An Impact of Environmental Management Practices on Firm Performance based on Balanced Scorecard

R. P. G. Hasini Yasodara

MC : 78251

CPM : 14001

Batch : 2013/ 2014

A research report submitted to the

University of Sri Jayewardenepura

For the B.Sc. Accounting (Special) Degree

In the Faculty of Management Studies and Commerce,

Department of Accounting

2018

Department of Accounting

Faculty of Management Studies and Commerce

University of Sri Jayewardenepura

Nugegoda

Sri Lanka

This is to certify that the research report

Presented by

R. P. G. Hasini Yasodara

On

An impact of environmental management practices on firm performance based on balanced scorecard

Can be accepted by the Department of Accounting

University of Sri Jayewardenepura

In partial fulfilment of the requirements of the

B. Sc. Accounting (Special) degree

…….	……
Senior Prof. K.D. Gunawardena	Dr. A. H.N.Kariyawasam
Research Supervisor	Head of Department

DECLARATION

The work described in this dissertation was carried out me under the guidance of Senior Prof. K. D. Gunawardena and has not been submitted in whole or in part to any university or any other institution for another Degree/ Diploma.

……

R. P. G. Hasini Yasodara 26th November 2018

ACKNOWLEDGMENT

The writing of this dissertation has been assisted by many generous individuals and I wish to express my humble gratitude to them

First and foremost I would like to express my sincere gratitude to my research supervisor Senior Prof. Kennedy D. Gunawardena for the extensive knowledge shared with me and for the generous assistance and the encouragement rendered to me throughout the research period.

Secondly, I would like to thank the University of Sri Jayewardenepura and the Faculty of Management Studies and Commerce for the knowledge and the skills given to me during the past four years.

Thirdly, I would like to thank all the lecturers of the University for the Tremendous Support rendered to me during my university journey.

Last but not least I would like to express my heartfelt gratitude to my beloved family and my friends for supporting me throughout my journey and being my pillars of strength in times of need and for motivating me to achieve greater heights.

Table of Contents

1 Introduction 1

1.1 Background 1

1.2 Problem Statement 3

1.3 Problem Justification 3

1.4 Objectives of the study 4

1.5 Significance of the study 5

1.6 Scope of the study 6

2 Literature Review 7

2.1 Environmental Management Practices 7

2.2 Firm Performance 9

2.3 Environmental Management Practices and Firm Performance 10

2.4 Measuring Environmental Performance 11

2.5 BSC as a measurement tool 12

2.6 Environmental awareness and BSC 13

3 Methodology 14

3.1 Conceptual Diagram 14

3.2 Hypothesis 15

3.3 Population and sample selection 16

3.4 Data collection and data analysis 17

3.5 Operationalization of variables 18

4 Findings and Discussion 24

4.1 Findings 24

4.1.1 Pearson correlations 26

4.1.2 Multiple regression analysis 29

4.2 Discussion 35

5 Conclusion and limitations. 41

List of Tables

TABLE 1.THE JOB POSITION OF THE RESPONDENTS 17
TABLE 2. KEY PERFORMANCE INDICATORS 19
TABLE 3 ROTATED COMPONENT MATRIX (SPSS) 20
TABLE 4. KEY PERFORMANCE INDICATORS – ROTATED COMPONENT MATRIX (SPSS) 22
TABLE 5 PERCEPTION ON BEING A SOCIALLY RESPONSIBLE CORPORATE CITIZEN VIA REPORTING ON TRIPLE BOTTOM LINE 24
TABLE 6. EXISTING ENVIRONMENTAL MANAGEMENT PRACTICES OF SELECTED LISTED COMPANIES. 25
TABLE 7 PEARSON CORRELATION (R) 27
TABLE 8 COEFFICIENT AND SIGNIFICANCE OF MODEL 1 REGRESSION ANALYSIS 29
TABLE 9 COEFFICIENT AND SIGNIFICANCE OF MODEL 2 REGRESSION ANALYSIS 31
TABLE 10 COEFFICIENT AND SIGNIFICANCE OF MODEL 3 REGRESSION ANALYSIS 33
TABLE 11 R^2 AND SIGNIFICANCE 34
TABLE 12 SUMMARY OF HYPOTHESIS TESTED AND P VALUES 35

List of figures

FIGURE 1. CONCEPTUAL DIAGRAM - DEVELOPED BY AUTHOR.....14

Abstract

Corporate world is seeking adoption of more Environmental Management Practices as the interest towards corporate social responsibility of them became one of the main stake of the public. Not only the public, key players of the companies' operation chain such as employees and customers also consider the practices undertaken by companies in lining to the protection of the environment. The increasing demand for more Environmental Management Practices resulted from experienced environmental hazards and bad weather conditions which were happened all over the world in recent past. Consequently, governments, institutions and authorities across countries began to standardize the adoption of environmental management practices in countries, industries and organizations. Sri Lankan government has also introduced such policies with adoption guidelines in order to comply with global requirement of environmental protection. On the other hand regulatory authorities such as Institute of Chartered Accounts of Sri Lanka and Security Exchange Commission of Sri Lanka have also published reporting requirements regarding the complying with such environmental protection practices. Corporate governance requirements of Sri Lanka have identified the practices of corporate social responsibility as a good governance practice and complying with integrated reporting focusing triple bottom line (economic, environment and society) as a key requirement of corporate governance requirement. Most of the Sri Lankan listed companies have begun to publish their annual reports complying with these requirements adopting relevant guidelines. Accordingly, it is very important to find out the actual environmental protection practices undertaken by companies in order to find out the contribution of corporate individuals towards protection of environment. However, every rational person including a corporate body would prefer to receive a return for their effort embedded to substantive cost. Therefore, the importance of identifying whether there is any attributable return for such environmental protection practices defined as the "Environmental Management Practices" in the current study, is brought into the discussion. Consequently, the purpose of the study was to identify whether there is an impact of Environmental Management Practice on Firm Performance. Return would be measure as the Firm Performance in terms of both financial and non-financial performances. The measurement tool used to measure Firm Performance is the well-known performance measurement tool introduced by Kaplan and Norton called "Balanced Scorecard" which includes four main aspects of companies' performance i.e. financial, customer, internal processes and learning & growth. Accordingly, the credibility of Balanced Scorecard model to address the environmental performance of an organization within its conventional pillars were

also determined in the study. Environmental Management Practices are identified basically in to three categories and those are Green Product Practices, Green Process Practices and Green Supply Chain Management (SCM) Practices. The data were collected through a postal and mailed questionnaire and it was focused companies listed in the Colombo Stock Exchange (CSE) where the main operations are included manufacturing processes. Respondents for the purpose of data gathering were senior management who have the knowledge about the relevant areas. The sample selection was based on the guidance of empirical studies. Data collected were analysed using descriptive analysis, Pearson correlation analysis and multiple regression model in SPSS statistics. Hypothesis testing was carried out based on the R^2 and significance values. Last of all, the findings of the discussion mainly focused that to what extent Balanced Scorecard implied environmental Management Practices in listed manufacturing companies in Sri Lanka and how it affects to the Firm Performance. The findings and results of the study will be useful for senior management on environmental strategy formulation and implementation at their organizations and will provide an insight rather motivation to adopt Environmental Management Practices within the organizations.

Key words: Environmental Management Practices, Firm Performance, Balanced Scorecard

1 Introduction

1.1 Background

During the past few decades, the whole world began to contemplate a shared issue which is commonly known to be global warming. Antonio Guterres, UN Secretary General, mentioned 2016 as the hottest year in recent past and this has been threatened the weather as well. Climate change makes the competing situation over the scares resources worst and this will not only affect the ecosystems and biodiversity of the world but peace, security and sustainable development of the world (UN Environment 2016).

It is acknowledged that highly affected industries due to climate change are agriculture and forestry where large number of developing countries depend on. It is evidenced from recent years that crop growing seasons are shifting, and this will negatively result on food security of most of Asian countries (European Parliament 2007). As it mentioned in the EU Accountability report (EU Accountability report 2007), susceptibility of climate change would be significant due to high sensitivity i.e. countries situated as a small islands. Thus it is obvious that Sri Lanka is also a threatened country.

This state of affairs has built a common conversation and accordingly, most of the global institutions, countries and societies have rearranged their policies, regulations and their accountability reporting to address what currently happening in the world in terms of global warming and its consequences. G20 countries have taken several steps towards this issue and thus lowering emission growth, protecting ecosystems (terrestrial and aquatic ecosystems, marine ecosystems), managing chemicals & waste and reviewing environment for early warning are few of those strategies (UN Environment 2016).

On the other hand, mitigation and adaption strategies are implementing for the sake of developing countries and Sri Lanka has also adapted these strategies (Climate Change Secretariat Sri Lanka 2016), as a sustainable footstep. As 28 % of Sri Lankan GDP is contributed through agriculture sector, which is highly sensitive to the climate condition, the adaptive capacity of Sri Lanka is highly questionable. Further the report highlights stakeholders of this adaptive policies, and **private sector (corporate sector and SMEs)** has also identified as a key contributor of environmental hazard and therefore business organizations have a collective responsibility headed for the success of this adaptive policies.

The most recent example from Sri Lankan context regarding negative externalities towards environment is the incident of "Rathupaswala" and it is obvious that contribution of corporate sector i.e. business organizations who benefited from the society towards negative environmental impact is significant and thus organizations should be accountable on this regards.

This accountability issue has been addressed through environmental reporting practices emerged with integrated reporting which has been practiced for many years by organizations. Report on RG-Sustainability Reporting Guidelines, 2000-2011 GRI indicates that focus on knowledge, economic development and technology is not far more sufficient and therefore organizations should be capable of addressing sustainable economies, societies and environment. Integrating these three bottom lines into core value system of organizations is regulated through the GRI guidelines and this initiation has built a new discussion on sustainability indicators and organizational performance (Idalina & Lucas 2005, Frank, Tobias, Stefan & Marcus 2002).

Adapting integrated reporting has built a competitive edge in Sri Lankan context where it has become significant in the process of value creation. Mr. Anura Priyadarshna Yapa, a former Minister of Environment, stated that self-evaluation of environmental practices by business organizations will drive Sri Lanka towards a sustainable future and this would facilitate the survival of those business organizations within both local and global markets (Ministry of Environment 2011). Not only that, the integrated reporting framework would be a self-control over any negative externalities as well.

However, every organization should ultimately consider about maximizing their shareholders' value as it is affected by the value transferred to all the interested groups. Whether Environmental Management Practices have essentially contributed to this value creation is highly debatable and thus it is required to be known the additional value created through adopting Environmental Management Practices. Even though business organizations are responsible for reducing greenhouse gas emission, carbon foot print, pollution, & waste etc. financing these practices will have a cost and a rational business organization would expect benefit on behalf of their effort headed for sustainable future in short term. Therefore measuring environmental performance and its impact to the Firm Performance is an area which is to be addressed as it will force business organization towards adoption of more Environmental Management Practices.

Accordingly, a common question which is identified in this research paper is “whether there is an impact to the firm performance by environmental management practices” and it is open to discussion that how it correlates i.e. the relationship in between Firm Performance and Environmental Management Practices is either positive or negative or no relationship at all. The current study has identified one of the most popular performance measurement tool which is commonly known as “Balance Scorecard” to measure Firm Performance in terms of both financial and non-financial perspectives. Not only that, the research paper will concern about “The credibility of BSC model to address the environmental performance of an organization within its conventional pillars.”

1.2 Problem Statement

Basically, Environmental Management Practices do not reflect its impact to the firm’s value creation in a transparent manner. Likewise it is not clear and no absolute conclusion about this phase of discussion. Further, as Environmental Management Practices are outlying from monetary terms, it is not possible to use any kind of performance measurement tool as well. Accordingly, the performance measurement tool which measures both financial and non-financial performance and known to be a strategic management tool, the “Balance Scorecard” introduced by Robert Kaplan & David Norton is taken under consideration of this research study. By applying, the research study into Sri Lankan context, the concern of the research study is highlighted as,

“To what extent Balanced Scorecard implied environmental management practices in listed manufacturing companies in Sri Lanka and how it affects to the organizational performance.”

