this, as the researchers can get a clear understanding of this research area after confirming the findings which get throughout the research. The study will develop a sustainability scoring model to measure sustainability reporting because of the lack of usage of the GRI guidelines of Listed manufacturing companies in Sri Lanka.

2. LITERATURE REVIEW

According to Lindblom (1994) legitimacy theory, an entity's value system is consistent with the value system of the larger social system to which it belongs. The theory consists of the importance of meeting social expectations and standards to safeguard the long-term position. Based on signaling and legitimacy theories, (Gerab, et al.,2017) suggest that the improvement in sustainability reporting quality acts as an important signal to gain legitimacy when information asymmetry happens during the legitimacy process. According to Filippo and Michele (2018) sustainability reporting has become particularly important in legitimacy processes, contributing to the enhancement of credibility, and building trust with the local community and stakeholders, and legitimacy processes differ from firm to firm, in space and time, due to the social contexts in which they operate.

2.1. Sustainability Reporting

Being a profitable firm is not enough in today's context and stakeholders of the companies also expect that firms should be sustainable. According to the European court auditors, "sustainability reporting involves how an organization considers sustainability issues while running its operations, and on its environmental, social and economic impacts"p(4). Sustainability reporting is the key platform for communicating sustainability performance and impacts. For a variety of reasons,

including leadership, accountability, and financial incentive, as well as a desire to bolster critical internal stakeholders, local governments in New Zealand were compelled to report on sustainability. According to Amber Bellringer et al., (2011) sustainability reporting by local governments in New Zealand appears to be driven more by pragmatism and economic rationalism than by an idealistic wish to create a sustainable world.

The most used measurement of sustainability is the global reporting initiative (GRI) worldwide. Helping to create sustainability reports which give positive impacts on businesses in social, environmental, and economic aspects is the purpose of the GRI. Coronavirus provides both challenges and opportunities for the practice of non-financial matters like sustainability (Sumit Lodhia et al.,2021). However, Ramona and Frederick (2021) pursue to commentate on the roles of sustainability reporting during the period the COVID-19 pandemic. According to the study GRI can play an important role in guiding immediate and short-term best practices in COVID-19 reporting. Thus, findings motivate us to report for vulnerable rather than powerful stakeholders and to recognize and celebrate proactive change.

2.2. Sustainability Reporting and Firm Performance in Global Context

There are several research findings on sustainability reporting and firm performance in a global context. Laskar (2018) analyzed the impact of corporate sustainability reporting (CSR) on firm performance in four Asian countries of Japan, South Korea, Indonesia, and India. That study was carried out to find out whether there is any significant difference between developed and developing countries in Asia. The firm performance, which was the dependent variable, was measured by the market-to-book ratio (MBR) which represents stakeholders' expectation. And Corporate Sustainability Performance (CSP) is the explanatory variable in the study and firm size and leverage are the control variables. The impact of CSP on the MBR of selected four Asian countries was investigated by the multivariate logistic regression model. The findings of Laskar (2018) reveal that, a positive and significant relationship between corporate sustainability performance and firm performance in Japan. Majority of the Japanese firms also voluntarily report their sustainability-related activities in GRI standards and found that disclosure of CSR is improving the firm performance very significantly. While South Korean firms have a positive and significant impact of CSP on firm performance, both Indian and Indonesian companies have a positive and considerable influence of CSP on MBR. According to the study, can be visible that the influence of CSP on MBR is more in the case of developed countries as compared to developing countries. One of the limitations of the study is disclosure scores of CSP are calculated based on the GRI reporting framework. Although the GRI framework is widely accepted, may not be found sufficient information relating to CSR for some companies belonging to different industries. As a reason for that, only using GRI does not give a clear picture of sustainability practices performed by the companies. When, calculating the CSP disclosure of companies, considering the various internationally recognized frameworks like United Nations Global Compact (UNGC) or Carbon Disclosure Project along with the GRI framework as a basis, will generate more accurate results.

The study also implies that future efforts should be made to establish a methodology that encompasses both financial and non-financial performance to obtain a clearer picture of the relationship between CS reporting and firm value.

The study of Nurlan and Monowar (2020) explores the relationships between sustainability reporting with factors of stand-alone sustainability reports, medium of language, financial leverage, financial capacity, firm profitability, firm age, firm size, and auditor type of publicly traded companies including energy, manufacturing and service companies at the Kazakhstani Stock Exchange for the period of 2013–2015. The scholars followed the GRI reporting standards which consist of 79 items from three main GRI-based performance indicators including economic contribution, environmental performance, and social responsibility. The findings of the study reveal that fifty percentage of energy companies disclose sustainability information in English, and only five percent of service companies issue stand-alone reports. Manufacturing companies have the highest mean values of twenty-five percent for economic performance. The result from regression analysis reveals that firm profitability is positively related to sustainability information and profitable companies in Kazakhstan disclose more sustainability information per the GRI guidelines. This study only considers the listed companies of Kazakhstan and used GRI 3 standards. If the scholar expands the sample of the study can give more consistent results.

Meanwhile, Shilpi and Hemal (2016) tried to study the impact of sustainability reporting on the firm's profitability. The major issues of the study are which sustainability measures affect firm profitability. They conducted the study using a sample of 103 companies for six years using secondary data and GRI guidelines help to identify the sustainability measures. The significance and impact of sustainability on the firm's profitability were investigated using multiple regression analysis. Their results showed that-, Indian companies have recognized the importance of sustainability reporting and the major companies are reporting on its overall sustainability has an impact on a firm's profitability to some extent. The scholars found that-, the community variable has a major contribution to the profitability of the firms out of the four key sustainability variables.

The impact of sustainability reporting on performance indicators in Indian companies is investigated (Garg, 2015). The companies' sustainability scores have been determined by using GRI guidelines as a base, which includes economic, environmental, social, related employee-related, and product-related indicators a total of 121 indicators. Sustainability Reporting Score, Return on Assets (ROA), and Tobin's Q are the key variables of the study. Paired t-test and Regression Analysis were used to analyze the data collected through secondary sources. The study's findings show that the sustainability reporting practices of a firm in India, impact its performance negatively in the short run while positively in the long run. Not only that, but the study also confirms that sustainability reporting practices of companies in India have improved over the study period of five years. And also, the study is limited to only companies which are a part of the BSE GREENEX index, and due to time constraints, the research could not be done extensively because it does not

provide a consistent result. The scholar recommends for future studies extending the period for the study and industry-wise comparison for reporting practices and it will give more accurate results. The limitation of this study is it was conducted only for one year. Expanding the sample size and years would give more reliable results.

