Linking Environmental Management Control System To Environmental And Financial Performance: The Interactive Role Of Environmental Capabilities In The Jordanian Manufacturing Sector

A thesis submitted for the degree of Doctor of Philosophy

by

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Abstract

This study helps to understand the environmental management and control system (EMCS) and the debate surrounding environmental and financial performance. The relationship between EMCS and its environmental and financial performance has been debated over the last decade. The extent research on the impact from an EMCS and performance perspective reveals that empirical results on this topic are not yet conclusive, add the mixed outcome on the relation between EMCS and environmental and financial performance; This is due in part to neglecting of the role of environmental capabilities in improving the positive impact between EMCS and performance. Moreover, the elusive relationships between EMCS and performance require further investigation into the intermediate variables that can affect the relationships.

This study develops a theoretical framework by investigating the impact of EMCS on environmental proactivity and organisational culture using resource-based view theory and eco-efficiency theory. Also, the impact of EMCS on both environmental and financial performance through environmental capabilities (i.e., environmental proactivity and organisational culture) as intermediary variables. Therefore, hypotheses are developed to test the relationship between the framework variables. An email survey was administered to 1000 random selected large manufacturing companies operating in Jordan. An analysis of 251 responses using Statistical Package for the Social Sciences (SPSS) AMOS revealed that significant relationship between EMCS and (organisational culture and environmental proactivity). Also, there is a direct and indirect relationship between EMCS and environmental performance, while EMCS has no direct impact on financial performance but indirectly (organisational culture and environmental proactivity). The overall findings of this research indicate that EMCS fosters organisational culture and environmental proactivity that can improve both environmental and financial performance. The contribution to the knowledge of this study is the exclusively focusing on the environmental capabilities (organizational culture and environmental proactivity), examining the impact of EMCS and environmental capabilities in the environmental and financial performance. this study provides scholars and practitioners with a better understanding of implementing the environmental management control system framework, backed by empirical evidence.

Declaration

I, HEBAH ALMAJALI, hereby declare that this thesis is fully independently developed by me. I also declare that this thesis contains material that has not been earlier submitted for any academic degree in any other university. Some of the materials reported in my thesis have been published in the following conference papers: I proposed some of the materials in the following conferences/ paper:

Academic Papers:

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Conferences:

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Almajali, H., 2019. The impact of environmental management control system on environmental and financial performance as mediated by environmental capabilities of manufacturers in the country of Jordan. *British accounting and finance association conference, Birmingham*, UK

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Dedication

To my beloved parents Yusra and Abdulkareem for their support during my journey.

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List of Abbreviations

AGFI	Adjusted Goodness-of-Fit Index
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted Average
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index Course
CR	Composite reliability Degree
EMCS	Environmental management control system
GFI	Goodness-of-Fit Index
KMO	Kaiser-Mayer-Olkin
MCS	Management control system
NFI	Normed Fit Index
RBV	resources-based view theory
RMSEA	Root Mean Square Error of Approximation Quality
SEM	Structure Equation Modelling
SPSS	Statistical Package for Social Sciences
X2	Chi-Square
X2/df	Normed Chi-Square
α	Cronbach's alpha

Chapter one: Introduction

1.1 Research background

The significant increase in population and quick economic development has raised unintended environmental degradation and social contrast for the past century. Today, our world is riddled with ecological problems, for instance, ozone depletion, global warming, declining biodiversity and toxic waste. In addition, current social issues including child labor in Asia, worker rights in North America, political turmoil in South America, and human rights abuses in Africa (Epstein and Buhovac, 2014). Realizing the significant of these defies, the Bruntland Commission pioneered in formulating the concept of sustainability, defined as the 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987; p.41). the concept of sustainability combines financial, environmental and social perspectives that ensure a fair and prosperous world for the succeeding generations (Dyllick and Hockerts, 2002).

Organizations around the world are under great pressure to reduce their impact on ecosystems and solve various social problems. Environmental and social regulations are becoming more restrictive (González-Benito, 2006). In addition, the costs of the environmental aspects are growing quickly. Fines and the cost of punishment are becoming more significant; in addition, the implementation of emissions, rights, carbon market and environmental tax increases for firms that emit large amounts of pollution (MacKenzie, 2009). Moreover, various stakeholders, such as the community and investors, are imposing more pressure on firms to take into account the social and environmental aspects of their activities(Abdel-Maksoud et al.,2020; Rodrigue et al., 2013; Burritt and Schaltegger,2010). Consequently, sustainability has become an important and inevitable issue that companies need to address.

Developing and implementing firm sustainability strategies in firms is a significant challenge for managers (Epstein, 2008). Because organizations need to be transformed and

reorganized to achieve sustainability (Shrivastava, 1995), the challenge is how processes, structures, and systems need to be adapted to support corporate sustainability strategies and how those strategies can be implemented in complex settings (Epstein and Roy, 2001).

The literature states that organizations should implement a sustainability strategy to develop strategic tools that incorporate environmental policy into the core business of enterprises; link performance measurement to the organization's strategic sustainability goals (e.g., Figge Hahn et al., 2002). The environmental management accounting claims that organisations can use the environmental management control system (EMCS) to reap the incentives of environmental performance. As an offshoot of management control systems (MCS), EMCS means to 'formalized procedures and systems that use financial and ecological information to maintain or alter patterns in environmental activity' (Schaltegger and Burritt, 2000, Henri and Journeault, 2010). EMCS integrates environmental information and cost in an environmental management strategy; moreover, it helps organisations to measure, control and disclose their performance (Schaltegger and Burritt, 2000).

Previous studies have examined environmental accounting through the literature of various fields. For example, comprehensive research has explored the findings of other industries on environmental disclosure and reporting practices (e.g., Al-Tuwaijri, Christensen & Hughes, 2004; Maas et al., 2016; Lodhia and Hess, 2014; Clarkson, Li, Richardson & Vasvari, 2008). Some works have discussed the current practices in environmental management accounting (e.g. Bartolomeo et al., 2000; Burritt, 2004) and have analyzed how firms adapt their environmental management practices during economic downturns (Delmas and Pekovic, 2015; Bansal et al., 2015), or how manufacturing context drives the implementation of environmental management in the first place (Rothenberg and Zyglidopoulos, 2007; Chen et al., 2017; Walker et al., 2015).In the same vein, a number of works have dealt with environmental cost accounting (e.g. Gluch & Baumann, 2004; Gray et al., 2014).

However, most research on EMCS is prescriptive or descriptive (e.g. Adem et al.,2008, Parise et al.; 2013, pondeville et al.; 2013, Journealt 2018.; Laten et al.;2018 Jorneault and Broussea2017, Ambarwati et al.; 2020). The existing literature often has limited sources

and insufficient empirical evidence (Burritt, 2004; Bouma & VanderVeen, 2002). Nevertheless, some studies have addressed this gap by empirically exploring certain facets of EMCS. For instance, Journeault et al. (2016) investigated the adoption levers of an EMCS in an organization and environmental performance. However, the study only investigated one dimension of the diagnostic and interactive levers, namely the use of EPIs.[1] Henri and Journeault (2010) analyse the influence of EMCS on environmental and economic performance, and they did not find a significant relationship between EMCS and economic performance. Similarly, Abdel-Maksoud (2020) found significant direct relations with both operational and non-operational environmental performance but not with economic performance.

These prior studies have presented a helpful understanding of the role of EMCS in environmental and financial performance. Nevertheless, little is recognized about the ways by which EMCS can influence the strategic development of organisations. Given that studies have generally investigated the direct relationship between EMCS and financial and environmental performance, mediating factors in this relationship have not been empirically studied. Therefore, this study seeks to dissect the influence of EMCS on environmental and financial performance within the organisation.

1.2 Statement of Research problem

For many decades, organizations have faced enormous challenges and developments within business environments. However, Matambele (2014) indicated that some companies are still not using MCS tools which could assist them in operating in the highly competitive business environment. Hence, these firms are the leading cause of environmental degradation and increasing pollution. Without MCS, a company will have difficulty controlling and managing its sustainable development process and day-to-day functioning. More specifically, the absence of MCS in the company may impede its success and financial performance (Schaltegger and Wagner, 2011). This absence will also make the company vulnerable to its competitors in the market (Matambele, 2014).

The research problem stems from insufficient empirical evidence that exhibits the effect of EMCS on environmental and financial performance. While current research have presented

[1] Eco-Control Environmental Performance Indicators

the various influences of environmental management control system on environmental and financial performance (e.g. Epstein and Wisner 2005, Wisner et al. 2010, Renaud 2011, Abdel-Maksoud 2020, Journeault et al. 2016, Ferreira et al. 2010), other works have delved into the link between environmental and financial performance of firms (e.g. Russo & Fouts, 1997 ;AlTuwaijri et al., 2004; Wagner & Schaltegger, 2004,Burnett & Hansen, 2008). These works have concluded varying outcomes. A number of studies have presented the positive impact of EMCS, whereas other works have detected negative effects. Meanwhile, some studies have determined that no effect exists. Nevertheless, limited empirical research have explored the particular influence of EMCS on environmental and financial performance. Notable exceptions include the works of Henri and Journelt (2010), who found that EMCS has positive relationship with environmental performance. In addition, Epstein and Wisner (2005) observed that various forms of EMCS positively influence environmental compliance. Furthermore, Journeault et al. (2016) found a positive relationship between the adoption of the levers of an EMCS in an organization and environmental performance of that organization. Consequently, researchers confer that this issue varies according to the context and nature of firm, thus calling for further research.

The literature has not provided substantial theories on environmental capabilities among environmental and financial performance (Guenther et al., 2016). The empirical findings on whether environmental capabilities enhance environmental and financial performance are still widely debatable (Abdel-Maksoud et al.; 2020, Journeault et al.; 2016). Modern organisations lack sufficient knowledge on aligning EMCS; hence, they have only assessed its impact on environmental and financial performance. Furthermore, further investigation is needed on the dissimilarities in the types of environmental capabilities that influence environmental and financial performance. These capabilities must be replicable in various contexts to understand their effects on different organisations. Moreover, explore the mediating effect of certain variables on the relationship between an organisation's ability to align EMCS and environmental capabilities and performance.

The elusive link and mixed findings regarding the relationship between EMCS and environmental and financial performance require extensive research to find intermediate variables that allow EMCS to improve performance. On the basis of the highlighted gaps earlier this research, focuses on environmental capabilities (namely, organisational culture

and environmental proactivity) as an essential intermediary that enhances the relationship between EMCS and environmental and financial performance. The environmental capabilities have become a driving concern for EMCS in seeking superior performance. However, EMCS is still a new issue within the context of Arab firms. No existing research has explored the relationship between EMCS (organisational culture and environmental proactivity) and performance. Therefore, this study is one of the first to examine the mediation role of organisational culture and environmental proactivity on the relationship between EMCS and environmental and financial performance.

1.3 Research questions

To address the above research issues, this study aims to answer the following questions:

1- To what extant do the environmental management control system impact environmental and financial performance?

2- To what extent do environmental management control system support environmental capabilities (organization culture and environmental proactivity)?

3- To what extent do the environmental capabilities (organization culture and environmental proactivity) act as mediators in the relationship between environmental management control system and environmental and financial performance?

To facilitate the answers to these research questions, some hypotheses have been developed and reported in Chapter 3.

1.4 Research motivations

This study offers substantial insights to different fields, especially environmental management control system literature and the environmental capabilities literature. Moreover, it uses a large-scale survey to supply new evidence on the impact of EMCS on enhancing the environmental capabilities and overall performance of manufacturers. Therefore, this study belongs to a small body of research that has used surveys to explore the use of EMCS in the manufacturing sector (Ahmad et al., 2017, Rehman et al., 2018). The outcomes of the present study show managers that the adoption of EMCS may serve as the basis for facing the challenges posed by the global economic crisis and climate

change (Abdel-Maksoud et al., 2020). Managers of various firms can emphasise the ability to develop environmental capabilities, such as environmental proactivity and organisational culture. In turn, these capabilities can create competitive advantages and environmental improvements.

This study is also motivated by the need for more evidence from non-western countries. The current study is being conducted in a different situation; nearly all previous studies on the link between EMCS and performance have been conducted in Belgium, Germany and Canada. The current study is one of the few studies conducted in the non-Western context and is the only one in the Jordanian context.

Furthermore, Jordan has opened its market to global business and investment and has therefore grown into a reliable player in the international and global markets. Therefore, we need more information about environmental issues. Choosing Jordan to achieve the objectives of current research has significant implications at the theoretical and practical levels. The country represents a strategic location, a relatively small population, and an important regional economy with limited resources, so the careful investment is required. Consequently, this study is expected to contribute to the EMCS literature, mainly to the Jordanian context, which desperately needs more research work regarding this topic (Altarawneh, 2009).

Regarding Jordan's manufacturing industry, some key issues encouraged us to carry out the present research in this industry, for example, as in other countries, Jordan's manufacturing industry occupies an important position. The industry is the second largest and most developed sector in the country and is undergoing significant deregulation, especially attracting private investment from within and abroad. In addition, Environmental issues/concerns affect the manufacturing industry worldwide (Hsiao et al., 2014). Expansions in manufacturing projects imply a degradation of the environment in terms of increased energy consumption, i.e., water and electricity (see Hsiao et al., 2014; Bastic and Gojcic, 2012). Like other businesses, manufacturing has a significant impact on the environment through its regular energy-greedy operations, which release toxic and dangerous materials into our environment. In addition, industrial factories have played a substantial part in the amount of air pollution that humans have to endure. The toxic gases

that factories release into the air, combined with those added by automobiles on the road, increase the risk of developing the chronic respiratory disease, lung cancer, heart disease and many other conditions. Hence, commentators recommend that the sustainable management of manufacturing requires more attention to environmental management issues.

Finally, scholars (e.g., Henri et al., 2016, Guenther et al., 2016; Abdel-Maksoud et al., 2020) have called for further studies on an EMCS that impacts environmental capabilities with the coupling process between the EMCS and environmental and financial performance. However, most previous research has dealt primarily with the direct link between EMCS and performance (Gadenne et al., 2012, Latan et al., 2018, Spencer et al., 2013) instead of the intermediaries that could enhance the relationship between them. The impact of such intermediaries is one of the primary assumptions of this research.

1.5 Aim and objectives of the research

This research mainly investigates the influence of EMCS on environmental capabilities within the context of the manufacturing sector in Jordan. The study also explores the extent to which these environmental capabilities (organisational culture and environmental proactivity) mediate the relationship between EMCS and environmental and financial performance. This work develops a framework that illustrates EMCS and environmental and financial performance using the mediation of environmental capabilities and on the basis of RBV theory and eco- efficiency theory. Therefore, this research seeks to achieve the following objectives.

The following objectives have been proposed to fulfil the aims of the present research:

1. Evaluate and analysis the relationships between EMCS and environmental and financial performance.

2. Evaluate and analyse the relationships of EMCS and environmental capabilities (organization culture, environmental proactivity).

3. Validate a proposed framework that investigates EMCS and environmental performance and financial performance using the mediation of environmental capabilities in the context of the large Jordanian manufacturing industry.

1.6 Research methodology: an outline

The researcher chooses the participants of large manufacturing companies with operations based in Jordan. A random sample of 1000 companies in a variety of manufacturing industrial sectors (e.g., chemicals, furniture and industrial equipment) (see Section 4.6 for the full list) was selected using Amman Stock Exchange (ASE) database and the ministry of industry and trade which included a sampling frame with 8000 companies. The data were collected through surveys given the limitations of the observation and interview methods of the current study. Accordingly, a thorough review of the relevant literature was carried out to inform the robust development and design of a user-friendly questionnaire. The measurement model, including the reflective indicators, was adopted and/or adapted from previous studies. The survey was pre-tested by academics in the management accounting field before being pilot tested with respondents that are similar to (but not part of) the actual population. Questionnaires were finally distributed by email after the careful consideration of the advantages and disadvantages of the other means of communication (e.g. phone and face-to-face). Structural equation modelling (SEM) was applied using AMOS v23 software (Ringle et al., 2014) and the Social Science Statistics Package (SPSS) v20.0 to analyze the data. The data were examined in four relevant stages: sample description, data screening, evaluating the measurement model and testing the structural model (i.e., hypotheses testing).

1.7 Research contribution

Firstly, this thesis developed a theoretical framework on the basis of an intensive literature review from the EMCS, environmental capabilities, and environmental and financial performance. This literature review provided guidance for this thesis in developing a combined theoretical framework for EMCS, including shared knowledge between EMCS and the environmental capabilities, including organisational culture and environmental proactivity as a mediator variable, and performances. Nevertheless, this research may be the first of its kind to integrate EMCS, organisation culture, environmental proactivity, and environmental and financial performance. To the best of the researcher's knowledge, no other existing study combines and empirically investigates the above constructs. Therefore,

this research added a broader view to the existing knowledge in the MCS and EMCS literature by offering different results from business managers' perspectives.

Secondly, most prior related works were performed in the context of developed countries. Thus, MCS researchers argue that drawing generalised conclusions from these results is difficult and that further investigations in various contexts are necessary (Henri et al., 2010). In response to this call, this study was conducted in a non-Western context and is the first of its type for the country of Jordan; the importance of this feature will be highlighted in section 1.8.3. The methodology presented in this study should cover the way for related studies of this nature in the non-Western context.

Thirdly, this study differs from most previous literature that investigates the impact of EMCSs on environmental and financial performance. This study enters into a black box and provides a broad view of how EMCSs influence organisational development to contribute to environmental and financial performance. In fact, this study determined that the improvement of environmental capabilities could be the missing link between the adoption of EMCSs and their effect on the environmental and financial performance of a company.

Fourthly, this study contributes to research on environmental capabilities by featuring the indirect role of two most popular capabilities—organisational culture and environmental proactivity—on environmental and financial performance. More specifically, this study provided a comprehensive and nuanced understanding of the role and influence of these two capabilities by explaining how they reinforce and enable the effective implementation of environmental and financial performance through an examination of their mediating effects on the relationship between EMCS and environmental and financial performance. This holistic and distinctive view offers an understanding of the specific characteristics and the relative importance of each capability in the implementation of EMCSs, which has not been previously elaborated in this context.

1.8 Current status of environmental issues in Jordan

Environmental issues in Jordan have been discussed for the past 30 years (Hadadin and Tarawneh., 2007). Similar to other developing countries, Jordan faces several environmental issues (Ola Al Jaafreh et al., 2018), including wildlife destruction, land

degradation, air pollution and water pollution. The rapid growth of the economy of Jordan has expedited urbanisation and brought severe environmental problems in the country, such as increased land use and the destruction of natural resources (Combaz, 2019).

1.8.1 Environmental Issues in Jordan

Until the 1970s, Jordan was relatively unburdened by environmental concerns. However, these issues emerged as both modernisation and population increased. Consequently, the growing population demanded more water supply, which the country could not provide sufficiently. Additionally, urbanisation became a major source of pollution. A large portion of land was developed for industrial purposes. As a result, the country's wildlife habitats diminished. Soil erosion also became a widespread issue, which was caused by years of agriculture and logging upon the land. These hazardous circumstances reached their peak in the 1970s and the 1980s, thus attracting a great deal of attention and concern towards the major ecological problems in need of immediate remedy (Irani et al., 2000)

Jordan still faces many challenges today. Firstly, the country experiences a water shortage. Water is necessary to sustain the population. However, the high population growth rate and the influx of refugees in the country has toppled the balance between the supply and demand of the essential resource. Neighbouring countries have consumed much of the water supply in the area, thus leaving Jordan with a scant portion. Moreover, the current demand for water has surpassed the limited available resource. Highland aquifer systems have been put in place. However, this solution has been counterproductive, as it has decreased the level of the water table. In addition, the excessive use of these aquifers has reduced the water quality. Secondly, soil erosion has drastically affected agriculture in the country. Along with it, urbanisation has further caused damages to the natural environment. Plastics and toxic wastes have also seeped into the soil and mixed with agricultural chemicals. Thus, the presence of these pollutants has stifled agricultural production.

Air pollution is another environmental problem that Jordan continues to experience. Emissions from the industrial sector have affected all types of living things in the country. In addition, air quality has deteriorated due to emissions from automobiles. When mixed with the other pollutants in the air, sand and dust storms exacerbate the poor quality of the atmosphere. In the urban environment, various sources also produce high levels of

emissions. For example, the number of cars has increased, and many of these vehicles have low efficiency. Moreover, the use of leaded petrol, which releases sulphur, is still rampant. In addition, various industries consume excessive amounts of energy. The poor logistics and use of building materials also produce toxins that can stay in the air. Waste treatment plants and sewage systems also release harmful particles, along with the odour emitted by waste.

Despite the intense pollution in Amman, Zarqa and Faheis, most parts of Jordan have clean air. Much of the pollution in these three areas come from stationary sources and mobile sources. Stationary sources pertain to industrial structures, such as plants, refineries and mines, as well as gas stations. Residential areas are also considered stationary sources. Meanwhile, mobile sources refer to vehicles, such as cars, aeroplanes, ships and trains. An estimated 400,000 vehicles use gasoline and diesel in Jordan, thus contributing to the high emissions in the atmosphere. In addition, among the natural sources are sand and dust storms. According to the Meteorological Department of Jordan, 1.8 million tons of dust travel to Jordan every year. These particles are transported by Khamasini weather depressions, which occur five to six times annually. In addition, transportation is another major source of air pollution in Amman. The combination of particles and other harmful gases in the city exceeds the limitations of the air quality standards of the World Health Organisation (Hadadin and Tarawneh., 2007).

Jordan's 2025 National Vision and Strategy (NVS) was launched in 2015. This framework aims to provide equal opportunities for people in the country as it makes steps towards the development of the country. The NVS has 400 policies, which also cover plans for the environment and climate (Bany Yasin, 2018; EcoPeace, 2019). Moreover, it coincides with other existing guidelines, such as the 2013 Jordan Poverty Reduction Strategy (USAID, 2017, p. 4). Solutions for the country's issues with the environment, food, agriculture, water and energy are also laid out in the plan. The NVS is also crucial to the creation of laws on climate change, which would be beneficial to the country. The strategy also reinforces the participation of ministries in the security and management of resources (water, energy, food and agriculture) in Jordan. The plans laid out by the NVS will be fulfilled through an executive development program that spans three years (EcoPeace, 2019).

The Nationally Determined Contributions (NDC) was submitted to the United Nations Framework Convention on Climate Change (UNFCCC). In addition, Jordan has adopted and updated a set of relevant environmental policies over the past 15 years, including:

* On the environment overall: A National Green Growth Plan for Jordan (2017), a reference guide for green policies and for green growth projects, with a cost-benefit analysis for 24 projects (EcoPeace, 2019, pp. 20–21; MoE, 2017);

* On climate change overall:

1 - National Climate Change Policy and Sector Strategic Guidance Framework, 2013-2020, which has been extended to 2030 and is to be revised accordingly, as reported in Jordan's 2016 NDC (see MoE, 2013; MFA NL, 2018, pp. 8–9);

2 - Climate Change Adaptation and Low Emission Development Strategy (2013).

* On desertification:

1 - National Strategy and Action Plan to Combat Desertification, 2015-2020 (2006).

2 - National Action Program to Combat Desertification.

* On the water:

1 - Water for Life: Jordan's Water Strategy, 2008-2022.

- Climate Change Policy for a Resilient Water Sector (2016).

1.8.2 Environmental Issues in the Jordanian manufacturing industry

The manufacturing sector is the second biggest industry in Jordan after the service sector. It contributed 27.58% to the GDP in 2018, while the service industry made up approximately 61.84%; in addition, the agricultural sector comprised 5.63% of the total GDP (The Economic Policy Council, 2020). The main manufacturing exports from Jordan include furniture, plastic, minerals, chemicals, garments and textiles, electrical appliances and machinery. In 2018, countries that received imported goods from the Jordanian market

were from the surrounding Arab countries (44%), North America (28%), Asia (21%), EU (3%) and other regions (3%) (Embassy of Jordan in Washington, 2018).

According to the Economic Complexity Index (ECI), the Jordanian manufacturing sector was the 86th largest export economy in the world in 2018. The manufacturing sector is considered one of the important economic sectors that support the Jordanian exchange rate and increase the budget of the government with USD1.4 billion in taxes annually (Jordan Chamber of Industry, 2017). An expert in the Jordanian economy argued that the sector contributed 0.75% to the total national export in 2017, and it was also the second-largest source of jobs after the public sector in the same year (Fanek, 2017). In addition, the total number of manufacturing companies reached 8000, and this sector employed 40% of the labour force (Fanek, 2017).

The industry, in general, has affected the Jordanian environment through air pollution, noise, solid waste production, sewage water and waste odours, which negatively impact human life. Specifically, heavy and medium industries, such as oil and phosphate refineries and cement manufacturers, are the main constant sources of air pollution in Jordan. As for the largest and most dangerous mobile pollutants, the increase in the number of cars and various means of transport has intensified air pollution, especially in crowded places. Among these culprits, buses and congested industrial sites are the top sources of these emissions. Therefore, modern environmental technologies must be used to reduce the rates of pollution emissions from factories (Alhassen, 2010).

A previous study by the World Health Organization revealed that air pollution and the inhalation of hazardous particles had caused lung cancer and the death of approximately 1.3 million people annually in industrialised and poor countries. Experts emphasised that the Ministry of Environment 'tends to [favour] the preservation of industries and not harm the interest of investors at the expense of paying attention to issues. On top of that is environmental pollution' (Jordan Environment, 2011).

However, the Jordanian government has realised the importance of addressing environmental problems and has thus set up the Ministry of Environment to handle these issues. Such effort has been done by the Ministry of environment are Monitoring and control of flue gas emissions, Fuel diversification and renewable energy use and Waste

minimization and recycling (and treatment) technologies. Jordan has applied different standards on environment-related activities. Thus, the country has adopted ISO 14001 and ISO 22000, which were formed by the national subcommittee on environmental management systems and environmental audits through the National Committee on Environmental Standards. JSMO[1] stated that the standards are applicable to all types and sizes of organisations operating an environmental management system.

1.9 Structure of the thesis

This thesis is organized into seven chapters as follows.

Chapter One (Introduction). This chapter introduces a brief background and presents the research problem, research questions, aim and objectives, research methodology and research contribution. It also outlined the status of environmental issues, a country profile and rationale for the research context.