1.3 Problem Justification

World has become more environmental consciousness and most of the world organizations and regulatory bodies have identified many reasons towards this situation and have taken several steps to mitigate the risk and to prevent the actions that cause this worseness.

When it is addressing this worseness, environmental hazards have affected to the hydrological cycle and this has impacted on number of severe floods and droughts through changeability in annual and seasonal rainfall. The situation exacerbates population growth, poverty and urbanization by pushing millions of people into further poverty. This is a growing issue in most

of the developing countries and if no responses made to mitigate and overcome this situation, the loss is estimated to be 20% of GDP (European Parliament 2007).

Sri Lanka is also experiencing changes of seasonal rainfalls and continuous annual flood in recent years. Hence there is no doubt that this adversity of natural factors have a negative impact on economic stability of the country. Since, Sri Lankan economy highly depends on environmental factors as 6.8% of its GDP contributed by agriculture sector (Central Bank of Sri Lanka 2018) this issue should be addressed immediately. As of this, it is precious to identify the importance of addressing this issue and provide substance paybacks of being environmental friendly.

In view of that, there is a growing importance of stirring business organization towards more environmental awake, highlighting overall benefits it will return in terms of Firm Performance as it would undertake more Environmental Management Practices.

Identifying the knowledge gap in Sri Lankan context, this research study addresses number of Environmental Management Practices that can be undertaken by organizations in a way of improving its Firm Performance, by means of a well-known performance measurement tool "Balances Scorecard" which provides more comprehensive and strategic way to accomplished overall goals and objectives of business organizations.

1.4 Objectives of the study

The current study basically aimed to understand the impact on firm performance of Sri Lankan listed companies after establishing Environmental Management Practices within the business organizations. Accordingly, objectives of this study were,

01. To find out the existing Environmental Management Practices of selected listed companies

Environmental Management Practices were identified in to three areas; Green Product, Green Process & Green Supply Chain Management (SCM). Based on the past researches this categorization will give a broad understanding of Environmental Management Practices currently undergone by companies and the management involvement towards Environmental Management Practices.

02. To identify the relationship between Environment Management Practices and Firm Performance in the cause of Balanced Scorecard

Alone financial performance will not be given a comprehensive performance results which is driven by Environmental Management Practices. Hence, Firm Performance will measure based on all the four pillars addressed in Balance Scorecard. Accordingly, the research will be identify the relationship between Environmental Management Practices and perceived Firm Performance at each of performance measurement category in the Balanced Scorecard.

03. To examine the gap existing in between Environmental Management Practices and Firm Performance

Perceived Firm Performance would be monitored against Environmental Management Practices identified in terms of Green Product, Green Process & Green Supply Chain Management (SCM). There may be performance differences in certain practices which would be measured using Balanced Scorecard. The research paper would concern these contradict situations as to find out any gap of Environmental Management Practices towards favourable Firm Performance.

04. To suggest environmental related KPI which is to be included in the BSC

Companies have already adopted Environmental Management Practices are catered with appropriate Key Performance Indicators (KPI) they would include in to their performance matrixes specifically, BSC in terms of Environmental Management Practices. Who have not initiated such practices have been provided with a guide to implement Environmental Management Practices and to measure the performance results based on identified KPI commonly set in the global context.

1.5 Significance of the study

There is no doubt that, the responsibility of mitigating the current situation is highly lied on business organizations as their contribution to environmental hazard is thousand times more than the households. Consequently, Sri Lankan government also encourage business organizations to reposition their operations where damage to the environment is minimum or zero. Adopting GRI guidelines has forced organizations to practice environmental friendly activities within their organization and to do their operations in an environmental friendly manner.

Rational business organization will always seek for returns on investments of Environmental Management Practices. This could not be measured basically from short-term financial

measures, and therefore owners and managers will not motivated to adopt Environmental Management Practices. However, other stakeholders as well as mandatory regulatory requirements would concern on organizations' Environmental Management Practices and force organizations to implement Environmental Management Practices. Facilitating this contradictory interests, this research is to give an analysis of Firm Performance that will gain in return of implementing Environmental Management Practices by business organizations. Accordingly, Managers decisions towards adopting more Environmental Management Practices; responding to the regulatory requirement will be enable by the analysis and findings of the research study.

1.6 Scope of the study

This research study basically focused on identifying the capability of Balanced Scorecard when addressing the impact of Environmental Management Practices on Firm Performance. However, when it comes to the practice of corporates, most of the organizations would not use Balanced Scorecard as a performance measurement tool as same as the term given in the books. Accordingly, it was difficult to identify organizations which used Balanced Scorecard as a performance measurement tool but in practice.

Further, these information were internally produced and not available in public. Therefore, as the data collection method, a questionnaire was developed and given to the selected personnel of selected listed companies. Since it is difficult to correlate Firm Performance with Environmental Management Practices; Perceived firm performances were taken into consideration. This could be identified as a limitation as it was not considered a numerical value of Firm Performance. Accordingly, future research studies may concern on these key limitations and would be able to overcome such scope limitations.

2 Literature Review

Environmental stability has become more important and many researches have contributed to this end of studies in various aspects, such as environmental consciousness, environmental management practices, environmental proactivity and so on (Frank, Ram & Robert 2007, Nazim, Ray & Robert 1998, Kaja & Tomaz 2015). On this regard organizations' engagement with environment has mostly influenced by regulators and government pressures (Davidson & Worrell 2001, Bansal & Roth 2000 and Lozano & Valle 2007 cited in Aapo 2008). Aapo (2008, p. 188) in reporting Pan's study, highlights that in 2003, has identified that most of the organizations have implemented Environmental Management Practices to gain the perceived competitive advantage through requirements such as ISO 14001. However it is also highlighted the increasing importance of "including environmental measures in to the process of strategy settings and strategic decision making process" as environmental issues may affect internal organizational functions such as operation, marketing and human resources. Extensive undertaken of strategic intensive environmental activities would result favorable impact on the society as well as expansion of the market share and the profitability (Kaja & Tomaž 2015).

2.1 Environmental Management Practices

Many scholars, who have done their research studies to identify the impact of Environmental Management Practices on firm performance, have ascertained the concept of Environmental Management Practices in various terms which are incompatible when defining the term Environmental Management Practices.

It is evidenced from the past research findings that, the concept of Environmental Protection is too broad to be narrowed down under a single definition. As Jeronima et al. (2013, p. 983) identified, the concept of Environmental Protection can be derived in three forms of definition based on their inherent specifications. Accordingly, it has been acknowledged, activities undertaken by firms to protect the natural environment as Environmental Management, strategic direction of companies towards environmental issues as Environmental Proactivity and the actual impact of firm's activities on environment as Environmental Performance. Further elaborating their argument, it has been determined that the impact of these three types of environmental practices on firms' financial performance would not be same inevitably.

Moreover, Jeronima et al. (2013, p. 985) in reporting Henri and Journeault's study, highlights that in 2008, explained Environmental Management Practices only reflects firms' intention to

protect the environment as a responsibility which is addressed stakeholders interest. Thus it would not be necessarily protect the Environment from its activities.

However it is really difficult to surface specific definitions about these concepts as less evidence are available to differentiate each among themselves. Therefore, the term Environmental Management Practices, is used for the current study considering that it reflects all above identified perspectives without any specific characteristics.

Frank, Robert and Ram arguing the positive impact of Environmental Management Practices on firm performance in their study (2007, p.998) , defined the term Environmental Management Practices, '[a]re the techniques, policies and procedures a firm uses that are specifically aimed at monitoring and controlling the impact of its operations on the natural environment'. The study has differentiated the effect of environmental management practices into three forms of corporate structural dimensions i.e. Strategic, tactical & operational. Strategic environmental practices have been defined as goals and objectives set by top management focusing external environmental factors that reflects organization's environmental direction. Environmental management practices that would be practiced in operations have been identified as operational environmental practices and environmental practices comes in between both strategic and operation level which considers both internal and external factors have been identified as tactical level environmental practices.

Environmental Management Practices have also been classified into three main practices i.e. design, recycling and waste practices where firm operations affected by its design practices and reduced restoration of waste consequently (Robert 2003). Accordingly various practices have been identified under each practice are commonly used by many companies at present such as, design practices: substitution, reduction, redesign, design for disassembly, using recycling materials; recycling practices: rebuilding of products, remanufacturing, consumption of scrap and typical waste materials internally; waste practices: waste stream, recycling, creating market for waste materials.

On the other hand, it is likely that companies which have adequate resources and capacity only adapt Environmental Management Practices in to their organizations where it is possible to integrate these practices within every operations undertake such as product design, material selection, manufacturing processes & distribution and management of product after its useful life (Daniel & Ailie 2014). However, the research paper has defined Environmental

Management Practices into three main areas i.e. green product, green process and green supply chain management which were used as the basis of identifying Environmental Management Practices for the current study purpose as well.

2.2 Firm Performance

In the Industrial Age, it was mainly focused on financial measures in the event of firm performance. Hence, Return on Capital Employed (ROCE), Return on Equity (ROE), Return on Investment (ROI) measures used to measure financial performance of firms. Subsequent evolve of Information Age expanded this scope of firm performance and introduced more measurement basis which are not limited to the financial measures (Kaplan & Norton 1996). Kaplan & Norton further argued in their study, that monitoring and controlling financial measures of historical performance would not be adequate in a competitive edge which is driven by technology, competitiveness and capabilities (1996, p.06). Though it has highlighted the importance of including non-financial indicators in to the performance measurement system, profitability and efficiency in operations have also been identified as key measures of firm performance in a competitive environment (Punniyamoorthy & Murali 2008).

Significance of other indicators other than focusing only financial measurements when determining overall firms' performance has identified recently (Kaja & Tomaz 2015). Mike and Andy (2003, p.213), in reporting Lynch and Cross study, emphasized that in 1991, elaborated, accompanying organizational activities with its corporate strategies and objectives can only be ensured by initiating a fitting performance measurement system. This has exaggerated as corporate activities are required to be external focus to react competitive markets and more challenging customers. As conventional measurement tools were not providing adequate knowledge of how to enhance corporate activities to address these situation it is required a comprehensive performance measurement system.

Most of the organizations used to magnifying their firm performance through defining sustainability KPIs, considering stakeholder perception over firms' sustainable adherence. Although, this importance has identified, less knowledge exists about how to implement sustainability indicators in to firms' performance management systems (Nancy, David & Steve 2013). They have further determined that an effective performance measurement connects both financial and non-financial performance of an organization and Balanced Scorecard has been identified as the most eminent method which caters management focus on four key

organizational aspects which address both financial and non-financial performance; together achieve organizational objectives.

2.3 Environmental Management Practices and Firm Performance

Environmental management practices and firm performance has been discussed together in many literature and there is a debatable situation about this relationship. The most preferred argument on this case is that there is a positive relationship between environmental awareness and the organizational performance without the consideration of industrial differences (Nazim, Ray & Robert 1998).

To prove the relationship between environmental management practices and firm performance, it is significant to have a correlation in between (Nazim et al. 1998). As an example given by Stuart and Gautam (1996, p. 30) in their study:

> [r]educing emission level by half of its current level may result less raw material usage and lowering inventory level would result cost savings.

Identifying a solid answer for the exact relationship between Environmental Management Practices and Firm Performance, it has found; a weak but relatively significant correlation between environmental design practices, manufacturing practices and waste practices with firm performance (Robert 2003).