Even though sustainability reporting has been introduced earlier but the implementation is still not constant among the firms (Jalila Johari, 2019). From the begging of the year 2007, Listed companies in Malaysia had to disclose sustainability activities in their annual reports according to the requirement of the Malaysian government. This study investigates the relationship between sustainability reporting and firm performance in the year 2016 among Malaysian Listed companies. By using financial performance indicators such as Return on asset (ROA), Earnings per Share (EPS), and Dividend per Share (DPS) scholars identified the relationship between sustainability reporting and firm performance. While GRI G4 guidelines are used to study the sustainability reporting elements and correlation analysis is used to measure the linear relationship among the variables. The study found that sustainability reporting has a positive relationship with firm performance in Malaysian Listed companies which is consistent with previous researchers. The limitation of this study is it was conducted only for one year. Expanding the sample size and years would give more reliable results.

If the sustainability reporting crosses a certain threshold, the firm's operating performance is positively impacted (Bansal and Bashir, 2021). Similarly, sustainability reporting positively impacts firms' market performance only up to a cut-off point. One of the limitations of the study is, it does not consider the heterogeneous impact of ESG on firm performance. Future researchers are encouraging analyses on the dynamic nature of ESG and firm performance relationship by using time-varying measures.

Furthermore Hongming, et.al (2020) explored the relationship between corporate sustainability practices and financial performance in Pakistan. According to their study data was collected from sustainability reports of 50 non-financial public limited companies, listed in Pakistan Stock Exchange from 2013 to 2017. The sustainability reporting index was calculated based on 42 indicators which include environmental, social, and health and safety indicators. To assess the impact of sustainability reporting on firm performance two regression models were used. The findings of the first regression model show the individual effect of the above-mentioned indicators. Social and environmental indicators have a significant positive impact on firm performance but, health and safety indicators show a significant and weak impact on firm performance in Pakistan. The second regression model of the study also confirmed a significant positive impact of the sustainability reporting index on firm performance.

Not only that, Buallay (2020) compared Sustainability reporting and firms' performance between the manufacturing and banking sectors. Data analysis was done of 932 manufacturing companies and 530 banks listed in 80 countries for 10 years period from 2008-2017 using the regression model. Firm performance is measured by three performance measures of operational, financial, and market performance by

using return on asset, (ROA), return on equity (ROE), and Tobin's Q respectively between two sectors. The researcher found that sustainability report disclosure positively affects the manufacturing sector's performance, but ESG negatively affects the operational, financial, and market performance in the banking sector. Most of the studies in the global context provide a positive relationship between sustainability reporting and firm performance.

Moreover, Aggarwal (2013) attempted to explore the relationship between sustainability reporting and corporate financial performance through a review of extant literature. The scholar analyzed 30 studies and found that 12 studies show a positive relationship, 2 show a short-term negative relationship, 7 studies show no relationship, and 9 studies provide mixed results. As a result, many studies show that sustainability reporting improves business reputation and financial performance by generating numerous synergies and benefits for the reporting company. Furthermore, many available studies have been conducted in developed countries such as the United Kingdom, the United States, Europe, and so on. As a result, there is a pressing need to investigate this relationship in the context of developing countries.

2.3. Sustainability Reporting and Firm Performance in the Sri Lankan Context

Sri Lanka is one of the developing countries in Asia. As there is a need to investigate the relationship between sustainability reporting and firm financial performance of developing countries the current study is conducted according to the Sri Lankan context. Prior studies dealing with the impacts of sustainability reporting on firm performance of Sri Lankan companies have provided somewhat mixed results with some positive and negative findings. The study Thayaraj and Karunaratne (2021) also identified a positive relationship between financial performance with economic, environmental, and social disclosures in listed companies in Sri Lanka.

Moreover, Silva (2019) conducted a study on, two state-owned banks, 10 private banks, and 20 finance companies which are selected based on the accessibility to the financial statements with sustainability reports to identify Sustainability Reporting and its Impact on the Financial Performance of the Sri Lankan Financial Sector. Banks disclose their direct economic impact and economic value but, it has failed to disclose the market presence, indirect economic impact, procurement practices, and anti-corruption policies. The study investigates that reporting on environmental disclosures is very poor. Thus, the study presents a similar trend in financial companies, which discloses more on social performance but less on environmental performance. G4 standards and GRI guidelines were used in this study over two years 2016/2017 and 2017/2018, showing no improvement over the period. The study confirmed that the level of disclosures has no correlation or association with the financial performance measure. The scholar found that, although reporting on sustainability does not provide immediate benefits but enhanced transparency, reduced risk, and increased stakeholder involvement will produce benefits in the long run.

The study by Dissanayake et al. (2016) declares that sustainability reporting and KPI reporting are gaining momentum in larger, publicly listed organizations in Sri Lanka.

The top 30 and bottom 30 companies of the Colombo Stock Exchange (CSE) were selected as the sample for the study. Those companies belong to seven industry categories, diversified holdings, beverage, food and tobacco, banks, finance and insurance, manufacturing and telecommunications, plantations and oil palms, chemicals and pharmaceuticals, and travel. A sustainability reporting scoring model was used to measure sustainability reporting as it assessed the quality as well as the quantity of sustainability reporting of companies. In this study, total revenue or ROE is not related to the level of sustainability reporting of the companies because data were observed for a short period of one year. Thus, longitudinal analysis is important for future research.

A study performed on Sri Lankan Listed companies obtaining data from 2012 to 2015 ascertains company size and usage of the GRI guidelines are found to be the most relevant company characteristics associated with sustainability reporting (Dinithi (2019)). According to the study, ownership, and industry sector do not show strong influences on the extent of sustainability reporting over the study period. The limitation of the study is, large companies which follow the GRI guidelines are more likely to report elaborately, indicating the influence of standards-setting bodies in Sri Lanka.

According to the findings of Senaratne (2009), Sri Lankan companies do not consider GRI Guidelines in reporting for sustainability thus there is an expectation gap as to the information needs of stakeholders on sustainability reporting and the information disclosed in the annual reports of companies in the Sri Lankan context.

Sustainability disclosure has a positive effect on firm value (Swarnapali, 2020). The data were analyzed related to the publicly listed companies on the CSE from 2012 to 2016. Although profitability (ROE), sales growth, and firm age are positively associated with firm value, it is negatively associated with firm size and leverage. The study confirms that sustainable firms have higher firm value than non-sustainable firms. The study was the first study that examined the consequences of sustainability disclosure in the Sri Lankan context. One of the limitations of the study is it does not investigate all the consequences relevant to sustainability disclosure such as cost of equity capital, tax aggressiveness, market reaction, and some other factors.

Board size, board independence, and representation of females on the board are positively and significantly associated with sustainability disclosure Mudiyansele (2018). The study used 100 listed Sri Lankan companies representing all the business sectors over four years from 2012 to 2016. However, dual leadership structure, board ethnicity, and board ownership showed a negative relationship with sustainability disclosure.

A Sri Lankan study Aruppala (2015) was conducted to investigate the present state of environmental disclosure practices of Sri Lankan listed companies. Here considered Manufacturing, Motor, Power, and Energy sector companies in Colombo Stock Exchange. The study found that many companies disclosed less information in their annual reports. Limitations of the study are only used a secondary database on

randomly selected three sectors of CSE and the study used annual reports of one financial year.