Chapter Two (Literature Review). This chapter critically reviews the current relevant literature on area of environmental management control system, performance measurement systems. The chapter presents the emergence of the EMCS, motivations of adopting EMCS, EMCS based on Malmi and brown, empirical literature on EMCS and identify the research gap. The chapter then provides discussion for organization culture and environmental proactivity. Additionally, it considers performance measurement systems and environmental and financial performance.

Chapter Three (Theoretical Framework). this chapter considers the conceptual framework and the hypotheses development process. in addition, it presents the theoretical perspectives that lay the foundations for the proposed framework namely, resources-based view and eco-efficiency theory. It then identifies the constructs related with the framework. Finally, it develops the related hypotheses based on relevant literature.

[1] is similar to the British Standards Institute (BSI) in that it is an implementing agency for standardisation and a core body in development of national standards and certification system in Jordan

Chapter four (Research methodology). This chapter elaborates the research methodology employed to examine the proposed theoretical framework. Also, it clarifies the major method applied for data collection and the main issues related to the research instrument, like survey development and pilot study. The chapter also presents the targeted study population and the sampling technique, the variables measurement, the statistical techniques and software packages employed in this research. The chapter ends by outlining the key ethical issues.

Chapter five (Data analysis and results). This chapter describes the data analysis procedures, which include descriptive statistics of the survey samples, tests for outliers and missing values, investigates the assumptions of multivariate analysis. in addition, this chapter presents the results of testing the structural model. we used Amos software package for SEM to measure the relationships.

Chapter six (Discussion). This chapter reviews and discusses the research findings in view of other empirical work. It provides a rational explanation that were suitable for counterintuitive results.

Chapter seven (conclusions). This chapter presents the conclusions, discusses both theoretical and managerial contributions. it also provides the limitations and recommendations for future research directions.

Chapter two: Literature review

2.1 Introduction

Environmental management control system has been considered as one of the crucial issues, both academically and in practice. This research aims to investigate the impact of environmental management control system on environmental capabilities (organization culture and environmental proactivity). In addition, the research aims to examine the mediation effect of environmental capabilities (i.e., organization culture, environmental proactivity) on the relationship between environmental management control system and environmental and financial performance.

The chapter begins with a brief background of the emergence of EMCS, motivations for adoption EMCS; Malmi and Brown framework, which represents the instrument that adopted to measure EMCS; the empirical literature on EMCS and identifying current research gaps. The chapter then presents the environmental capabilities related to this study (organization culture and environmental proactivity). Section three represent the performance measurement system.

2.2 Emergence of literature on environmental management control system

The inclusion of EMCS[1] in management accounting and management systems has been considered for decades in the literature on environmental management accounting; a number of accounting scholars have used the term "EMCS" to refer to MCS related to environmental issues (Schaltegger & Burritt, 2000). However, the concept of EMCS still a "black box", primarily in terms of realization the conditions under which local actors are mastered (Caron et al., 2007). Moreover, it has not been extensively investigated (Henri and Journeault,

[1] As noted in the literature review on management control systems by Chenhall (2003:129), the terms management accounting (MA), management accounting systems (MAS), management control systems (MCS), environmental management control system (EMCS) and eco- control system are sometimes used interchangeably.

2010). According to Caron et al. (2007), the specific conditions for the adoption of EMCS by the firms have not been investigated. To open this "black box", they suggest the socio-economic task of EMCS. This is different from the other three tasks described in the accounting literature, which are Economic operations function (Henri and Journeault, 2006), interpretation function (Schaltegger et al., 2003) and governance function (Langevin, 1999).

Under the approach of interpretive function, EMCS was described as "creation of a permanent, institutionalised, internal management process based on environmental accounting and reporting" Schaltegger et al. (2003). According to these authors, EMCS has five processes. That is purpose and policy creation, information management, decision support systems, policy manipulation and implementation, and communication (internal and external). Goal and policy development aims to shift the position of the organization from environmental activities to environmental management by assessing the company's key environmental issues and exposures, defining priorities, and modifying operational goals. The environmental accounting system aims to improve the efficiency of information management by providing relevant information to the decision support system, which needs to evaluate environmental information according to its relevance and be based on economic and environmental sides. In addition, incentive systems for the operation and implementation of environmental enterprise plans and internal communication are needed to achieve efficient implementation.

With regard Economic operations function, Caron et al. (2007) suggest that there is no certainty about the reasons and consequences of the environment, and therefore a global response must be built. Consequently, EMCS is defined as "a relay used to operate environmental knowledge jointly developed by multiple parties," and it is not only developed as environmental knowledge is built but also at the same time that network of humans (managers, accountants) and non-humans (performance indicators, inclusion in budget processes) associated with this innovation. Caron et al. (2007) emphasize some questions Based on this socio-economic function of EMCS, such as whether EMCS is a "green transformation" of traditional management control or a modern object; what EMCS can expect from people already exist in traditional management systems.

Most of the literature still focuses on the economic operation and interpretation of EMCS. Under these features, EMCS is primarily defined as the 'application of financial and strategic management techniques to environmental management' (Henri and Journeault, 2010). In particular, these authors describe EMCS as a ' formal procedure and system for maintaining or changing patterns of environmental activity using financial and ecological information' (Henri and Journeault, 2010). Journeault et al. (2011) propose to follow the same approach and examine the ability of EMCS systems to put environmental strategies into action using the four levers of eco-control (Simons, 1995). They found that the strength of the use of these levers depends on the direction of the environmental strategy (internal or external).

Essid and Berland (2011) are investigating CSR management control systems using Simons' control tools. According to the definition of Simons (1987), “sets of formalized procedures and systems, based on financial, non-financial, environmental and social information, which managers utilize to maintain or alter certain organizational activity patterns in order to improve its global performance ". The authors are primarily interested in the results of these systems regarding information overload, especially the interrelationships between diagnostic and interactive control systems and their separation into conventional management control systems. The authors found that due to the presence of many indicators of CSR, there is an overload of information, which further complicates the interactive use of these systems, replacing them for diagnostic use. Though, at the same time, there was also diagnostic use of reports instead of interactive use.

Similarly, Gond et al. (2012) used levers in Simons' control framework to explore the responsibility of sustainability control systems in the combination of sustainability within managerial strategies. The author suggests eight "ideal types" of organizational structures that reflect the usage and modes of the combination of sustainability control systems. These systems, when used as autonomous strategic tools, can remain isolated as peripherals, thus deepening understanding of the nature and mode of integration needed. Integration is defined as "the degree of overlap between the two control systems under investigation" (p.206). it includes technical, organizational, and cognitive aspects. According to these authors, these three forms of combination can exist and compensate for each other within the same firm.

Integration is also referred to as the attention of Durden (2008), who was interested in combine formal and informal control systems with aspects of social accounting. The authors found that both formal and informal controls did not adequately support the social responsibility within the organization under investigation. Therefore, coordination of formal and informal controls seems to be a powerful combination for the firms. The same results were suggested by Norris and O'Dwyer (2004), pointing out the significance of formal and informal control systems being joint and therefore supporting each other. The authors noted that both systems have mixed messages, as informal control exercised corporate social responsibility, but on the other hand, formal management systems did not include the results of CSR activities, which were mainly focused on financial considerations.

2.3 Motivations for adopting the environmental management control system.

Industrial development in the last few centuries has enabled firms to garner large sums of wealth. However, these advancements have also unintentionally led to ecological degradation. Among the environmental crises that have emerged are the rising global temperatures, the depletion of the ozone layer, the deforestation and desertification of once-lush terrains, the decline in biodiversity and the release of toxic waste (Shrivastava, 1995). Organisations can either cause further harm or potentially curb ecological problems. Thus, EMCS allows firms to attain potential benefits (Schaltegger & Burritt, 2000). For example, organisations can take certain steps to reduce costs, which can be achieved by improving ecological efficiencies, developing green markets and first-mover advantage, forming a strong relationship with communities and enhancing the image of their firms (Hart, 1995; Shrivastava, 1995; Porter & Van der Linde, 1995).

EMCS is a part of EMA that applies methods for financial and strategic control to environmental management (Schaltegger & Burritt, 2000). It has gained traction in recent years, as it drives the environmental strategies of the firm and allows the organisations to measure, regulate and report their environmental performance. The system also supplies information for decision-making to certify that the environmental objectives are met. In addition, it provides compelling evidence that supports the benefits of the decisions of the firm.

Conventional management accounting practices have limited the adoption of EMCS in formulating environmental strategies (Burritt, 2004; Burnett and Hansen, 2008). Gray et al. (2002) claimed that environmental initiatives are hampered by the existing practices and structures in the accounting field. Moreover, these prevailing systems encourage activities that further harm the environment. Managers may not have a clear grasp of the negative financial consequences of poor environmental performance. In addition, they may also overlook the potential costs and benefits of enhancing the environmental performance of their firms. Such oversight occurs because managers do not have access to relevant information. According to IFAC (2005), the limitations in the conventional style of management accounting cause managers to make decisions on the basis of inaccurate or misinterpreted information.

Organisations should consider the environment for a number of compelling reasons amidst the increasing pressures—both in magnitude and frequency—that they face (Grabner and Moers, 2013; Malmi and Brown, 2008; Journealt, 2016). Firms can experience pressure from lawmakers, consumers, environmental organisations, communities, bankers, shareholders and acquirers (Schaltegger and Burritt, 2006). Stakeholders can urge firms to find solutions for environmental sustainability. In addition, organisations can be motivated to pursue sustainability by managing regulatory compliance, following business cases and securing competitive advantage (IFAC, 2005; Schaltegger and Burritt, 2006). Gray et al. (2002) categorise these motivations into legislative and market-based motivations. Additionally, initiatives for environmental conservation may add sources of revenue for organisations and provide cost-saving opportunities (Bennett et al., 2002; Schaltegger and Burritt, 2006).

EMCS can be used to reduce costs, develop better pricing strategies, attract human resources and enhance the reputation of firms (Burritt et al., 2002; Bennett et al., 2002; Gibson and Martin, 2004). Moreover, the EMCS obtains the information that can aid organisations in decision-making (Burritt et al., 2002). Such knowledge may open new avenues, for instance, reduced energy, methods for material recycling and better waste management methods for material recycling. The information obtained by EMCS may also be applied in the development of more effective procedures.

2.4 EMCS based on Malmi and Brown framework

An MCS is crucial to the structure of an organisation (Hill and Jones, 1992) and to the implementation of strategies (Anthony and Govindarajan, 2001). Thus, EMCS is used to incorporate environmental issues into the MCS of the organisation. Then, environmental management tools can be used in the application of the system.

This study asserts that EMCS should be combined with environmental capabilities to enhance environmental and financial performance. Building on this premise, EMCS should incorporate not only one but a package of MCS. Drawing from the MCS frameworks, we adopted Malmi and Brown framework to measure EMCS in this study. The next section provides a brief discussion about five types of controls.

2.4.1 Planning controls

Planning can be perceived as an early form of control (Flamholtz et al., 1985). First of all, it sets out the objectives to direct efforts and behaviour. Secondly, it establishes the standards in relative to the targets. It also delineates the degree of effort and performance that are required from the members of the organisation. Planning enables coordination by associating a group of goals throughout the practical areas of a firm. This proposal ensures that the activities of the teams and individuals correspond to the desired outcomes of the organisation. Two broad approaches are used for planning. The first is planning, in which the objectives and procedures for the current future are established. This approach is tactical. Meanwhile, the-second-wide approach is more strategic. It involves long-term planning, and the goals and actions for the medium term and long term are established (Malmi and Brown.; 2008).

2.4.2 Cybernetic controls

Cybernetic principles have long been associated with the control (Arrow, 1964). According to Green and Welsh (1988), cybernetic control is ‘a process in which a feedback loop is represented by using standards of performance, measuring system performance, comparing that performance to standards, feeding back information about unwanted variances in the systems, and modifying the system’s comportment’. A cybernetic system is an information or control system depending on its usage. It supports managers when they spot irrelevant

variances by providing knowledge and facilitating decision-making. Moreover, the system allows managers to modify the behaviour or activity that is responsible for the variance (e.g., a production process) alone. However, a cybernetic system for information and decisions transforms to an MCS when the behaviour is linked to the targets, and the accountability for the variations in performance is established. Four main cybernetic systems have been identified in the literature on MCS: financial measures, budgets (Malmi and Brown .; 2008).

2.4.3 Reward and compensation controls

Reward and compensation systems motivate and increase the performance of the employee within organisations. They align their goals and activities of these individuals and groups with those of the organisation (Bonner and Sprinkle, 2002). The presence of rewards and compensation increases the effort of individuals compared with a setting with no clear rewards (Bonner and Sprinkle, 2002). While reward procedures can be external or intrinsic (Flamholtz et al., 1985), extrinsic rewards have been widely examined in the literature on management accounting (Ittner and Larcker, 2001). Bonner and Sprinkle (2002) reviewed the existing study on incentives and performance. They asserted that monetary incentives improve effort and performance by concentrating on the efforts exerted by individuals on the job. Linking the effort to the task can affect performance in three ways: the direction of effort (the task individuals focus on), the duration of effort (the length of time individuals devote themselves to the task) and the intensity of effort (the number of attention individuals devotes to the task) (Malmi and Brown .; 2008).

2.4.4 Administrative controls

Administrative control guide employee performance within the organisation. In addition, they monitor the behaviour and assign supervisors to whom employees are accountable for their behaviour. These systems also specify the ways in which tasks or behaviours should be performed or avoided. There are three groups of administrative controls: governance structures within the firm, organisation design and structure and procedures and policies (Simons, 1987).

2.4.5 Cultural Control System (CULTURE)

culture control is 'the set of values, beliefs and social norms which tend to be shared by its members and, in turn, influence their thoughts and actions' (Flamholtz et al., 1985, p. 158). This perspective towards culture is supported by the existing literature on accounting (Pratt and Beaulieu, 1992). Organisations may function within a cultural context; moreover, managers may not be able to control the influence of culture. Nonetheless, culture is a control system that can regulate behaviour.

The impact of values on behaviour, which is formed under belief systems, can be observed in three stages. The first level of impact is observed when companies intentionally recruit individuals with values that match those of the organisation. On the second level, individuals socialise with one another, and their beliefs change to match the organisational beliefs (see Alvesson and Karreman, 2004). On the third level of impact, the values of the firm are explicated, and employees act in accordance with the beliefs of the organisation even if these workers do not adhere to these values in their personal lives. It involves several issues, for example, their social responsibilities to the community. Workers may act in accordance with this important statement because it has been personalised by them. Alternatively, the organisation may expect this type of behaviour from its employees. Either way, the values of the firm have been designed to influence employee behaviour (Malmi and Brown; 2008).

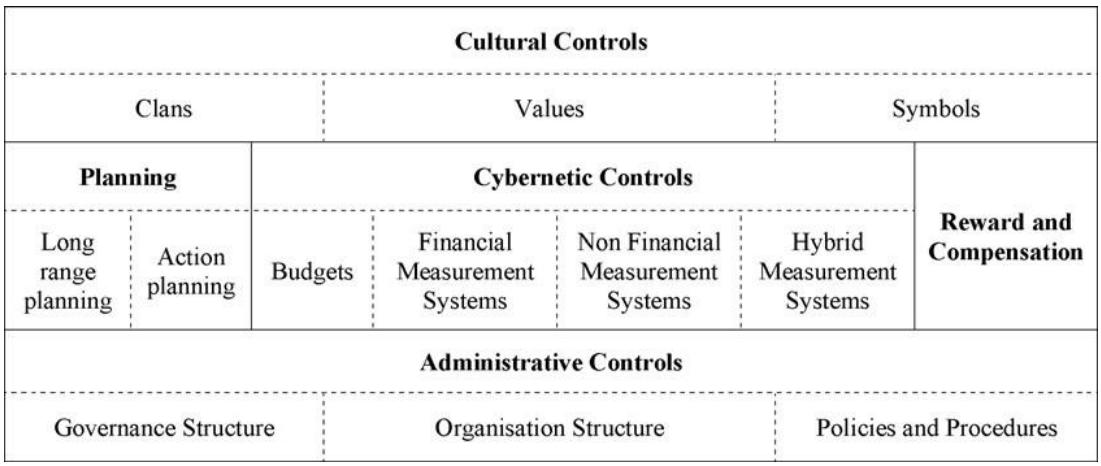


Figure 2. 1 Management control systems package.

2.4.6 Motives to adopt MCSs as a package.

Otley (1980) is the first researcher to consider that there are two types of controls which are package and system. He mentions that "It is often impossible to separate the effect of an AIS from other controls; they act as a package and must be assessed jointly". There are numerous motives why studying MCS as a package is relevant. The first motivation is concerning to "... MCS does not work on its own" (Malmi & Brown, 2008, p. 287). It is the primary cause of the packaging phenomenon. Researchers have examined controls or systems as a single practice that seems to have little relevance between them. Therefore, these practices are part of a wider control system. It needs to be studied as a total (Chenhall, 2003). Firms use different MCSs that could have a connection, and thus the applied of one system is likely to be influenced by other MCSs (Abernethy & Brownell, 1997). Scholars acknowledge the fact that when designing an MCS, controls need to be largely analysed and considered as systems that work together (Otley, 1999; Fisher, 1998; Malmi & Brown, 2008). According to Bedford (2006), MCS is built when various MC components work together to guarantee the success of an organization's goals. Nevertheless, the task is to try to design the various elements within the MCS (Fisher, 1998). In addition, Fisher (1998) and Flamholtz (1983) suggest that if the links between various MCS elements are not appropriate, the expected function that these controls expected to perform may not be reached.

To date, empirical research on the adoption of MC as a system has been limited. Of the few studies which have been undertaken, in supporting firm performance, Ahmad et al.;(2017) and Rehman et al.;(2018) conducted studies how companies can use management control system to achieve better performance. Ahmad et al.; (2017) investigated the three elements of control from Malmi and Brown (2008) MC package, which include planning control, administrative control and cultural control on performance; he suggests if these elements of controls are adopted by Nigerian firms, it will trigger institutional changes as it would cease the practices of isolated treatment of control. The study performed by Rehman et al. 2018 generated similar results, and he concluded that "…. This suggests that the need for more explanation of Pakistani textile industry managers on the need to adopt better MCS practices as these practices lead to better organizational performance".

However, another group of study focused on which formal and informal controls adopted by the companies and led to better performance. Crutzen et al.; (2017) on their study considered to be amongst the "best performance" in terms of sustainability in Europe, found that the companies that have pronounced formal controls tend to have less developed cultural control systems and the existence of rewards and compensation vice versa. Following these studies by Bouten and Hoozee (2016) report the results of a creative safety campaign introduced by a Belgian scaffolding firm to align employee behaviour at different organizational levels. The main objective is to examine how a package of control systems (Malmi and Brown, 2008; Malmi and Granlund, 2009) can enhance safety performance. Where the findings suggest that cybernetic and rewards and compensation controls are not sufficient for safety in organizational life. In contrast to this result, Svensson et al. (2019) found that both formal and informal control adapts with the large organizations, where the findings show that cultural controls serve as a foundation for the values and socializing employees.

Table 2.1 Overview of empirical work on Malmi and Brown framework

Year	Data collection	Management control system package	Research focus	Main finding	Limitations
2017 (Ahmad)	Survey	Malmi and Brown, 2008	investigation if planning control, administrative control and cultural control can trigger better performance	the need for adoption of these elements of control from Malmi and Brown viewpoint as they have the needed attributes for improving performance	
2018 (Rehman)	Survey		Investigation if Malmi and Brown package 2008 improve organizational performance	he suggests that if MCS as package topology elements is adopted by Pakistani textile organizations it would enhance the performance of this sector.	Focus only in developing countries without comparing the output with developed countries.
2019 (Svensson)	Case study		Investigation Malmi and Brown framework to explain how management controls adapt to sustainable management.	this study shows that both formal and informal control adapts as organizations apply circular business models.	Hard to generalize the result because case analysis is explorative and focuses on three cases, all situated in Sweden.

2016 **(Bouten et al)**	Case study		examine how a package of control systems (Malmiand Brown, 2008; Malmi and Granlund, 2009) can enhance safety performance.	the findings suggest that cybernetic and rewards and compensation controls are not sufficient to safety in organizational life	safety performance campaign only operates in Belgium, The Netherlands and Germany. It will not be expanded to other countries.
2017 **(Crutzen)**	Interview		explores empirically the extent to which large companies have developed a package of formal and informal management control mechanisms	companies are likely to revert to both approaches, as formal and informal management controls are complementary and may reinforce each other. Focusing only on one kind of management control, either formal or informal, involves a risk of internal organizational conflicts.	the interviewers were only sustainability managers; thus, it did not consider the point of view of accountants or top manager

2.5 Empirical literature on EMCS

The empirical research on EMCS has covered several issues, namely, drivers, implementation, designs and properties, and consequences and outcomes. Before proceeding to present the literature, one essential problem can be encountered when attempting to research EMCS. Despite the increased relevance of EMCS, academic research has been very scarce on this topic. In the remainder of the review, the boundaries

of the fragmented, multidisciplinary literature that has directly or indirectly examined EMCS will be delimited.

The results are brought together in Section 2.5.3 to define the most relevant gaps and future research needs. Notably, these themes are not mutually exclusive, and certain articles appear in several categories. Spencer et al. (2013), for example, looked at the relationship between top management commitment to environmental protection and environmental success. Such connection contributes to the discussion of the two themes.

2.5.1 Adoption of EMCS (drivers and implementation)

The factors that affect EMCS adoption and implementation are a common research topic that has gotten a lot of attention (Adams and McNicholas, 2007; Ferreira et al., 2010; Gates and Germain, 2010; Spencer et al., 2013; Christ and Burritt, 2013; Windolph et al., 2014). The research question referred in this theme is What factors do justify the adoption of environmental management control system? At a conceptual level, a number of factors have been investigated.

The extant literature has examined the general state of implementation and integration of EMCS. Bartolomea et al. (2000) explored which environmental management controls have been implemented in companies and what are the difficulties for applying. The authors assessed the eco-management accounting practices in 84 companies in four countries in Europe; they found that the company's interest in EMA (as a component of EMCS) is moderate but growing. However, these practices have international differences, and their implementation is challenged by internal barriers like cost. Meanwhile, Brown (1996) focused on company strategy rather than cost by arguing that the strategy of hotels should change when they implement a proactive response to environmental issues. He concludes that such modifications should match the changes made in their MCS to improve the performance of the hotel.

Another group of studies found that the implementation of EMCS requires firms to build and develop the necessary performance measurement techniques and to improve the skills and capabilities of internal employees. More precisely, Adams et al. (2008) investigated

the development and integration of key performance indicators (KPIs) of sustainability into decision-making. The results suggest that most companies have adopted the ideal methods to integrate sustainability into decision-making, with performance measurement techniques that encourage decisions that consider their social and environmental impacts. Similarly, Morsing et al. (2009) pointed out several mechanisms that can be applied to guarantee the implementation and integration of sustainability into businesses. The author concludes that Novo Nordisk's approach is the best tool for assessing the collective corporate level. Therefore, this approach is generalised and limited in integrating sustainability into business decisions. Wilmshurt et al. (2001) highlighted that accountants should be trained in skills required for the development and operation of appropriate EMS that result in the recording, reporting, disclosure and verification of a firm's performance, including its environmental performance.

When studying the factor that influences the general state of implementation and integration of EMCS, some researchers have found management commitment to be one of the key antecedents. For instance, Parise et al. (2013) used a sample size of 405 executives of large European companies. The result indicated a positive impact of top management commitment on the effectiveness of strategic performance measurement systems related to sustainability. Similarly, Spencer et al. (2013) investigated the link between the commitment of top management to promote environmental sustainability and to improve environmental performance of 200 listed companies in Australia. The results showed the use of an internal environmental information system indicated the commitment of the management to uphold the sustainability of the environment. Adams and McNicholas (2007) conducted case studies and observed that CEO commitment is an important driver of a company's orientation towards sustainability and its development and integration of a sustainability-reporting framework into planning and decision-making. In addition to the internal drivers for the implementation of EMCS, Chinander et al. (2001) used a mixed-methods approach to examine the values and alignment of rewards and punishment. They found that traditional incentives used to motivate operating personnel are not likely to succeed in the environmental area due in part to potential delays between action and consequences.

Furthermore, the second factor that influences the adoption of EMCS is the type of strategy. This factor has also been discussed by another group of scholars. Perego and Harmann (2009) used data from 81 financial managers in manufacturing companies located in the Netherlands. According to the survey data, firms that are more proactive in formulating environmental strategies rely more on EMCS. Moreover, Pondeville et al. (2013) investigated contextual and strategic factors to determine their role in the development of EMCS in manufacturing companies. Overall, the results from a survey of 256 manufacturing companies suggested that companies that perceive greater strategic factor are more inclined to develop EMCS. In contrast, Ferreiro et al. (2010) provided cross-sectional evidence for the link between strategy and EMA use. They did not find a relationship between pursuing a prospector strategy and EMA use. Similarly, Gates and Germain (2010) observed no relationship among different types of strategies (quality strategy, cost leadership strategy and innovation strategy) and the use of sustainability performance measures in strategic performance measurement systems.

Findings on the influence of the type of industry on EMCS have been mixed. Ferreira et al. (2010), Gates and Germain (2010) and Christ and Burritt (2013) found that firms operating in environmentally sensitive industries exhibit greater levels of use of EMA. Frost and Wilmshurst (2000) proved that firms that are environmentally sensitive have a higher tendency to legitimise their actions by sharing environmental information with the broader community. In contrast, Windolph et al. (2014) investigated the influence of institutional factors on the application of sustainability management tools. Interestingly, they found a negative relationship between the variable denoting environmentally sensitive industries and the number of sustainability management tools applied. With regard to the designs and properties of EMCS, a group of studies have examined the measurement and monitoring of social responsibility within EMCS. By using a case study for a manufacturing business in New Zealand, Durden et al. (2008) found that the social responsibility goals of the organisation were not clearly defined. Thus, social responsibility was not completely integrated into EMCS, and the ways through which it should be measured and monitored remains uncertain. With respect to complexities in the measurement and management of environmental performance, Virtanen et al. (2013) found that the significant challenges are due to the technical difficulties in constructing and using

the measurement, particularly the difficulties in understanding the environmental KPI employed.