In favor to the same argument, it has found that firm financial performance has a positive & strong relationship with environmental proactivity and environmental performance but not with environmental management (Jeronimo et al. 2013). The research study has also emphasized the importance of finding out an efficient way of improving firm performance after adapting environmental management and it suggested that use of new management practices would be helpful on this account (Jeronimo et al. 2013, reporting in Ronnerberg et al. 2008). Further, Kenneth et al. (2012, p. 201) asserted that from single business organization aspect, it is preferred to have environmental sustainable practices and it will always enhance firms' strategic position. Though the impact is varying from lower to higher, a favorable impact of environmental practices at every division of an organization can also be identified interchangeably (Robert 2003).

Contradictory to these findings, there is an inability of giving a conclusion regarding the positive relationship between environmental practices and organizational performance, as the impact of environmental activities are affected by both complexity and uncertainty of

businesses and its environment. On the other hand, there is lack of evidence to ensure that whether the better performance results are actually an outcome of environmental proactive actions rather other internal and external factors affecting firm performance (Kaja & Tomaz 2015). Moreover, there is less substantiation that return would be more than the cost incurred in relation to establishing environmental management practices and this situation affects organizational orientation towards initiating environmental management practices within their business organization.

Consequently, the cost associates with establishment of environmentally sustainable guild lines in an organization may negatively affect competitiveness of an organization (Kenneth et al. 2012) and investing in environmental management activities has not been identified as a fruitful strategy to take as it is more complex and long-standing (Hillary 2004, cited in Jeronimo et al. 2013). In addition, limitation of organizational resources has been identified as a fact that affects small businesses being less environment consciousness compared to the large organizations as small size business firms seem it is more uncertain to invest in environmental strategies (Nazim et al. 1998).

Notwithstanding these opposing arguments, there may be unforeseen advantage of being environmental friendly in terms of improvement of corporate image (Nancy, David & Steve 2013). Likewise, entrenching responsibility of being a green corporate citizen in to organizational activities, drives more favorable performance results where it has a positive relationship in between (Sofia 2009).

2.4 Measuring Environmental Performance

Stuart L and Gautam A (1996, p. 31) have found an affirmative result to prove the arguments of the positive relationship and accordingly, there is an indication of this positive relationship between the organizational performance in terms of ROA, ROE & ROS and the emission reduction and less pollution which have been taken as the measurement variables of environmental practices. Even though the financial indicators are used to measure the organizational performance in many cases, instead of the overall organizational performance it is basically captured the financial performance.

Sharma and Henriques observations in 2005 (cited in Jeronimaet at al. 2013) acknowledged, the amount of waste generated by a firm as a significant measure in the cause of environmental performance. Further, it has been found a difference in the result between measuring

environmental performance based on environmental activities and performance. Hence Jeronima et al (2013, p.1004) indicated in their study, a positive relationship exists in both cases but the impact is significant only when the practice is in terms of environmental performance. Classifying environmental activities and environmental performance, they have identified obtaining a membership of environmental association and repossessing waste generated from operation as examples for environmental activities and environmental performance respectively. However the research study further claimed that industry differentiation as a factor affect when determining the measurement variables in relation to the environmental performance.

Being specific to the manufacturing industry, it has been suggested to take a strategic move in a way of environmental sustainability and enhance the management information system (MIS) in order to monitor consequences of such practices before incorporating with suppliers and customers. However the impact of green collaboration with supply chain parties; on firm performance is not yet ascertained (Kenneth et al. 2012). It has also found that amount of resources used and pollution created as tools to measure environmental adherence of manufacturing organizations and the importance of prerequisite of continuous inspection of factors influence and factors that get affected from such activities; for the environmental engagement to be throve (Sofia 2009).

2.5 BSC as a measurement tool

Kaplan and Norton argued the insufficiency of financial measurement results of past performance for a competitive and technology driven future of business environment where it requires quantifying intangible assets and company capabilities which enable companies to determine any improvement in those aspects. Even though some organizations currently practice performance measurement systems includes both financial and non-financial measures the mere objective would only be the control of the short term achievements (1996, p.06-08). On this background, Balanced Scorecard is competent to merge company's strategies into its performance measures providing a complete set-off performance system (1996, p. 24).

Balanced Scorecard initiated by Kaplan and Norton has four aspects: financial, customers, internal business process and learning & growth (Kaplan & Norton 1996). Notwithstanding these four perspective which could use in many companies across the industries, it has only been developed as a template (1996, p. 34). Therefore, company can alter the categories in

Balanced Scorecard framework based on key performance drivers use in their organizations (Wongrassamee, Gardiner & Simmons 2003).

Balanced Scorecard become much popular as it provides balanced importance of both tangible and non-tangible performance measures establishing a proper linkage in between (Punniyamoorthy & Murali 2008). Moreover, Balance Scorecard has identified as a model which does not only balance performance of key business areas rather than it balance company goals verses its accountability (Meena 2009). This unique characteristic of Balanced Scorecard has identified as a "double loop" which would specially be used in strategy management of an organization (Wongrassamee, Gardiner & Simmons 2003).

Balanced Scorecard has further been identified as a single yardstick which provide guidance of the key activities to be taken, their measures and achievement of such planned activities in both short-term and long-term (Punniyamoorthy & Murali 2008).

2.6 Environmental awareness and BSC

The uniqueness of Balanced Scorecard has directed many researchers to find out the ability to use Balanced Scorecard in relation to the Environmental Management. Consequently, it has found that Balanced Scorecard model would be more comprehensive by integrating strategic aspects of Environmental Management (Butler, Sandra & Cecily 2011, Luis, Cristovao & Susana 2016, Zeynep & Ozalp 2016). Researches who have claimed integrating Environmental Management into Balances Scorecard have specified four options in doing so i.e. identifying environmental performance measures within four conventional aspects, adding an additional pillar for environmental management as a new perspective, including environmental management measures only into internal process category and identify environmental management as a separate department and use a specific Balanced Scorecard (Dias-Sardinha & Reijnders 2001, cited in Luis, Cristovao & Susana 2016). In addition to these four options establishment of a specific scorecard model to address environmental issues has also been identified (Butler, Sandra & Cecily 2011).

Based on the evidence gathered from empirical studies, subsequent chapters were developed in order to build new knowledge in respective to the identified research question.

3 Methodology

In this section the method and approach used in the current study has discussed. The impact of Environmental Management Practices on Firm Performance based on so-called performance measurement system; Balanced Scorecard was found out in relation to the manufacturing industry in Sri Lanka as many of the related studies have mentioned the significance of manufacturing industry when undertaking environmental management practices within the business organizations (Stuart & Gautam 1996, Robert 2003, Sofia 2009, Kenneth et al. 2012, Samuel, Kwasi & Disraeli 2018).

3.1 Conceptual Diagram

In order to demonstrate the relationship between identified key variables of the study, following conceptual diagram has developed. Dependent variables' measures are categorized in to underlined performance measurement system i.e. Balanced Scorecard and Environmental Management Practices which have been identified in to three areas are linked to all four aspects of the Balanced Scorecard. This will give a simplified description of variables, their measures and relationship among these variables and measures which are going to be addressed in this research paper.

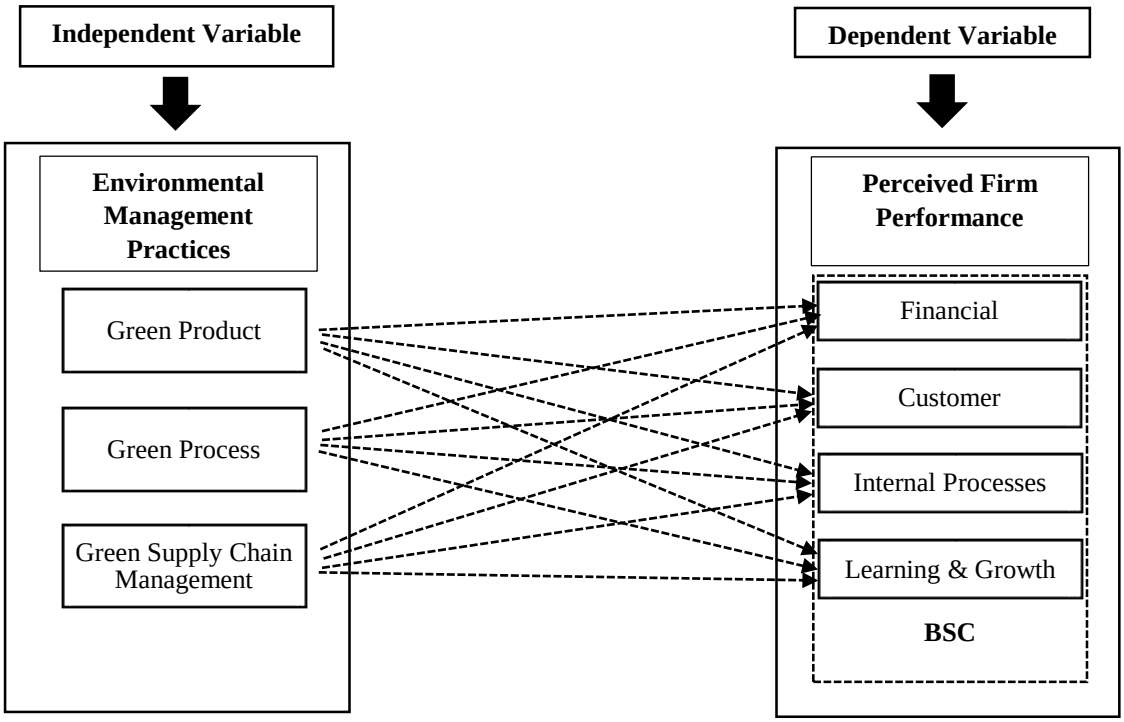

Figure 1. Conceptual Diagram - Developed by author

3.2 Hypothesis

The hypothesis development basically under-pined by the research question and the objectives. Though many scholars have studied the relationship between Environmental Management Practices and Firm Performance, results are not as same as in all the cases (Samuel, Kwasi & Disraeli 2018). Therefore it is highly important to specify whether the relationship between Environmental Management Practices and Firm Performance is positive or negative.

Management perceived firms' performances were considered when ensuring the impact of Environmental Management Practices on Firm Performance. This impact might be resulted from one or few of performance measurements. Considering all that facts following hypothesis were developed where it gives the significance of the impact of firms' Environmental Management Practices in terms of Green Product Practices, Green Process Practices and Green Supply Chain Management (SCM) Practices on the key aspects of Balanced Scorecard separately (Daniel & Ailie 2014).

H1a: Green Product Practices will have a positive impact on firm performance in terms of financial perspective

H1b Green Product Practices will have a positive impact on firm performance in terms of customer perspective

H1c: Green Product Practices will have a positive impact on firm performance in terms of internal processes perspective

H1d: Green Product Practices will have a positive impact on firm performance in terms of learning and growth perspective

H2a: Green Process Practices will have a positive impact on firm performance in terms of financial perspective

H2b: Green Process Practices will have a positive impact on firm performance in terms of customer perspective

H2c: Green Process Practices will have a positive impact on firm performance in terms of internal processes perspective

H2d: Green Process Practices will have a positive impact on firm performance in terms of learning and growth perspective

H3a: Green SCM Practices will have a positive impact on firm performance in terms of financial perspective

H3b: Green SCM Practices will have a positive impact on firm performance in terms of customer perspective

H3c: Green SCM Practices will have a positive impact on firm performance in terms of internal processes perspective

H3d: Green SCM Practices will have a positive impact on firm performance in terms of learning and growth perspective

Ultimate objective of the current study was to identify the relationship between Environmental Management practices and Firm Performance (Samuel, Kwasi & Disraeli 2018) and the credibility of Balanced Scorecard to address this matter. The findings and analysis section evaluated the hypothesis in order to appraise the acceptance of identified hypothesis.