The study discussed literature studies on the impact of sustainability reporting on firm performance. There is little literature in the Sri Lankan context, on the impact of sustainability reporting on the firm financial performance of manufacturing companies. The Manufacturing sector has no consistent results in the global context as well. Then there is a gap in identifying the impact of sustainability reporting on the firm financial performance of Listed Manufacturing companies in Sri Lanka during pre- and post-Covid-19. Therefore, the study contributes to the literature to fill the gap by performing content analysis and considering the potential relationship between sustainability disclosures and the firm's financial performance in Sri Lankan Listed manufacturing companies with the comparison of pre Covid-19 and post Covid-19 period.

3. METHODOLOGY

The study focuses on the impact of Sustainability Reporting on the firm financial performance of Listed Manufacturing companies in Sri Lanka during Pre and Post Covid-19. The literature review section identified that most of the studies have used, GRI guidelines to measure the sustainability reporting of companies. According to the listed manufacturing companies in Sri Lanka, every company does not disclose separate sustainability reports. Lack of usage of GRI guidelines in the manufacturing sector in the Sri Lankan context and to measure the quality of the sustainability reporting, this study developed a sustainability reporting scoring model to measure sustainability reporting disclosures of Manufacturing companies.

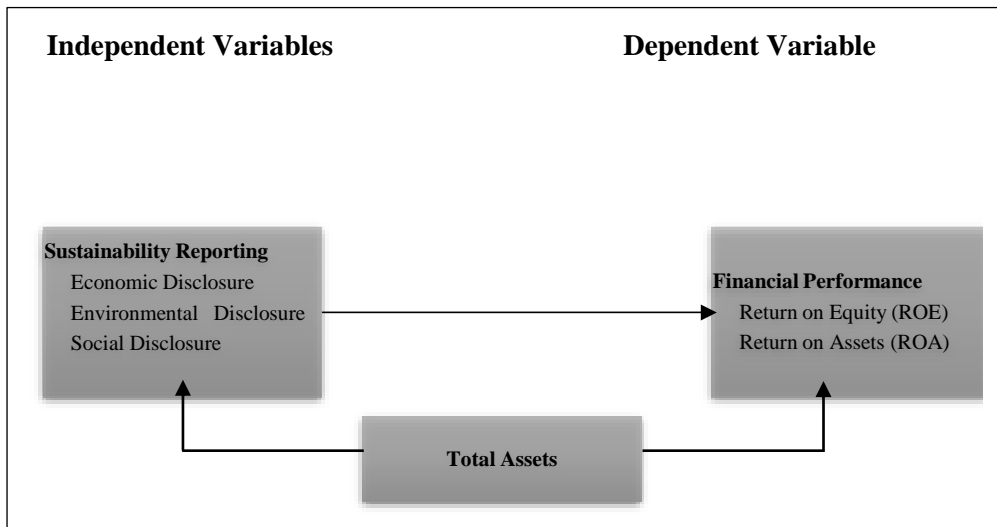
Table 1: Variable Measurement

Variable	Dimension	Measurement
Dependent Variable	Return on Assets (ROA)	$\frac{Net\ income}{Total\ Assets}$
Dependent Variable	Return on Equity (ROE)	$\frac{Net\ income}{Shareholder's\ Equity}$
Independent Variable	Environmental Disclosure (En)	<i>GRI – G4</i>
Independent Variable	Economic Disclosure (Ec)	<i>GRI – G4</i>
Independent Variable	Social Disclosure (S)	<i>GRI – G4</i>
Independent Variable	Overall Sustainability Reporting	Sustainability scoring model which measures overall sustainability reporting
Control Variable	Total Assets (TA)	Annual total assets of the firm

Source: Author Created

While the dependent variable of the study is financial performance, the independent variables are economic, environmental, and social disclosures. The financial performance of the companies will be measured using Return on Assets (ROA) and Return on Equity (ROE). Total Assets (TA) will take as a firm-specific control variable (Table 1). The conceptual diagram (Figure 1) has been developed based on

prior literature. Table 1 states how to measure dependent and independent variables in the study during the pre and post Covid-19 periods.



Source: Author Created

Figure 1: Conceptual Framework

3.1. Development of Hypotheses

According to a study conducted by Buallay (2020) to find the impact of sustainability reporting disclosure on the firm performance of the manufacturing and banking sector in the global context. Three dependent variables (ROE, ROA, and Tobin’s Q) were used to conduct the study to find the impact of sustainability reporting disclosure on the firm performance of the manufacturing and banking sector in the global context. Financial leverage, total assets, and audit quality were the firm-specific control variables used in the study. As the results showed there was a significant positive effect on the firm performance by the sustainability reporting disclosures in the manufacturing sector. This study only focuses on the impact of sustainability reporting on the firm financial performance of the manufacturing sector in the Sri Lankan context. While this study uses the dependent variables ROE and ROA, the firm-specific control variable is the total assets. Sooriyaarachchi (2018) used GRI guidelines to measure sustainability reporting, and regression analysis was conducted to analyze the data using E-views software. H₁, H₂, H₃, H₄, H₅, H₆, H₇, H₈, H₉, H₁₀, H₁₁ and H₁₂ are using GRI-G4 guidelines to measure the sustainability reporting disclosures. The quality and quantity of the sustainability reporting were measured by the sustainability scoring model developed by (Dinithi ,2016) In this study to test H₁₃, H₁₄, H₁₅, and H₁₆ use the developed sustainability reporting scoring model.

As discussed in the literature review chapter the studies which have been conducted, have produced mixed results. The below hypothesis is developed to analyze further during pre and post Covid-19 situation in Manufacturing Companies Sri Lankan context.

H₁: There is a significant positive relationship between Economic Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₂: There is a significant positive relationship between Environmental Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₃: There is a significant positive relationship between Social Disclosure and firm ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₄: There is a significant positive relationship between Economic Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₅: There is a significant positive relationship between Environmental Disclosure and the ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₆: There is a significant positive relationship between Social Disclosure and firm ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₇: There is a significant positive relationship between Economic Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₈: There is a significant positive relationship between Environmental Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₉: There is a significant positive relationship between Social Disclosure and firm ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₁₀: There is a significant positive relationship between Economic Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₁₁: There is a significant positive relationship between Environmental Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₁₂: There is a significant positive relationship between Social Disclosure and firm ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₁₃: There is a significant positive relationship between overall Sustainability Reporting and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₁₄: There is a significant positive relationship between overall Sustainability Reporting and ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.

H₁₅: There is a significant positive relationship between overall Sustainability Reporting and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.

H₁₆: There is a significant positive relationship between overall Sustainability Reporting and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid-19 situation.

3.2. Research Design & Method

This study uses the deductive method because the study is based on theories. The exploratory approach uses here because quantitative data is used for the study. Prior literature also mentioned an exploratory approach for quantitative data in similar studies as well.