External drivers may have positive effects on the adoption of EMCS. Journeault et al. (2018) examined several factors that may explain the reasons for the adoption of EMCS within organisations. The results showed that competitive motivations, ethical motivations, stakeholder pressure, size, and environmental exposure influence the adoption of EMCS practice. These results confirmed the influence of various factors on eco-control practice deployment. Organisations that are highly motivated by competitive and ethical considerations face the highest stakeholder pressure, experience the most environmental exposure and adopt eco-control practices to the greatest extent.

2.5.2 Consequences of environmental management control system

An increasing number of studies addresses consequences of environmental management control system from various theoretical approaches and data collection methods. The empirical study concentrated on the link between specific features or elements of an environmental management control system and outcome variables represented primarily by environmental, financial, or economic performance. The research question referred in this theme is whether the implementation of different systems for environmental management control system has influenced a company's environmental profile and impacted its competitiveness through improved environmental performance.

A considerable number of academics were found to be strongly believe in the effectiveness of EMCS to performance. Several studies analyse the link between EMCS and environmental performance at the firm level. For instance, Epstein and Wisner (2005) discussed the five elements of EMCS and their impact on environmental performance using data from 236 cross-sections in Mexican industrial facilities operating in four major industry groups. The study result shows that stronger environmental performance is significantly linked with EMCS practice (planning, management commitment, belief systems, rewards and measurement systems). Similarly, Gadenne et al. (2012) report, for a sample of 314 Australian firms, a positive association between the usage of environmental management practices and environmental performance of the firm. At the employee level,

Latan et al., (2018) examine the effect of combination environmental uncertainty and top management commitment, along with the focus on the responsibility EMCS, on environmental performance. The result shows a significant relationship between the variables and supports the fact of how firms attested by ISO 14001 in Indonesia should improve their environmental performance by implementing improving top management commitment to the environment and using EMCS tools. Spencer et al.. (2013) support that top management commitment to EMCS is powerful for improving environmental performance. In contrast, Russo and Harrison (2005) have not found a significant relationship between the degree of environmental manager participation in strategic processes and environmental performance in a study of electronics factories in the United States. Similarly, Wisner et al. (2010) found no direct relationship between EMCS and environmental performance; instead, they reported an indirect relationship mediated by the type of environmental strategy employed by the organization.

Another group of researchers has been looking into the relationship between interactive control system elements and environmental performance intervention (Wisner et al., 2006), as well as the multifaceted need of interactive control systems in environmentally proactive businesses (Renaud, 2011). Wisner et al., (2006) examined at how three elements of interactive control systems (strategic planning, management commitment, and proactivity) were related to environmental performance activities using Simons' levers of control framework. The authors discovered that management commitment influenced planning, which in turn influenced proactive decision-making in organisations with an explicit interest in controlling environmental efficiency. This fruitful alignment resulted in improved environmental and financial efficiency. Renaud (2011), on the other hand, looked at how digital control systems are implemented in environmentally conscious businesses. The author discovered that interactive control systems had been used to improve vertical communication between top managers, middle managers, and employees, as well as transversal communication among members of different business units or functions and external communication with stakeholders.

Intangible resources have also been studied as potential consequences of EMCS. Perez et al., (2007) reported that, in their case study, environmental management controls fostered

the development of intangible assets through various catalysts for change. Ferreira et al., (2010), however, investigated the effect of environmental management accounting on innovation; they found no relationship between EMA use and product or process innovation.

Few papers focusing on the link between EMCS and both environmental /economic or financial performance. For example, in their work, Judge and Douglas (1998) conducted a cross-sectional survey of US firms to look at environmental considerations in the strategic planning phase as one form of management control system Their findings show that there is a relation between the level of strategic planning consideration and financial and environmental results. Similarly, in an online survey of 249 manufacturing organizations in Canada, Journeault et al., (2016) found a positive relationship between the adoption of the levers of an EMCS in an organization and environmental performance of that organization and the adoption of an EMCS reflected an organization's environmental strategy for reducing their impacts on environments. In contrast, Henri and Journeault (2010) analysed the impact of EMCS on environment and economic performance; they found no significant relationship between EMCS and economic performance. Furthermore, the study concluded that economic performance might be improved through environmental performance. Interestingly, Abdel-Maksoud et al, (2020) found the same result. The author investigates the direct relationship between EMCS and environmental and economic performance; he found significant direct relations with both operational and non-operational environmental performance but not with economic performance.

Three studies in the literature applied a longitudinal study; Henri, Journeault, and Brousseau (2017) examined the relationship between EMCS change and environmental performance among 78 manufacturing organizations in Canada at two points in time, 2005 and 2010. The study focused on EMCS change in three areas, which were the scope of change, the scale of change and the direction of change. The study concluded that changes leading to increased importance that was given to EMCS within an organization contributed positively to environmental performance, and concerted changes in all facets of the mixture of eco-controls contributed more to environmental performance than piecemeal changes on specific aspects of the mixture did. Hartmann and Vachon (2018)

used data from European firms covers an 11-year period; the result indicates that the relationship between EMCS and performance are moderating by the firm's industry context. Where they confirm that munificence as a component of industry context improve the relationship. Therefore, the relative abundance of slack resources often associated with a munificent context can generate more effective environmental management techniques or technologies. Which in turn can interact with environmental management for better environmental performance. However, Ambarwati et al., (2020) examine the effect of eco control on the disclosure of carbon emissions and examine the effect of disclosure of carbon emissions on economic consequences at four points in time, namely (2013-2016). The Authors conclude that companies that have a great concern for the environment will carry out carbon emissions due to operational activities in their annual reports. On the other hand, their effect on the bid-ask spread is negative, where the more carbon information in the annual report, it will reduce data asymmetry and bid-ask spread.

Table 2. 2: the key current empirical work on EMCS

NO	AUTHOR	COUNTRY	THEORY	METHOD	Research focus	FINDINGS	FURTHER RESEARCH
1	Spencer et al (2013)	Australia	contingency theory	Quantitative (Questionnaire)	examine the antecedent factor, top management's commitment to environmental sustainability and their effect on performance	Organisations with high commitment to environmental sustainability tend to adopt EMCS top management commitment was associated with the EMCS	the sample size in study was insufficient to undertake covariance-based structural equation modelling techniques
2	Judge et al(1998)	US	NRBV	Quantitative (Questionnaire)	investigate the consideration of environmental aspects in the strategic planning process as one type of management control practice and their effect on performance	positive relationships between level of integration of environmental issues into the strategic planning process and both financial and environmental performance	the author used sample that have appointed environmental officers, consequently, the generalizability of the study is limited by the sampling frame used

3	Latan et al 2018	Indonesia	NRBV	Quantitative (Questionnaire)	Investigation the effect of the combination of organizational resources such as intangible assets in order to continuously improve environmental performance	positive and significant influence between those resources on the use of EMA, which in turn can improve the environmental performance of companies	only considers the use of EMCS as a driving force to improve the environmental performance of companies, without examining the role of EMCS or environmental information system.
4	Journeault et al.2016	Canada	Eco-efficiency	Questionnaire	Investigation the impact of adoption eco-control system on environmental performance	found a positive relationship between the adoption of the levers of an eco-control system in an organization	investigated one dimension of the diagnostic and interactive levers, namely the use of EPIs.
5	Epstein and Wisner (2005)	Mexico	management control theory	Quantitative (Questionnaire	test the association between management control elements and extent of environmental compliance	Significant relationship between five elements and environmental compliance	the data were self-report measures, which are subject to perceptual and bias errors
6	Hartmann and Vachon (2018)	European firms	contingent resource-based view	Questionnaire	investigate whether and to what extent a firm's industry context influences the linkage between environmental management and environmental performance	munificence as a component of industry context improve the relationship,	
7	Journeault, and Brousseau(2017)	Canada		Questionnaire	The extent of change of EMCS of environmental performance	changes leading to increased importance that was given to EMCS within an organization contributed positively to environmental performance	does not investigate all the potential components of the mix of ecocontrol

2.5.3 Gaps in EMCS research

This chapter has presented a state-of-the-art overview that has organised and consolidated the disparate literature on EMCS research up to this stage. The adoption, implementation, and consequences of EMCS were described as two major themes in the study, which are partially interrelated. As a result, the literature was discussed and analysed along these lines, and the results revealed various flaws in the previous empirical study.

Figure 2.2 summarises the conceptual map of EMCS research that holistically incorporates the adoption, implementation and performance outcomes of EMCS research examined in the literature. The most of current research had examine internal and external antecedent for example, management commitment, rewards and punishment, type of industry, ethical motivation, etc. In addition, the researcher confirms that adoption EMCS will require the organization to update their role regard cost, company strategy performance measurement and skills. Finally, the researcher studied for types of consequence which are, environmental performance, financial performance, economic performance and intangible resources. The remainder of this section, however, addresses gaps related to the performance implications (theme 2).

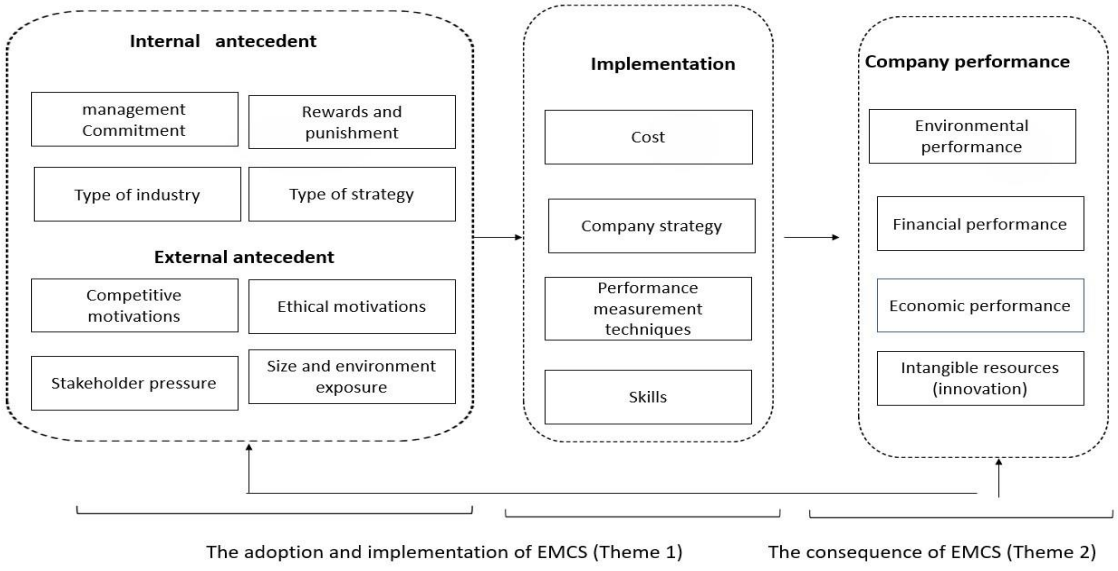


Figure 2. 2: Conceptual framework of EMCS research

Source: Developed by the author

Despite the previous and more recent contributions towards a better understanding of the benefits associated with EMCS, an in-depth assessment of the extant literature reveals several limitations.

Firstly, prior research considers environmental and financial performance improvement to be the ultimate goals of the implementation of EMCS. However, while several attempts have been made to examine the impact of EMCS on environmental or financial performance (e.g. Spencer et al., 2013; Abdel-Maksoud et al, 2020), attempts to examine its impact on both environmental and financial performance are rare (Wisner et al.,2006, Douglas 1998, Journeault, and Brousseau 2017). Only three studies (Abdel-Maksoud et al., 2020, Henri and Journeault 2010, Journeault et al., 2016) have explicitly attempted to examine both performances.

Secondly, the majority of the current research on EMCS- performance has focused on particular elements of EMCS, mostly measurement systems, planning and administrative control, but rarely examined different elements or referred to existing MCS framework, only two studies (Wisner et al.,2006, Renaud, 2011, Ferreira et al. 2010) used an established MCS framework, namely Simons' (1995) levers of control framework, simultaneously which results in an inadequate insight regarding the real impact of EMCS on performance. However, as case study findings have to be treated carefully in terms of generalizability, it would be useful to applied Malmi and Brown's (2008) for exploring how MCS elements are configured as a package to improve the performance.

Thirdly, the difficulty of generalizing the results of EMCS research in another context based on several reasons. Most EMCS research restricted with small samples covering limited industries. Research from Western countries dominates the EMCS literature with a relative dearth of researches from non-Western countries. Thus, there is a need for conducting other studies on the EMCS that include data from other parts of the world. In particular, Jordan, for example, has cultures that are distinct from Western countries.

Fourthly, the current literature has provided inconclusive results of the impact of EMCS on environmental and financial performance. For example, Henri and Journeault (2010) analyse the influence of EMCS on environmental and economic performance, and he did not find a significant relationship between EMCS and economic performance. Also, Wisner et al. (2010) found no direct relationship between EMCS and environmental performance; in contrast, Gadenne et al. (2012) report, for a sample of 314 Australian firms, a positive relationship between the use of environmental management practices and a firm's environmental performance. Nevertheless, the mixed results concerning the direct relationship between EMCS and performance highlights the urgent need for deeper investigations, including consideration of possible mediating variables.

It seems that research on EMCS thus far has been somewhat arbitrary when it comes to theoretical foundations. Also, references to broader theories are rather rare in the empirical literature. Given the important role of particular theories, such as the resource-based view, for research in the field of organizations and the environment (e.g., Endrikat et al., 2014), it is interesting to note that this theoretical approach has been used only to a limited extent. This research adopts the resource-based view theory, with its focus on internal resources and capabilities (organization culture and environmental proactivity), may provide a particularly useful perspective on EMCS and has been extensively used in other empirical studies, especially in the field of strategic management (Newbert, 2007). Therefore, stronger theoretical support is necessary for the concept of EMCS, as well as to explain how it impacts environmental and financial performance (Baker et al., 2011). This study aims to fill this gap by examining the mediating effect of environmental capabilities (organization culture, environmental proactivity) on the relationship between EMCS and environmental, financial performance.

2.6 Environmental capabilities

2.6.1 Organisational culture

Organisational culture, which is an organisational phenomenon identified in the early 20th century, has garnered attention from researchers in recent decades. Despite having over

150 definitions in the existing literature (Kroeber and Kluchholn, 1952), scholars have not established a standard definition for the term.

Culture is mainly perceived as a structure with elements similar among individuals (Broms and Gahmberg, 1983; Schwartz and Davis, 1981; Bate, 1984; Posner et al., 1985; Lorsch, 1985; Trice, 1985). It comprises the common beliefs of members within a group (Schein, 1992). Culture has also been described as a collective experience of individuals in a system with shared concepts, standards, principles and consciousness (Pettigrew, 1979; Trice and Beyer, 1993; Hatch and Cunliffe, 2006). Overall, it involves the values and practices shared by a group.

Researchers have highlighted the several types and implied facets of organisational culture. Alvesson (2000) defined it as an ideational concept involving interpretation, perception, ideology, cognition and other abstract aspects. In addition, organisational culture is more integrated, involves the interaction of individuals and deals with emotions instead of mainly using reason and logic. Meyerson (1991) claimed that culture depicts the subjective aspect of humans. In organisations, culture has also been recognised as a pattern of cognitive processes (Weick, 1979). The organisation and its invisible characteristics, that is, principles, ideologies, expectations and meanings, are the main factors that define culture (Trice and Beyer, 1993).

Scholars have identified multiple variations of culture in terms of the functionalist perspective of organisational culture, which are characterised by their distinct features (Ashkanasy et al., 2000; Hofstede, 1980). These types of culture have been created over time. For instance, organisations are traditionally understood to be bureaucratic and hierarchical, which focus on the internal processes within the culture.

The current study uses the competing values framework (CVF) (Cameron and Quinn, 1999) to measure organisational culture. The next section provides definitions for the four types of culture.

2.6.1.1 Competing Values Framework Approach to Organisational Culture

The competing values approach was constructed by Quinn and Rohrbaugh (1981). It eventually developed into the CVF after the improvements made by Cameron and Quinn

(1999). Quinn and Rohbaugh (1981) aimed to create a stable model that presents opposing perspectives regarding effectiveness. The model has four criteria for effectiveness, namely, human relations, open system, internal process and rational goal models. Cameron and Quinn (1999) later formed a scheme with four types of organisational culture. These categories are in line with the criteria for organisational effectiveness, which are then used to analyse various approaches in which organisations function.

The four types of culture in the CVF and their basic characteristics will be illustrated and discussed in the following section.

2.6.1.2 Hierarchy Culture

Hierarchy culture promotes an environment that is stable, predictable, efficient and harmonious. In an efficient organisation, the staff are motivated through security, order, procedures, rules and regulations (Quinn and Spreitzer, 1991). Therefore, leaders within this culture facilitate a team that is systematic, organised and cautious. Organisations succeed through dependable delivery, smooth scheduling and low cost. Moreover, the effectiveness of organisations relies upon formal rules and policies. Organisations adhering to a hierarchical culture aim for long-term stability, performance and efficient and smooth operations (Cameron and Quinn, 1999).

2.6.1.3 Market Culture

Market culture involves the accomplishments, competitiveness, external satisfaction and efficiency of a firm. Leaders are authoritative and crucial figures that prioritise the achievement of goals and outcomes (Cameron and Quinn, 2011; Ferreira, 2014). In this rational system that emphasises competitive actions, the staff are motivated by measurable goals and targets that they need to reach. Moreover, market share and penetration are the aspects that define success in market culture (Quinn and Spreitzer, 1991).

In the late 1960s, companies explored new avenues for competition, which in turn increased the popularity of market culture. In this form of culture, the organisation is the market itself, as it is related to the external environment. Hence, firms concentrate on transactions with suppliers, customers, contractors, licensees, unions and regulators. Market culture assumes that external factors are hostile. In addition, consumers are

discerning and generally seek value. The competitive advantage of an organisation that is market-oriented increases in an environment where customers have control over their purchase selection. Moreover, the organisation perceives that its profitability improves through clear objectives and assertive strategies (Cameron and Quinn, 1999).

2.6.1.4 Clan Culture

Clan culture highlights the members' teamwork, loyalty, trust and support within a firm (Demir et al., 2011). Hence, an organisation is similar to an extended family. Organisations that lean towards clan culture advocate the development of their members. Moreover, they are concerned with the rules and regulations of hierarchies and the competitiveness of markets. These organisations also take into account open culture as well as the risk-taking and the experimentation that come along with it. The goal of leaders and managers under this type of culture is to encourage staff and stimulate their participation, commitment and loyalty. Therefore, the employees perceive their leaders as mentors or parents. In addition, the staff are incentivised as a team rather than as individuals. The management is also open to suggestions from the staff regarding methods for work development. At the same time, this culture stresses the external aspects of employees and organisational performance (Cameron and Quinn, 2011).

2.6.1.5 Adhocracy Culture

Adhocracy culture promotes flexibility, change and openness. It urges members to grow rapidly, be creative, innovate, experiment and take risks (Hartnell et al., 2011). In such a culture, leaders are risk-taking visionaries that push for innovations. In addition, the staff and their success are fostered through their individual fulfilment, resourcefulness and independence, which in turn encourage an enterprising and creative mindset among the employees. Innovation is valuable in organisations that promote this type of culture. It is perceived as the innate capacity to create resources and garner high yields, which is in contrast to the characteristic of cultures that are more traditional and lean towards processes, authority, hierarchy and shared cooperation (Cameron and Quinn, 2011).

2.6.1.6 Organisational Culture as a Competitive Advantage

Numerous researchers have claimed that intangible assets, with organisational culture being one example, are among the most substantial forms of sustainable competitive advantages (Barney, 1986; Chan et al., 2004; Muratovic, 2013). Competitive advantage is enhanced through an organisation's actions (Muratovic, 2013). Moreover, this advantage mainly comes from the culture of the company, as it directs the values and norms of a company through activities. Given the difficulty to replicate organisational culture, this structure is crucial to competitive advantage (Smart and Wolfe, 2000). As such, organisational resources, such as culture, directly affect the development of sustainable advantage, whereas the physical and human resources in organisations do not provide a competitive edge.

Organisational culture can bolster a company's competitive advantage, the performance of employees and their productivity (Tharp, 2009). Organisations can surpass their competitors by maximising their edge (Muratovic, 2013). For example, the artfulness of an organisation can be beneficial because its staff can adapt to changing circumstances more rapidly and effectively than its competitors. Hence, such advantages create opportunities that only the company possesses, thus beating other firms (Muratovic, 2013). According to Barney (1986), competitive advantage is attained through the value and distinctiveness of the organisational culture of a company. To achieve its best overall performance, the organisation must form feasible strategies to maintain its advantage. These assets can then benefit the organisation (Muratovic, 2013).

A sustainable competitive advantage can be created by a resource that has value and is unique to a company; moreover, the resource must be difficult to replicate and replace (Chan et al., 2004). An organisation's adaptability, flexibility to upgrade and ability to renew resources influence how the firm sustains its edge. To have a feasible competitive advantage, an organisation must ensure that the circumstances in which it creates assets that are exclusive to the firm can efficiently and continually enhance the firm's value. Moreover, competitors must have difficulty imitating these assets.

Organisational culture is the most crucial factor in achieving competitive advantage (Chan et al., 2004; Smart & Wolfe, 2000; and Uddin et al., 2013). For instance, Chan et al. (2004) viewed organisational culture as a valuable resource. Moreover, a firm's competitive advantage may primarily stem from individuals and their interactions. For example, given that organisations have their own recognisable culture, a company that is able to cultivate values within its culture has a sustainable edge over other firms.

2.6.7 Organisational Culture and Performance

Organisational culture and performance have been at the forefront of studies on organisation and management, with the number of relevant publications considerably rising from the 1980s to the present. Thus, a solid empirical foundation has been established on this topic. The literature indicates that research on organisational culture and performance are no longer constrained within certain countries wherein the primary research was carried out, such as the USA and the UK. In recent years, studies from Western and Eastern countries have also emerged. Given these developments, research on the matter can help organisations increase their performance by aligning it with the firm's culture (Xenikou and Simosi, 2006; Mannion et al., 2005c; Taylor, 2014).

Despite the research on culture and performance becoming specialised (Sackman, 2011), numerous researchers have merely investigated the direct connection between culture and performance (Jing et al. 2011; Chan et al., 2004; Karim et al., 2010; Tsui et al., 2006; Nazir and Lone, 2008; Van Bentum and Stone, 2005; Uzkurt et al., 2013). Gordon and DiTomaso (1992) and Denison and Mishra (1995) determined a positive correlation between a strong culture and short-term financial performance. Meanwhile, research has shown that culture with 'adaptive values' has more significant long-term effects on the development of an organisation's performance than short-term impacts (Kotter and Heskett, 1992). For instance, Karim (2010) investigated Zain, a telecom company in Jordan. In the study, the researcher observed how corporate culture influences the financial performance of the firm. The survey gathered information from 50 employees regarding the various dimensions of organisational culture. Then, the analysis of the data presented the constructive impacts of corporate culture on the financial results of the firm and other indices for effectiveness. In another study, Jing et al. (2011) conducted a survey on small

businesses using an organisational climate questionnaire (OCQ) to examine the link between organisational climate and performance. The authors observed that small and large firms react differently to the climate in terms of firm performance. Another study facilitated a survey among 154 branches of major banks in Turkey to explore organisational culture and performance in the banking sector; then, the authors evaluated the inter-connection among these banks in terms of organisational culture (Uzkurt et al., 2013). As culture affects performance, the nature of organisational culture can be used as a basis for demonstrating and evaluating the suitability and the outcomes of reforms. Moreover, variations in the culture of organisations in industrialised and developing countries substantially influence organisational performance (Ates, 2004).

Numerous studies have also examined the correlations among specific types of culture and their combined effect on performance. For instance, some of these studies have looked into market culture and innovation, the quality of service and the satisfaction of the staff (Lee et al., 2004; Hamborg and Pflesser, 2000; Akroush et al., 2015). Meanwhile, other studies have explored the innovative culture and market-oriented performance and internal efficiency (Park et al., 2016; O'Cass and Ngo, 2007). The correlations and effects of learning culture and financial and non-financial performance and knowledge performance have also been studied in the literature (Skerlavaj et al., 2007; Song and Kolb, 2012).

CVF has been widely used to investigate the link between organisational culture and performance. A study by Deshpande et al. (1993) examined various types of organisational culture derived from CVF to determine the impact of organisational culture, innovation and customer orientation on the performances of 50 firms in Japan. Their research revealed that the market culture's emphasis on the competitive edge and the firm's superiority in the market provides the most optimal results. Hence, this culture has a substantial influence on organisational performance. In a hierarchy culture, the organisational performance is substandard because the culture prioritises bureaucracy. Moreover, the study found that adhocracy, which highlights innovation and risk-taking, fosters a more desirable organisational performance than clan culture. In another work, Prajogo and McDermott (2011) examined 194 middle and senior managers of firms in Australia and identified

adhocracy (developmental) culture as the only strong factor that predicts the performance for these firms.

Instead of merely exploring the correlations between culture and performance, studies have recently examined the links between various cultures and performance in organisations as these firms adopt different types of values. In a study on the Public Institutions of Higher Education in Malaysia, Hussein et al. (2016) pointed out how the learning culture of an organisation improves the performance of the firm. In a similar work, 443 municipalities in the Netherlands showed that a result-oriented culture positively affects a firm's performance (Verbeeten and Spekle, 2015). Meanwhile, Acar and Acar's (2014) research on the Turkish health sector indicated a positive correlation between hierarchy culture and the performance of an organisation.

Jacobs et al. (2013) studied acute hospitals in England (NHS Trusts) using the CVF model to observe the link between the culture and performance of the senior management team. They used probity and multinomial logit models to assess how the culture of a hospital affects its performance. The study emphasised the cross-sectional links between culture and performance and how only a number of these relationships are sustained in the long run. Organisational culture was found to change over time on the basis of the constant and predictable organisational characteristics and customary measures of performance.