3.3 Population and sample selection

Listed companies in Colombo Stock Exchange (CSE) were taken as the population. There are 299 companies listed in CSE as at 31st of March 2018, categorized in to 20 sectors. Sample was selected from those companies listed under manufacturing, beverage food & tobacco, and footwear & textile sectors which basically undertake manufacturing processes. Initially, sample was limited to those companies listed under manufacturing sector. However due to lack of responses were received sample was expanded to two other sectors. The selection of specific industries was to control any variable factor affecting industrial differences over the results of the study and practicability to operationalize the measurements of Environmental Management Practices in the selected industry compared to others (Kenneth et al. 2012, Sofia 2009).

There are 37, 23 and 2 companies listed under manufacturing sector, beverage food & tobacco sector and footwear & textile sector respectively as it is given in the CSE website. Therefore the total number of sample units identified for data collection were 62. However, only 54 companies were able to contact for data collection as unavailability of correct contact details of other companies.

It was found difficult to identify companies used Balanced Scorecard as it is given in the books; in practice and therefore perceived performance results of company management were observed.

3.4 Data collection and data analysis

Data for the study was collected through an author developed questionnaire which has improved after carrying out a pilot study. The postal questionnaire was used as the primary data source to collect data from all the companies listed under manufacturing sector from which only 11 responses were received. Therefore, the questionnaire was re-sent through electronic mail to whom did not response and to the companies listed under beverage food & tobacco, and footwear & textile sectors as the sample has expanded in to these two sectors. Responses were received from 30 companies out of 54 companies and analysis was done based on the responses given by these 30 companies. The reliability of data gathered were checked using SPSS statistics, Cronbach Alpha and it gave a value of 0.941.

Selected companies were required to mention the number of years listed in the Colombo Stock Exchange and summary of the details given in the Table 1.

	Responses	**% responses**
Number of years listen in CSE		
1 – 5 years	2	6.7
6 – 10 years	7	23.3
11 – 15 years	9	30
More than 15 years	12	40
Total	30	100
Position of respondents		
General Manager	8	27
Finance Manager	14	47
Performance Manager	6	20
Other	2	7
Total	30	100

Table 1.The job position of the respondents

Unit of analysis identified for questionnaire purpose was either the General Manager or the Finance Manager or the other personnel of the company whoever has a higher position in the organizational hierarchy with the awareness of Environmental Management Practices. Proportion of the respondents are tabulated in Table 1.

3.5 Operationalization of variables

The conceptual diagram given in the figure 1 depicts the relationship established between dependent variable and independent variable. Perceived Firm Performance, the dependent variable was measured using key performance indicators set out based on Balanced Scorecard (Nancy, David & Steve 2013). Independent variable was determined to be Environmental Management Practices which was measured based on three main practices, Green Product, Green Process and Green Supply Chain Management (Daniel & Ailie 2014).

Environmental Management Practices related to green products, principally focused on green product design which reduce by-products, waste and enhance the processes of recycling and re-use (Lennox et al. 2000, Linton et al. 2007, cited in Daniel & Ailie 2014). Klassen and Whybark's study in 1999 (cited in Daniel & Ailie 2014) described green processes as of those employed environmental technology which prevent, formalize, evaluate the impact and control pollution. Moving towards new aspects of organizational undertaking, supply chain management has become an integral part of value creation process which has to be identified as green supply chain management as of corporate green thinking. Likewise Environmental Management Practices address both supplier and customer relationship to be focused in relation to the green supply chain management (Daniel & Ailie 2014).

In order to identify the existing Environmental Management Practices of selected listed companies, a five-point Likert scale; 1 indicates "not at all" and 5 indicates "very large extent" was used (Daniel & Ailie 2014). Green product, green process and green supply chain management practices were identified based on previous studies (Lennox et al. 2000, Sroufe 2003, Vachon 2007, Gonzalez-Benito 2008, Zhu et al. 2008, cited in Daniel & Ailie 2014).

Questionnaire was developed to identify Perceived Firm Performance instead of actual performance as it was difficult to find companies those practice Balanced Scorecard as it is in Sri Lankan context. Therefore questionnaire itself identified perceived performance of management in relation to the key performance indicators identified in the Table 2.

Analysis of hypothesis was done via multiple regression model using SPSS statistics (Stuart & Gautam 1996, Robert 2003, Frank, Ram & Robert 2007, Daniel & Ailie 2014). The multiple regression model tested multiple dependent variables from multiple independent variables.

$$\gamma = \beta_{\circ} + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

Y – Dependent variable

β_0 - Intercept

$\beta_1, \beta_2, \beta_3, \beta_4$ – Coefficient of independent variable

x - Independent variable

ε – Error term

Accordingly, basic formula was identified in to several formulas which measure the impact of each Environmental Management Practices on the firm performance.

Key performance indicators		
Higher revenue – v1	Tax benefits – v3	Higher shareholder value – v5
Effective working capital management – v2	Higher asset utilization – v4	Higher return on equity – v6
Higher market share – v7	Higher customer retention – v9	Increase of customer acquisition – v11
Higher customer satisfaction & brand equity –v8	Higher customer loyalty- v10	Higher customer profitability – v12
Decrease of cost per unit – v13	Reduction of idle and lead times in the process - v15	Improvement of product quality - v17
Potential to develop better products. – v14	Reduction of cost of defects – v16	Identified as a socially responsible corporate citizen – 18
Higher job satisfaction of employees – v19	Higher employee productivity – v21	Better employee self-development – v23
Obtaining new market opportunities – v20	Higher employee retention – v22	Less trade union actions – v24

Table 2. Key Performance Indicators

Before run the multiple regression analysis, a factor analysis was done using SPSS. Based on the factor analysis results, it was given that the value of Kaiser-Meyer-Olkin Measure of sampling adequacy as 0.744 which was greater than the benchmark of 0.5 and hence, it could be concluded that the adequacy of the sample size of 30 units. The model found identical and thus appropriate to run a factor analysis as KMO and Bartlett's test gave a significance value of .000 which was less than the 5%. Based on the results of factor analysis, total variance table given that, the appropriateness of three components where, Eigenvalues is greater than 1. In

order to construct valid models, Rotated Component Matrix was used. The results which were extracted given in the Table 3. & Table 4. (Independent and Dependent variables respectively).

Independent variable	Component		
	1	2	3
Energy efficient equipment (gpr2)	.885		
Clean technology and equipment (gpr1)	.883		
Reuse & recycling (gp2)	.671		
Waste generation, product usage and disposal (gp4)	.586		
Market for waste (gscm2)		.906	
Green distribution (gscm4)		.800	
Green Material (gscm1)		.684	
Green packaging (gscm3)		.529	
Material consumption (gp1)			.837
Reuse waste and scrap internally (gpr4)			.671
Pollution control technologies (gpr3)			.629
Resource consumption during manufacturing (gp3)			.582

Table 3 Rotated component matrix (SPSS)

The Table 3 & Table 4 are given the component models extracted from a principal component analysis, which suppressed small coefficients using absolute value below 5. From 24 dependent variable, identified in the questionnaire 8 variable were excluded after performing the factor analysis.

Relying on the factor analysis results three formula were developed. For the analysis purposes, these three formula have been identified as Model 1, Model 2 and Model 3. Relying on the results given in the Table. rotated component matrix of the principal component analysis, identified independent variable were re-defined as Model 1 includes, green process practices, Model 2 includes green SCM practices and Model 3 includes green product practices considering the common features of the practices in given categories.

$$\gamma_n = \beta_\circ + \beta_1 gpr_2 + \beta_2 gpr_1 + \beta_3 gp_2 + \beta_4 gp_4 + \varepsilon \quad \text{——} (1)$$

$$\gamma_n = \beta_\circ + \beta_1 gscm_2 + \beta_2 gscm_4 + \beta_3 gscm_1 + \beta_4 gscm_3 + \varepsilon \quad \text{——} (2)$$

$$\gamma_n = \beta_\circ + \beta_1 gp_1 + \beta_2 gpr_4 + \beta_3 gpr_3 + \beta_4 gp_3 + \varepsilon \quad \text{——} (3)$$

Y_n – Dependent variable

Y_1 - *Financial performance*

Y_2 - *Customer performance*

Y_3 - *Internal Process performance*

Y_4 - *Learning Growth performance*

β_0 – Intercept

$\beta_1, \beta_2, \beta_3$ – Coefficient of independent variable

x – Independent variable

gp – *Green Product Practices (gp1 – gp4)*

gpr – *Green Process Practices (gpr1 – gpr4)*

gscm – *Green Supply Chain Management (gscm1 - gscm4)*

The measures of practices in relation to green products consists four items based on the re-definition

1) Design & development of products for reduced material consumption. – *gp1*
2) Design of products to minimize resource consumption during manufacturing. – *gp3*
3) Installation pollution control technologies in the organization. – *gpr3*
4) Establishment of processes focus on reducing waste by reusing waste or scrap internally. – *gpr4*

Green process practices were also identified within four main practices after considering re-definition.

1) Design of products to make reuse, recycle, recovery of material, component parts possible. – *gp2*
2) Design of products to minimize waste generation and environmental impact on product usage and product disposals. – *gp4*
3) Acquisition of clean technology & equipment in to the organization. – *gpr1*
4) Installation of energy efficient equipment in the organization. – *gpr2*

Green supply chain management practices were also identified based on past research studies (Gonzalez-Benito 2008, Green et al. 2012, Liu et al. 2012, cited in Daniel & Ailie 2014).

Accordingly, four practices were identified addressing both up-stream party, suppliers and down-stream party, customers in the supply chain.

1) Co-operating with suppliers to replace materials that can cause environmental problems with alternatives which are not problematic. – g*scm1*
2) Co-operating with customers to create a market for waste by making waste as an input to another product that can be made and sold at a profit. – g*scm2*
3) Co-operating with customer for *green* packaging and organize customer awareness programs. - g*scm3*
4) Co-operating with customer for *green* distribution and transportation. – g*scm4*

Dependent variable values were identified as the average value of the given respondents which are categorized into six components derived from the component table of Varimax with Kaiser Normalization derived from the principle component factor analysis. For each component, a separate model was identified. Therefore six dependent variable were identified given in Table 4 below.

Key performance indicators	**Component**					
	1	2	3	4	5	6
Higher shareholder value						.682
Higher return on equity						.829
Higher customer loyalty				.593		
Higher customer profitability				.603		
Obtaining new market opportunities				.819		
Decrease of cost per unit					.772	
Reduction of idle and lead times in the process					.875	
Reduction of cost of defects	.760					
Improvement of product quality	.778					
Better employee self-development	.861					
Higher asset utilization		.857				
Higher employee productivity		.896				
Higher employee retention		.721				
Higher market share			.708			
Higher customer satisfaction & brand equity			.720			
Higher job satisfaction of employees			.786			

Table 4. Key Performance Indicators – Rotated component matrix (SPSS)

Six dependent variables which have been identified as follows.

Factor 1 – Financial performance in terms of shareholder value and ROE (FIN1)

Factor 2 – Customer performance in terms of customer loyalty, profitability and new market opportunities (CUS1)

Factor 3 – Internal process performance in terms of cost per unit and less idle and lead time (IP1)

Factor 4 – Internal process performance in terms of cost of defects, product quality, employee-self-development (IP2)

Factor 5 – Learning and growth performance in terms of higher asset utilization, productivity and employee retention (LG1)

Factor 6 –Learning and growth performance in terms of higher market share, customer satisfaction& brand equity and higher job satisfaction (LG2)

Based on the principal component analysis results identified six factors were calculated as follows.

$$FIN\ 1 = (v5 + v6)/2 \quad \text{——} \quad (4)$$

$$CUS\ 1 = (v10 + v12 + v20)/3 \quad \text{——} \quad (5)$$

$$IP\ 1 = (v13 + v15)/2 \quad \text{——} \quad (6)$$

$$IP\ 2 = (v16 + v17 + v23)/3 \quad \text{——} \quad (7)$$

$$LG\ 1 = (v4 + v21 + v22)/3 \quad \text{——} \quad (8)$$

$$LG\ 2 = (v7 + v8 + v19)/3 \quad \text{——} \quad (9)$$

Multiple regression was performed to undertaking these six factors as dependent variable in each scenario and thus, eighteen of regression model were performed. Moreover, as one objective is to identify the relationship, between Environmental Management Practices and Firm Performance, the Pearson correlation was performed.