3.3. Population & Sample Design

The Colombo Stock Exchange (CSE) has 295 Listed companies including fifty-two Listed Manufacturing companies. The entire population is considered as the sample of the study. All the Listed manufacturing companies that disclose annual reports within the sample period are considered as the sample and purposive sampling is the technique used by the study. The sample of the study consists of 43 manufacturing companies listed in CSE.

Since Sri Lanka faced Covid-19 during the year 2020 onwards, the analysis will be divided into 2 phases whereby 1st phase will be named as “pre-Covid-19 period” from 2015 to 2019 and the 2nd phase will be named as “post-Covid-19 period” from 2020.

3.4. Data Sources and data collection methods

In the current study, the researcher focuses on secondary data collection techniques to gather data. The required data will have collected through annual reports and sustainability reports for selected samples for pre-Covid-19 and post-Covid-19 periods. All annual reports will have been collected from the websites of the respective companies and CSE.

3.5. Study Type

This research will use a panel study to obtain the mentioned objectives of the study because here use the same data repeatedly during pre-Covid-19 and post-Covid-19 periods.

3.6. Method of Data Analysis

Data analysis is a very important part of any research and after collecting data it should be analyzed and interpreted. The study will use some statistical methods to analyze quantitative data which is collected from 43 manufacturing companies listed in CSE. Data will be analyzed using Descriptive Statistics, Pearson Correlation, and Panel Data Regression Analysis. Mean, standard deviation, variance graphs, and tables will be used to discuss the findings, according to the descriptive analysis. Regression analysis was used to test the relationship between economic, environmental, and social disclosures and firm financial performance.

Below research models proposed for this study,

$$\text{ROE (Pre Covid-19-GRI)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \quad \rightarrow \quad (1)$$

$$\text{ROA (Pre Covid-19-GRI)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \quad \rightarrow \quad (2)$$

$$\text{ROE (Post Covid-19-GRI)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \quad \rightarrow \quad (3)$$

$$\text{ROA (Post Covid-19-GRI)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \rightarrow (4)$$

$$\text{ROE (Pre Covid-19-SRSM)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \rightarrow (5)$$

$$\text{ROA (Pre Covid-19-SRSM)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \rightarrow (6)$$

$$\text{ROE (Post Covid-19-SRSM)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \rightarrow (7)$$

$$\text{ROA (Post Covid-19-SRSM)} = \beta_0 + \beta_1\text{IVEC} + \beta_2\text{IVEN} + \beta_3\text{IVS} + \beta_4\text{CVTA} + \varepsilon \rightarrow (8)$$

3.7. Sustainability Reporting Scoring Model (SRSM)

A separate sustainability report is a report which includes all three dimensions of sustainability. Developed a sustainability model, differentiated between a separate sustainability report and sustainability disclosures. In the absence of separate sustainability reports, some key phases were used to identify the sustainability disclosures within the annual report according to (Dinithi, 2016). To measure over all sustainability reporting sustainability scoring model was developed with refereeing to the prior literature as well. Table 3.9 is based on twelve numerical scales, each with bipolar adjectives at each end and intervals measured by numbers. Experience, Format, CEO statement, Stakeholder focus, Sustainability goals, Sustainability goal achievement strategy, GRI guidance, GRI application level, External assurance, Economic indicators, Environmental indicators, and Social Indicators are the criteria of the SRSM. According to the model, values between 0 and 4 are awarded to each criterion, and a final overall "Score" out of a possible forty points is determined for each organization.

4. DATA ANALYSIS AND DISCUSSIONS

The required data for the study were obtained from the annual reports, sustainability reports, and company websites of listed manufacturing companies from 2015 to 2021. Sustainability reporting disclosures are measured by the GRI-G4 guidelines using a scoring model to measure economic, environmental, and social disclosures. It includes 91 items that are covering Economic Performance, Market Presence, Procurement Practices, Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services, Employment, Occupational Health and Safety, Diversity and Equal Opportunity, Local Communities, Public Policy, Customer Health, and Safety and so on. When data are available under each circumstance, it recorded 1, and 0 in all the other instances. After measuring the sustainability disclosures with GRI –G4 guidelines, the study developed a sustainability scoring model to measure overall sustainability reporting because it measures the quality of sustainability reporting. As per Dinithi et al. (2016). It consists of Experience, Format, CEO statement, Stakeholder focus, Sustainability goals, Sustainability goal achievement strategy, GRI guidance, GRI application level, External assurance, Economic indicators, Environmental indicators, and Social Indicators to measure all overall sustainability reporting in manufacturing companies in Sri Lanka.

4.1. Descriptive Statistics

Descriptive analysis provides a summary of the basic characteristics of data in a study. This section provides an overview of the descriptive statistics for the study's

regression models' independent and dependent variables. According to descriptive statistics, central tendency and dispersion measures are used to define the data set. While Central tendency includes mean, medium, and mode, the measures for dispersion include standard deviation, variance, and distribution measures including skewness and kurtosis.

For assessing the quality as well as the quantity of sustainability reporting, Sustainability reporting was measured using a Sustainability Reporting Scoring Model (SRSMS) by providing a detailed framework (Dinithi et al., 2016)

During the pre-Covid-19 situation, the highest DVROA is 5.37, which indicates the maximum, and the lowest DVROA in the selected sample period is -0.20 while the mean DVROA for the sample is 0.26 with a standard deviation of 0.79. In the case of IVSR, CVTA presents the same results whereas the dependent variable, ROA. During the post Covid-19 situation, the highest DVROA is 5.97, which indicates the maximum, and the lowest DVROA in the selected sample period is -0.20 while the mean DVROA for the sample is 0.27 with a standard deviation of 0.83. In the case of IVSR, CVTA presents the same results whereas the dependent variable, ROA.

4.2. Correlation Results

4.2.1. Correlation Results during Pre-and Post-Covid Situation (Sustainability Reporting measured by GRI –G4)

In Table 2, the correlation illustrates that there is a significant negative relationship between the ROE and IVEN during the pre-Covid-19 situation when measuring the independent variables by GRI –G4 guidelines. The correlation between IVEC and DVROE represents a significant positive correlation. The correlation between IVS and DVROE, CVTA, and DVROE has a significant positive relationship. Then, IVEC, IVS, and CVTA have been positively correlated with DVROE independently during the pre-Covid-19 situation. In Table 2, the correlation illustrates that there is a significant positive relationship between the ROE and IVEC during the post-Covid-19 situation when measuring the independent variables by GRI –G4 guidelines as same to the pre-Covid-19 situation. Similarly, IVEC, IVS, and CVTA positively correlated with DVROE independently. However, IVEN represents a significant negative relationship between ROE during the post-Covid-19 situation as like the pre Covid19 situation. The relationship between sustainability disclosures and ROE has revealed the same relationship during the pre-and post-Covid-19 situation.