Deshpandé and Farley (2004) explored the impacts of market orientation, organisational culture and innovativeness on the performance of firms. They found that the national cultures of the countries they examined substantially affected the variables of their study (i.e. adhocracy, market, organisational culture, hierarchy, organisational climate, innovativeness, market orientation and performance). In addition, their study revealed that market orientation and innovativeness are implicit measurable indicators of organisational culture after concluding that open organisational cultures (market and adhocracy), robust market orientation and innovativeness constructively impact organisational performance.

Similarly, Acar and Acar (2012) assessed organisational culture and innovation in the healthcare industry and the roles of these aspects in the performance of organisations. Organisational focus and dynamism shape a cooperative clan culture, while hierarchy

culture, which emphasises control, is manifested through the factors of internal organisational focus and consistency. Meanwhile, the consistency and control of firms foster a competitive market culture among success-centric organisations. In addition, adhocracy culture, which is characterised as a culture that cultivates entrepreneurship, adaptability, innovativeness, and creativity, focuses on the firm's external orientation and self-motivated organisational structure.

2.6.2 Environmental proactivity

Environmental proactivity emerged from the management literature, with publications from Aragón-Correa (1998), Berry and Rondinelli (1998) and Sharma and Vredenburg (1998). It refers to firms' tendencies to adopt environmental protection strategies that exceed the standards of legislation and the industry. For example, Sharma and Vredenburg (1998) believed that a firm is environmentally proactive if it presents 'a consistent pattern of environmental practices, across all dimensions relevant to their range of activities, not required to be undertaken in Fulfilment of environmental regulations or in response to isomorphic pressures within the industry as standard business practices' (Sharma and Vredenburg, 1998). A proactive mindset towards a firm's strategies for the environment is more voluntary and anticipated rather than reactive (Aragón-Correa and Sharma, 2003; Gonza´lez-Benito and Gonza´lez-Benito, 2006; Murillo-Luna et al., 2008). It is also related to strategies on pollution prevention (Berry and Rondinelli, 1998; Aragón-Correa, 1998; Buysse and Verbeke, 2003; Aragón-Correa and Sharma, 2003). Moreover, the concept encourages the use of advanced measures in the decision-making of the management within firms (Lee and Rhee, 2007).

Environmental proactivity is characterised by the practices in planning and organisation, operation practices and communication.

(1) Planning and organisational practices delineate a company's interpretation of its environmental policies by demonstrating the growth and application of the firm's environmental management system (EMS). Through such practices, the organisation is able to present its goals in terms of environmental protection. The firm is also able to manage its practices and assess the impacts of the application of such strategies. Planning

and organisational practices also reflect the duties that have been set out by the firm for the environment. Although EMS cannot fully reduce the destruction of the environment, it can formulate logical and engineered processes that push firms to prevent further damages.

(2) Operational practices, which are categorised into product-related practices and process-related practices, indicate the changes within the firm's production and operations system that are significant in addressing issues in the environment (Sarkis, 2001). The first group of practices formulates strategies to eradicate pollution and other dangerous substances in the items produced by the firm. Hence, this category emphasises the creation of environmentally friendly products. Firms that implement product-related strategies aim to lessen the consumption of resources in production as well as in the use of the actual product. Moreover, organisations also aim to outline processes that aid in disassembly, which includes the reusability, recyclability and remanufacturing of products (Sarkis, 1998). Meanwhile, process-related practices deal with the strategies used in the operation of organisations. Methods developed and implemented in the firms' manufacturing, and operations are more concerned about the environment. These strategies influence the internal decision-making within firms, as well as reversing, curbing (e.g. emission filters or waste separation and preparation) and impeding (e.g. use of renewable energy or clean technologies) damages to the environment. In addition, organisations work with other components within the value chain and acquire ecological products to be used for external activities, as well as for supply and distribution processes. Hence, firms select their suppliers on the basis of a certain number of criteria regarding environmental performance. Moreover, companies within this group also integrate shipment logistics for smoother transportation. They also opt for reusable or recyclable materials for packaging and implement systems for the recovery and recycling of products (Sarkis, 1998).

(3) Communicational practices aid companies in disseminating information on the environmental strategies of firms. Amidst the rising demand for transparency on the firms' social responsibility, companies have been led to divulge reports on their environmental and social contributions in addition to their financial performance (Waddock et al., 2003). Moreover, firms push commercial objectives and form friendly relationships with their stakeholders. In turn, stakeholders acknowledge such practices, which to some extent

strongly influence the stakeholders' views on the organisations' environmental performance. Although communicational practices reflect firms' commitment to the environment, such as diminishing their emissions and consumption of resources (e.g. Aragón-Correa, 1998; Florida and Davison, 2001), these practices ultimately do not enhance the actual environmental performance of firms.

2.6.2.1 Environmental proactivity as a competitive advantage

Several researchers demonstrated how enhancing environmental proactivity benefits firms. For instance, Aragón-Correa (1998) used the competitive advantages of environmental proactivity to describe the positive effects of such practice. Moreover, this behaviour facilitates the environment and firms in some scenarios (King and Lenox, 2001), as well as the companies' performance and marketing strategies (González-Benito, 2005). The benefits of environmental proactivity include the reduction of waste, a decrease of costs, an increase in the satisfaction of customers, improvement of products and enhanced public relations (Gadenne et al., 2009). Research in recent years has also indicated that environmental proactivity aids internationalisation (Martín-Tapia et al., 2010) and enhances the financial resources of companies (Clarkson et al., 2011). Meanwhile, other researchers have probed the connection between environmentally friendly management techniques and value creation. One study established that companies experience changes after obtaining certification under the ISO 14001 (the environmental management standards of the International Organization for Standardization), thus benefitting the firms (Rondinelli and Vastag, 2000). Similarly, an extended study on the industrial sector in the US revealed that ISO 14001 certification provides companies with certain rewards (Melnyk et al., 2003). This trend is consistent within the food industry in Spain (Segarra et al., 2011). Another study in Spain formulated a theoretical framework that urges the government to minimise taxes on companies with favourable environmental practices and to reinforce its authority over industries that heavily emit pollution (Rivas and Magadán, 2010).

2.6.2.2 Environmental proactivity and performance

Studies usually frame green management within several practices that implement environmental strategies (Sharma and Henriques, 2005). Firms perceive the opportunities in the environment and thus implement proactive measures to protect nature (Sharma, 2000). The field of general business and strategy has used the term 'proactive' to define the various reactions of firms with regard to their circumstances (Aragón-Correa, 1998). For instance, the approaches of organisations in addressing environmental protection causes variations in the strategies they implement.

Environmental proactivity entails voluntarily taking and cultivating measures that surpass current environmental regulations. One such example of these measures is the firms' initiative to curb emissions. Firms may even overhaul products and systems altogether (Hart, 1995), recalibrate their strategies (Sharma and Henriques, 2005) and be at the forefront of the industry or society to reshape the behavioural patterns of the firms (Guenster et al., 2011).

From a business perspective that compels organisations to develop and innovate, environmental proactivity helps firms recognise and maximise potential economic opportunities (Gupta, 1995; Guenster et al., 2011). In turn, creating strategies to promote such proactivity encourages firms to protect the environment (Aragón-Correa, 1998). The literature on business strategies has expounded on the various roles of environmental proactivity, thus depicting the advantages and disadvantages of such behaviour. On the one hand, proactive organisations increase their financial investments for the sake of their environmental performance (Russo and Fouts, 1997; Hart and Ahuja, 1996).

On the other hand, a firm's RBV, which is corroborated by sound empirical evidence, accounts for the link between the firm's environmental proactivity and the improvement of its financial and environmental performance (Sharma and Vredenburg, 1998; Lo´pez-Gamero et al., 2009; Clarkson et al., 2011; Guenster et al., 2011). A firm's assets and competence can be improved by practicing environmental proactivity. Moreover, this practice can help a company boost its image, sway policies, attract stakeholders, innovate and participate in gain capabilities based on knowledge (Russo and Fouts, 1997; Hart,

1995; Sharma and Vredenburg, 1998; Willard, 2005; Christmann, 2000). Consequently, companies can acquire a competitive edge and first-mover advantages through such enhancements and through the dynamic and forward-looking search for new opportunities in the environment (Hart, 1995; Clarkson et al., 2011; Nehrt, 1998). These capabilities stem from the distinct mechanisms and variations in the firm's framework that improves environmental performance (Aragón-Correa and Sharma, 2003). Given that environmental practices or technologies are gradually acquired over time, first movers have the edge in surpassing firms who are still struggling to adopt new technologies.

The capabilities developed by proactive firms allow these environmental organisations to maximise their resources. These characteristics also minimise threats by mitigating emissions, fostering a firm's distinct position in the market and initiate innovations for the environment (Willard, 2005). As proactive firms have developed a unique system, other organisations that are not environmentally driven have difficulty imitating the capabilities developed by these dynamic firms (Clarkson et al., 2011; Aragón-Correa and Sharma, 2003).

In practicing environmental proactivity, firms require the complex coordination of several skills and resources of organisations to decrease environmental hazards and sustain or enhance their competitiveness (Guenster et al., 2011; Sharma and Vredenburg, 1996). Hence, a strategy known as organisational competence requires changes in the processes and management of firms (Christmann, 2000; Hart, 1995; Guenster et al., 2011; Murillo-Luna et al., 2008) which outweigh the costs and risks of methodically implementing measures for environmental protection that go beyond what is prescribed by the law. The negative effects of proactivity are apparent in the performance of firm policies in the short term. However, the benefits that can be gained through such practices emerge gradually. Meanwhile, reduction in costs is achieved through learning by doing and economies of scale, which can be observed in the middle term. As new practices are established, threats to firm policies are managed more effectively.

2.7 Performance measurement systems (PMS)

Global competition has rapidly increased because of the changes in technology and the diversification of products in recent years. Consequently, various organisations worldwide

perceive the continuous development of firm performance as a strategic and competitive requirement. Hence, the assessment, management and enhancement of business processes have been extensively conducted through performance measures; doing so has helped the sustainability and improvement of the competitive edge of firms (Ghalayini and Noble, 1996).

Performance measurement systems (PMS) are the tools that measure an organisation's actions (Neely, Gregory and Platts, 2005). Performance measurement effectively cultivates a firm's competitive advantage, productivity and profitability, which can be used to gauge the strengths and weaknesses of the firm through the most appropriate single or multiple measures (Tangen, 2003). To gain a long-term view of the situation, managers can apply the correct performance strategies and delegate the company's resources to activities that most effectively improve the firm.

Performance measurement has been classified as follows. Firstly, hard performance measurements, or 'traditional performance measures', are based on management accounting systems, such as financial outcomes, including return on assets (ROA), return on sales (ROS), market share sales growth, stock price performance and other financial ratios (Pearce et al., 1987; Pearce et al., 1987; Ansoff et al., 1970). Measures for profit, such as ROA and ROS, assess the efficiency of the organisation's operations, while growth measures, such as those for sales, evaluate the capability of an organisation to expand to new markets (Brews and Tucci, 2004).

Secondly, soft measures of performance include process innovation, learning and customer satisfaction (Subramanian and Nilakanta, 1996). Objective measurements look into data on profit and finances, while subjective measurements depend on assessments of the management. Respondents' ranking of companies within the industry as a whole is reflected in subjective measurements (Brews and Hunt, 1999). Alternatively, such estimations use the views of respondents regarding their organisation's prevailing profitability, quality and social reactions (Hart and Banbury, 1994).

We used a subjective instrument to measure the financial and environmental performance for various reasons, which will be explained in the succeeding sections of this research.

2.7.1 Environmental performance

In the emergence of issues on the environment, the term environmental performance has been widely used in recent decades. It is generally defined as the measurable results of a firm's environmental management (ISO, 2004). Tibor and Feldman (1996) expanded this description by defining environmental performance as the phase in which organisations are trained to handle the firms' activities, threats and crucial environmental impacts; moreover, this performance includes the factors that can be assessed on the basis of the environmental actions, goods and services of the management.

Various EP measures are used in empirical research. James (1994) categorised these measures into the process, resource consumption, emission and waste, efficiency, risk, ecological impact, consumer perception and financial impact. Meanwhile, Bartolomeo (1995) executed a more systematic strategy by differentiating the indicators for performance and impact. Performance indicators are rooted in procedures (efficient use of raw materials), frameworks (effectiveness in achieving ecoefficiency targets) and even financial attributes (economic efficiency in implementing environmental programs). Meanwhile, impact indicators assess the physical and financial aspects of environmental impacts. Schultze and Trommer (2012) categorised these indicators on the basis of Günther et al. (2004), Jung et al. (2001), who divided the measures into strategic and operational groups. The first category evaluates the firm's views and aims towards environmental responsibility, as well as environmental information systems and environmental management systems (EMS). These measures were further separated into four correlated subcategories, namely, input, process, output and outcome measures (Jung et al., 2001).

Operational EP measures consist of the indicators for the short-term initiatives to improve the environment (Günther et al. 2004). It also looks into the raw materials, water, energy and land consumed by firms (Wagner 2005b), as well as the actions that diminish the organisations' effects on the environment. In addition, the different methods to mitigate pollution, such as the prevention of waste, treatment and transfer, are also gauged (King and Lenox, 2002). The recycling quota of hazardous waste has also been used as an indicator (Al-Tuwaijri et al., 2004). Some studies have also applied financial indicators,

including the use of new pollution control technology by financial investments (Nehrt, 1996).

Output measures, which are widely applied in empirical research, consist of numerous indicators given that the outputs of firms have various effects on the environment. These indicators are usually measured using physical units (e.g., the release of carbon dioxide in parts per million, accumulated waste in tonnes, use of freshwater in cubic metres and size of land in hectares). However, they usually range within the volume of the production. A large amount of information on the toxic release inventory (TRI) is available, as data on toxic waste emissions are widely accessible to the public (e.g., King and Lenox 2002; Konar and Cohen 2001; Cordeiro and Sarkis 1997; Hart and Ahuja 1996; King and Lenox 2002 Griffin and Mahon 1997; Bhat 1999; Konar and Cohen 2001; Clarkson et al. 2011; King and Lenox 2001).

The perception of business representatives (e.g., executives and managers) towards environmental performance are measured under the perceived performance category. Companies gather data on these viewpoints through surveys, which use operational and strategic EP indicators (see above) and evaluate the personal views of respondents regarding certain scenarios, such as gauging the level of EP in relation to competitors (Günther et al. 2004). EP has been measured through the respondents' perception of how firms abide by environmental laws, manage activities that affect the environment and disclose their policies (Judge and Douglas, 1998). In one survey, participants were asked to indicate the tools and methods they use for environmental management (Biondi et al., 2000). Meanwhile, another survey evaluated the managers' views on energy consumption, resource utilisation and pollution prevention of their firms compared with their competitors (Karagozoglu and Lindell, 2000). Furthermore, Álvarez Gil et al. (2001) used a questionnaire with items measuring the environmental costs and savings, environmental training programs, green purchasing schemes, communication approaches, customer cooperation, energy and water-saving decisions and recycling strategies.

In this thesis, we use measures in various categories to calculate an overall ranking. As a result, the items cannot be allocated to a particular category of operational or strategic EP interventions since single criteria are insufficient to cover the complex EP construct.

2.7.2 Financial performance

Financial performance has been defined variedly in the literature. The phrase currently does not have a standard definition and measurement amidst the existing frameworks that can analyse it (Burca and Batrinca, 2014). Some scholars have used the concept with a neutral connotation, whereas other studies have explained the term extensively. Despite the numerous efforts to establish a definition for financial performance, its interpretations seem appropriate only for certain contexts (Allen and Wood, 2006). In addition, no single-target variable is able to explain financial performance fully (Houben and Kakes, 2013 and Schinasi, 2004). The Bank of England used the term 'financial stability' in 1994 to refer to financial performance. To this date, researchers have not established a widely accepted definition for the phrase (Allen and Wood, 2006). Moreover, even the concept of stability is considered imprecise and difficult to explain (Heikensten, 2004).

Financial performance, which is a significant factor in financial risk management, generally gauges the extent to which financial objectives are attained. It measures the monetary results of the plans and processes of a firm. Moreover, it comprehensively evaluates the financial status of the firm over a certain period and compares the company with firms within and beyond the industry (IAI, 2016). The financial performance of the organisation is measured through certain indicators, such as operating income, return on investment (ROI) and residual income, which are typically taken from the financial accounting system and reveal monetary information or ratios (Eldenburg and Wolcott, 2005).

Despite providing information related to the financial performance of an organisation, financial statements are not comprehensive. Therefore, they should be assessed using one or more techniques in financial analysis for a more complete overview of a firm's profitability and financial situation. For instance, ratio analysis can be applied, which is one of the most significant and generally used techniques. It uses financial ratios, which denote the numerical relationships between two or more figures that appear in financial statements or other data (Salmi and Martikainen, 1994). These ratios have five main groups, namely, profit ratios, liquidity ratios, activity ratios, leverage ratios and shareholder-return ratios, which reflect the strengths and weaknesses of a firm in multiple

financial aspects. Through this information, researchers can assess the firm's financial performance vis-à-vis the average ratio in the industry or the annual performance of the organisation (Hill and Jones, 2011).

Large firms no longer depend solely on traditional financial methods and techniques to gauge their performance (Basu, 2001). Instead, they use non-financial measures to analyse certain aspects of their performance, such as their daily operations (Maskell, 1991; Iveta, 2012). These indicators can foresee the future financial performance of a company, thus being more efficient in presenting the investment and performance of the intangible aspects of the firm (Epstein & Manzoni, 1998; Kaplan & Norton, 2004). In addition, traditional performance measures are based on traditional cost management systems that use outdated metrics and are not integrated into the firm's strategies (Ghalayini and Nobel, 1996). Moreover, these rigid and disjointed systems are difficult to implement. Thus, these measures do not enhance the old methods, thus overlooking the needs of customers. Traditional measures for financial accounting can also send ambiguous cues for the continuous improvement and innovation of organisations and fail to develop the sustainable capabilities and skills required for today's companies (Maltz et al., 2003).

Given the constraints of traditional performance measures, this study subjectively measures financial performance using an instrument with three indicators: ROI, operating profits and cash flow from operations. The respondents were asked to indicate the performance of their organisation over the past 12 months compared with their leading competitors on the basis of a five-point Likert-type scale, which range from 1 (well below average) to 5 (well above average), where a higher score signifies better financial performance. This interpretation is in line with prior research, which has demonstrated that neither objective nor subjective measures are superior in terms of consistently providing valid and reliable performance assessments. In addition, these three financial performance dimensions represent a commonly agreed list of financial competitive priorities and the main performance objectives among EMCS scholars (Journeault et al.2016, Abdel-Maksoud et al.2016).

2.8 Conclusion

This chapter outlines the areas underlying the framework proposed in this research study. It covered the area of environmental management control system, performance measurement

systems. The first theme was analysed under four subthemes: namely, the emergence of the EMCS, motivations of adopting EMCS, EMCS based on Malmi and brown, empirical literature on EMCS and identify the research gap. The second research theme was discussed environmental capabilities, and it includes two subthemes: organization culture and environmental proactivity. The last theme is performance measurement systems discussed the definition of environmental and financial performance.

Chapter three: Theoretical framework and hypotheses development

3.1 Introduction

In the previous chapter, a critical analysis of the relevant literature on environmental management control system was provided, highlighting a number of current limitations and identifying the limitations that the present research addresses. This chapter aims to address these limitations by developing a conceptual framework concerning environmental management control and environmental and financial performance through environmental capabilities by integrating Resource-based view (RBV) Theory and eco-efficiency theory. This chapter is structured as follows. The next section introduces the base model, conceptual framework and defines its associated constructs. Section 3.3 presents an overview of the theoretical perspectives that set the foundation for the conceptual framework before the research hypotheses are developed in section 3.4. A summary of the chapter is provided in section 3.5.

3.2 Derivation of the Theoretical Framework

In this section, the derivation of the framework through an evaluation of the literature (Chapter 2) and the formulation of the research gap (Section 2.5.3) is provided. Afterwards, two theoretical models are presented in detail.

3.2.1 The base model

An overview of the base model is exhibited in Figure 3.1. A study by Henri and Journeault (2010) showed that this model has a direct relationship between environmental management control system (EMCS) and environmental performance and an indirect relationship between EMCS and economic performance due to environmental performance. Henri and journealt framework provide the grounding for studying how EMCS can improve financial and environmental performance in order to achieve the goals and objectives. In particular, Henri and Journeault found that EMCS can help promote environmental performance by providing feedback and decision-making information, by focusing on the organisation's attention and through data in external reports. Specifically,

EMCS may provide feedback on differences in environmental goals. EMCS also functions as a source of data that offers support for decision-making by showing the causal relationships between environmental operations, strategies and goals, or environmental and organisational issues. Henri and Journeault found an indirect relationship between EMCS and economic performance, with environmental and economic performance having a positive and significant relationship. Moreover, their findings show that environmental performance contributes to economic performance by lowering costs and increasing revenue.

More specifically, they argued that even though initial investments could raise short term costs, operating costs can be lowered by practising ecological efficiency in different ways, such as waste reduction, energy savings, material reuse and the prospect of life cycle costs. Good environmental performance may also lower the cost of compliance and liability, as well as that of long-term risks related to resource depletion, energy cost volatility, product liability, pollution and waste management. In addition, it offers the chance to cultivate a competitive advantage and increase revenue by meeting the needs of "green" consumers. Finally, through good environmental performance, organisations have the opportunity to build up their public relations and corporate image and attain social justification that can contribute to their economic performance.

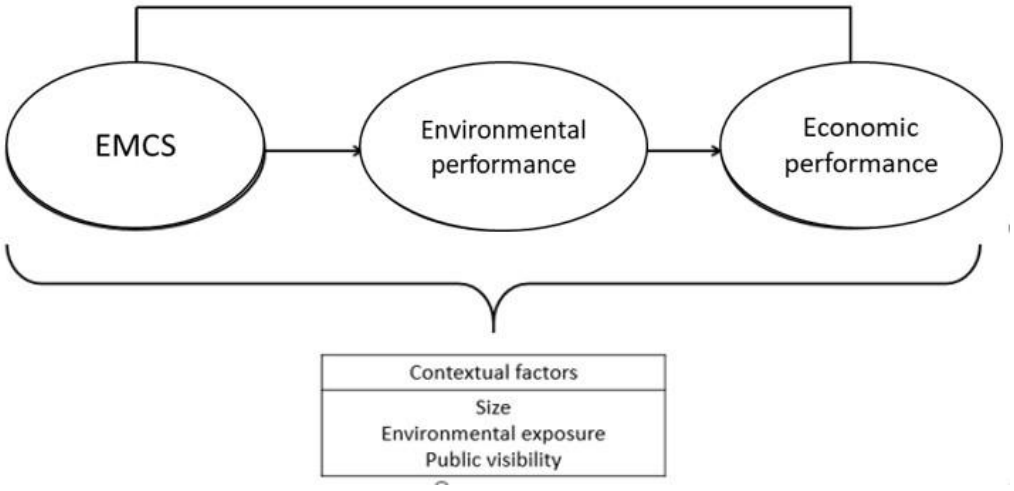
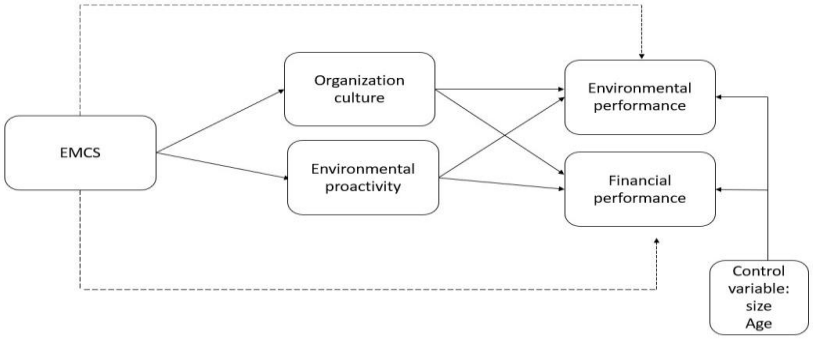


Figure 3. 1: Conceptual framework of the base model (Henri and Journeault (2010).

3.2.2 The revised model

In the base model, Henri and Journeault (2010) support the idea of the existence of direct relationships between EMCS and environmental performance. However, they did not support the existence of direct relationships between EMCS and financial performance, which is recognised as the main reason for the importance of further research in this direction. An overview of the revised model is given in Figure 3.2. This model is based on the concept that EMCS contributes to environmental capabilities, thereby improving the environmental and financial performance as a result. Therefore, the expected result is that EMCS will positively and directly affect the environmental proactivity and cultural capabilities of an organisation. EMCS is also expected to establish indirect and positive relationships between environmental and financial performance through its environmental capabilities. Moreover, with respect to the base model, the revised model controls firm size and age because of their potential associations between the two independent variables. The model includes links between these contextual factors and EMCS, environmental capabilities, environmental and financial performance. Consequently, the presented framework was initially inspired by the existing model developed by Henri and Journeault. (2010) and supported by research on the contributions of environmental proactivity and an organisation's cultural capabilities.



Source: Developed by the

Figure 3. 2: a conceptual model

3.3 Theoretical background

Two well-established theoretical perspectives—resource-based view (RBV) theory (Acedo, Barroso et al., 2006) and eco-efficiency theory—are applied in this work to address the research questions. An overview and justification for the adoption of these theoretical foundations are outlined in the following paragraphs.

3.3.1 Resources-based view theory

RBV theory is a widely accepted perspective in strategic management (Priem & Butler, 2001). It posits that the sustained competitive advantage of a firm rests upon the unique blend of its internal resources and capabilities (Wernerfelt, 1984; Barney, 1991), which can be separated as either tangible (equipment and assets) or intangible (knowledge and intellectual property) elements (Barney, 1991). These factors should be valuable to customers. Moreover, they should be difficult to imitate by other entities and nonsubstitutable ('VRIN' attributes). The firm must also be able to organise and deploy these elements effectively.

The main assumption is that the resources and internal competencies of organisations are heterogeneous, and they are not reliant on strategic positioning (Barney, 1991). RBV theory highlights the internal analysis of differences in resource endowments across firms within the same institutional context (Wernerfelt, 1984). This theory believes that the ability of organisations to acquire and develop resource/capabilities to fit their strategic intent determines the attainment of sustainable competitive advantage (Wernerfelt, 1984).