In addition to the Pearson correlation analysis and multiple regression analysis a descriptive analysis was carried out to identify the average perception on being a socially responsible corporate citizen via reporting on triple bottom line.

4 Findings and Discussion

4.1 Findings

Company's management perception on being a socially responsible corporate citizen via reporting on triple bottom line was find out in addition to the main objectives. The results showed that 86.7% of responds have recognized it is as a benefit to them. However, 13.3% of participants said that they have adapted such practices due to regulatory requirement. Only one participants has said it is as a hurdle while rest of the participants of five have identified it as a neither hurdle or a benefit as given in the Table 5.

	Responses	**% responses**
1 It is a hurdle	1	3.3
2 It is neither hurdle or a benefit	5	16.7
3 It is a benefit	20	66.7
4 Adapt because of regulatory requirement	4	13.3
Total	30	100

Table 5 Perception on being a socially responsible corporate citizen via reporting on triple bottom line

One of the principal objective of the study was to find out the existing Environmental Management Practices of selected listed companies. These practices were identified in terms of green product, green process and green supply chain management which were also identified in empirical studies. On the other hand, current study intended to identify the impact of Environmental Management Practices on Firm Performance in the cause of Balanced Scorecard.

Descriptive analysis results of company practices of green product, green process and green supply chain management presents in Table 6. The results given in the Table 6 emphasized the Environmental Management Practices currently undertaken by manufacturing companies of Sri Lanka in relation to the selected sample. Responses given for the each practice were also identified in the table. In terms of mean value, mode value, SD, variance, minimum response value and maximum response value. Respectively these information would be intended to suggest some Environmental Management practices that can be adapted by the companies if those practices have not yet been undertaken within the organization but who really concern on this matters.

	Mean	Mode	SD	Var[2]	Min	Max
Product design (gp1)	3.33	3	.606	.368	2 -3.3%	5-3.3%
Reuse & recycling (gp2)	3.30	4	.988	.976	2-26.7%	5-10%
Resource consumption during manufacturing (gp3)	3.53	3	.776	.602	2-3.3%	5-13.3%
Waste generation, product usage and disposal (gp4)	3.60	4	.770	.593	2-6.7%	5-10%
Clean technology and equipment (gpr1)	3.60	3	.855	.731	2-6.7%	5-16.7%
Energy efficient equipment (gpr2)	4.20	4	.551	.303	3-6.7%	5-26.7%
Pollution control technologies (gpr3)	3.67	4	0.992	0.851	2-10%	5-20%
Reuse waste and scrap internally (gpr4)	3.93	4	.785	.616	3-33.3%	5-26.7%
Green material (gscm1)	3.67	4	.922	.851	1-3.3%	5-10%
Market for waste (gscm2)	3.67	4	.994	.989	2-13.3%	5-23.3%
Green packaging (gscm3)	3.60	4	.621	.386	2-3.3%	4-3.3%
Green distribution (gscm4)	3.47	4	.730	.533	2-13.3%	5-60%

Table 6. Existing Environmental Management Practices of selected listed companies.

Most of the companies have implemented all the identified Environmental Management Practices at least to a little extent and more, other than, gscm1 (gscm1- *co-operation with suppliers to replace materials that can cause environmental problems with alternatives which are not problematic)* which has the minimum reported value of 1 (1="Not at all"). It can also be noted that there is a significant deviation (SD) of actual Environmental Management Practices from the average of selected practices of gp2, gpr3, gscm1 and gscm2 (gp2 – *design of products to make reuse, recycle, recovery of material, component parts possible,* gpr3 – *installation pollution control technologies in the organization*, gscm1 – *co-operating with suppliers to replace materials that can cause environmental problems with alternatives which are not problematic*, gscm2 - *co-operating with customers to create a market for waste by making waste as an input to another product that can be made and sold at a profit)* where the deviation is more than 90% (gp2 – 98.8%, gpr3 – 99.2%, gscm1 -92.2%, gscm2 – 99.4%). On the other hand, except for gp1, gp3 and gpr1 (gp1- *design & development of products for reduced material consumption*, gp3 - *design of products to minimize resource consumption during manufacturing*, and gpr1 - *acquisition of clean technology & equipment in to the organization)* other practices have already been implemented to a large extent by many Sri Lankan companies at present where it shows a mode value of 4.

Specifically, the value of the variance of practices of gp1, gpr2 and gscm3 (gp1 - *design & development of products for reduced material consumption*, gpr2 - *installation of energy efficient equipment in the organization* and gscm3 - *co-operating with customer for green*

packaging and organize customer awareness programs) represent a lower value compared to others i.e. 0.368, 0.303 and 0.386 respectively. At the same time the mean value of gpr2 (gpr2 - *installation of energy efficient equipment in the organization*) shows the highest value of 4.20 and 26.7% of companies from the selected sample have implemented energy efficient equipment at their organizational premises to a very large extent. Practices of gpr2 and gpr4 (gpr2 – *installation of energy efficient equipment in the organization* and gpr4 - *establishment of processes focus on reducing waste by reusing waste or scrap internally*) have been adopted significantly by the companies comparatively to other practices as the minimum responded value is 3 (3 = "To some extent") whereas minimum value responded in other cases is 2 (In between 1 = "Not at all" and 3 = "To some extent") other than gscm1.

It could be noted that 60% of companies from the sample have established gscm4 (gscm4 - *co-operating with customer for green distribution and transportation)* to a large extent where it denoted by maximum respondent value of 5 (5 = "To a very large extent"). In contrast, companies have a less incentive to adapt gp1 and gp2 (gp1 - *design & development of products for reduced material consumption* and gp2 - *design of products to make reuse, recycle, recovery of material, component parts possible*) practices within their organizations as both practices recorded a lower mean value compared to other practices.

Selected practices might not be included all the Environmental Management Practices that Sri Lankan company currently practiced. The above practices were extracted from the empirical studies and therefore it is assumed that it assured the all the aspect of the requirement of Environmental Management Practices of corporates. Findings also give evidence on the implementation of such practices.

4.1.1 Pearson correlations

Findings of perceived Firm Performance explore the perceived Firm Performance that management expected to gain through undertaking these practices within their operation environment. Perceived Firm Performance were identified dividing into these practices in lined with the four respective pillars i.e. financial, customer, internal processes and learning & growth of Balanced Scorecard. In order to find out the relationship between each green practices with identified performance perspective Pearson correlation analysis was done and results elaborated in Table 7.

		1	2	3	4	5	6
1.	Clean technology and equipment (gpr1)	.371	.351	.187	.625**	.576	.654***
2.	Energy efficient equipment (gpr2)	.294	.167	.217	.513	.573	.600***
3.	Reuse & recycling (gp2)	.434	.384	.485	.459	.271	.711***
4.	Waste generation, product usage and disposal (gp4)	.587**	.578**	.207	.413	.331	.653***
5.	Green material (gscm1)	.329	.358	.252	.568**	.289	.400
6.	Market for waste (gscm2)	.645***	.551**	.284	.072*	-.101	.183
7.	Green packaging (gscm3)	.347	.560**	.337	.354	.097*	.507**
8.	Green distribution (gscm4)	.656***	.559**	.086*	.545**	-.097*	.464
9.	Product design (gp1)	.222	.412	.439	.432	.238	.598**
10.	Resource consumption during manufacturing (gp3)	.296	.440	.625***	.424	.453	.651***
11.	Pollution control technologies (gpr3)	-.073*	.227	.198	.568*	.429	.482
12.	Reuse waste and scrap internally (gpr4)	.146	.300	.415	.189	.068*	.410

Table 7 Pearson correlation (r)

Notes: *r < (+/-) 0.1; ** (+/-) 0.5< r> (+/-) 0.6; ***r > (+/-) 0.6

Pearson correlation results represented the linear correlation between dependent variable and independent variables. Results explain that the relationship between perceived performance and environmental management practices are varied in different circumstances upon different practices. Accordingly, while factor 1 has a significant relationship with gscm2 (gscm2=.645 at r > 0.6) and gscm4 (gscm4=.656); there is no relationship with gpr3 (gpr3= - .073 at r < 0.1), meanings that extent to which organizations implement pollution technologies within their organization do not necessarily improve the financial performance in terms of receiving a higher shareholder value and higher return on equity (ROE). Practice of gp4 also have a moderate level of relationship with factor 1, i.e. financial performance (gp4= .587 at 0.5< r > 0.6).

Practices of gp4 (gp4=.578 at 0.5< r > 0.6), gscm2 (gscm2=.551 at 0.5< r > 0.6), gscm3 (gscm3=.560 at 0.5< r > 0.6), and gscm4 (gscm4=.559 at 0.5< r > 0.6) also have a quite strong relationship with perceived performance in customer perspective which denoted by factor 2. The point to notice is that perceived customer performance in terms of customer loyalty, customer profitability and obtaining new market opportunities have a quiet relationship with production design to minimize waste generation and environmental impact on product usage

and disposal, creating a market for waste by making waste as an input to another product that can be made and sold at a profit, green packaging, customer awareness programs, green distribution and transportation. Factor 3 has a strong relationship only with the gp3 (gp3=.625 at r > 0.6) while gp3 correlate significantly with factor 6 as well (gp3=.651 at r > 0.6). The point that can be highlighted is perceived performance of internal process in terms of reduction of cost per unit and reduction of idle and lead time and perceived performance of learning & growth in terms of higher asset utilization, employee productivity and employee retention have a strong relationship with product design to minimize resource consumption during manufacturing. Similarly, gpr1 has a strong relationship with factor 4 (gpr1=.625 at r > 0.6) and factor 6 (gpr1=.654 at r > 0.6). The emphasized matter is that acquisition of clean technology & equipment has a strong relationship with internal process performance in terms of cost of defects, product quality and employee self-development in the process activities and learning and growth performance in terms of higher market share, customer satisfaction & brand equity through employee who have a higher job satisfaction.

No correlation can be identified between gscm4 with factor 3 (gscm4=.086 at r < 0.1) and factor 5 (gscm4=-.097 at r < 0.1). This results indicate that, green distribution and transportation do not have an association with perceived internal process practices of product cost and idle and lead time of processes as well as perceived performance of learning & growth performance specified by higher asset utilization, employee productivity and employee retention. Factor 4 has no relationship with gscm2 (gscm2=.072 at r < 0.1) and this explains that internal process performance perceived from cost of defects, product quality and employee self-development does not correlate with creating a market for waste. Factor 5 also have no relationship with gscm3 (gscm3=.097 at r < 0.1) and gpr4 (gpr4=.068 at r < 0.1) while only gpr1 (gpr1=.576 at 0.5 <r> 0.6) and gpr2 (gpr2=.573 at 0.5 <r> 0.6) have a quiet relationship which is lied between 0.5 and 0.6. This reflects that implementation of clean technology, equipment and energy efficient equipment within organization have a moderate level association with perceived performance of learning & growth in relation to the higher asset utilization, employee productivity and employee retention. Despite of that there is no relationship with green packaging, customer awareness programs and reduction of waste by reuse waste and scrap internally.