As per Table 2, although there is a significant positive correlation between IVEC with DVROA, the correlation between IVEN and DVROA represents a significant negative correlation during the pre-Covid-19 situation. IVEC, IVS, and CVTA positively correlated with DVROA independently.

Like the pre-Covid-19 situation, there is a positive correlation for IVEC with DVROA during the post-Covid-19 situation. The relationship between the variables IVEN and DVROA is significantly negative. DVROA between IVEC, IVS, and CVTA all showed positive correlations and the results are the same during pre-and post-Covid-19 situations.

The study measured the overall sustainability by developing a sustainability reporting scoring model of manufacturing companies for the pre-Covid-19 situation. According to H₁₃, overall sustainability reporting has a significant and positive impact on the ROE of the listed Manufacturing Companies in Sri Lanka. Similarly, correlation results show there is a positive relationship between these two variables. When increases sustainability disclosures, ROE increases slowly. The post Covid-19 situation also measured the overall sustainability by developing a sustainability reporting scoring model for manufacturing companies.

Table 2: Summary of Correlation Analysis

Variable	Pre Covid-19 ROE		Post Covid-19 ROE		Pre Covid-19 ROA		Post Covid ROA	
	Correlation	P-Value	Correlation	P-Value	Correlation	P-Value	Correlation	P-Value
IVEC	0.017866	0.0079	0.037109	0.0073	0.008537	0.0090	0.005996	0.0095
IVEN	-0.13164	0.0439	-0.131191	0.0286	-0.09992	0.0014	-0.042141	0.0070
IVS	0.215112	0.0015	0.22084	0.041	0.192585	0.0046	0.140011	0.0019
CVTA	0.401718	0.0000	0.371008	0.0004	0.439326	0.0000	0.420207	0.0001

Source: Author Created

4.2.2. Correlation Results during Pre and Post Covid situation (Sustainability Reporting measured by SRSM)

In Table 3 the correlation illustrates that there is a positive relationship between the ROE and IVSR during the post Covid-19 situation when measuring the independent variables by the developed sustainability scoring model. While the environmental disclosures show a negative relationship between ROE, here sustainability shows a positive relationship during the pre-and post-Covid-19 situation.

According to H₁₄, overall sustainability reporting has a significant and positive impact on the ROA of the listed Manufacturing Companies in Sri Lanka during the pre-Covid-19 situation. Similarly, correlation results show there is a positive relationship between these two variables. When increasing the sustainability disclosures, ROA increases slowly like in the previous situation.

According to H₁₅, overall sustainability reporting has a significant and positive impact with ROA listed Manufacturing Companies in Sri Lanka during post Covid-19 situation. Similarly, correlation results show there is a significant positive relationship between these two variables. When increasing the sustainability disclosures, ROA increases slowly like in the previous situation.

Table 3: Summary of Correlation Analysis

Variable	Pre Covid-19 ROE		Post Covid-19 ROE		Pre Covid-19 ROA		Post Covid ROA	
	Correlation	P-Value	Correlation	P-Value	Correlation	P-Value	Correlation	P-Value
IVSR	0.216068	0.0014	0.199936	0.0449	0.18488	0.0066	0.118062	0.0079
CVTA	0.401718	0.0000	0.371008	0.0004	0.439326	0.0000	0.420207	0.0001

Source: Author Created

4.3. Regression Analysis

In order to determine whether there is no multicollinearity issue, the correlation coefficients between explanatory variables were examined. Therefore, in respect, coefficients of every possible association between explanatory variables have been seen. Correlation between the independent variable is estimated to test whether multicollinearity amongst these variables.

4.3.1. Multicollinearity Analysis during Pre-and-Post-Covid Situation (Sustainability Reporting measured by GRI)

When centered VIF values are more than 10 means, the data set is suffering from multicollinearity with another variable. But according to the output of Table 4, the data set is not suffering from the multicollinearity effect with another variable during pre-covid-19 when measuring the financial performance by ROE. Two or more independent variables are not highly correlated with each other. VIF is the reciprocal of the tolerance value; small VIF values indicate low correlation among variables under ideal conditions $VIF < 3$. However, it is acceptable if it is less than 10. When multicollinearity exists with the data set, the study cannot predict the exact independent variable that correlated with the dependent variable. During the post covid situation the output of Table 4 presents, the data set is not suffering from the multicollinearity effect with another variable.

All independent variables are not highly correlated with each other. During the pre-covid situation when measuring the firm performance by ROA, the above output also shows the data set is not suffering from the multicollinearity effect with another variable (Table 5). The independent variables are not highly correlated with each other. According to Table 5, the data set is not suffering from the multicollinearity effect with another variable. Same to the previous situations here also (post covid situation), independent variables are not highly correlated with each other.

Table 4: Multicollinearity Analysis (Variance Inflation Factors)

Variable	Pre Covid-19 ROE				Post Covid 19 ROE		
	Coefficient	Uncentered	Centered	Coefficient	Uncentered	Centered	
	Variance	VIF	VIF	Variance	VIF	VIF	
C	0.468125	132.9640	NA	1.317426	164.0722	NA	
IVEC	0.153645	6.390109	1.282171	0.415393	14.82328	1.417942	
IVEN	0.497565	10.81866	2.774504	0.847421	10.13276	2.173284	
IVS	0.576055	19.42690	2.360278	0.944123	21.60316	2.290163	
CVTA	0.001077	133.9369	1.180522	0.002812	159.3730	1.070768	

Source: Author Created

Table 5: Multicollinearity Analysis (Variance Inflation Factors)

Variable	Pre-Covid-19 ROA				Post-Covid-19 ROA		
	Coefficient	Uncentered	Centered	Coefficient	Uncentered	Centered	
	Variance	VIF	VIF	Variance	VIF	VIF	
C	0.292418	132.9640	NA	1.107432	164.0722	NA	
IVEC	0.095976	6.390109	1.282171	0.349180	14.82328	1.417942	
IVEN	0.310808	10.81866	2.774504	0.712345	10.13276	2.173284	
IVS	0.359838	19.42690	2.360278	0.793632	21.60316	2.290163	
CVTA	0.000672	133.9369	1.180522	0.002363	159.3730	1.070768	

Source: Author Created

4.3.2. Multicollinearity Analysis during Pre-and-Post-Covid Situation (Sustainability Reporting measured by SRSM)

Table 6 presents the multicollinearity analysis of sustainability reporting measured by SRSM, while the dependent variable is ROE during the pre- and post-covid situation. The independent variables are measured using a developed sustainability scoring model and the output also presents, the data set is not suffering from the multicollinearity effect with another variable. Similarly, all independent variables are not highly correlated with each other. The data set is not affected by the multicollinearity impact with another variable during the post covid situation. Like the earlier instances, there is little correlation between the independent variables in this situation.