The theory also has two further assumptions. Firstly, organisations within an industry are heterogeneous (Rumelt, 1984). Secondly, resources have high mobility (Barney, 1986). Industries are believed to vary from one another because the strategic resource/capabilities of organisations are within their own control. Moreover, resources may not be entirely movable, thus lengthening the period of heterogeneity (Barney, 1991).

Resources and capabilities are explicitly defined in RBV theory. Furthermore, the theory explains how each component leads to a long-term competitive advantage. Business resources are defined as 'all assets, capabilities, organisational processes, attributes, information, the knowledge that are controlled by the organisations that enables them to

implement strategies that improve its efficiency and effectiveness' (Barney, 1991; p.101). Physical skills and financial skills are two examples of these resources (Barney, 2001). In addition, Organizational assets are often related to the concept of dynamic capabilities. Meanwhile, capabilities are described as 'the socially complex routines that determine the efficiency with which organisations physically transform inputs into outputs' (Collis, 1994; p. 145). The capabilities contributing to organisational heterogeneity are divided into three categories. The first category reflects the basic activities that the organisation can perform, such as logistics and marketing campaigns. The second type includes the capabilities with dynamic improvements to the activities of the organisation. Ultimately, this category is closely related to theoretical insights on strategies; these insights enable organisations to recognise the intrinsic value of resources and develop novel strategies to surpass competitors (Collis, 1994). The capabilities in the third category allow organisations to respond more quickly to changes in the environment. In addition, they help firms maintain their edge among other organisations. The three categories are difficult to distinguish from one another; creating an exclusive classification of capabilities is even more challenging given the abundance of capabilities in each industry (Collis, 1994).

A number of intangible resources have been analysed by researchers mainly through the use of quantitative studies. Among these resources are tacit knowledge (Berman, Down & Hill, 2002), relationships with customers (Gouthier & Schmid, 2003), reputation of the firm (Michalisin et al., 2000), human capital (Hitt, Bierman, Shimizu & Kochhar, 2001), cooperative capabilities of the members of the firm (Tyler, 2001), trust (Barney & Hansen, 1994) and information technology (Powell & Dent-Micallef, 1997). Little attention has been given to investigate organisational culture and environmental proactivity. Thus, the present study investigates the two most dominant environmental capabilities in the RBV literature. Each of these capabilities is unique, valuable, inimitable and non-substitutable factors. Thus, these elements can contribute to the firm's competitive advantage.

The RBV was found to be an appropriate theoretical perspective. In addition, the argument of the positive impact of organizational culture and environmental proactivity

on the relationship between EMCS and both environmental and financial performance is in line with the RBV's logic. In Particular, the RBV argues that environmental capabilities have the ability to help achieve a competitive advantage in the organization and, consequently, its contribution to environmental and financial performance.

3.3.2 Eco-efficiency theory

Schaltegger and Sturm (1989) were the first to discuss the idea of eco-efficiency, and the subject was then widely publicised in Changing Course (Schmidheiny 1992), a book that was published by the World Business Council for Sustainable Development (WBCSD).

The definition of eco-efficiency as given by the WBCSD is that it is 'achieved by the delivery of competitively priced goods and services that satisfy human needs and bring the quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the Earth's estimated carrying capacity. This theory suggests that the practical and theoretical significance of the concept of eco-efficiency rests on its ability to integrate performance along with two of the three axes of sustainable development; these two axes are environment and financial.

The perspective of environmental efficiency is a socioeconomic theory that disproves the traditional economic view that argues that improving environmental performance unavoidably results in increased costs and lowered productivity (Burnett and Hansen, 2008). Environmental efficiency is defined as a general goal of creating value and is achieved particularly through the reduction of costs while reducing environmental impact (Burnett and Hansen, 2008; Huppes and Ishikawa, 2005; Boiral, 2009). In other words, as one aspect of corporate sustainability (Adams and Ghaly, 2006; Dyllick and Hockerts, 2002; Young and Tilley, 2006), eco-efficiency often means producing the same or more output with reduced input to enhance financial and environmental performance. Reducing ecological impacts increases resource productivity, which then improves financial performance as a result. This view finds support through several case studies (Ditz et al., 1995; Epstein, 1996) and empirical studies (Al-Tuwaijri et al., 2004; Orlitzky et al., 2003; Hansen, 2008; Wisner et al., 2006) in accounting and environmental management literature.

This study's prediction of the positive impact of using environmental management control system on environmental and financial performance is consistent with the reasoning of eco-efficiency theory. Based on eco-efficiency, it is possible to increase the level of productivity and consequently reduce the cost while improving the environmental performance (Bebbington, 2001, Lehman, 2002). Schaltegger, 2003 argued that tracking environmental costs exposes the economic impact of improper use of environmental resources and dirty production processes. These efforts to decrease non-value-added costs contribute to the enhancement of environmental performance by reducing the effect on the environment. Reducing this ecological impact leads to increased resource productivity, which in turn can improve financial performance.

3.4 Constructs of the theoretical model

The constructs presented above in the conceptual model are identified in the following subsections.

Environmental management control system

As a specific application of management control, EMCS refer to "the formalized procedures and systems that use financial and ecological information to maintain or alter patterns in environmental activity"(Henri and Journeault, 2010, p. 64; Schaltegger and Burritt, 2000). Companies use MCS to support and adopt environmental systems as a socially and environmentally responsible entity (Gond, Grubnic, Herzig, & Moon, 2012; Songini & Pistoni, 2012). Recent work on MCS includes issues of environmental responsibility, addressing the growing need for organizations to focus on environmental Performance. (Durden, 2008; Gond et al., 2012; Henri and Journeault, 2010; Pondeville et al., 2013)

Following the work of Malmi and Brown (2008), environmental management control system includes five major categories; namely, cultural controls (composed of clans, values and symbols), planning (divided into long-range planning and action planning), cybernetic controls (in the form of budgets, financial measurement systems, non-financial measurement systems and hybrid measurement systems), rewards and compensation, and

lastly, administrative controls (governance structure, organizational structure and policies and procedures).

Environmental performance

Environmental Performance provides information to make decisions in the certain process that define environmental pollution, waste reduction, and waste disposal. The ISO defined environmental performance Council on Economic Priorities (CEP) as "the results of an organization's management of its environmental aspects".The term of environmental performance in the accounting literature has been mostly defined in terms of environmental impacts such as hazardous wastes recycled (Al-Tuwaijri et al. 2004), toxic releases (Patten, 2002), pollution-level in discharged water (Cormier and Magnan, 1997), non-compliance with environmental statutes (Mobus, 2005), or environmental ratings of firms developed by external groups (i.e., Council on Economics Priorities' (CEP) company rating chart, Dow Jones Sustainability Index, etc.).

Financial performance

Previous studies have seen financial performance being defined in many ways, from a neutral definition to an extreme definition. Currently, there is no agreed definition of financial performance. There have been many attempts to define financial performance, but most of them seem to fit only a particular theme of research or usage (Allen and Wood 2006). Financial performance in this study refers to the degree to which financial goals are being met or have been met, and it is an important feature of financial risk management. It is the method of calculating the monetary value of a company's policies and operations. It's used to assess a company's overall financial health over time, as well as to compare similar companies in the same industry or to compare industries or sectors in aggregate (IAI, 2016).

Environmental capabilities

Organizational culture and environmental proactivity were two of the most common environmental capabilities found in the RBV literature. Each capability is described as a one-of-a-kind, useful, and irreplaceable capability that can help a company gain a

competitive advantage. Previous RBV studies have also supported the ability of these two environmental capabilities to establish a competitive advantage in terms of the environment, both conceptually and empirically (e.g. Hart 1995, Sharma and Bredenberg 1998). Furthermore, several environmental management studies have identified fundamentals of these skills that can assess environmental proactivity and organisational culture in a more general sense. As a result, their future contribution to environmental and financial performance is taken into account.

First, the concept of environmental proactivity is constant in the management literature (Aragón-Correa, 1998; Berry and Rondinelli, 1998; Sharma and Vredenburg, 1998), were known as " It refers to firms' tendencies to adopt environmental protection strategies that exceed the standards of legislation and the industry " (González-Benito and GonzálezBenito 2006). It is also conceptualized as the competitiveness that characterizes best environmental practices to advance and prepare firms for future changes in regulations and social trends. (Aragón-Correa and Sharma 2003). To improve, redesign, and/or transform operations, processes and products to continually address negative environmental effects on the natural environment (Hart 1994; Russo2005 and Buysse et al. 2003).

Several studies have confirmed that environmental proactivity can offer companies unique advantages. This includes reducing costs (Christmann, 2000, Shrivastava, 1995), differentiating and first-mover advantage (Porter and van der Linde, 1995), stakeholder integration, and improved organizational commitment and learning. Skills that include the ability to continuously innovate and the increase in employees' skills. (Russo and Fouts, 1997; Sharma and Vredenburg, 1998), Etc.

Organizational culture can be defined as "the pattern of basic assumptions, beliefs and core values it holds, framework it adopts for interpreting what is happening and approaches, it adopts in solving problems of external adaptation and internal integration" (Schein, 1990).

Several structures, dimensions, and levels have been proposed for the study of organizational culture (Wallach, 1983), but in the current research, we adopt the

Competing Values Framework(CVF) proposed by Cameron and Quinn(2005). The CVF is based on four cultures --- adhocracy, clan, market and hierarchy. This is typically seen in companies that operate in dynamic situations those looking for to be leaders in their markets. The primary values of ad adhocracy culture are creativity, entrepreneurship, and risk-taking. The clan culture also emphasizes flexibility, but internally teamwork, loyalty. Clan culture companies are characterized by teamwork, employee involvement, and company commitment to employees. Market culture preaches control and constancy and is externally oriented. Achieving goals, consistency, and competitiveness are central values of a company with this culture. Finally, hierarchy culture is also control-oriented but emphasises internal organisation. Its key value is efficiency and adherence to norms, rules and regulations.

Control variables:

Control variables need to be included in this research because they have possible associations with the two dependent variables: environmental and financial performance. The control variables are firm size and firm age, and we control for their influence on environmental and financial performance. These factors were selected for different purposes. Firstly, the influence of these variables was documented in previous environmental management and accounting research (Al-Tuwaijri et al., 2004). Secondly, these variables combine internal and general organisational factors and specific environmental factors. According to the literature review, firm size and age are control variables that are commonly used in studies on performance link because they can induce significant variations in the impact of environmental practices on organisational performance. Firm size, in particular, is considered an important control variable (see, for example, Henri et al., 2017; Perego & Hartman, 2009; Windolph et al., 2014), while firm age may have an influence on the firm's overall performance. The conceptual model's constructs are defined in Table 3.1.

Table 3. 1: Definitions of the conceptual model construct

Construct	Definition	Facets	References
EMCS	"The formalized procedures and systems that use financial and ecological information to maintain or alter pat-terns in environmental activity"	code of formal information and routines procedures concerning with environment aspects of organization	Schaltegger & Burritt, 2000; Henri & Journeault, 2010
Environmental Performance	"The results of an organization's management of its environmental aspects"	Evaluate environmental information	ISO 14031
Financial performance	"Financial performance refers to the degree to which financial objectives being or has been accomplished ".	Evaluate the results of a firm's policies and operations in monetary terms, measure firm's overall financial health over a given period of time.	IAI, 2016
environmental proactivity	the voluntary implementation of practices and initiatives aiming at improving environmental Performance.	Competitive capabilities, improving, redesigning operations, processes and products to continuously combat the negative impacts on the natural environment	González-Benito and González-Benito 2006
Organization culture	the pattern of basic assumptions, beliefs and core values it holds, framework it adopts for interpreting what is happening and approaches, it adopts in solving problems of external adaptation and internal integration.	norms for behaviour in the firm	Schein, 1990

Source: Compiled by the author

3.5 Hypotheses development

The conceptual model's relationships are developed in four sections. The first section connects the environmental management control system (EMCS) to environmental and financial performance. The second section explores the link between EMCS and environmental proactivity as well as organisational culture. The third section examines the impact of environmental capabilities on environmental and financial performance. The final section establishes the proposed mediating effects of environmental capabilities on the relationship between EMCS, environmental performance, and financial performance. The hypothesis developed in this study is summarised in Table 3.2.

Table 3. 2: List of the research hypothesis

No.	Hypothesis
H1a	EMCS are positively associated with environmental Performance
H1b	EMCS are positively associated with financial Performance
H2a	EMCS are positively associated with environmental proactivity
H2b	EMCS are positively associated with organization culture
H3a	Environmental proactivity is positively associated with environmental Performance
H3b	Environmental proactivity is positively associated with financial Performance
H4a	Organization culture is positively associated with environmental Performance
H4b	Organization culture is positively associated with financial Performance
H5a	EMCS are indirectly associated with environmental Performance through their contribution to organization culture capability.

H5b	EMCS are indirectly associated with environmental Performance through their contribution to environmental proactivity capability.
H6a	EMCS are indirectly associated with financial Performance through their contribution to organization culture.
H6b	EMCS are indirectly associated with financial Performance through their contribution to environmental proactivity.

3.5.1The direct effect between EMCS and Performance

Recently, researchers have begun to focus on the relationship between the use of EMCS and performance. Eco-efficiency theory suggests that productivity level may be increased and thereby reduce costs while improving the environmental performance at the same time (Bebbington, 2001; Lehman, 2002). This argument is supported by the findings of previous studies, which revealed that environmental strategic planning and environmental and financial performance have a positive association (Judge and Douglas, 1998; Wisner et al., 2006). In their work, Judge and Douglas (1998) conducted a cross-sectional survey of US firms to look at environmental considerations in the strategic planning phase as one form of management control system. Their findings show that there is a relation between the level of strategic planning consideration and financial and environmental results. Likewise, Gadenne et al. (2012), there is a positive association between the use of environmental management policies and company environmental efficiency in a study of 314 Australian companies. Using data from manufacturing facilities in Mexico, Epstein and Wisner (2005) examined the effect of various control practices on environmental compliance. They identified that some control practices, such as planning and rewards, had a positive impact on environmental Performance, whereas others, such as reporting structure, did not. Henri, Journeault, and Brousseau (2017) examined the relationship between EMCS change and environmental performance among 78 manufacturing organizations in Canada at two points in time. The study concluded that changes leading to increased importance that was given to EMCS within an organization contributed positively to environmental performance.

On the basis of survey data from Canadian manufacturing companies, Henri and Journeault (2010) observed that a significant relationship exists between EMCS and environmental performance. Spencer et al. (2013) supported that top management's commitment to EMCS strongly drives the improvement of environmental performance. In the same vein, Abdel-Maksoud et al. (2020) has investigated the direct relationship between EMCS and environmental and economic performance; he found significant direct relations with both operational and non-operational environmental performance. In this regard, Dixon et al. (2005) and Patten (2005) suggested that the improvement in environmental performance has a high likelihood of enhancing public relations and corporate image, as well as increasing social legitimacy, which will ultimately improve organisational performance.

From a financial standpoint, EMCS may support financial performance by offering incremental information. With the incorporation of information about managerial actions and environmental issues that are not fully captured in financial results, EMCS can improve contracting and, ultimately, financial performance.

In sum, EMCS promotes goals between the individual and the organisation, coordinates and communicates strategic priorities, lead managers to critical areas of concerns, and improves the allocation of resources and the establishment of priorities on the basis of organisational goals; EMCS is similar to MCS in this aspect. Therefore, EMCS promotes environmental and financial performance through its contributions to resource management.

H1a: There is a significant positive association exists between extent of using EMCS and environmental performance.

H1b: There is a significant positive association exists between extent of using EMCS and financial performance.

3.5.2 Relationship between EMCS and environmental capabilities

EMCS is an informational system that provides data and input on environmental processes in order to aid in the advancement of environmental capabilities. These feedback mechanisms provide data on how well the routines and processes incorporated

in environmental capabilities are working (Burritt, 2004). Furthermore, this cybernetic input helps in the development of the organisational skills needed to conduct efficient activities repeatedly and without error (Ethiraj, Kale, et al., 2005), resulting in enhanced environmental capabilities. An EMCS can also aid managers' strategic decision-making by exposing cause-and-effect relationships between environmental policy and priorities (Chenhall, 2005). This expertise and understanding can help firms improve their capabilities (Teece, Pisano et al., 1997). More specifically, EMCS can promote environmental proactivity and organisational culture in a variety of ways, as outlined below.

Environmental proactivity is fostered by EMCS by providing a forum for regular face-to-face discussion that support the development of new environmental initiatives (Henri and Journeault, 2010). Environmental proactivity that depends on the information provided by EMCS can help a firm become more resource-efficient through reduced energy usage, lower raw material and abatement costs, as well as the production of high-quality products that are able to ease the environmental burden (Behrend et al., 2009). Moreover, EMCS ensures that environmental proactivity can offer additional benefits to companies, such as the control of regulatory compliance to get the requirements of the organizer, the estimate of the green performance of products throughout the value chain to satisfy the expectations of consumers,

EMCS can apply various methods to help foster organisational culture capabilities. Firstly, EMCS provides information that enables top managers to reinforce their current organisational culture or to rethink and transform it to address new environmental challenges and opportunities, as well as to motivate and enlist the involvement of workers in environmental issues (Shrivastava, 1995; Russo and Fouts, 1997). According to Schein (1990), culture is what a group learns over time as it solves its survival-related problems in an external environment and its problems related to internal integration. Therefore, EMCS extend the Environmental Strategy plan to all employees and propose the area of business operations (Pearce and David, 1987: p.109) and helps focus attention on important issues (Ireland and Hitt, 1992: p.34) by informing people about environmental impacts, costs and benefits of products and processes, as well as by assisting operating

employees in executing continuous improvements so that organisational members are able to develop mutually acceptable ideas and beliefs about what is real, what is important and how to respond (Trice & Beyer, 1984).

H2a: There is a significant positive association between the extent of using EMCS and environmental proactivity.

H2b: There is a significant positive association between the extent of using EMCS and organization culture.

3.5.3 Environmental capabilities and Performance

3.5.3.1 the effect of Environmental proactivity on Performance.

Environmental proactivity is an attitude to business that is related to innovation and change and is associated with the identification and exploitation of economic opportunities through environmental protection (Gupta, 1995; Guenster et al., 2011). the RBV of the firm presents the majority of the arguments that link environmental proactivity to improved financial and environmental performance; this viewpoint is supported by substantial empirical findings (Alvarez-Gil et al., 2001; Sharma and Vredenburg, 1996; Guenster et al., 2011; Lo'pezGamero et al., 2009; Clarkson et al., 2011). Environmental proactivity encourages the growth of specific tools or skills, such as a better reputation, the opportunity to influence public policy, stakeholder integration, ongoing creativity, and other knowledge-based capabilities (Russo and Fouts, 1997; Hart, 1995; Christmann, 2000; Sharma and Vredenburg, 1998; Willard, 2005). These environmental proactivity-derived capabilities can have the necessary characteristics to help a company achieve long-term competitive advantages (Hart, 1995; Clarkson et al., 2011). By actively and anticipatorily searching for new environmental opportunities, first-mover advantages can be gained (Nehrt, 1998). If time is required to learn or develop environmental practices or innovations, first movers will benefit from their extensive expertise or the time required by lagging firms to implement new technologies. These capabilities are also built through the specific process or course of changing business structures to boost environmental performance, as explained by Aragón-Correa and Sharma (2003). Other organisations that are not environmentally conscious would find it difficult to replicate the built capabilities (Clarkson et al., 2011; Aragón-Correa and

Sharma, 2003). These abilities allow proactive environmental organisations to make better use of resources, reduce risk through successful pollution management, and develop unique market positions and environmentally specific innovations (Willard, 2005). Environmental proactivity involves the dynamic integration of a diverse set of skills and tools in order to mitigate environmental impacts while sustaining or improving firm competitiveness (Guenster et al., 2011; Sharma and Vredenburg, 1996). In other words, proactive environmental management necessitates changes in routines and activities and has been referred to as an organisational skill (Christmann, 2000; Hart, 1995; Guenster et al., 2011; Murillo-Luna et al., 2008) because it results in benefits that outweigh the expense and danger of systemic environmental protection that goes beyond legal requirements. In the long term, learning by doing and scale economies allow advantages to be realised and costs to be minimised, while the risk is better handled through the institutionalisation of new practices. Thus, the points above lead us to propose the following hypothesis:

H3a: there is a significant positive association between environmental proactivity and environmental Performance.

H3b: there is a significant positive association between environmental proactivity and financial Performance.

3.5.3.2 the effect of Organization culture on Performance

organisational culture represents the key capabilities that are necessary to provide individual employees with the behavioural norms in the firm and serves as a tool that management can use to shape the direction of their firms (Smircich, 1983). Culture influences how firms adapt to internal and external exigencies help motivate employees, enhances productivity and considerably influences the overall functioning of organisations. Hence, organisational culture is a key capability that stimulates environmental actions and commitment throughout the organisation, thereby enhancing environmental performance.

Several studies used different dimensions of organisational culture and organisational performance to examine the relationship between the two. by Gordon and DiTomaso

(1992) and Denison and Mishra (1995 determined a positive correlation between a strong culture and short-term financial performance. In contrast, Kotter and Heskett (1992) found that performance will improve in the long run by having an 'adaptive values' culture compared with that in the short term. Lee and Yu (2004) discovered that the cultural intensity of organisations is often linked to organisational success and that certain cultural elements that distinguish organisations from each other have a positive influence on organisational performance.

Other studies used the competing values framework (CVF) to investigate the relationship between organisational culture and performance. By using organisational culture types derived from CVF, Deshpande et al. (1993) studied the impact of organisational culture, innovation and customer orientation on organisational performance in 50 Japanese firms. Their findings show that market culture has a considerable influence on organisational performance, yielding the best results because of its focus on competitive advantage and market superiority. In contrast, hierarchy culture exacerbates unsatisfactory organisational performance because its emphasis is on bureaucracy. Furthermore, they argue that, with the emphasis of adhocracy on innovation and risk-taking, adhocracy is therefore anticipated to provide better organisational performance than clan culture does. In a recent study on the relationship between organisational culture and organisational performance, Prajogo and McDermott (2011) showed that in a sample of 194 middle and senior managers of Australian firms, only adhocracy (developmental) culture was a strong predictor of performance among all four cultural types. According to existing research, none of the organisational culture styles can provide organisations with the principles and methods they need to adapt to their dynamic environment and achieve high success on their own. Therefore, this hypothesis is proposed:

H4a: There is a significant positive association between organization culture and environmental Performance.

H4b: there is a significant positive association between organization culture and financial Performance.

3.5.4 The mediation effect of environmental capabilities

Given the elusive link and inconsistent results on the direct relationship between EMCS and environmental and financial performance, further research is needed to examine the intermediate variables by which EMCS may affect environmental and financial performance. Organisational culture and environmental proactivity are possibly critical mediators in increasing performance, according to researchers. Therefore, this section presents several hypotheses on the linkage between EMCS and two intermediary variables and their influence on performance.

The mediating effect of environmental capabilities (organisational culture and environmental proactivity) on the relationship between EMCS and environmental and financial performance is included in the theoretical framework — that is, the ability of EMCS to increase environmental and financial performance is influenced by the level of organisational culture and environmental proactivity.

3.5.4.1The mediation effect of environmental proactivity on environmental Performance

A growing body of literature has demonstrated that capabilities of environmental proactivity, and organization culture play an important role in managing environmental issues (Hart, 1995; Sharma and Vredenburg, 1998; Aragon-Correa and Sanjay, 2003; Aragon-Correa and Rubio-Lopez, 2007). environmental capabilities may represent key factors needed to attain superior environmental Performance.

More specifically, many studies confirm that environmental proactivity can provide firms with unique advantages. This includes cost reduction (Christmann, 2000; Shrivastava, 1995), differentiation and first-mover advantage (Porter and van der Linde, 1995), capability for stakeholder integration, improved organizational commitment and learning, capability of continuous innovation, an increase in employee skills (Russo and Fouts, 1997; Sharma and Vredenburg, 1998), It has also been conceptualized as competitive capabilities that characterize the best environmental practices, which advance and prepare companies for future changes in regulations and social trends (Walley et al.,1994) with the aim of improving, redesigning and/or transforming operations, processes and products to continuously combat the negative impacts on the natural environment.

3.5.4.2 The mediation effect of organization culture on environmental Performance

Organizational culture represents key capabilities needed to provide individual employees with norms for behavior in the firm and serves as a tool utilized by management to shape the direction of their firms (Fiol, 1991; Smircich, 1983). Culture influences how firms adapt to both internal and external exigencies, helps motivate employees, enhances productivity, and exerts considerable influence on the overall functioning of organizations (Deal & Kennedy, 1982). Hence, organization culture, a key capability, stimulates environmental actions and commitment throughout the organization and thus improving environmental Performance

Hypothesis 5a: EMCS are indirectly associated with environmental Performance through their contribution to organization culture capability.

Hypothesis 5b: EMCS are indirectly associated with environmental Performance through their contribution to environmental proactivity capability.

3.5.5 The mediation effect of organization culture and environmental proactivity on financial Performance

According to the RBV, a firm's unique and useful capabilities can provide a competitive advantage, resulting in enhanced financial results (Barney, 1986; Rumelt, 1984; Barney, 1991). Environmental proactivity and organisational culture have long been recognised as distinct, important, imperfectly imitable, and substitutable capabilities, with previous research demonstrating their impact on a company's financial results (Aragon-Correa, Hurtado-Torres et al., 2008; Henri, 2006a; Sharma and Vredenburg, 1998).

EMCS has been associated with organisational culture (hypothesis 2a) and environmental proactivity (hypothesis 2b) capabilities. According to the claim raised, organisational culture and environmental proactivity should have a positive impact on environmental performance. As a result, EMCS are expected to have indirect effects on both environmental and financial performance by adding to environmental capacities, which increase environmental and financial performance in turn. As a result, the following hypotheses are presented.

H6a: EMCS are indirectly associated with financial Performance through their contribution to organization culture.

H6b: EMCS are indirectly associated with financial Performance through their contribution to environmental proactivity.