At last, factor 1 has a moderate relationship with gpr2 (gpr2=.513 at 0.5 <r> 0.6), gpr3 (gpr3=.568 at 0.5 <r> 0.6), gscm1 (gscm1=.568 at 0.5 <r> 0.6) and gscm4 (gscm4=.545 at 0.5

<r> 0.6). This results emphasized that energy efficient equipment, pollution control technologies, replacement of materials with green materials, green distribution and transportation have a sensible connection with perceived performance of internal process in relation to cost of defects, product quality and employee self-development. Factor 6 also reported a reasonable correlation with gp1 (gp1=.598 at 0.5 <r> 0.6), gp4 (gpr4=.653 at 0.5 <r> 0.6) and gscm3 (gscm3=.507 at 0.5 <r> 0.6) that can be proved by an existing relationship of product design & development to reduced material consumption, waste generation, environmental impact on product usage, product disposal, green packaging and customer awareness programs with perceived performance of learning and growth perspective which measures through higher market share, higher customer satisfaction & brand equity and higher employee job satisfaction.

4.1.2 Multiple regression analysis

Multiple regression analysis was performed to find out whether identified green practices have an impact on the perceived Firm Performance. Based on the number factors identified, as dependent variables, and models were identified as independent variables i.e. 6 factors and 3 models respectively; three regression model to each dependent variable were carried out.

Model 1	**B**				**Sig.**			
	gp2	gp4	gpr1	gpr2	gp2	gp4	gpr1	gpr2
FIN1	-.045	.462	-.124	.230	.745	.018*	.507	.358
CUS1	-.052	.404	.013	-.025	.693	.028*	.941	.915
IP1	.279	-.140	-.054	.411	.008**	.289	.683	.040*
IP2	.268	-.021	.352	.076	.018*	.916	.099	.784
LG1	-.163	.140	.206	.392	.249	.452	.278	.126
LG2	.195	.222	.033	.335	.139	.041*	.850	.156

Table 8 Coefficient and significance of model 1 regression analysis

Notes: * $p < 0.05$; ** $P < 0.01$

Table 8 gives the coefficient values and significance of each practice to address the impact of perceived performances identified in relation to the green practices identified in model 1. Value of B gives the coefficient of independent variable i.e. what is the impact on dependent variable from the one unit of change in independent variable. Significance value of coefficient indicate

that whether the impact is significantly varied from zero. If value is less than 5%, it can be concluded that, impact is significantly greater than zero.

The results of model 1 shows that, FIN 1 only has an impact from gp4 (β = 0.462 at $p < 0.05$), where the impact is significantly vary from the zero in a positive way. Based on that evidence following equation can be constructed to depict the impact of green practices on perceived financial performance based on the model 1 information where it proved that higher shareholder value and higher ROE will only be affected by product design to minimize waste generation and environmental impact on product disposals in relevant to the model 1.

$$FIN\ 1 = \beta_{\circ} + 0.462gp_4 + \varepsilon$$

CUS1 also has a significant impact form gp4 (β = 0.404 at $p < 0.05$) where the influence of gp4 on CUS1 performances is significantly differ from zero. Other practices have not an impact on CUS performance as the all p-values are higher that 5%. Accordingly, following formula is developed based on the model 1. Therefore it is found that only, product design to minimize waste generation and environmental impact on product disposals has a favorable position on customer loyalty, customer profitability and obtaining new market opportunities.

$$CUS\ 1 = \beta_{\circ} + 0.404gp_4 + \varepsilon$$

It can be noted that, IP1 has a positive impact from gp2 (β = 0.279 at $p < 0.01$) and gpr2 (β = 0.411 at $p < 0.05$) where, p-values give adequate evidence about the significance influence of given practices on IP1 performances. Hence, only these two practices can be elaborate in the regression formula as practices that have a positive impact on IP1. This can be further explained as product design to make reuse, recycle, recovery of materials, component possible and energy efficient equipment have a positive impact on cost per unit and idle & lead time but no other practices. The following equation is constructed to show the impact of said practices on IP1 underlying the model 1 information.

$$IP\ 1 = \beta_{\circ} + 0.279gp_2 + 0.411gpr_2 + \varepsilon$$

IP2 also has a positive impact from gp2 (β = 0.268 at $p < 0.05$) This means design of products to make reuse, recycle, recovery of materials, component possible has a positive impact on perceived internal process performance in relation to reduction of cost of defects, product

quality and employee self-development. Equation shown below depicts the impact of gp2 on IP2.

$$IP\ 2 = \beta_{\circ} + 0.268gp_2 + \varepsilon$$

LG1 has no impact from either practices identified in the model 1 where all the given p-values are greater than the 5%. Hence, it can be concluded that higher asset utilization, employee productivity and employee retention have no impact from the gp2, gp4, gpr1 and gpr2.

LG2 has a positive impact from gp4 (β = 0.222 at $p < 0.05$) thus, product design to minimize waste generation and environmental impact on product disposals has a upward interrelationship with higher market share, higher customer satisfaction& brand equity and higher job satisfaction of employees. The impact of gp4 on LG2 given the equation below.

$$LG\ 2 = \beta_{\circ} + 0.222gp_4 + \varepsilon$$

Impact of green practices identified in the model 2 with dependent variables given in the Table 9. Model 2 practices are all included green supply chain management practices where separately, categorized through the principle component factor analysis.

Model 2	**B**				**Sig.**			
	gscm1	gscm2	gscm3	gscm4	gscm1	gscm2	gscm3	gscm4
FIN1	-.072	.211	.026	.328	.441	.034*	.838	.017*
CUS1	.004	.097	.276	.199	.965	.306	.034*	.127
IP1	.086	.072	.156	-.124	.310	.403	.178	.295
IP2	.315	-.375	.310	.435	.002**	.001**	.021*	.002**
LG1	.305	-.139	.162	-.215	.021*	.284	.348	.228
LG2	.171	-.240	.477	.327	.166	.061	.007**	.062

Table 9 Coefficient and significance of model 2 regression analysis

Notes: * $p < 0.05$; ** $P < 0.01$

Based on the given information, A positive impact can be identified on FIN1 from gscm2 (β = 0.211 at $p < 0.05$) and gscm4 (β = 0.211 at $p < 0.05$) since, a conclusion can be made that co-operating with customers to create a market for waste by making waste as an input to another product that can be made and sold at a profit and green distribution & transaction have an

impact on higher shareholder value and higher ROE positively. The relationship is identified in following formula considering practices only given in the model 2.

$$FIN\ 1 = \beta_{\circ} + 0.211gscm_2 + 0.328gscm_4 + \varepsilon$$

When consider CUS1, gscm3 has a positive impact (β = 0.276 at $p < 0.05$) only from gscm3, where it is given that green packaging and customer awareness program will increase customer loyalty, customer profitability and new market opportunities. The relationship found is given in the following formula which is based on the module 2 practices.

$$CUS1 = \beta_{\circ} + 0.276gscm_3 + \varepsilon$$

IP1 has no impact from any of the given supply chain management practices. However, IP2 has an impact from all the identified practices i.e. gscm1 (β = 0.315 at $p < 0.01$), gscm2 (β = -0.375 at $p < 0.01$) gscm3 (β = 0.310 at $p < 0.01$), gscm4 (β = 0.435 at $p < 0.01$). Notably, there is a negative impact from gscm2 in relation to the IP2 practices. IP2 practices of cost of defects, product quality and employee self-development are negatively affected from creating a market for waste by making waste as an input to another product that can be made and sold at a profit. On the other hand, replace materials with green materials, green packaging and green distribution will enhance the performance of IP2. The impact of identified practices in Model 2 in relation to IP2 given in the following equation.

$$IP2 = \beta_{\circ} + 0.315gscm_1 - 0.375gscm_2 + 0.310gscm_3 + 0.435gscm_4 + \varepsilon$$

Further, there is a positive impact from gscm1 (β = 0.305 at $p < 0.05$) on LG1 performance. Moreover, this implies, that replace materials with green materials will improve higher asset utilization, employee productivity and employee retention. The impact of gscm1 on LG1 depicts in below formula.

$$LG1 = \beta_{\circ} + 0.305gscm_1 + \varepsilon$$

Based on the model 2 regression analysis, LG2 has an impact from gscm3 (β = 0.477 at $p < 0.01$) where the given impact denoted a positive coefficient. Accordingly, green packaging and customer awareness programs have a positive impact on higher market share, customer satisfaction & brand equity and higher job satisfaction of employees.

At last, Model 3 results of regression analysis, given in the Table 10.

Model 3	β				Sig.			
	gp1	gp3	gpr3	gpr4	gp1	gp3	gpr3	gpr4
FIN1	.234	.213	-.228	.003	.353	.184	.098	.983
CUS1	.160	.194	-.045	.078	.478	.176	.709	.529
IP1	.224	.276	-.071	.213	.038*	.003**	.333	.139
IP2	-.001	.134	.299	.030	.996	.408	.037*	.828
LG1	-.263	.304	.230	.002	.281	.044*	.054	.987
LG2	.146	.348	.087	.145	.529	.024*	.484	.259

Table 10 Coefficient and significance of model 3 regression analysis

Notes: * $p < 0.05$; ** $P < 0.01$

Particularly, FIN1 and CUS1 have no impact from any of the practices identified in the Model 3. The evidence said that product design to reduce material consumption and resource consumption during manufacturing and pollution control technologies and process focus on reducing waste by reusing waste and scrap internally, have no impact on higher shareholder value, higher ROE, customer loyalty, customer profitability or obtaining new market opportunities. However, IP1 has a positive impact from gp1 ($\beta = 0.224$ at $p < 0.05$) and gp3 ($\beta = 0.276$ at $p < 0.01$). The fact is product design to reduce material consumption and resource consumption during manufacturing positively influence on cost per unit and the idle & lead time in internal processes. This outcome given in the following formula.

$$IP1 = \beta_{\circ} + 0.224gp_1 + 0.276gp_3 + \varepsilon$$

IP2 has a positive impact from gpr3 ($\beta = 0.299$ at $p < 0.05$) thus, green packaging and customer awareness program has a positive effect on cost of defects, product quality and employee self-development performance. However, this result may mostly attributed by the impact on self-development of employee through customer awareness programs. The identified results given in the below equation.

$$IP2 = \beta_{\circ} + 0.299gpr_3 + \varepsilon$$

LG1 ($\beta = 0.304$ at $p < 0.05$) and LG ($\beta = 0.348$ at $p < 0.05$) both performance have a positive impact from gp3, that is product design to minimize resource consumption during manufacturing. Two formulas identified to show the above results are depict here.

$$LG1 = \beta_{\circ} + 0.304gp_3 + \varepsilon$$

$$LG2 = \beta_{\circ} + 0.348gp_3 + \varepsilon$$

Finally, R^2, coefficient of determination explains the proportion of the variance in the dependent variable that is predictable from the independent variable and respective significance value shows the acceptability of null hypothesis against the identified hypothesis.

	R^2			Sig.		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FIN1	.367	.540	.188	.018*	.000**	.248
CUS1	.340	.488	.243	.029*	.002**	.125
IP1	.300	.189	.475	.055	.246	.002**
IP2	.400	.648	.350	.010*	.000**	,024*
LG1	.408	.226	.301	.009**	.156	.054
LG2	.617	.458	.513	.000**	.003**	.001**

Table 11 R^2 and significance

Notes: * $p < 0.05$; ** $P < 0.01$

According to the Table 11 the overall acceptability of alternative hypothesis is given. Based on the re-definition, Model 1 i.e. green process practices alternative hypothesis build to identify a positive impact on firm performance in terms of financial performance (H2a at $p < 0.05$), customer performance (H2b at $p < 0.05$), internal process performance (H2c at $p < 0.05$) in respective to the cost of defects, product quality, employee self-development and learning & growth performance (H2d at $p < 0.01$) acceptable. Therefore the alternative hypothesis of H2a, H2b, and H2c & H2d can be accepted subject to performance difference in IP1 results.

Green SCM practices identified in Model 2 and its impact on firm performance given that, alternative hypothesis developed to address financial performance (H3a at $p < 0.01$) and customer performance (H3b at $p < 0.01$) can be accepted without any concern. However, acceptance of H3c and H3d is subject to two concerns i.e. only IP2 (H3c at $p < 0.01$) and LG2 (H3d at $p < 0.01$) are agreed to the alternative hypothesis.