The results of Table 7 present the multicollinearity analysis of sustainability reporting measured by SRSM, while the dependent variable is ROA during the pre-and post-covid situation also predict that the data set is not suffering from the multicollinearity effect with another variable. As same to the pre and post covid situation when measuring the sustainability reporting with GRI-G4 guidelines, the variables are not suffering from multicollinearity issues. Similarly, when using the sustainability scoring model to measure the overall sustainability, there is no multicollinearity issue with the data set reported.

Table 6: Multicollinearity Analysis (Variance Inflation Factors)

Variable	Pre Covid-19 ROE			Post Covid 19 ROE		
	Coefficient	Uncentered	Centered	Coefficient	Uncentered	Centered
	Variance	VIF	VIF	Variance	VIF	VIF
C	0.437196	119.8965	NA	1.285623	158.7348	NA
IVSR	360646.2	9.214892	1.000957	1197039.	11.88646	1.000160
CVTA	0.000945	113.5643	1.000957	0.002649	148.8637	1.000160

Source: Author Created

Table 7: Multicollinearity Analysis (Variance Inflation Factors)

Variable	Pre-Covid-19 ROA			Post-Covid-19 ROA		
	Coefficient	Uncentered	Centered	Coefficient	Uncentered	Centered
	Variance	VIF	VIF	Variance	VIF	VIF
C	0.274013	119.8965	NA	1.068958	158.7348	NA
IVSR	226035.0	9.214892	1.000957	995302.7	11.88646	1.000160
CVTA	0.000593	113.5643	1.000957	0.002203	148.8637	1.000160

Source: Author Created

Moving on to the regression analysis, estimates of both fixed and random effects models were confirmed by using Redundant Fixed Effects Tests and the Hausman Test. Regression models in the form of pooled, fixed effects, and random effects were evaluated to identify better estimates for models indicated in this section.

4.3.3. Selecting the Best Model for Measuring Sustainability Reporting

Pre Covid-Situation (Sustainability measured by GRI) - ROE

Firstly, the redundant fixed effects test (F Test) was carried out to check the validity of the fixed effects model against the simple pooled ordinary least squares (OLS) method and the results are presented in Table 8. There is no significant difference

between the selected companies when considering the pool method regression. All data can conclude as together. The fixed method discusses whether there is a difference between selected companies. After running those two methods, the redundant fixed effect test shows the fixed method is the best model for this data set. This leads to the fact that the fixed method is the appropriate approach for the regression analysis when the mean cross-section chi-square value is less than 5%. According to Table 14, results shown in the redundant fixed effect test confirm that the fixed method is the best method for this study.

In addition to these two models, there is another one called random effect testing, which is a statistical model with random variables for the model parameters. A random effects model is a special case of a mixed model. The Hausman Test shows the results of identifying the best model either random or fixed. According to Table 15, the probability value is more than 0.05, and conclude that the fixed model is more appropriate for the analysis.

According to the results of the regression model (Table 10) of the fixed method, the overall model is statistically significant as the probability F statistic value is less than 0.05. R squares indicate the goodness of fit of the model. That means the amount of percentage change of the dependent variable is explained by the selected independent variables. In this model, 23% of ROE is explained by the economic, environmental, and social disclosures in the selected manufacturing companies' company's annual reports. While IVEC and IVS are positively affected by the dependent variable of ROE, IVEN is negatively affected by ROE. Since the Durbin-Watson value is around 1 there is no autocorrelation in the sample.

Table 8: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.765558	(42,168)	0.0000
Cross-section Chi-square	265.713189	42	0.0000

Source: Author Created

Table 9: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.291004	4	0.1213

Source: Author Created

Table 10: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.499753	0.684197	8.038265	0.0000
IVEC	0.921927	0.391976	2.351997	0.0196
IVEN	-1.648373	0.705383	-2.336848	0.0204
IVS	0.795561	0.758983	1.048193	0.0058
CVTA	0.235502	0.032810	7.177659	0.0000
R-squared	0.237639	Mean dependent var		0.257864
Adjusted R-squared	0.223118	S.D. dependent var		0.987087
S.E. of regression	0.870028	Akaike info criterion		2.582398
Sum squared resid	158.9591	Schwarz criterion		2.660785
Log-likelihood	-272.6078	Hannan-Quinn criter.		2.614070
F-statistic	16.36500	Durbin-Watson stat		0.927656

Prob(F-statistic)	0.000000
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Source: Author Created

Pre Covid-Situation (Sustainability measured by GRI) – ROA

According to Table 11, the probability value is less than 0.05, and conclude that this model is more appropriate for the analysis. As per Table 12, the value of the test is higher than 0.05. The null hypothesis is rejected, and the alternative hypothesis is accepted and the best model is the fixed model.

The results of the regression model (Table 13) of the fixed method show that an overall model that is statistically significant as the probability F statistic value is less than 0.05. That means the amount of percentage change of the dependent variable is explained by the selected independent variables. In this model, 25% of ROA is explained by the economic, environmental, and social disclosures in the selected manufacturing companies' company's annual reports. While IVEC and IVS are positively affected by the dependent variable of ROA, IVEN is negatively affected by ROA like the previous situation. Similarly, since the Durbin-Watson value is around 1, there is no autocorrelation in the sample.

Table 11: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	17.105440	(42,168)	0.0000
Cross-section Chi-square	357.595845	42	0.0000

Source: Author Created

Table 12: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.291818	4	0.0815

Source: Author Created

Table 13: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.709237	0.540757	8.708602	0.0000
IVEC	0.750544	0.309800	2.422674	0.0163
IVEN	-1.236502	0.557502	-2.217933	0.0276
IVS	0.568171	0.599865	0.947165	0.0446
CVTA	0.202606	0.025932	7.813028	0.0000
R-squared	0.258760	Mean dependent var		0.265862
Adjusted R-squared	0.244641	S.D. dependent var		0.791184
S.E. of regression	0.687629	Akaike info criterion		2.111847
Sum squared resid	99.29513	Schwarz criterion		2.190234
Log-likelihood	-222.0236	Hannan-Quinn criter.		2.143519
F-statistic	18.32728	Durbin-Watson stat		0.773990
Prob(F-statistic)	0.000000			

Source: Author Created

Post-Covid Situation (Sustainability measured by GRI) – ROE

As the first step, the Redundant fixed effects test (F Test) was carried out to check the validity of the fixed effects model against the simple pooled ordinary least squares (OLS) method as previously which have done during the pre-covid situation (Table

14). Based on the reported probability cross-section F/cross-section chi-square values the null hypothesis that all the constants are the same (homogeneity); $H_0: a_1 = a_2 = \dots = a_n$ has been rejected and the application of fixed effect models provide appropriate than pooled OLS for the analysis of measuring sustainability reporting. The outputs of Table 15 present that the probability value is higher than 0.05 and conclude that the best model is the fixed model and rejected the null hypothesis. The results of fixed effect regression are summarized in Table 16 and it indicates that IVEC and IVS significantly affect ROE at the 5 percent level, which leads to accepting H_7 and H_9 . However, the IVEN coefficient is negative, which leads to rejection H_8 .