3.6 Summary

This chapter has drawn on resource-Based View and eco-efficiency perspectives to set the theoretical foundations for the development of the proposed conceptual framework. The framework indicated that EMCS has a direct positive impact on the environment. and financial Performance based on the logic of eco-efficiency. It goes further by arguing a detrimental positive effect of the joint implementation of EMCS on environmental proactivity and organization culture. Moreover, the framework posits a mediation effect of environmental capabilities (i.e. environmental proactivity and organization culture.) on the relationship between EMCS and environmental and financial performance, which is also supported by the complement view of resource-Based.

Chapter four: Research methodology

4.1 Introduction

In the prior chapter, a conceptual framework was developed with relevant hypotheses that represent the theory of this study. This chapter is identifying the basis for the empirical analysis by sets the suitable methodology that should be adopted to examine the framework in this research and achieve the overall goal of this thesis. However, identifying the right methodology requires a good understanding of the different research paradigms, approaches, strategies, and methods that researchers can choose from.

This chapter is structured as follows. Sections 4.2,4.3 and 4.4 provide a brief review of research paradigms, approaches and strategy. In section 4.5 provides the various methods of data collection together with their advantages and disadvantages in justifying the method chosen in this research. Section 4.6 presents the targeted study population and the sampling technique. In sections 4.7, 4.8 and 4.9, the stages of designing the questionnaire instrument, as well as the measures of the variables used, are described in

detail. The statistical techniques and software packages employed in this research are presented in section 4.10. The chapter ends by outlining the key ethical issues.

4.2 Research paradigm

Research is an organised, systematic effort to investigate a problem scientifically and discover answers or solutions to it (Sekaran, 2016). The entire process in which we try to solve problems is called 'research'. This process involves a well-thought-out and carefully performed set of activities that allow us to decide how to resolve the problem or at least minimize it. Therefore, the research includes inquiry, investigation, examination and experimentation. This section describes the various research paradigms applied in the research and the motivation for current research methods.

Research paradigm is a dimension that can help the researcher distinguish between research philosophies connected to the political or ideological beliefs of researchers towards the social world they investigate. The research paradigm is "the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed" (Kuhn, 1962). The research paradigm has three fundamental components, which are epistemological, ontological and methodological assumptions (Guba and Lincoln, 1994).

Epistemology relates to how to acquire reality or knowledge and what constitutes acceptable knowledge (Blumberg et al., 2014; Saunders et al., 2015), that is, how can knowledge be acquired and the nature of the relationship between participants and researchers (Ponterotto, 2005; Guba and Lincoln, 1994). By contrast, ontology relates to the fundamental nature of reality and being (Neuman, 2011). Finally, the methodology covers how to know and gain knowledge of the world. The paradigm guides scholars in philosophical assumptions about projects and the choice of participants, tools and methods to be applied in the research (Denzin and Lincoln, 2000).

The research paradigm can be presented in two extreme continuums, namely, interpretivism and positivism, as discussed by Bryman and Bell (2007). The adoption of any of these two paradigms has been claimed to contain important implications for the research approach and method employed to achieve research objectives (Collis and

Hussy, 2009). In the following section, we will introduce the two paradigms, clarify the underlying ontology and epistemological assumptions, and explain why we choose the positivist paradigm in our research.

4.2.1 Positivism vs. interpretivism

The term positivism is defined as "an epistemological position that advocates the application of the methods of the natural science to the study of social reality and beyond" Bryman and Bell (2011, p.15). Collis and Hussy (2009) mention that positivism presupposes that the true survival of society does not depend on us. It depends on several basics. Firstly, positivism seeks to produce hypotheses that can be examined scientifically and logically rely on the role of deductivism (Bryman and Bell, 2011). Secondly, positivism views reality as an objective point of view, that is, the place of no value (Saunders et al., 2009). Finally, positivism can contain deductive and inductive aspects. However, positivism is primarily associated with quantitative study in the social science philosophy. Positivism researchers often insist on using structured methodologies to create replicability. Therefore, positivism confirms that social phenomena are measurable and based on strongly structured quantitative methods such as tests, questionnaires and statistical analyses of quantitative research data (Saunders et al., 2009; Collis and Hussy, 2014).

Interpretative research presupposes creating and associating subjective meaning as people interact with the world around them. Social reality is influenced by the act of examining it (Collis and Hussey, 2009). We believe that this paradigm requires a strategy that respects the differences between humans and the natural sciences and that social scientists need to understand the subjective value of the social sciences (Bryman and Bell, 2007). Interpretation researchers assume that when people interact with the world around them, they create and associate their subjective meanings.

Table 4. 1:characteristic of positivist and interpretivist

Positivist	Interpretivist
concentrates with hypothesis testing	concentrates with generating theories
Using large sample	using small sample

‘produce quantitative data	produce qualitative data
high reliability but low validity for the result	Low reliability but high validity for the result
Generalized from the sample to the population	Generalized from one setting to another
The data is very specific and precise	The data is subjective

Source: Collis and Hussy (2009, P. 62)

Ontological assumptions, considered general theories about what exists in the world and the types of matter, are part of metaphysical systems (Guba and Lincoln, 1988). They mention various existences and relationships that are recognised in a certain knowledge (McCracken, 1988). The positivist paradigm dependent on ontological assumptions requires identifying time free popularisation depend on unintended impacts (Hudson and Ozanne, 1988). In addition, positivists emphasise dualism and objectivism situation (Guba and Lincoln, 1994). Researchers and research participants are assumed independent of one another, and following rigorous, standard procedures enables researchers to study participants and phenomena without bias (Saunders et al., 2015). In addition, positivists argue that a reductionist, deterministic approach is essential for avoiding a two-way effect between researchers and participants (Ponterotto, 2005). By contrast, the interpretative paradigm seeks to study specific phenomena at specific times and situations (Hudson and Ozanne, 1988). Interpretivists promote transactional and subjective positions, claiming that reality is constructed socially and empirically (Guba and Lincoln, 1994). Thus, the dynamic role of the researcher as a facilitator and the interaction with the participants is essential for capturing and observing the participants' complex experiences (Ponterotto, 2005).

4.2.2 Rationale for Adopting positivism paradigm.

After reviewing the philosophical assumptions and objectives underlying the main research paradigms, the positivist paradigm was considered more relevant to guide current research. This decision was primarily determined by the nature of the phenomena under investigation and shaped by the ontological and epistemological assumptions of the researchers.

This research aims to explain the impact of environmental management control system (EMCS) on environmental and financial performance and examine the mediation influence of environmental capabilities (i.e., organisational culture, environmental proactivity) on the link between EMCS and environmental and financial performance.

From an ontological stand, the researcher claims that the application of EMCS exists independently, whether human beings are aware of its existence. Thus, predicting the consequences between variables defined in the theoretical framework through the laws and principles of natural science is understandable, identifiable and measurable. From an epistemological position, Scholars believe that moving away from a participant in this study leads to credible conclusions by reducing the apparent bias that might arise from participants (social desirability) and researcher's (e.g. own perception and interpretation of the informants' answers) interactions as can be the case with the interpretivist approach (Hudson and Ozanne, 1988).

4.3 Research approaches (deductive versus inductive)

Upon selecting a paradigm, researchers should choose a research approach (Saunders et al., 2009). Research approaches are generally classified into deductive and inductive approaches (Collis and Hussy, 2009; Bryman and Bell, 2007).

Based on known information about the phenomenon being investigated, the deductive approach formulates several hypotheses that are then empirically examined in the subsequent steps of the research project (Bryman and Bell, 2007; Saunders et al., 2009). The deductive approach involves six stages: (1) reviewing and selecting a theory from the relevant literature, (2) formulating hypotheses, (3) collecting data, (4) reporting the findings, (5) confirming which hypotheses are supported and rejected and (6) revising the theory based on the results (Collis and Hussy, 2009). In sum, the deductive approach starts from general details and procedures before gradually moving to specific ones (Collis and Hussy, 2009).

Meanwhile, the inductive approach starts by collecting actual observations of the phenomenon being investigated and then using these observations to create a theoretical basis for the subsequent investigation (Bryman and Bell, 2007). In other words, inductive

research starts from specific details and procedures before gradually moving to general ones (Collis and Hussy, 2009). Table 4-2 shows some important differences between inductive and deductive approach, according to Saunders et al. (2009, p. 127).

Figure 4. 1: the six stages of the deductive approach

Source: Bryman and Bell (2007, P.11)

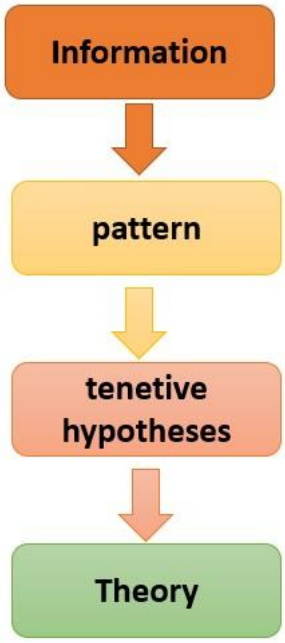


Figure 4. 2: the four stages of the deductive approach

Source: Bryman and Bell

Table 4. 2: major differences between the deductive and inductive approach

Deduction approach	Induction approach
Scientific principles	Gaining understanding of the meanings humans attach to events
Moving from theory to data	A close understanding of the research context
Need to explain causal relationships between variables	Collection of qualitative data
Collection of quantitative data	A more flexible structure to permit changes of research emphasis as the research progresses
Application of controls to ensure validity. of data	A realisation the researcher is part of the research process
Operationalisation of concepts to ensure. clarity of definitions	Less concern with the need to generalise
A highly structured approach	
Researcher independence of what is	

Source: Saunders et al. (2009, p. 127)

This study employs a deductive approach because it is based on an assessment of the merits of the two logical approaches and is consistent with the positivist paradigm. This study develops a theoretical model depend on current literature to explain the various fundamental relations between EMCS, environmental capabilities, environmental and financial performance. Thus, a deductive approach that highlights measuring and empirical investigations of the relationship between variables appears to be more significant than an inductive approach given the motivation and nature of this study (Bryman and Bell, 2007).

4.4 Time horizon (cross-sectional versus longitudinal design)

The complete part of the design of a scientific study determines whether to conduct a cross-sectional study or a longitudinal study. Cross-section design involves the way of collecting quantitative data of multiple variables from a sample of a particular population over a particular time period (Sekaran and Bogie, 2014). However, longitudinal design requires data to be collected at more than one time point (Sekaran and Bogie, 2014; Malhotra et al., 2012).

Longitudinal studies examine variables or groups of subjects during a period of time (Collis and Hussy, 2009), which enhances fundamental relationship deduction and reduces common method variance. It also highlights changes in the improved relationships under investigation (Saunders et al., 2009). Though, a number of practical aspects limit their implementation to business study (Bryman and Bell; 2015). First, managing some studies is very time consuming and resource intensive (Blumberg et al., 2014). Second, presenting various data collections can lead to social relevance (Rindfleisch et al., 2008). Third, collecting the data needed for research from knowledgeable staff within the organization makes it difficult to convince such busy members to reveal multiple times more information about the same variable; in turn, the study results fail to reach an appropriate sample size for generalisation (Malhotra et al., 2012).

A cross-section design has been adopted in this study for several reasons. First, cross-section design is associated with time and cost savings (Blumberg et al., 2014). Second, the current study analyses inter-firm relationship phenomena that require data from

highly educated respondents who are most likely to cause acquiescence bias (Rindfleisch et al., 2008). Finally, this study uses different measurement scales with different endpoints to help reduce common method bias (Rindfleisch et al., 2008).

Table 4. 3:Guidelines for selecting a survey research approach.

Guideline	Cross-sectional survey design	Longitudinal survey design
1. Nature of the key constructs	Concrete and externally oriented	Abstract and internally oriented
2. Likelihood of response biases	Low	High
3. Measurement format and scales	Heterogeneous	Homogeneous
4. Start and end dates	Unclear	Clear
5. Theoretical foundation	Well-developed	Nascent
6. Interview	Interview	Interview
7. Likelihood of alternative explanations	Low	High
8. Nature of the argument	Between subjects	Within-subjects

Source: Rindfleisch et al. (2008, p. 274)

4.5 Data collection methods

Researchers can use various data collection methods to collect the data needed for their studies. These methods include interviews, surveys and observation. Verifying the most suitable and effective method always depends on the strengths and weaknesses of each method as well as the purpose of the study. This study seeks to conduct a large empirical investigation of the theoretical model that emphasises the relevance of EMCS for manufacturing companies to provide generalisable results that overcome the lack of earlier literature. The most of data required to realize the study aims are internal resources. This kind of data is primarily in the mind of informed organisation members. Below is a brief description of the three data collection methods.

4.5.1 Interview

Interviews are a method of data collection in which the researcher (or another person) asks the interviewee to obtain information about a problem of interest (Collis and Hussy, 2014). Interviews have three types, namely, structured, semi-structured and unstructured, which can be done face-to-face or by phone or video conferencing. (; Sekaran and Bogie,

2014; Saunders et al., 2012). In a structured interview, the interviewer has a set of pre-set questions (interview protocol) that are asked in the same manner to all selected participants (Sekaran and Bogie, 2014). In contrast, in unstructured interviews, researchers do not have prepared questions; however, they evolve over the course of the interview. (Collis and Hussy, 2014). This type of interview aims to explore the phenomenon under investigation (Saunders et al., 2012). In a semi-structured interview, the interviewers ask for a set of themes and questions, but additional questions may be asked during the interview to further clarify the answer (Saunders et al., 2012).

Interviews are flexible in terms of coordinating, adapting and changing questions, but several issues hinder their effectiveness as a type of data collection. First, the interview is time-consuming and expensive, especially if interviewer training is required (Sekaran and Bogie, 2014). As a result, interviews are less likely to be used in large studies. Secondly, the lack of anonymity and unified audio recordings can prevent participants from answering several questions (Sekaran and Bogie, 2014; Bryman and Bell, 2015). Finally, the interviewer's comments and facial expressions during the interview can lead to biased responses from the interviewee (Saunders et al., 2012).

4.5.2 Survey

A survey is “a list of carefully constructed questions selected after an important test to elicit reliable answers from selected samples”. This method is popular for data collection in business study. Handing out surveys to sample participants can be performed in several manners such as online, email or telephone (Saunders et al., 2009).

This study selects the survey data collection method considering the shortcomings of the interview and observation methods described in the previous sections. In particular, email surveys prove to be the most appropriate manner of collecting data from the target population. The study asks information from top management staff in large manufacturing companies across Jordan. The main advantage of an email questionnaire is that the survey can cover a large geographic area (Saunders et al., 2012). Email surveys can make respondents more anonymous than other methods, which can reduce bias and increase response rates (Zikmund et al., 2013). Email surveys also allow respondents to think, gather facts, consult with others, answer questions and improve the quality of

responses (Blumberg et al., 2014). Finally, email surveys are cheaper than face-to-face interviews and telephone calls (Blumberg et al., 2014).

4.5.3 Observations

Observational data collection method is defined as the procedure of recording, monitoring, analysing, explaining and interpreting specific behaviour in the natural environment (Sekaran and Bogie, 2000). This procedure can be organised or unorganised. In organised or observations, data collection is performed according to a predefined schedule using specific variables (Bryman and Bell, 2015) to aggregate the actions of all participants in each type of term and ensure that each individual's actions are systematically recorded on the actions that are being observed. Unorganised observations are made in an open, free manner rather than predetermined variables or objectives for researchers (Sekaran and Bogie, 2000). Observational data collection methods allow direct contact with research phenomena and ensure a high level of flexibility in creating records of phenomena that will be analyzed later. Additionally, this method exhibits higher levels of observer bias, longer time requirements, and observer impact on primary data (Bryman & Bell, 2015).

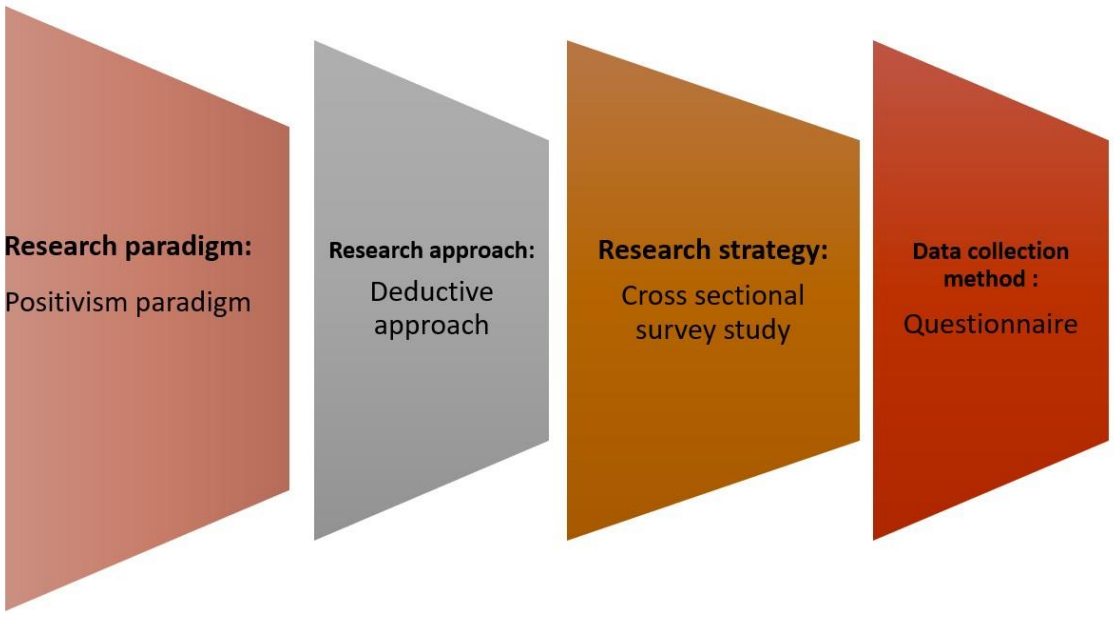


Figure 4. 3: outline of the methodology choices applied in this research.

4.6 Sample selection and unit of analysis

Fully examining all aspects of a subject because of cost, time, and access restrictions is extremely impractical (Sekaran and Bogie, 2014; Saunders et al., 2012). Examining the entire population can also result in a significant increase in non-sampling errors, which can exceed the sampling error (Sekaran and Bogie, 2014; Malhotra et al., 2012). In addition, examining all populations can increase errors and reduce overall accuracy (Barnett, 2002). Therefore, studying a subset of the population that can be generalised to a large population is desirable owing to these considerations (Burns, 2000).

The decision on the sampling strategy affects the generalisability of the findings and the type of statistical analysis employed (Bryman and Bell, 2015). Therefore, considerable attention must be paid to the sampling technique employed. Sampling methods can be categorized into two: probability and non-probability (Malhotra et al., 2012).

In a probabilistic sample, each component of the population recognises a non-zero or fixed probability chance that is chosen for the sample applying random collection (Bryman and Bell, 2007). Selecting survey participants in probabilistic sampling assumes that participants are representative of the survey population. This sampling design is applied when the sampling structure and the date are set, and the study is intended to determine results or future predictions. (Collis and Hussy, 2009). Various processes, including stratified random, simple random and systematic and multistep clusters, are used in probabilistic sampling.

Non-probability sampling is a subjective selection where including each population element in the sample is not possible (Blumberg et al., 2014). Selection is usually based on accessibility, specific criteria and category of elements (Sekaran and Bogie, 2014). Several elements of the population have a greater probability to be selected than others (Bryman and Bell, 2015). Non-probability sampling is more appropriate when the sampling frame is uncertain and the cost and time limits are presented (Blumberg et al., 2014). However, non-probability sampling tends to produce biased samples (Malhotra et al., 2012; Bryman and Bell, 2015; Saunder et al., 2012). Therefore, stochastic sampling designs are often recommended to address this limitation.

The above assessment of the comparative advantages of probability and non-probability sampling in terms of generalisability and sampling bias clearly shows that the former is superior to the latter. Therefore, probability sampling is adopted because generalisation is very important for the current research, and sampling frames are available. More specifically, random sampling is more appropriate because it provides more detailed information and representation of the population of interest (Sekaran and Bogie, 2014; Saunders et al., 2012).

4.7 Survey development

Survey development is an important step in the research because it affects the quality (reliability and validity) and response rate of the data collected (Collis and Hussy, 2014; Saunders et al., 2012). The survey for this research is developed in four phases. In the first phase, an in-depth literature review of EMCS, environmental capabilities and environmental, financial performance is conducted, and a choice is made to inform the development of measurement models (see Section 4.10). In the second phase, the selected measures are slightly adapted to fit the context of this study. In the third stage, all aspects of the survey design, general appearance of the survey, flow, layout, type and format of questions, cover letters and instructions are carefully considered (Dillman, 2000; Bryman and Bell, 2015 and Saunders et al., 2012). In the final stage, the first draft of the survey is evaluated by experts and tested by pilots. The following subsections describe the details of each step.

4.7.1 Questionnaire design

The thorough literature on questionnaire design is followed, for instance, (Dillman, 1978; Bickman and Rog, 1998) to draft the research questionnaire. Researchers need to consider important issues such as question language, question type and format, question order and length, clear instructions and general appearance to design a high-quality questionnaire. All these issues are considered when designing the main instrument for the study.

The survey is divided into two parts (see Appendix B). Part 1 explains how to complete the survey and includes questions about respondents and general information about the company. This part asks for information on respondent titles, experience, industry

sectors, company size and company age. Part 2 explains the structure of the research model and is divided into three sections. Section A contains questions about EMCS implementation. Section B incorporates questions about environmental capabilities (organisational culture, environmental proactivity). Finally, Section C looks at the levels of environmental performance and financial performance.

4.7.2Question formats

Survey questions can be open or closed (Collis and Hussey, 2009). Hence, many academics advocate more confidence by applying closed questions in empirical research (Collis and Hussy, 2009). All questions involved in the survey are closed to increase the response percentage considering the length of the survey. A various answer structure can be applied to create closed questions (Collis and Hussy, 2009); however, this survey primarily uses rating questions (such as Likert-type questions) and categorical questions. All rating questions are implemented using the 5-point scale. This gives members more choices to provide their views on the aspects given in all questions.

4.7.3 Questionnaire design and question flow

Survey design is important for two reasons: reducing response errors and reducing non-response rates (Dillman, 2007). The survey design is suggested to be enchanting such that the responder tends to answer the survey completely (Saunders et al., 2009; Collis and Hussy, 2009). An online survey is created on Google Drive to make it more favourable and attractive to the responder (Wright and Kevin, 2017). In addition, attempts are made to avoid creating cramped surveys in terms of page footnote and space to break various questions (Bryman and Bell, 2007). A matrix style is adopted to evaluate questions and consequently save space (Saunders et al., 2009), and a gridline layout is applied to facilitate the procedure of following questions to the reader. We rely on the recommendations of Bryman and Bell (2007) regarding opening the questions with the most significant questions given in a logical order owing to the significance of the question flow in the questionnaire.

4.7.4 Cover letter

The design and content of the cover letter play an important role in improving response rates; thus, the cover letter is considered an important aspect of survey management

(Dillman, 2000; Frohlich, 2002). The cover letter includes the purpose and significance of the survey, the purpose for contacting a participant, the important consequences of sharing, the privacy of the information provided by the respondents, the directive to answer the questions and the researcher's contact if any information or explanation is needed. Each cover letter is attached with the questioner link by email and promises that all respondents would have a version of the study findings, as suggested by Dillman (2007), to improve response rates. A copy of the cover letter is provided in Appendix B.

4.7.5 Questionnaire pre-testing

Many researchers conduct small pre-pilot surveys to review the validity of the survey before it goes into complete process (e.g. Saunders et al., 2012, Bryman and Bell, 2015). The importance of this operation depends on the expected benefits. Firstly, it reduces the problems that respondents may face in terms of readability and validity of instructions that influence their capability to respond to surveys (Bryman and Bell, 2015). Secondly, it obtains recommendations for inserting, removing or changing questions to improve the general look of the questionnaire. Lastly, pilot surveys can provide quantitative estimates of response rates and item non-responses.

The questionnaire was examined by three Jordanian scholars in a management accounting professional qualification, as recommended by Bryman and Bell (2007). In addition, the survey was evaluated by five senior managers as a sample of participants. All respondents in the pilot survey must complete the survey and provide deductive feedback on overall appearance, item relevance, clarity, readability, outline and survey item suitability. However, we received numerous feedbacks from the respondents to this survey. These feedbacks include rearranging several questions, enhancing the outline rating, expressing, lengthening other questions and flow of questions. All feedback received were taken seriously to clarify the questions.

A reviewed version of the questionnaire managed group of participants uses samples from the identical population (Flynn et al., 1990). Respondent contact email addresses were obtained from the ministry of industry and trade. Respondents were asked to reply to questions and provide feedback. Thus, pilot studies have shown that participants' expectations in developing countries (Jordan) may differ from those in developed

countries, resulting in cultural differences. The final form of the survey is available in Appendix B.

4.7.6 Questionnaire translation

Many researchers have focused on the notion of translation equivalence (e.g., Craig and Douglas, 2000, Reynolds, 2000;). This concept means instrument research translated into another language (e.g., research) must be similar to the first language, that is, have meaning comparable to that of the primary language (Craig and Douglas, 2000; Herk et al., 2005). Our survey conducted in English was tested by native speakers in the United Kingdom before distribution to confirm that it is easy to understand. Translating the questionnaire into Arabic is important because the sample population consisted of native Arabic speakers. Therefore, the direct interpretation method was used to obtain a comparable translation with English as the main language. The Arabic version of the survey was translated by one of the linguists at the University of Jordan. In addition, an inverse translation from Arabic to English was used to confirm that the differences between the two languages are managed effectively, with correct structure, grammar and word usage. Finally, the questionnaire was handed out to sampled Jordanian organisations. The Arabic survey had a cover letter attached to the Arabic translation. Two sets of questionnaires are shown in Appendix B (Arabic and English).

4.8 Questionnaire administration

After modifying the survey instrument in response to comments received from the pilot survey, the survey was prepared to be managed throughout the sample to collect data for main empirical surveys. The Amman Stock Exchange (ASE) database and the ministry of industry and trade was used, which included a sampling frame with 8000 companies distributed over 10 different industries. the surveys were sent to a random sample of 1,000 Jordanian manufacturing firms with over 250 employees. The questionnaire was sent to eligible participants on June 1, 2019.