However, when considering the Model 3 results that includes green product practices, have no overall positive impact on financial performance (H1a at $p > 0.05$) and customer performance (H1b at $p > 0.05$) thus H1a and H1b can be rejected. In contrast, H1c (IP1 at $p < 0.01$ & IP2 at $p < 0.05$) can accepted confirming the positive impact of green product practices on internal

process performance while H1d can only be accepted subject to LG2 results (H1d at $P < 0.01$) where LG1 is not supported the alternative hypothesis.

	Dependent variable	Independent variable	*p*	Supported?
H1a - FIN1	Financial performance	Green product practices	0.248	No
H1b - CUS1	Customer performance	Green product practices	0.125	No
H1c – IP1	Internal process performance	Green product practices	0.002*	Yes
H1d – LG2	Learning & growth performance	Green product practices	0.001**	Yes
H2a - FIN1	Financial performance	Green process practices	0.018*	Yes
H2b - CUS1	Customer performance	Green process practices	0.029*	Yes
H2c - IP2	Internal process performance	Green process practices	0.010**	Yes
H2d – LG2	Learning & growth performance	Green process practices	0.000**	Yes
H3a - FIN1	Financial performance	Green SCM practices	0.000**	Yes
H3b - CUS1	Customer performance	Green SCM practices	0.002**	Yes
H3c - IP2	Internal process performance	Green SCM practices	0.000**	Yes
H3d - LG2	Learning & growth performance	Green SCM practices	0.003**	Yes

Table 12 Summary of hypothesis tested and *p* values

A summary of acceptance of alternative hypothesis is given in the Table 12.

4.2 Discussion

One of the main objective of the study was to identify the existing Environmental Management Practices of selected listed companies i.e. manufacturing companies. As per the findings, most of the organizations have implemented identified practices within their organizations. Especially, energy efficient practices have been implemented to a very large extent as they are expecting energy saving as a one of the main green practice as well as a cost saving solution. Not only, that clean technology and equipment has also initiated at number of organization though it is not expected to have a positive influence on firm performance. Without any special reason underlined, pollution control technologies and process focus on reuse waste and scrap internally practices have also been implemented to a large extent by companies. Even though companies have initiated green process practices to a greater level there is lack of motivation to implement product design practices in order to reduce material consumption, product design to reuse and recycling possible. On the other hand green packaging practices have not been implemented much by the manufacturing companies. Based on these findings, it can be further study the reasons for the lack of implementation of certain green practices in future researches.

Company management may also identify the possible Environmental Management Practices that they could applied within their organization.

The current study also elaborates the responses of company management of selected manufacturing companies against the perception on being socially responsible corporate citizen via reporting on triple bottom line. 66.7% of respondent have identified this as a benefit. That is company management takes; the being socially responsible corporate citizen as a benefit rather than complying with reporting requirement. This might be resulted from the perceived and experienced performance results or returns that companies have already identified. Besides, 1% of responses have identified it as a hurdle while 13.3% selected companies have identified it as adapting because of regulatory requirement. Therefore it is very important to find out that whether there is any favourable return on being socially responsible corporate citizen. The current study focuses environmental aspect of being socially responsible and aims to contribute this gap of knowledge. Accordingly, discussing the results found out and explained under previous chapter, following elaboration can be made.

Based on the findings, in order to identify the respective performance influence of each practice six main formulas were made based on the identified dependent variable. The impact of applicable green practices on relevant perceived financial performances was given in the below equation.

$$FIN1 = \beta_{\circ} + 0.462gpr_4 + 0.211gscm_2 + 0.328gscm_4 + \varepsilon$$

Accordingly, process focus on reducing waste by reusing waste or scarp internally will improve the shareholder value of the company. On the other hand this practice is expected to have a positive influence on ROE of the company. When company's process are able to reuse waste and scrap internally, while reducing as much as waste generate through the manufacturing process, return or the profit will increase as losses on waste can be convert to a material or other usable product internally. This will increase ROE as then shareholder value. Also when company has a co-operation with customer to create a market for waste by making waste as an input to another product that can be made and sold at a profit. This will lead to gain an additional income to the company which might be a loss previously. Since company receive an additional income through waste and scarp sales, and ROE will enhance as a result of that. Also green distribution also has a positive impact on financial performance. Green distribution may consists with on-line sales where distribution through heavy vehicles are reduced to larger level. Moreover, implementing effective distributing channel which reduced unnecessary

transportation can also be identified on this respective. Without doubt, this will reduce travelling and transportation cost of companies to a larger level where profit will increase by a greater amount, resulting a higher ROE and higher shareholder value.

When considering the customer performance of companies, the impact of certain green practices are identified in following equation.

$$CUS1 = \beta_{\circ} + 0.404gp_4 + 0.276gscm_3 + \varepsilon$$

Product design to minimize waste generation and environmental impact on product usage and disposals, has a positive impact on higher customer loyalty, customer profitability and new market opportunities. Especially, consumers are really concern on this matters as the garbage become a huge problem at present. They are seeking products that they can reuse and where there is no environmental impact when the products are disposal. Therefore, when products are having the feature of less waste generation and lesser or no environmental impact on product usage and disposal, customers will become loyal to purchase these products other than products which are not. Also customer already purchased and consumed these products will buy these products regularly, without searching for alternatives and will talk about their experience with other customers as well. This will lead companies to grab new market opportunities easily. On the other hand, green packaging also one of the interested topic in todays' consumer world. Customers will be pleased with green packaging as they are not facing with the problem of reusing packaging or disposing the package.

Internal process performance of product cost and idle & lead time will positively impact from the product design to make reuse, recycle, recovery of materials. Component parts possible. All these practices, caused to reduced factory cost as abnormal loss can recovered within the factory premises. Accordingly, manufacturing overhead will reduced and employee could be employed in these practices whenever, production process has stopped or when they are free of work, reducing idle time of the factory. On the other hand, recycling procedure some raw materials could be produced internally, which will reduce the cost of unit. Not only that, using energy efficient equipment also reduced cost of product as a reduction of direct overhead. Nonetheless, the lead time will be dropped as a result of energy efficient equipment. Product design to reduce material consumption and resource consumption during manufacturing process is directly attributable to the reduction in cost of unit of production. The following equation elaborate the summary of the impact of green practices on internal process performances.

$$IP1 = \beta_{\circ} + 0.279gp_2 + 0.411gpr_2 + 0.224gp_1 + 0.276gp_3 + \varepsilon$$

Internal process performance in relation to the cost of defects, product quality and employee-self-development which resulted from internal processes has a positive impact from product design to make reuse, recycle, recovery of materials, component parts possible. Defects are cost of the company as they are to be disposed after incurring the cost to manufacture the particular product. However, when the company has implemented the process to recycle the defects items or to reuse the defects items or recover the materials or components parts of defects it will reduce the cost of defects. Defects may not be a cost anymore and employee will be developed themselves due to involve in these processes.

$$IP2 = \beta_{\circ} + 0.268gp_2 + 0.315gscm_1 - 0.375gscm_2 + 0.310gscm_3 + 0.435gscm_4 + 0.299gpr_3 + \varepsilon$$

As well as through installation of pollution control technologies within the organization, company will receive a positive internal process performances. That is it will enhance the product quality when it is a consumer product. Green distribution will also result to reduce the cost of defects and product quality. However, there is a negative impact on performance if company resale these waste to an outside party without internally recover the waste.

Highlighting the result on learning and growth performance, co-operating with suppliers to replace materials that can cause environmental problems with alternatives which are not problematic i.e. green materials. This will reduce possible health consequences that can be occurred due to involving in the manufacturing process and this will result on higher employee retention. Not only that, product quality will also increase from using green materials and productivity of employees will increase as employees are with good health condition comparatively.

$$LG1 = \beta_{\circ} + 0.305gscm_1 + 0.304gp_3 + \varepsilon$$

Also, product design to reduce resource consumption during the manufacturing also enhance the productivity of employees. When less materials are consumed, warehousing duties of employees will reduce and then employee movements will be reduced. As a result of that, higher asset utilization will be achievable in terms of employees and machineries.

Moreover, employee job satisfaction will be increased due to less work to do in operating the manufacturing process as the product has designed to reduce resource consumption during manufacturing process. On the other hand product design to minimize waste generation and environmental impact on product usage and product disposals will attract more customers to

the organization directing the company the expanding its market share i.e. more customers. Moreover, this will positively effect on higher customer satisfaction and brand equity as the consumers are more delight with green products which enable them reusing or safely disposing with less or no environmental impact.

$$LG2 = \beta_{\circ} + 0.222gp_4 + 0.348gp_3 + \varepsilon$$

When focus on the overall aspects of Environmental Management Practices and the impact of them on Firm Performance which were address through the alternative hypothesis, green product practices will not have a positive impact on both financial performance and customer related performance measures. This can be explained as having green product design will not contribute to financial performances directly, may be indirectly through other performance perspectives. On the other, if customers cannot see the green product design effects on final product what they are consuming at the end of value chain, they will not response favourably to green product practices.

Finally, based on the research findings, it can be noted that, green product practices will have a positive impact on internal process performance where product design and its consequences highly interconnected together and also on learning and growth performance of an organization. Further, green process practices and green supply chain management practices will have a positive impact on all the four aspects of performances. This means, all the alternative hypothesis could be accepted except *H1a* and *H1b.* However, there is a performance differences in certain situations where, all the practices identified have no an impact rather one or two of them have a positive impact in respective to one particular model. While some practices have a positive impact on key performance indicators in one performance perspective given in the Balanced Scorecard the same practices will have no impact on the same key performance indicator. Based on the research findings this is due to the inherent specification of each key performance indicators have, though they are contained within one particular performance perspective. Therefore it is very important to identify the impact of Environmental Management Practices at each key performance measures.

Drawing attention on the credibility of Balanced Scorecard to define Environmental Management Practices impact on Firm Performance, it can be identify, the current study only focus on perceived performance regarding each perspective of the company. Based on the findings gathered, Balanced Scorecard itself could be included key performance indicators in relation to the Environmental Management Practices. However, future studies can expand this

question into identified other options in the empirical studies. According to the given facts, Balanced Scorecard can be used to imply Environmental Management Practices in listed manufacturing companies in Sri Lanka as all these effects are interrelated which give both explicit and implicit benefits to the organizations.

5 Conclusion and limitations.

Corporate response towards Environmental Management Practices is receiving much attention in current world. Therefore, it is particularly important to know the impact of such practices on Firm Performance. Current study was focused to find out the Environmental management Practices currently practiced by Sri Lankan company and its impact of Firm Performance. This research question has also been studied in the past empirical studies (Frank, Ram & Robert 2007, Nazim, Ray & Robert 1998, Kaja & Thomz 2015). Moreover, the research study focused to examine any gap existing between Environmental Management Practices and Firm Performance.

The results of the study has found that green product practices will have a positive impact on internal process performance and learning and growth performances. Notably, green product practices will not have a positive impact on financial performances and customer performances. It is very important to identify the reasons for this performance difference which is not address through the current study. However, green process practices and green SCM practices will have a positive impact on all performance measures identified in the conventional Balanced Scorecard model. Therefore there is an interest to find why Environmental Management Practices in relation to green product practices are not positively affect to the financial performance of an organization and why company management believe that the impact is negligible as the current study relied on their perceived performances.

Research study suggests twenty four of key performance indicators that can be included in the Balanced Scorecard by company management based on the findings given in the empirical studies. This will enable companies to properly monitor the respective and most reliable performance outcome from implementation of particular Environmental management Practices within their organizations. Moreover, providing an insight of Environmental Management Practices that can be undertaken by a manufacturing company, twelve performance practices were identified in three basic forms i.e. green product, green process and green SCM practices. Company management can gain a knowledge about the most common Environmental Management Practices which are used globally from this information represent in the current study as these practices were identified based on the empirical studies.