Table 14: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.765558	(42,168)	0.0000
Cross-section Chi-square	265.713189	42	0.0000

Source: Author Created

Table 15: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.291004	4	0.1213

Source: Author Created

Table 16: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.902315	1.147792	4.271083	0.0001
IVEC	0.821879	0.644510	1.275201	0.0059
IVEN	-0.663026	0.920555	-0.720246	0.0034
IVS	1.415328	0.971660	1.456608	0.0491
CVTA	0.203254	0.053024	3.833217	0.0002
R-squared	0.202549	Mean dependent var		0.243319
Adjusted R-squared	0.163169	S.D. dependent var		0.908398
S.E. of regression	0.830988	Akaike info criterion		2.523979
Sum squared resid	55.93387	Schwarz criterion		2.666674
Log-likelihood	-103.5311	Hannan-Quinn criter.		2.581407
F-statistic	5.143424	Durbin-Watson stat		1.330757
Prob(F-statistic)	0.000961			

Source: Author Created

Post-Covid Situation (Sustainability measured by GRI)-ROA

As per Table 17, based on the reported probability cross-section F/cross-section chi-square values the null hypothesis that all the constants are the same (homogeneity); $H_0: a_1 = a_2 = \dots = a_n$ has been rejected and the application of fixed effect models provide appropriate than pooled OLS for the analysis of measuring sustainability reporting. Although the probability value of Table 18 is less than 0.05, it is higher than the probability value of the fixed model. Then the best model is the fixed model and rejected the null hypothesis. The results of fixed effect regression are summarized in Table 19, and it indicates that IVEC and IVS significantly affect ROA at the 5 percent level and which leads to accepting H_{10} and H_{12} . However, the IVEN coefficient is negative, and which leads to rejection H_{11} .

Table 17: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	31.811414	(42,39)	0.0000
Cross-section Chi-square	306.392639	42	0.0000

Source: Author Created

Table 18: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	15.024210	4	0.0047

Source: Author Created

Table 19: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.804107	1.052346	4.565141	0.0000
IVEC	0.664684	0.590915	1.124839	0.0040
IVEN	-0.302915	0.844005	-0.358902	0.0206
IVS	0.982958	0.890860	1.103380	0.0431
CVTA	0.206183	0.048615	4.241142	0.0001
R-squared	0.207011	Mean dependent var		0.276930
Adjusted R-squared	0.167851	S.D. dependent var		0.835198
S.E. of regression	0.761886	Akaike info criterion		2.350342
Sum squared resid	47.01815	Schwarz criterion		2.493037
Log-likelihood	-96.06473	Hannan-Quinn criter.		2.407770
F-statistic	5.286289	Durbin-Watson stat		1.229779
Prob(F-statistic)	0.000781			

Source: Author Created

Pre-Covid-Situation (Sustainability measured by SRSM) - ROE

According to Table 20, the probability value is less than 0.05, and conclude that this model is more appropriate for the analysis. Although the probability value of Table 21 is less than 0.05, it is higher than the probability value of the fixed model. Then the best model is the fixed model and rejected the null hypothesis. The results of fixed effect regression are summarized in Table 22, and it indicates that IVSR significantly affects ROE at the 5 percent level and which leads to accepting H₁₃.

Table 20: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	13.919632	(42,41)	0.0000
Cross-section Chi-square	234.365340	42	0.0000

Source: Author Created

Table 21: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.911552	2	0.0070

Source: Author Created

Table 22: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.962294	0.661208	7.504890	0.0000
IVSR	1995.400	600.5383	3.322686	0.0011

CVTA	0.198178	0.030747	6.445435	0.0000
R-squared	0.202888	Mean dependent var		0.257864
Adjusted R-squared	0.195368	S.D. dependent var		0.987087
S.E. of regression	0.885430	Akaike info criterion		2.608368
Sum squared resid	166.2050	Schwarz criterion		2.655400
Log-likelihood	-277.3995	Hannan-Quinn criter.		2.627371
F-statistic	26.98007	Durbin-Watson stat		0.939963
Prob(F-statistic)	0.000000			

Source: Author Created

Pre-Covid Situation (Sustainability measured by SRSM) - ROA

Similarly, in pre covid situation when using the GRI guidelines, Table 23 also presents the probability value as less than 0.05 and concludes that this model is more appropriate for the analysis. Although the probability value of Table 24 is less than 0.05, it is higher than the probability value of the fixed model. Then the best model is the fixed model and rejected the null hypothesis. The results of fixed effect regression are summarized in Table 25, and it indicates that IVSR significantly affects ROA at the 5 percent level and which leads to accepting H₁₄.

Table 23: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.870824	(42,41)	0.0000
Cross-section Chi-square	307.455591	42	0.0000

Source: Author Created

Table 24: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.524858	2	0.0031

Source: Author Created

Table 25: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.964698	0.728821	1.323642	0.0474
IVSR	901.2735	495.3971	1.819295	0.0706
CVTA	0.046004	0.034457	1.335126	0.0436
R-squared	0.854208	Mean dependent var		0.265862
Adjusted R-squared	0.816473	S.D. dependent var		0.791184
S.E. of regression	0.338944	Akaike info criterion		0.857799
Sum squared resid	19.53007	Schwarz criterion		1.563281
Log-likelihood	-47.21338	Hannan-Quinn criter.		1.142846
F-statistic	22.63733	Durbin-Watson stat		2.053671
Prob(F-statistic)	0.000000			

Source: Author Created

Post-Covid Situation (Sustainability measured by SRSM) - ROE

During the post covid situation also, Table 26 states that the probability value is less than 0.05 and concludes that this model is more appropriate for the analysis. Although the probability value of Table 27 is less than 0.05, it is higher than the probability

value of the fixed model. Then the best model is the fixed model and rejected the null hypothesis.

The results of fixed effect regression are summarized in Table 28, and it indicates that IVSR and ROE significantly affect ROE at the 5 percent level and which leads to accepting H15. That means there is a positive relationship between ROE and overall sustainability disclosures.

Table 26: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	13.919632	(42,41)	0.0000
Cross-section Chi-square	234.365340	42	0.0000

Source: Author Created

Table 27: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.911552	2	0.0070

Source: Author Created

Table 28: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.871963	1.133853	4.296820	0.0000
IVSR	2143.772	1094.093	1.959406	0.0434
CVTA	0.190327	0.051468	3.697971	0.0004
R-squared	0.175773	Mean dependent var		0.243319
Adjusted R-squared	0.155912	S.D. dependent var		0.908398
S.E. of regression	0.834584	Akaike info criterion		2.510494
Sum squared resid	57.81200	Schwarz criterion		2.596110
Log-likelihood	-104.9512	Hannan-Quinn criter.		2.544950
F-statistic	8.850205	Durbin-Watson stat		1.309082
Prob(F-statistic)	0.000328			

Source: Author Created

Post-Covid Situation (Sustainability measured by SRSM) - ROA

During the post covid situation also, table 29 states that the probability value is less than 0.05 and concludes that this model is more appropriate for the analysis. Although the probability value of Table 30 is less than 0.05, it is higher than the probability value of the fixed model. Then the best model is the fixed model and rejected the null hypothesis. The results of fixed effect regression are summarized in Table 31, and it indicates that IVSR and CVTA significantly affect ROA at the 5 percent level and which leads to accepting H₁₆. That means there is a positive relationship between ROA and overall sustainability disclosures.