A questionnaire was sent by email to the managers/directors. Those responsible for such positions could provide valid, complete information required by the analysis. Participants

were asked to share their questions with well-informed people of the company if they felt the information was more accurate and relevant. In most cases, respondents completed the survey.

The Tailored Design Method (Dillman, 2000), an updated version of the Total Design Method (TDM) proposed by Dillman (1978), was adopted for survey management. Based on a study of social exchange principles, TDM provides individual, detailed steps for conducting an email survey. The steps cover designing and implementing email surveys, from ordering and positioning survey questions to send each email. Dillman (2007) argued that communication considerations and procedures have a greater effect on improving response rates than survey design.

TDM proposes four elements to manage email surveys effectively: respondent-friendly surveys, timely contacts, personalised communications, personalisation of communications and token financial incentives. However, financial incentives were used because they violate the Brunel University London Code of Research Ethics and may violate the ethics of business organisations (Dillman, 2007). Therefore, financial incentives were replaced with a promised concise summary of the research results. The process undertaken is summarised in the following points:

1- A brief pre-notice email was sent three days before the survey was distributed. The purpose of this initial contact was to notify participants in a proactive and timely manner that they would receive a request to support an important survey. The prior notice provides an opportunity to increase response rates (Yammarino et al., 1991) and build interests, expectations and relationships (Dillman, 2007; Gupta et al., 2000).
2- A survey email containing a cover letter and survey questionnaire was sent.
3- Two weeks later, a notification email was sent to all participants. The purpose of this gentle reminder was to express appreciation for participating in the survey, remind respondents that the survey was sent and ask if the survey was completed.
4- Three weeks later, follow-up emails were sent to those who did not complete the survey (e.g. Linsky, 1975; Schaefer and Dillman, 1998; Dillman, 1991).

4.9 Measurement model

Decisions about how to measure variables used in the study are one of the most important, influential decisions a researcher must make because they directly affect the reliability and validity of the collected data and the results. The proposed conceptual model includes EMCS as independent variables, environmental capabilities (i.e., organisational culture, environmental proactivity) as mediator variables, and environmental and financial performance as dependent variables. A considerable literature suggested using existing scales to capture the study's constructs (e.g. Frohlich, 2002; Flynn et al., 1990). The reason for the adoption of the existing scale is that its reliability and validity have already been demonstrated (Flynn et al., 1990; Bryman and Bell, 2015; Frohlich, 2002). Moreover, existing measurements can be used by researchers to verify the results of prior studies and add to the work of other researchers (Sekaran and Bogie, 2014). In addition, selecting a scale with established reliability and validity increases the reliability of the findings (Flynn et al., 1990). Therefore, an extensive review of existing literature on EMCS was conducted. Despite preferring to employ the same method, several measurements were slightly adapted to fit the current study situation.

An important issue associated with the measurement model development methods is the elaboration of the study construct. The elaboration of the study constructs determines whether the constructs are formative or reflective. Before discussing the measurements, the following subsections describe the main differences between reflective and formative constructs, guide standard, their specifications, and the result of the model is designation.

4.9.1 Formative construct versus reflective construct

The difference between formative and reflective measurements is important because the appropriate specifications for the measurement model are important for assigning substantial relationships in the structural model (Anderson and Gerbing, 1988). Formative and reflective constructs can be differentiated depending on various standards. First, the theoretical relation between a construct and its measurements is identified as a method of causality (Bollen and Lennox, 1991). The causal effects in reflective constructs flow from structure to measurement (Diamantopoulos and Winklhofer, 2001). If the construct changes, the measurements are supposed to change (Jarvis et al., 2003).

Alternatively, a reflective measurement is an observable sign or reflex of the constructs. By contrast, formative composition assumes that the flow of causality arises from the measurement of composition (Bollen and Lennox, 1991). Therefore, changing measurements is expected to change the constructs (Bollen and Lennox, 1989).

Secondly, reflective and formative constructs could be differentiated depending on the compatibility of their indicators. Reflective indicators are interchangeable, but formative indicators are not (Bollen and Lennox, 1991; Jarvis et al., 2003; Diamantopoulos and Winklhofer, 2001). As a result, discarding one of the formative indicators can significantly alter the conceptual area of the construct (Bollen and Lennox, 1991; MacKenzie et al., 2005). Unlike reflection indicators, formative indicators do not co-mutate with one another. Covariation between formative indicators is not required, but covariation between reflective indices is needed (Jarvis et al., 2003) because the reflective indicator is a representative sample of all potential indicators available within the conceptual domain of the construct, and the formative indicator captures various aspects of the construct domain (Hair et al. 2014b).

Lastly, formative and reflective constructs could be distinguished depending on whether their indicators have the same antecedent and outcome (Jarvis et al., 2003). All reflective indicators have the same antecedents and outcomes because they reflect the same underlying latent construct. Conversely, formative indicators do not always hold the same aspects of a construct field; thus, different sets of antecedents will affect different levels of indicators, and the indicators are expected to lead to different outcomes (MacKenzie et al., 2005). Jarvis et al. (2003) developed a comprehensive set of conceptual criteria that can be used to model structures as formative or reflective, as reported in Table 4.4.

Table 4. 4:Framework for assessing reflective and formative models: theoretical consideration.

Considerations	Reflective model	Formative model
Nature of construct	Exists of the latent construct. Latent construct occurs independent of the measures applied	▪ Latent construct is formed. ▪ Latent construct is a combination of its indicators
Direction of causality between items and latent construct	▪ Causality from construct to items ▪ Variation in the construct causes variation in the item measures. ▪ Variation in item measures does not cause variation in the construct	▪ Causality from items to construct. ▪ Variation in the construct does not cause variation. in the item measures ▪ Variation in item measures causes variation in the Construct
Characteristics of items used to measure the construct	▪ Items are manifested by the construct. ▪ Items share a common theme. ▪ Items are interchangeable. ▪ Adding or dropping an item does not change the conceptual domain of the construct	▪ Items define the construct. ▪ Items need not share a common theme. ▪ Items are not interchangeable. ▪ Adding or dropping an item may change the conceptual domain of the construct

Source: Jarvis et al. (2003; p. 203)

Researchers need to know how the construct from the literature is developed, specified, and validated. So, after a critical review of the literature review, this study includes five reflective constructs. The following section describes the measurement items for all constructs.

4.9.2 Measures of EMCS

EMCS is a first-order reflective construct measured on Likert scale from 5 points, 'not implemented=1' to 'fully implemented=5', applying items adapted from Malmi and Brown (2008), who suggested a framework of five management control practices of EMCS, namely, 1-planning controls (PLAN), 2-cybernetic controls (CYB), 3-reward and compensation controls (REW), 4-administrative controls (ADM) and cultural controls (CULT). These practices represent control tools, as supported by the EMA literature (Ittner and Larcker, 2001). The participants were asked about the extent to which EMCS practice is currently available in their company.

4.9.3 Measures of environmental capabilities

Consistent with prior studies, all environmental capabilities (i.e., environmental proactivity, organisational culture) are first-order reflective contracts. Environmental proactivity was measured on five-point scale ranging from ‘not implemented=1’ to ‘fully implemented=5’ by applying items from González-Benito and González Benito, 2005.

The participants were asked to determine what extent their firm integrates of environmental concerns into decision-making processes. In addition, organisational culture was measured using items adapted from Kalliath et al.’s (1999) CVF-based culture instrument. The 16-item scale included explanations of four principles associated with each of the four CVF culture domains. The 16 items were scored in a five-point Likert response format from ‘strongly disagree=1’ to ‘strongly agree=5’.

4.9.4 Measures of environmental and financial performance

Environmental performance is considered a first-order reflective construct measured on a Likert scale from 5 points ‘very small contribution=1’ to ‘very large contribution=5’ using 9 items adopted from Sharma and Vredenburg (1998) and validated by Henri and Journeault (2010). Respondents were asked to show how environmental practices have led to different types of benefits (e.g., reduced material costs, increased productivity, improve quality). The average score of 9 items was calculated. The higher the score is, the better the environmental performance.

Financial performance was measured using three widely used performance variables: return on investment, operating profits and cash flow from operations. Participants were asked to show the performance of their company over the past 12 months compared with their leading competitors based on a five-point Likert-type scale (well below average=1, well above average=5). A higher score shows better financial performance.

4.9.5 Measures of the control variable

firm size and age were chosen in this study as control variables for several reasons. Firstly, because of their potential associations between the two independent variables. secondly, the effects of these variables were documented in previous environmental management and accounting studies (Al-Tuwaijri et al., 2004). Finally, these variables are a combination of

internal and general organizational factors and specific environmental factors. The total number of employees in the respondents' firms was used to calculate the firm size . The number of years the business has been in service was used to determine its age.

4.10 Data analysis and techniques

This section provides a brief overview of the data analysis measures and statistical methods used. Data collected was analyzed in four steps. SPSS version 20 was used for sample description, data screening, and measurement model evaluation. In the final stage, structural equation modelling (SEM) and moment structure analysis (AMOS) version 23 were applied to perform structural modelling (that is, hypothesis testing). This statistical method is considered one of the most important because it provides a high standard of accuracy needed for theory development (Hair et al., 2010). More details about the results and findings are provided in Chapter 5.

4.10.1 Sample strategy

The study required the involvement of a randomly selected large industrial company based in Jordan. Frequency analysis and descriptive analysis were used to understand the nature of the sample better. This analysis provided data about respondents, their gender, age and work history, and general information on the industry areas of the participating companies.

4.10.2 Data screening

The data screening phase identifies and processes missing data, detects and manages outliers, checks for non-response biases, scrutinises the variance of common methods and presents assumptions for multivariate analysis (i.e., normal gender, multicollinearity and homodispersity).

Missing value analysis (MVA) was employed to determine the amount and pattern of missing data, replacing potential missing data with the mean of the same variables obtained from valid responses. The z-scores of the variables were taken to find and process outliers, and values outside the range of ±3.29 (Tabachnick and Fidell, 2014) were used as indicators of outliers. Harman’s (1967) single-factor test was applied to identify potential common method variance. Finally, kurtosis and skewness were used to

check linearity and examine the assumptions of multivariate analysis, and Pearson's correlation and variance inflation coefficient (VIF) were used to examine multicollinearity. Kurtosis and skewness of study variables within ±2.58 were considered indicators of normally distributed data (Tabachnick and Fidell, 2014). A VIF value of ≥0.5 was utilised as the threshold to detect multicollinearity (Hair et al., 2014).

4.10.3 Evaluating the reflective measurement model

The reflective measurement model was then tested in terms of its reliability and validity. Reliability indicates the degree of consistency amongst different measurements of the same construct, whereas validity indicates the degree to which a construct is accurately represented by the corresponding measurements (Hair et al., 2014a). Cronbach's alpha (Cronbach, 1951) and composite reliability (Werts et al., 1974) are generally used to check for reliability. Some researchers, such as Hair et al. (2014a) and Nunnally (1978), proposed that a Cronbach's α of 0.70 indicates acceptable reliability.

The content validity, convergent validity and discriminative validity of the reflective measurement model were then measured following the procedures of Hair et al. (2010). Specifically, the content validity of the model was verified by conducting an extensive literature review and identifying from the literature several measures that can accurately reflect a given construct (Cooper and Schindler, 2001). Next, the proposed questionnaire was evaluated by scholars and experts in the area of EMCS

Convergent validity indicates the degree to which all composition measurements are showing a large variance (Hair et al., 2010) and are tested by using the average variance extracted (AVE) and the standardized factor loadings of the measures (Hair et al., 2010).

Discrimination validity indicates the degree of difference between one construct and the others (Hair et al., 2010). This type of validity was assessed following the criteria proposed by Fornell and Larcker (1981). If the AVE value is more than the square root of the bivariate correlation with another construct, then the construct creates discriminant validity (Fornell and Larcker, 1981). The reliability and validity tests are described in detail in the following chapter, and the rest of this section presents some background about the data analysis techniques and software used in this study.

4.10.4 Structural equation modelling

This study empirically tests the relationships amongst EMCS, environmental proactivity, organizational culture, environmental and financial performance via structural equation modelling (SEM) and by using the AMOS software version 23. In SEM, a confirmatory approach (i.e. hypothesis test) is adopted to analyse a structural theory concerning a certain phenomenon. This approach usually involves making causal observations about the variables (Bentler, 1988).

Academics in social science tend to adopt SEM given that this approach effectively addresses the limitations of first-generation statistical methods, including multiple regression and cluster analysis. SEM is suitable for structural equation sequences, interaction modelling, latent variable measurement errors, correlated independent variables and multiple independent and dependent variables measured by several indicators. Given these advantages, SEM was employed in this study to examine the relationships amongst several variables at the same time.

Two types of models, namely, structural and measurement models [confirmatory factor analysis (CFA)], are often employed in SEM (Hair et al., 2010). On the one hand, the structural model examines the hypothesised connections amongst constructs (latent variables or factors) by pinpointing those constructs that directly or indirectly affect another (Hair et al., 2010). An SEM procedure using the structural model is generally divided into two steps. Firstly, the measurement model is validated. Secondly, the structural model is fitted. On the other hand, the measurement model is used to validate a set of measurements and assumes that a single theory governs the relationships amongst constructs.

In this study, those variables that were built into a model were considered latent (unobservable) variables that were measured by using the selected theory, the proposed model and several other indicators. The literature review produced several indicators that, according to the CFA results, were assigned to the components or latent variables. Each of these components and latent variables was assigned two to three indicators. Common factor analysis or principal factoring was then performed on a large representative sample to

validate the measurement model (CFA) by extracting a list of indicators and their constructs (latent variables) to which they were assigned.

To achieve an acceptable model fit, several models were created and compared. Model fit refers to the degree of consistency between the model-predicted covariance and the covariance observed in the data. This study employs several goodness-of-fit indices (GFIs) for assessing model fit, including chi-square (X^2) to degrees of freedom [Df], comparative fit index (CFI), Tucker–Lewis Index (TLI), and root mean square error of approximation (RMSEA). Critical ratios (t-values), critical values (p-values) and standardised estimates were used to test the hypotheses, as will be described in Chapter 5.

4.10.5 Rationale for selecting SEM.

As a general-purpose technique, SEM evaluates the relationships amongst structures by comparing the characteristics of first-generation statistical techniques, including regression and factor analyses (Hair et al., 2014; Bagozzi and Yi, 2012). This second-generation technology was adopted in this study for several reasons.

Firstly, SEM measures each variable (or latent variable/construct) and minimises measurement errors by using multiple indicators (Hair et al., 2014). Secondly, researchers can study multiple dependencies (e.g. causalities) amongst constructs at the same time and analyse structural equations by using SEM (Hair et al., 2010). Thirdly, this hybrid model can highlight the direction of effect amongst the study constructs and indicate how much one construct influences the others (Tabachnick and Fidell, 2014).

Fourthly, the presence of mediating variables (representing indirect effects) amongst dependent and independent variables is permitted in SEM. By considering direct and indirect effects, SEM effectively points towards the causes and effects of each exogenous variable. In this study, the direct effects are from exogenous to endogenous variables, which suggests the direct effect of the EMCS on environmental and financial performance. The indirect effect comes from the exogenous variables to the endogenous variable using mediating factors such as the indirect effects of EMCS and performance via the environmental capabilities as a mediating variable.

Finally, SEM makes efficient use of CFA to test the quality of measurement and structural models (Hair et al., 2010). Amongst its multiple programmes (e.g. linear structure relationship, equations and AMOS), researchers prefer to use AMOS due to its capabilities in GFI, preliminary analysis, parameter estimation and model specifications. Introduced by Abuckle (1977), AMOS offers its users an easy-to-use GUI and allows them to build structural models and highlight the relationships amongst their constructs. AMOS version 23 was utilised for SEM in this study, and the results were graphically illustrated. AMOS has also attracted wide usage in management accounting research adopting SEM. The next chapter presents more details about the adopted SEM analysis method.

4.11 Research ethics

Research ethics revolve around how researchers conduct their study and present their results in accordance with the values and rules underlying the Code of Conduct (Collis and Hussey, 2014). Unlike those in other fields, social science studies are generally harmless to their human participants yet on some occasions bring them distress (Bell and Bryman, 2007), such as affecting their career prospects, chances for future employment and overall growth (Grandall, 1978). To avoid these negative effects, the identities of the study participants and their respective organisations should be kept confidential at all times. In business research, Bell and Bryman (2007) defined anonymity as concealing the names and other identifiers of research participants and described confidentiality as something that 'relates to the protection of information provided by study participants from other parties' (Bell and Bryman, 2007; p. 69).

For ethical reasons, the data of the participants, including their experience, gender and age, as well as their manufactures, including their organisational units and types of sections, were kept confidential all throughout the study period. Each respondent was given a cover letter (Appendix B) that summarises the objectives of the study and informs them about the value of their contributions to the completion of the study. Through these letters, the authors also offered the participants a guarantee that their identities and answers will be kept confidential and that they are free to terminate their participation at any time in line with the recommendations outlined in Brunel University London's Code of Research Ethics. The researchers also sought the approval of the University Research Ethics

Committee of Brunel University for all their activities that involve human subjects. Before collecting any data, an ethical form signed and filled out by the research supervisor was submitted to the committee and was met with their formal approval (Appendix A).

4.12 Conclusion

This chapter elaborates the research methodology employed to examine the proposed conceptual framework. The positivist research paradigm was implemented after careful discernment of its philosophical premise, such as the interpretive paradigm. A deductive approach and a cross-sectional survey strategy were adopted to examine the hypotheses associated with the theoretical model developed in this study.

A random sample of 1,000 large manufacturing companies in the various industrial sector in Jordan was established. The survey was selected as the data collection method considering the observations associated with the overall objectives of the study and the limitations associated with the interview method. A thorough review of the relevant literature was conducted, and information was provided for the robust development and design of a user-friendly questionnaire. Two types of measurement model (i.e., formative and reflective construct) were distinguished critically; thus, the reflective measurement model was adopted following the previous research. The survey was pre-tested by academics in the management accounting field before being pilot tested with resemblance respondents to the targeted population. The survey was finally administrated by email after carefully considering the advantages and disadvantages of the other delivery approaches (e.g., phone and face to face).

Chapter five: Data analysis and results

5.1 Introduction

The aim of this research is to investigate the impact of environmental management control system on environmental capabilities (organization culture and environmental proactivity) and investigate the mediation impact of environmental capabilities (i.e., organisational culture, environmental proactivity) on the relationship between EMCS and environmental and financial performance. The earlier chapter outlined the methodology used in this research. This chapter presents the findings of data analysis.

This chapter is structured as follows: Section 5.2 presents the Sample description. Section 5.3 explains the process of screening and examining data for missing values, potential outliers, non-response bias, common method variance and its appropriateness for multivariate analysis. Section 5.4 evaluates the measurement model in terms of unidimensionality, reliability and validity by applying the statistical package of AMOS version 23. Section 5.5 describes the structural model analysis testing and briefly presents the research's hypotheses results. Finally, Section 5.6 summarises the chapter.

5.2 Sample description

The prior chapter described the design and execution of the study that applies to this research. This section provides further information on the questionnaire instrument applied in this research. A total of 1,000 major manufacturing1 firms based in Jordan were randomly selected for this analysis. Large manufacturing companies were chosen because they are better able to invest and adopt socially responsible practices (Hsiao et al., 2014). Of the 1,000 questionnaires, 251 responses were received, and the response rate was 25.1%. This rate is comparable to that in similar research (e.g., Locke, 2005; Widener, 2007; Peter G. Roetzel et al., 2018). In order to gain a greater understanding of

[1] Large manufacturing companies (>250 employees)

this sample, we used frequency and descriptive analyses. Tables 5.1 to 5.3 present the sample details in terms of respondent's age, gender, company age and industry.

The completed survey was achieved from 251 respondents over three months. Table 5.1 shows respondent demographics and frequencies related to age, gender and years of experience. Respondents' age scope is weighted to a young age cluster between 20 and 29 years old (n=36, representing 14.3%) and 30 to 39 (n=97, representing 38.6%). The highest response is from groups aged between 40 and 49 years old (n=118, representing 47%). Responses according to the gender of eligible respondents are broken down into male (n=190, representing 75.7%) and female (n=61, representing 24.3%).

Table 5.1: Demographics of respondents

Category	Frequencies	Percent
Gender		
Female	61	24.3
Male	190	75.7
Age		
20–29	36	14.3
30–39	97	38.6
40–49	118	47

In terms of age, measured by years of employment, the companies are distributed in four categories, as shown in Table 5.2. The majority of the companies (n=160, representing 63.7%) have been in business for over 10 years, followed by companies that have been in business for 7 to 10 years (n=42, 16.7%) and companies aged 3 to 6 years (n = 33, 13.1%). Only 16 companies (6.4%) have been in business for less than two years. Overall, we can conclude that the companies included in the current sample are proven companies that have been operating for several years.

Table 5.2: Age of participating firms

Firm age	Frequency	%
Less than two years	16	6.4
3–6 years	33	13.1
7–10 years	42	16.7
More than 11 years	160	63.7

The participating companies in the industrial sector are spread around ten separate manufacturing sectors, as shown in Table 5.3. The majority of the participating companies work in the food industry, agricultural and animal stock industries (n=53, representing 21.1%), followed by the response received from firms in Chemical and cosmetic preparations (n=47, 18.7%). Engineering, electric and information technology, and mining firms are all represented similarly in the sample (n=24, 9.6%).

Table 5.3 lists the remaining sectors, along with their frequency and percentages.

No	Industry	Frequency	Percentage
1	Textile and readymade garment industries	7	2.8
2	Therapeutic industries and medical supplies	8	3.2
3	Engineering, electric and information technology industries	24	9.6
4	Plastic and rubber industry	14	5.6
5	Chemical industries and cosmetic preparations	47	18.7
6	Paper, carton and office equipment industries	15	6.0

7	Food, agricultural and animal stock industries	53	21.1
8	Construction industry	18	7.2
9	Wood and furniture industries	11	4.4
10	Mining industries	24	9.6
11	Other	30	12.0

5.3 Data screening

Data analysis starts with data screening because this is an initial step in any field of analysis where the researchers code and clean the data, evaluate the effects of missing data, detect and handle outliers, check for non-response bias, examine common method bias and investigate assumptions of multivariate analysis (Tabachnick and Fidell, 2014, Hair et al., 2014a, Podsakoff et al., 2003). As mentioned earlier, the main purpose of these tests is to detect what is invisible because hidden effects can be easily ignored.

5.3.1 Data coding and editing

data coding involves assigning predetermined codes to responses in order to facilitate processing and analysis. This is often a necessary stage in data file production. According to this study, the accuracy of the data file was evaluated in several steps. Firstly, a codebook was prepared for encoding all the participants' responses into a data file (Pallant, 2013). In the preparation, each categorical and continuous variable was labelled and defined, and the available responses to each question in the survey were numerically coded (Pallant, 2013). Secondly, in the data window, the contents of the main data file were matched with those of the computerised data file (Tabachnick and Fidell, 2014). Thirdly, the observations regarding the study variables were examined by generating descriptive and frequency statistics (Tabachnick and Fidell, 2014).

5.3.2 missing data analysis

Respondents generate missing data when they answer questions in the survey, yet their responses were not taken into account (Hair et al., 2014a) due to problems in the data collection, inaccurate entry of information or the refusal of respondents to answer these

questions (Hair et al., 2014a). These missing data not only affect the generalisability of findings but may also lead to biased results (Tabachnick and Fidell, 2014, Hair et al., 2014a). To eliminate missing data, researchers should examine their underlying patterns and relationships (i.e. randomness) and count how many values are missing from their datasets (Tabachnick and Fidell, 2014, Hair et al., 2014). A random distribution of missing values throughout a dataset is generally preferred, and a non-random distribution may lead to biased results (Tabachnick and Fidell, 2014).

The descriptive statistics for the missing data of each variable are presented in Table 5.4. The variable, planning and organisational practices and operational practices, has the largest number of missing data (2 or 0.8%).

Researchers have not yet reached an agreement as to which percentage of missing values is considered acceptable for deriving statistical inferences that are free from bias. For instance, Schafer and Olsen (1998) and Tabachnick and Fidell (2014) considered a 5% missing data rate negligible, whereas Hair et al. (2010) proposed a much higher percentage of less than 10%. Hair et al. (2014b) added that a large percentage of missing responses for a single contract might require the deletion of some observations even if the percentage of missing data is maintained below 15%.

Results of MVA tests reveal that missing data are completely random by nature ($p>.05$, $p=.61$), thereby avoiding biases and producing no hidden influences on the results. In this case, these missing data can be easily addressed (Hair et al., 2010). For instance, those missing data based on valid responses can be replaced with variable means (Hair et al., 2010, Tabachnick and Fidell, 2007).

Table 5. 4: Descriptive statistics of missing values

Variables		N	Mean	Std. Deviation	Missing	
					Count	Percent
EMCS	PLAN[1]	251	3.6235	.90038	1	.4
	CYB	251	3.7311	.93509	1	.4
	REW	251	3.1574	.93602	1	.4
	ADM	251	3.2729	.94985	1	.4
	CULT	251	5.4323	1.45238	1	.4
Environmental proactivity	PLANING	250	3.7080	.81954	2	.8
	OPER	250	3.7720	.86995	2	.8
	COMM	251	3.8486	.86877	1	.4
Organizational culture	Hierarchy Culture	251	4.1335	.61450	1	.4
	Market culture	251	3.9781	.65347	1	.4
	Clan culture	251	3.9114	.66735	1	.4
	Aldocracy culture	251	4.0159	.68136	1	.4
Financial performance	F performance	251	3.0930	1.03676	1	.4

[1] PLAN= Planning controls; CYB= Cybernetic controls; REW= Reward and compensation controls; ADM= Administrative controls;CULT= Cultural controls;PLANIN= planning and organisational practices ; OPER=operational practices; COMM=Communication practice.