However, the sample of the research was only focused the manufacturing companies in Sri Lanka as it is more relevant to compare the Environmental Management Practices with manufacturing organizations rather than with service organizations. However, it is very

important to find out the possible Environmental Management Practices that can be implemented within service organizations as well.

In concluding, the research paper, it can be elaborated that, there is a favourable impact of Environmental Management Practices on Firm Performance in the cause of Balanced Scorecard.

References

Journal Articles

1. Aapo, L & Marko, J 2008, 'Environmental and performance management forces: Integrating "greenness" into balanced scorecard', *Qualitative Research in Accounting & Management*, vol.5, no. 3, pp.184-206.
2. Butler, J B, Sandra, C H & Cecily, R 2011, 'Sustainability and the balanced scorecard: integrating green measures into business reporting', *Management Accounting Quarterly Winter*', vol. 12, no .2
3. Daniel, P 2014, 'The diffusion of environmental management system and its effect on environmental management practices', *Internal Journal of Operations & Production Management,* vol.34, no.5, pp. 565-585.
4. Frank, F et.al 2002, 'The sustainability balanced scorecard-linking sustainability measurement to business strategy', *Business Strategy and the Environment,* vol. 10, no. 11, pp. 269-284.
5. Frank, M, Ram, N & Robert, S 2007, 'An examination of corporate reporting, environmental management practices and firm performance', *Journal of Operations Management,* vol. 25, no. 5, pp. 998-1014.
6. Ferreira, L M D F et.al 2016, 'An environmental balanced scorecard for supply chain performance measurement (Env_BSC_4_SCPM), *Benchmarking: An International Journal*, vol. 23, no.6, pp.1398-1422.
7. Idalina, D & Lucas, R 2005, 'Evaluating environmental and social performance of large portuguese companies: a balanced scorecard approach', *Business Strategy and the Environment, Bus. Strat. Env*. Vol. 14, pp. 73–91.
8. Jackie, B B & Brendam M 1995, 'The balanced score-card: short-term guest or long-term resident', *International Journal of Contemporary Hospitality Management*, vol. 7, no. 2/3, pp.7-11.
9. Jerónimo, B J et.al 2013, 'Environmental protection and financial performance: an empirical analysis in wales', *International Journal of Operations & Production Management,* vol. 33, no. 8, pp. 981-1018.
10. Kaja, P & Tomaž, Č 2015, 'Environmental proactivity and firm performance: a fuzzy set analysis', *Management Decision*, vol. 53, no. 3, pp. 648-667.

11. Kenneth, W G et.al 2012, 'Do environmental collaboration and monitoring enhance organizational performance', *Industrial Management & Data Systems*, vol. 112, no. 2, pp.186-205.
12. Meena, C 2009, 'The balanced scorecard: a new challenge', *Journal of Management Development*, vol. 28, no. 5, pp.393-406.
13. Mike, K & Andy, N 2003, 'Measuring performance in a changing business environment', *International Journal of Operations & Production Management*, vol. 23, no. 2, pp. 213 – 229.
14. Mike, P, Anna, G & Helge, R 2014, 'What do we really mean by balanced scorecard', *International Journal of Productivity and Performance Management*, vol. 63, no. 2, pp.148-169.
15. Nancy, B, David, M & Steve, E 2013, 'Understanding environmental performance variation in manufacturing companies', *International Journal of Productivity and Performance Management*, vol. 62, no. 8, pp.856-870.
16. Nazim, U A, Ray, V M & Robert, J F 1998, 'Organizational performance and environmental consciousness: an empirical study', *Management Decision*, vol. 36, no.2, pp.57-62.
17. Punniyamoorthy, M 2008, 'Balanced score for the balanced scorecard: a benchmark tool', *Benchmarking: An International Journal,* vol.15, no. 4, pp. 420-443.
18. Robert, S 2003, 'Effects of environmental management systems on environmental management practices and operations', *Production and Operation Management,* vol. 12, no. 3, pp. 416-431.
19. Samuel, F et.al 2018, 'Environmental management practices, operational competitiveness and environmental performance: empirical evidence from developing countries', *Journal of Manufacturing Technology Management,* vol. 29, no. 3, pp. 588-607.
20. Sofía, L R 2009, 'Environmental engagement, organizational capability and firm performance', *Corporate Governance: The international journal of business in society*, vol. 9, no. 4, pp. 400-408.
21. Stefan, S & Marcus, W 2006, 'Sustainability accounting as the link between the sustainability balanced scorecard and sustainability reporting', *Sustainability Accounting and Reporting*, pp.681-697.

22. Stuart, L H & Gautam, A 1996, 'Does it pay to be green, empirical examination of the relationship between emission reduction and firm performance', *Business Strategy and the Environment*, Vol. 5, 30-37.
23. Wallace, E C 2003, 'Effects of environmental management systems on environmental management practices and operations', *Production and Operations Management*, vol. 12, no. 3.
24. Wongrassamee, S, Simmons, J E L & Gardiner, P D 2003, 'Performance measurement tools: the balanced scorecard and the efqm excellence model', *Measuring Business Excellence*, vol. 7, no. 1, pp.14-29.
25. Zeynep, T K & Ozalp, V 2016, 'The fifth pillar of the balanced scorecard: sustainability', *Social and Behavioral Sciences*, no.235, pp. 76-83.

Hardcopy books

1. Kaplan, R S & Norton, D P 1996, *Translating strategy into action: the balanced scorecard*, Harvard Business School Press, USA.

Report (online) (corporate author)

26. Central Bank of Sri Lanka 2018, *Economic and Social Statistics of Sri Lanka*, viewed 1 March 2018, https://www.cbsl.gov.lk/sites/default/files/cbslwebdocuments/statistics/otherpub/economic_and_social_statistics_of_SL_2018_e_0.pdf
27. Colombo Stock Exchange 2016, *Communicating Sustainability – Six Recommendations for listed Companies*, viewed 2 June 2018, https://cdn.cse.lk/pdf/sustainability document.pdf
28. Global Reporting Initiative 2011, *RG-Sustainability Reporting Guidelines*, viewed 11 February 2018, https://www.globalreporting.org/resourcelibrary/G3.1-Guidelines-Incl-Technical-Protocol.pdf
29. UN Environment 2016, *2016 Annual Report*, viewed 25 February 2018, https://wedocs.unep.org/bitstream/handle/20.500.11822/19529/UN%20Environment%202016%20Annual%20Report.pdf?amp%3BisAllowed=&sequence=1
30. UN Environment 2017, *Green Finance Progress Report*, viewed 25 February 2018, http://unepinquiry.org/wpcontent/uploads/2017/07/Green_Finance_Progress_Report_2017.pdf

Government report, corporate author (online)

31. Climate Change Secretariat 2015, *National Adaption Plan for Climate Change Impacts in Sri Lanka 2016-2025*, Viewed 1 March 2018, http://www.climatechange.lk/NAP/NationalAdaptationPlan_RevisedFinal.26.10.2015.pdf
32. European Parliament 2007, *United Nations Framework Convention on Climate Change*, viewed 1 March 2018, https://unfccc.int/resource/docs/publications/impacts.pdf
33. Ministry of Environment Sri Lanka 2011, *National Green reporting System of Sri Lanka*, viewed 1 March 2018, http://mmde.gov.lk/web/images/pdf/green_report.pdf

    Policy Department Economic and Scientific Policy 2007, *Climate Change Impacts of Developing Countries - EU Accountability*, viewed 1 March 2018, http://www.europarl.europa.eu/RegData/etudes/etudes/join/2007/393511/IPOL-ENVI_ET(2007)393511_EN.pdf

Annexure

An Impact of Environmental Management Practices on Firm Performance based on Balanced Scorecard

01. What is your position in the organization?

a. General Manager ☐
b. Finance Manager ☐
c. Other (Please specify) …….

02. How long have you been in that position?

a. 1-3 years ☐
b. 4-6 years ☐
c. More than 6 years ☐

03. How many years your company have been listed in Colombo Stock Exchange?

a. 1-5 years ☐
b. 6-10 years ☐
c. 11-15 years ☐
d. More than 15 years ☐

04. What is your company's perception on being a socially responsible corporate citizen via reporting on triple bottom line?

a. It is a hurdle ☐
b. It is neither a hurdle or a benefit ☐
c. It is a benefit ☐
d. Adapt because of regulatory requirement ☐

05. Please indicate to what extent your company has implemented the following environmental practices in the organization

Please refer the Likert Scale and fill below table accordingly,

1	2	3	4	5
Not at all		To some extent		Very large extent

Environmental Management Practices	1	2	3	4	5
a. Our products are designed & developed for reduced material consumption.					
b. We have designed our products to make reuse, recycle, recovery of material, component parts possible.					
c. Our product are designed to minimize resource consumption during manufacturing.					
d. Our Products are designed to minimize waste generation and environmental impact on product usage and product disposals.					
e. We have acquired clean technology & equipment in to our organization.					
f. We have installed energy efficient equipment in our organization.					
g. We have installed pollution control technologies in our organization.					
h. Our processes focus on reducing waste by reusing waste or scrap internally.					
i. We are co-operating with suppliers to replace materials that can cause environmental problems with alternatives which are not problematic.					
j. We are co-operating with customers to create a market for waste by making waste as an input to another product that can be made and sold at a profit.					
k. We are co-operating with customer for *green* packaging and organize customer awareness programs.					
l. We are co-operating with customer for *green* distribution and transportation.					

06. Please indicate perceived firm performance of company Management after adapting Environmental Management Practices.

Please refer the Likert Scale and fill below table accordingly,

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Perceived Firm Performance	1	2	3	4	5
a. We are receiving a higher revenue from green products compared to other products.					
b. We are able to manage working capital more effectively due to less material consumption.					
c. We are receiving tax benefits due to pollution control technologies.					
d. We are recording a higher asset utilization through use of energy efficient equipment & clean technology.					
e. We have been creating a higher shareholder value in terms of goodwill through customer awareness programs on benefits of green products and green packaging.					
f. We are recording a higher return on equity from new markets for waste by making waste as an input to another product that can be made and sold at a profit.					
g. We have retained a higher market share due to our products and services being easy to reuse, recycle and easy to recover material and component parts.					
h. We achieve higher customer satisfaction & brand equity through green product design.					
i. We have retained more customers due to the use of pollution control technologies.					
j. We have ensured higher customer loyalty through transparent internal process which consumes waste and scrap internally.					
k. We are successful in customer acquisition as a result of green distribution and transportation.					
l. We are achieving higher customer profitability from sale of waste and scarp as raw materials for another product.					

Perceived Firm Performance	1	2	3	4	5
m. We are able to reduce cost per unit as a result of our products being designed & developed for reduced material consumption.					
n. Through the processes of reuse, recycle, recovery of material, component parts we have the potential to develop better products.					
o. We have reduced idle and lead times in the process as a result of energy efficient equipment.					
p. We are able to reduce cost of defects as our production planning and control focus on reducing waste and optimizing material which enables us to consume waste or scrap internally.					
q. We are able to improve our product quality as we are co-operating with suppliers to replace materials that can cause environmental problems with alternative material which is not problematic.					
r. We have been identified as a socially responsible corporate citizen as we are co-operating with customers for green packaging, green distribution and transportation.					
s. Our employees usually repot higher job satisfaction due to less resource consumption and less waste generation in product usage.					
t. We are able to identify new market opportunities due to our product design which focuses on reducing environmental impact on product disposal.					
u. We are experiencing higher employee productivity due to energy efficient equipment.					
v. Our employee retention ratio is very higher due to clean technology and pollution control technologies.					
w. We are experiencing better employee self-development on environmental awareness due to customer awareness programs on green consumption.					
x. We are experiencing less trade union actions due to co-operation with suppliers to replace materials that cause environmental problems with alternative materials which does not cause health problems.					

-Thank you for you corporation-