Table 29: Redundant Fixed Effect Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.870824	(42,41)	0.0000
Cross-section Chi-square	307.455591	42	0.0000

Source: Author Created

Table 30: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.524858	2	0.0031

Source: Author Created

Table 31: Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.813815	1.033904	4.655959	0.0000
IVSR	1138.205	997.6486	1.140887	0.0472
CVTA	0.198847	0.046931	4.236995	0.0001
R-squared	0.189288	Mean dependent var		0.276930
Adjusted R-squared	0.169753	S.D. dependent var		0.835198
S.E. of regression	0.761015	Akaike info criterion		2.325934
Sum squared resid	48.06897	Schwarz criterion		2.411551
Log-likelihood	-97.01517	Hannan-Quinn criter.		2.360391
F-statistic	9.689576	Durbin-Watson stat		1.234938
Prob(F-statistic)	0.000165			

Source: Author Created

4.4. Hypothesis Testing

Table 3: Summary of the Analysis for Hypotheses

Hypothesis	P-Value	Accepted or Rejected
H ₁ : There is a significant positive relationship between Economic Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	0.921927	Accepted
H ₂ : There is a significant positive relationship between Environmental Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	-1.648373	Rejected
H ₃ : There is a significant positive relationship between Social Disclosure and firm ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	0.795561	Accepted
H ₄ : There is a significant positive relationship between Economic Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation	0.750544	Accepted
H ₅ : There is a significant positive relationship between Environmental Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	-1.236502	Rejected
H ₆ : There is a significant positive relationship between Social Disclosure and firm ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	0.568171	Accepted
H ₇ : There is a significant positive relationship between Economic Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	0.821879	Accepted
H ₈ : There is a significant positive relationship between Environmental Disclosure and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	-0.663026	Rejected
H ₉ : There is a significant positive relationship between Social Disclosure and firm ROE of Listed	1.415328	Accepted

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H ₁₀ : There is a significant positive relationship between Economic Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	0.664684	Accepted
H ₁₁ : There is a significant positive relationship between Environmental Disclosure and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	-0.302915	Rejected
H ₁₂ : There is a significant positive relationship between Social Disclosure and firm ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	0.982958	Accepted
H ₁₃ : There is a significant positive relationship between overall Sustainability Reporting and ROE of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	1995.400	Accepted
H ₁₄ : There is a significant positive relationship between overall Sustainability Reporting and ROA of Listed Manufacturing companies in Sri Lanka during Pre Covid situation.	901.2735	Accepted
H ₁₅ : There is a significant positive relationship between overall Sustainability Reporting and ROE of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	2143.772	Accepted
H ₁₆ : There is a significant positive relationship between overall Sustainability Reporting and ROA of Listed Manufacturing companies in Sri Lanka during Post Covid situation.	1138.205	Accepted

Source: Author Created

According to the study H₁, H₃, H₄, H₅, H₆, H₇, H₉, H₁₀, H₁₂, H₁₃, H₁₄, H₁₅, and H₁₆ are accepted. Buallay (2020) also revealed that sustainability reporting positively affects the ROA and ROE in the manufacturing sector.

4.5. Discussions

This chapter discussed the results obtained from descriptive statistics, regression analysis, and empirical results generated by the researcher using various statistical tests. Panel regression analysis is employed to test the hypotheses and the fixed effects model is selected as it was the most appropriate method used based on the literature previously done. Based on the findings, the researcher accepted the main hypothesis that concluded that the overall sustainability reporting had an impact on the financial performance of the listed manufacturing companies. In this research, there are sixteen hypotheses developed by the researcher for the pre-Covid-19 situation as well as the post covid-19 situation. Researchers rejected the hypothesis of H₂, H₅, H₈, and H₁₁ and concluded that the impact of the environmental disclosures negatively impacts the financial performance during the pre and post-COVID-19 pandemic.

The study's findings revealed that there are serious positive consequences to ROE, ROA which measure the financial performance of the manufacturing companies due

to the economic and social disclosures during the pre- and post-Covid-19 situation. Even though other disclosures showed a positive correlation with firm performance revealed a negative correlation between the environmental disclosures with firm financial performance during the pre- and post-Covid-19 situation. Finally, the results reveal that there is a positive relationship between ROE and sustainability reporting during pre-covid situation when measuring the overall sustainability reporting by the developed sustainability scoring model because of the quality and quantity of the sustainability reporting model. Similarly, post covid -19 situation also shows that there is a positive relationship between ROA and sustainability reporting when measuring the overall sustainability reporting by the developed scoring model. The results of the current study further confirm the literature findings of (Buallay, 2020).

5. CONCLUSION

The main objective of the study is to identify the relationship between firm financial performance and sustainability reporting of listed manufacturing companies in Sri Lanka during the post-Covid-19 period. From the analysis done in the previous chapter, there was a significant and positive impact on the financial performance in the manufacturing sector during pre and post Covid-19 when the sustainability reporting by developed sustainability reporting scoring model. However, when measuring the sustainability reporting by GRI-G4 guidance there was a negative relationship between environmental disclosures with firm financial performance. Although it was negatively affected by the firm performance, economic and social disclosures positively correlated with the variables. Another objective was to find out the relationship between firm financial performance and sustainability reporting of Listed Manufacturing companies in Sri Lanka during the pre-Covid-19. From the analysis done in the previous chapter, the results were the same as the post Covid-19 situation when measuring the sustainability reporting by GRI-G4 guidelines and sustainability scoring model. The final objective was to develop a measurement system to measure sustainability reporting using GRI in Sri Lanka. The study developed a sustainability scoring model to measure the overall sustainability reporting and it measures the quality of the sustainability reporting also.

The occurrence of epidemics and pandemics has been a rare event in history, but the occurrence of COVID-19 has reminded the entire world that, while rare, such events do occur. The only way to protect against such pandemics is to be prepared and formulate plans. Policies to address their consequences as in the past, the adverse financial situation. The consequences of such events are severe and widespread. This research is one of the pioneers of such research in terms of analyzing the impact of sustainability reporting on firm financial performance during pre- and post-Covid-19.

Throughout the research process, the researcher found the following gaps prevailing in this study and Sri Lankan context. This study has some limitations because the results of the research are only applicable to the Sri Lankan context. As a result, it is suggested to investigate this area with a comparison study between developing countries and developed country contexts using primary data.

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