Environmental performance	E performance	251	4.0407	.59072	1	.4

5.3.3 Identification of outliers

Outliers are extreme observations that are substantially different (i.e., have extreme values) from the remaining observations in the dataset for one or more variables (Tabachnick and Fidell, 2014, Hair et al., 2014a, Field, 2009). Outliers can cause Type I and II errors, resulting in misleading conclusions about hypothetical relationships (Tabachnick and Fidell, 2014). Pallant (2013) argued that outliers might be detected if the data have a normal distribution and exceed three box lengths from the end of the box plot, for example, three standard deviations from the mean.

Outliers can be caused by mistakes in coding or data entry (Hair et al., 2014a). In any case, checking back an arranged codebook is vital (Pallant, 2013) to assess the method of sending the response to SPSS (Tabachnick and Fidell, 2014). A few researchers prescribed removing all outliers from the dataset, whereas other researchers proposed changing the values to non-extreme ones and counting them (Tabachnick and Fidell, 2014).

All raw data were converted into standardised scores to detect potential outliers, where the mean of the data is 0, and the standard deviation is 1 (Tabachnick and Fidell, 2014, Hair et al., 2014a). Consistent with Tabachnick and Fidell (2014), outliers are observations with a standardised score of 3.29 or higher. Table 5.5 shows the Z scores for all variables[1]. All Z scores for the variables are within ±3.29 limits.

[1] The z-score is a method that uses mean and standard deviation values to detect outliers in the data set. The main basis of this rule is that X has a normal distribution; therefore, z has a standard normal distribution. When the integer values of z-scores exceed 3, the corresponding observation value is detected as an outlier.

Table 5. 5: Z-scores of constructs

Construct		N	Z-scores	
			Minimum	Maximum
EMCS	PLAN	251	−2.91	1.52
	CYB	251	−2.92	1.35
	REW	251	−2.30	1.96
	ADM	251	−2.39	1.81
	CULT	251	−2.70	1.42
Environmental proactivity	PLANING	251	-3.15	1.57
	OPER	251	-3.18	1.41
	COMM	251	-3.22	1.32
Organizational culture	Hierarchy culture	251	-3.14	1.41
	Market culture	251	-2.74	1.56
	Clan culture	251	-3.25	1.63
	Aldocracy culture	251	-2.65	1.44
Financial performance	F performance	251	-2.01	1.83
Environmental performance	E performance	251	−2.77	1.63

5.3.4 Assumptions of multivariate analysis.

According to Hair et al. (2014a), before analysing the data, their compliance with the statistical assumptions that underlie various techniques for multivariate analysis needs to be evaluated for two reasons. Firstly, when the statistical assumptions are not satisfied, the complex relationships in the multivariate analysis will increase the possibility for biases and distortions to emerge from the data. Secondly, these complexities prevent researchers from detecting possible violations of the statistical assumptions in univariate analyses. In multivariate analysis, the underlying assumptions commonly include multicollinearity, linearity, homoscedasticity and normality (Tabachnick and Fidell, 2014; Hair et al., 2014a), which are examined in the following sections.

5.3.4.1 Normality assumption

A major assumption in multivariate analysis, normality highlights the degree to which the distribution of data is considered normal. A distribution that is significantly non-normal can either negate or distort the results of other statistical tests (Hair et al., 2014a). Normality is often tested in two levels, namely, the univariate (distribution of scores at the item level) and multivariate levels (distribution of scores for two or more items combined).

The descriptive analytic functions in SPSS were used to generate kurtosis and skewness statistics, which were then used to test the normality assumption (Tabachnick and Fidell, 2014; Hair et al., 2014a). Skewness reflects the degree to which the distribution is symmetrical or shifts to either the right or left (Andersen et al., 1982), whereas kurtosis indicates the degree to which the distribution is 'peak' or 'flat' relative to normal (Hair et al., 2010). Kurtosis or skewness that maintains a 0 value or excessively high levels for an extended period is reflective of a deviation (Hair et al., 2014a). A negative skewness value indicates a distribution shifted to the right, and a positive value indicates a distribution shifted to the left. Similarly, negative kurtosis shows a flatter distribution, and positive kurtosis shows a peak distribution (Tabachnick and Fidell, 2014). However, skewness and kurtosis values within the limits of ±2.58 suggest an acceptable level of deviation from the normal; Tabachnick and Fidell, 2014; Hair et al., 2014a).

Table 5. 6: Normality test

	variables	**Std. deviation**	**skewness**	**kurtosis**
EMCS	PLAN	0.90	-0.49	-1.30
	CYP	0.94	-0.75	0.13
	REW	0.93	-0.36	-0.32
	ADM	0.95	-0.35	-0.58
	CULT	1.45	-0.73	-0.17
Environmental proactivity	PLANING	0.81	-1.15	1.50
	OPER	0.86	-0.94	0.84

	COMM	0.87	-1.17	1.72
Organizational culture	Hierarchy culture	0.62	-0.66	0.56
	Market culture	0.66	-0.75	1.49
	Clan culture	0.70	-0.66	1.17
	Aldocracy culture	0.69	-0.93	1.62
Financial performance	F performance	1.03	-0.23	-1.03
Environmental performance	E performance	0.88	-0.75	0.95

The skewness and kurtosis values of the study constructs are shown in table 5.6. The skewness and kurtosis values for all study constructs are within the acceptable range of ±2.58. Consequently, the results show that the data are normally distributed.

5.3.4.2 Multicollinearity assumption

Multicollinearity indicates the degree of extremely high correlations amongst exogenous or independent variables (Hair et al., 2014a), which will influence the validity of the model results, increase the standard error of the regression coefficient and prevent researchers from identifying the most important coefficients (Tabanic and Fidel, 2014; Hair et al., 2010).

The potential multicollinearity amongst variables is often tested based on VIF and tolerance values (Hair et al., 2014b). Whilst tolerance indicates the degree of variance amongst exogenous variables that cannot be explained by the other exogenous variables in the model (Hair et al., 2014), VIF reflects how much the collinearity amongst variables increases the standard errors (Hair et al., 2014). As presented in Table 5.7, all variables have tolerance values above 0.2 and VIF values below the 5.0 threshold, thereby suggesting that multicollinearity does not present an issue in this study (Hair et al., 2014).

Table 5. 7: Multicollinearity statistics

	Model	**Multicollinearity measures**	
		Tolerance	VIF
EMCS	PLAN	0.37	2.61
	CYP	0.26	3.79
	REW	0.37	2.69
	ADM	0.36	2.75
	CULT	0.30	3.37
	PLANING	0.27	3.70
Environmental proactivity	OPER	0.24	4.17
	COMM	0.25	3.95
Organizational culture	Hierarchy culture	0.57	1.75
	Market culture	0.26	1.06
	Clan culture	0.27	3.26
	Aldocracy culture	0.35	2.79
Financial performance	F performance	0.47	1.3
Environmental performance	E performance	0.63	1.57

5.4 Measurement model

Structure Equation Modelling (SEM) is the recent method in the Confirmatory Factor Analysis (CFA) technique in social science study (Worthington and Whittaker, 2006). CFA is deemed the strongest tool in contrast to multiple regression (Kline, 2015, Byrne, 2001).

CFA considers the modelling of correlated error terms and independents, measurement errors, non-linearities and multiple latent independents that are measured by multiple indicators and integrates error variance into the research model to efficiently estimate the coefficients and investigate the variances. Consequently, following the recommendations of Hair et al. (2010), the validity of CFA (measurement model) needs to be evaluated in two stages: (1) construct validity approach indices and (2) goodness of fit indices. Therefore, this study examined these two steps to validate the CFA.

5.4.1 CFA procedure

According to classical test theory, CFA can be used to test a reflective measurement model. Each construct must be measured for unidimensionality, reliability and validity to assess discriminant validity and convergent validity by CFA as a statistical method and determine the extent to which the observed variables meet the expecting factor structure (Hair et al., 2014a).

In CFA, two theoretical issues need to be addressed. Firstly, the observed structure must be evaluated for its conceptual validity, and each expected factor should be sufficiently captured by the variables (Hair et al., 2014a; Tabachnick and Fidell, 2014). Afterwards, each variable is linked to predictable factors based on the results of a comprehensive literature review. These variables should capture at least three predictable factors (Hair et al., 2010). Secondly, the sample should be tested for its homogeneity, and variances in the factor structures of the observed variables should be addressed (Tabachnick and Fidell, 2014). The survey sample used in this study demonstrated homogeneity as it only comprised public companies having more than 250 employees.

According to Hair et al. (2014a), researchers should meet two statistical assumptions in turn before performing factor analysis. Firstly, they should have a sufficient number of samples for building a correlation matrix. Secondly, they should ensure that the observed variables have a sufficiently large cross-correlation.

To determine the suitability of their data for CFA, previous studies have often performed Kaiser–Meyer–Olkin (KMO; Kaiser, 1974) and Bartlett's tests (Hinton et al., 2004). The KMO test (Kaiser, 1974) was applied to examine the validity of the observed variables. KMO shows the sum of squared correlations relative to that of squared partial correlations

(Tabachnick and Fidell, 2014). A higher KMO value corresponds to the higher validity of data for building a correlation matrix, and a KMO value of no lower than 0.50 essentially confirms the validity of the observed variables. The KMO value of the variables employed in this study was 0.81, as shown in Table 5.8, thereby confirming their suitability for building the correlation matrix.

Bartlett's test

Bartlett's test was applied to determine whether a sufficient level of cross-correlation exists between the variables observed in the factor analysis. Bartlett's sphericity test was performed to emphasise the link between variables (Hair et al., 2010). Generally, when Bartlett's sphericity test is important ($p \leq 0.05$), the observed variables are correlated in the population. The observed variables in the population are uncorrelated if the test is not significant ($p > 0.05$). Table 5.8 indicates that the results of this study suggest Bartlett's test (p0.05), indicating a significant degree of cross-correlation among the observed variables that is appropriate. The discussion above demonstrates that the statistical and theoretical assumptions of factor analysis are met, indicating that the data is sufficient for factor analysis.

Table 5. 8: KMO and test Bartlett's test

KMO and Bartlett's Test		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		.810
Bartlett's Test of Sphericity	Approx. Chi-Square	465.155
	df	10
	Sig.	.000

5.4.1.1 Reliability of research constructs

Reliability measures the degree of conformity of indicators when measuring a particular construct (Sekaran and Bogie, 2014). As an important aspect of reliability, internal

conformity denotes the degree of homogeneity amongst a group of indicators (Bagozzi, 1981). Such conformity is measured based on composite reliability and Cronbach's α coefficient (Werts et al., 1974), which measures the average cross-correlation between those indicators that are intended for capturing the same construct (Sekaran and Bogie, 2014). The value of Cronbach's α ranges between 0 and 1, with a value closer to 1 indicating better internal conformity (Sekaran and Bogie, 2014). A Cronbach's α of 0.7 is generally considered acceptable in previous studies (e.g. Hair et al., 2014a, Nunnally, 1978). However, the value of Cronbach's α may increase along with the number of indicators considered in a study, given that its value indicates the average cross-correlation amongst these indicators. In this case, the ideal Cronbach's α value for measuring constructs in exploratory research was reduced to 0.6 (Hair et al., 2014a), and a Cronbach's α value of 0.5 was generally accepted in studies employing a small number of indicators (Cortina, 1993). The Cronbach's α values for all indicators in this study ranged from 0.90 to 0.93, as reported in Table 5.9, thereby indicating adequate internal conformity.

Composite reliability is computed as the ratio of the squared sum of the standardised loadings of all indicators to that of the squared sum plus the total variance in the measurement error (Bagozzi and Yi, 1981). In this case, compared with Cronbach's α, this measure is less sensitive to the number of indicators. The value of composite reliability ranges between 0 and 1, with a larger value indicating a higher internal consistency (Hair et al., 2014b). Confirmatory studies generally deem a value of 0.7 as indicative of an acceptable level of internal conformity (e.g. Hair et al., 2014a, Nunnally, 1978). The composite reliability values for the constructs employed in this study ranged from 0.81 to 0.93, as shown in Table 5.9, thereby indicating a satisfactory level of internal consistency.

Table 5. 9: Properties of the measurement model

	Constructs and Indicators	Standard Error	Cronbach Alpha	Composite Reliability	AVE
EMCS	EMCS		**0.934**	**0.94**	**0.53**
Planning controls	Q1	0.77		0.77	0.63
	Q2	0.82			
Cybernetic controls	Q3	0.771		0.80	0.57
	Q4	0.76			

	Q5	0.74			
Reward and compensation control	Q6	0.76		0.68	0.52
	Q7	0.687			
Administrative controls	Q8	0.81		0.68	0.64
	Q9	0.79			
Cultural control	Q10	0.75		0.77	0.62
	Q11	0.83			
Environmental proactivity	Environmental proactivity		**.922**	**0.91**	**0.50**
Planning and organization practice	Q12	0.77		0.83	0.50
	Q13	0.63			
	Q14	0.67			
	Q15	0.78			
	Q16	0.46*[1]			
	Q17	0.59*			
	Q18	0.68			
Operational practices	Q19	0.63		0.81	0.52
	Q20	0.72			
	Q21	0.77			
	Q22	0.76			
Operational practices	Q23	0.77		0.81	0.51
	Q24	0.69			
	Q25	0.76			
	Q26	0.63*			
Environmental performance	Environmental performance		**0.92**	**0.90**	**0.50**
	Q27	0.75			
	Q28	0.66			
	Q29	0.67			
	Q30	0.68			
	Q31	0.67			
	Q32	0.78			
	Q33	0.68			
	Q34	0.77			
	Q35	0.69			
Organization culture	Organization culture		**0.927**	**0.81**	**0.53**

[1] *:Item deleted

Hierarchy culture	Q36	0.49*		0.76	0.52
	Q37	0.80			
	Q38	0.70			
	Q39	0.66			
Market culture	Q40	0.75		0.75	0.50
	Q41	0.50*			
	Q42	0.66			
	Q43	0.71			
Clan culture	Q44	0.74		0.81	0.52
	Q45	0.81			
	Q46	0.64			
	Q47	0.69			
Aldocracy culture	Q48	0.78		0.79	0.56
	Q49	0.75			
	Q50	0.73			
	Q51	0.47*			
financial performance	Economic performance		**0.924**	**0.91**	**0.77**
	Q52	0.889			
	Q53	0.881			
	Q54	0.867			

5.4.1.2 Validity

Whilst reliability specifies how a construct should be measured; validity specifies which construct should be measured (Hair et al., 2014a). Validity refers to the degree to which an indicator actually measures the constructs which it is trying to measure (Peter, 1981). Validity comes in three forms, as discussed below.

1. Content validity

Content validity (or facial validity) deals with a subjective assessment to the extent that a group of indicators that capture a construct is appropriate and represents the theoretical field of that specific construct (Sekaran and Bogie, 2014, Hair et al. 2014a). Two successive steps were followed to establish the validity of the content of the study components. Firstly, the related literature on environmental capabilities and performance and ECMS was comprehensively evaluated to gather enough information about the measurement model and to ensure a robust model development. Secondly, a pilot survey was conducted amongst academics experienced in the field of EMCS.

2. Convergent validity

Convergent validity refers to how much alternative measurements of the same construct are positively correlated with one another (Hair et al., 2014a). In this case, convergent validity is established when these measurements have a high and uniform intercorrelation (Bagozzi, 1981). The convergent validity of the measurements employed in this study was measured by using AVE and factor loading. The standardised factor loadings highlight a correlation between various indicators and their components (Hair et al., 2014a). All standardised regression weights are required to exceed 0.50 in factor loading. The standardised loadings of all indicators used in this study on their respective constructs exceed 0.50, as shown in Table 5.9.

$$\text{AVE} = \frac{\sum_{i=1}^{n} Li^2}{n}$$

[1]

3. Discriminant validity

Discriminant validity ensures that the constructs are not measuring the same indicator and are not highly correlated. Both construct and its indicators should be different from other construct and their indicators. To assess the discriminant validity of the constructs, we adopted two methods, namely the cross-loadings method and AVE method. cross loadings method can be established by confirming higher loadings of indicators on their specified construct in comparison with their loadings on other constructs (Hair et al., 2010). Second, according to Fronell and Larcke'r's criteria, it was claimed that a construct can establish discriminative when a specific construct has a greater square root of mean variance extracted than standardised correlation (Fornell and Larcker, 1981). The correlation between constructs can be used to test discriminant validity by evaluating whether there is a very large correlation indicating that the model has a discriminant validity problem. In addition, as reported in Table 5.10, although some variables correlate highly (such as

[1] Note: In the above formula, λ represents factor loadings (standardised regression weights), and i represents the total number of items.

culture control, 0.77), all of the research correlations had a value of less than the recommended cut off of 0.90 (Bagozzi et al., 1991). Table 5.11 shows the root of mean variance in the diagonal line and the correlation between constructs of each construct. The AVE value is higher than correlation between any construct and other constructs (i.e., below the diagonal).

Furthermore, as reported in Table 5.9, based on the Fronell and Larcker (1981) formula, all constract clarified for more than 50% of the variance, range from 0.50 to 0.77 which met the recommendation that AVE values should be at least 0.50 for each construct (Hair et al., 2010; Holmes-Smith, 2001). Hatcher (1994) states that it is common for AVE to be estimated less than 0.50 for small sample sizes, even if reliability is acceptable. Therefore, the measurements show a significant level of discriminant validity between constructs. Table 5. 10: Correlations between study constructs

	A	B	C	D	E	F	G	H	I	J	K	L	M	K
Planning Controls(A)	1													
Cybernetic(B)	.651**	1												
Reward (C)	.614**	.726**	1											
Administrative Controls(D)	.622**	.710**	.686**	1										
Cultural controls(E)	.684**	.770**	.703**	.730**	1									
The planning(F)	.479**	.525**	.486**	.441**	.475**	1								
Operasional(G)	.419**	.481**	.496**	.435**	.417**	.508**	1							
Communication(H)	.489**	.544**	.479**	.491**	.466**	.597**	.619**	1						
Hierarchy Culture(I)	.441**	.422**	.383**	.464**	.421**	.338**	.381**	.396**	1					
Market culture(J)	.343**	.284**	.280**	.316**	.300**	.242**	.218**	.251**	.650**	1				
Clan clutre(K)	.369**	.386**	.347**	.399**	.368**	.329**	.281**	.321**	.627**	.677**	1			
Aldocracy(L)	.443**	.431**	.390**	.441**	.461**	.347**	.267**	.353**	.589**	.685**	.696**	1		

Financial performance(M)	.365**	.291**	.293**	.267**	.303**	.331**	.319**	.347**	.266**	.093	.261**	.315**	1	
Environmental performance(N)	.425**	.392**	.366**	.429**	.397**	.325**	.333**	.357**	.301**	.256**	.322**	.254**	.204**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.11: Discriminant Validity

	A	B	C	D	E	F	G	H	I	J	K	L	M	K
Planning Controls(A)	**0.73**													
Cybernetic(B)	.651**	**0.87**												
Reward (C)	.614**	.726**	**0.72**											
Administrative Controls(D)	.622**	.710**	.686**	**0.80**										
Cultural controls(E)	.684**	.770**	.703**	.730**	**0.79**									
The planning(F)	.479**	.525**	.486**	.441**	.475**	**0.70**								
Operasional(G)	.419**	.481**	.496**	.435**	.417**	.508**	**0.72**							
Communication(H)	.489**	.544**	.479**	.491**	.466**	.597**	.619**	**0.72**						
Hierarchy Culture(I)	.441**	.422**	.383**	.464**	.421**	.338**	.381**	.396**	**.72**					
Market culture(J)	.343**	.284**	.280**	.316**	.300**	.242**	.218**	.251**	.650**	**.71**				
Clan clutre(K)	.369**	.386**	.347**	.399**	.368**	.329**	.281**	.321**	.627**	.677**	**0.72**			
Aldocracy(L)	.443**	.431**	.390**	.441**	.461**	.347**	.267**	.353**	.589**	.685**	.696**	**0.75**		
Financial performance(M)	.365**	.291**	.293**	.267**	.303**	.331**	.319**	.347**	.266**	.093	.261**	.315**	**0.88**	

Environmental performance(N)	.425**	.392**	.366**	.429**	.397**	.325**	.333**	.357**	.301**	.256**	.322**	.254**	.204**	**0.71**

**. Correlation is significant at the 0.01 level (2-tailed).

Note : Bold numbers are the square root of AVE for each construct.

5.4.1.3 Estimation and model fit indices

Many goodness-of-fit indices are supported to determine whether a model is constant with the empirical data. The choice of estimation depends on the type of data contained in the model (Hair et al., 2010). The goodness-of-fit indices also determine whether to accept or reject the model under test. No agreement exists on specific fitness indices in the evaluation of research models, but researchers (e.g., Hair et al., 2010) made several approaches to overcome the weaknesses of model indices. Multiple metrics must be applied to measure the fit of each measurement model before validating it by estimating a single construct for unidimensional validity and reliability.

CFA by AMOS 20.0 was used to test the measurement model. The measurement model aims to explain the relationships between latent variables measured by a group of evident indicators. Hair et al. (2010) proposed that four tests at least of model fit should be applied for structural models and CFA. According to their suggestions, this research applied five goodness-of-fit indices: chi-square to degrees of freedom (Df) (X^2), GFI, incremental fit index (NFI), TLI, goodness-of-fit index (CFI) and RMSEA. However, scholars (Kline, 2015) indicated that the ratio of chi-square per degree of freedom (x^2/df) between 2 to 1 or 3 to 1 is considered an acceptable fit between the hypothesised model and the sample data. Therefore, the x^2/df ratio for this study was within the recommended value ($x^2/df=3.29$). NFI=0.952, TLI=0.855 and CFI=0.90. RMSEA also meets the recommended standard <.80 and achieves an acceptable value of 0.08.

Overall, the numbers generated from the first CFA indicate that the model needs to be further refined because several model fit indices are inadequate and less than the minimum recommended criteria (Anderson and Gerbing, 1982). Model refinements can be performed

by associating or removing an indicator with a low factor, associating an indicator with multiple factors or using correlation measurement errors (Anderson and Gerbing, 1982). In addition, the model's goodness of fit can be improved by checking for standardised residuals, correction indices and specification searches (Hair et al., 2010). In this study, we used these steps to improve the model fit and remove several items from EMCS, environmental protection and organisational culture. After removing the problematic item from the initial model, we ran another test, as shown in table 5.12. The final CFA results are satisfactory, as presented.

Table 5. 12: Measurement model fit indices

Model Fit Indices	Recommended Criteria	Initial Estimation	Final Model
CMIN/DF	2 to5	3.29	2.58
NFI	≥90	0.952	0.98
TLI	≥90	0.855	0.91
CFI	≥90	0.90	0.98
RMSA	0.03 to 0.08	0.08	0.078

The final CFA model shows that all figures are suitable for the measurement model. X^2/df achieves an acceptable fit of 2.58, which is well above the minimum requirement (1:3). The results for NFI, TLI, CFI and RMSA are 0.98, 0.91, 98 and 0.078, respectively, which are all above the recommended value of 0.90. The RMSEA results also meet the recommended criteria and achieve an acceptable value of 0.078.

5.5 Structural model analysis and hypothesis testing

The reliability tests and convergent and discriminant validities in this study support the general measurement quality. Consequently, the measurement model is deeming suitable for testing path coefficients that estimate hypothetical relationships of the model under study (Gerbing and Anderson, 1992). Thus, testing the structural model confirms the study hypothesis and empirically identifies the relationships between factors. The proposed theoretical framework in Figure 3.2 of Chapter 3 presents that EMCS influences

environmental and financial performance through two enablers in the existing study. For more information, see Section 3.4 of Chapter 3, which shows the research hypotheses. This study aims to examine the relationship between EMCS and environmental capabilities on environmental and financial performance. In detail, the effect of EMCS was examined on environmental capabilities (organisational culture, environmental proactivity). In addition, the influences of EMCS on environmental and financial performance were tested directly and indirectly. All the control variables were presented to control their possible effects on environmental and financial performance.

The results of the empirical studies show engaging results for discussion, which expends previous research in the field of EMCS. Six hypotheses related to the purpose of this study were created and examined, as reported in Tables 5.13 and 5.14.

Table 5. 13: Results of testing the theoretical model.

Hypothesis		**Direct effect**				**Result**
		Estimate	S.E	C.R.	P	
H1a	EMCS -> environmental performance	0.316	0.083	3.81	***	Supported
H1b	EMCS-> financial performance	-0.16	0.115	-1.41	0.15	Not Supported
H2a	EMCS -> environmental proactivity	0.387	0.44	8.52	***	Supported
H2b	EMCS -> organization culture	0.77	0.42	18.52	***	Supported
H3a	Environmental proactivity -> Environmental performance	0.281	0.077	3.636	***	Supported

H3b	Environmental proactivity -> financial performance	0.55	0.107	5.14	0.024*	Supported
H4a	Organisational culture -> environmental performance	0.45	0.073	6.16	0.036	Supported
H4b	Organisational culture -> financial performance	0.35	0.101	3.46	0.10	Supported
Control variables	Firm size -> financial performance	0.061	0.020	3.05	***	
	Firm size-> environmental performance	0.051	0.015	3.42	***	
	Firm age-> financial performance	-0.010	0.14	-0.070	0.48	
	Firm age-> environmental performance	0.12	0.063	1.90	0.043	

Note: Estimate= Standard Regression Weights (Path Estimate), S.E. = Standard Error, C.R.= Critical Ratio (t-value), P Value = Significance Value, $p < .10$, $*p < .05$, $**p < .01$, $***p < .001$

The study hypotheses were tested by examining the path significance of each relationship. The direct hypotheses of this study were tested using standardised estimates (SE), critical ratios (CR or often called t-value) and p-value. The critical ratio (t-value) is achieved by dividing the regression weight estimate by the standard error (SE). The relationship is

important if the t-value >1.96, and the p-value is ≤.05. The results reveal that all casual paths are significant because the t-value exceeds 1.96, and the p-value is ≤.05.

The rest of this section is described briefly, and the results of the 12 hypotheses are discussed in accordance with the above results. More details are provided in Chapter 6.

Hypothesis H1: A significant positive association exists between the extent of using EMCS and performance.

This section provides the test of the hypotheses that predict a direct relationship between the independent variables (EMCS) and the dependent variables (i.e., Environmental and financial performance). This section also reports the possible effect of the control variables on the dependent variables.

There is a significant impact for the control variable (size) on financial and environmental performance ($p < .001$). In addition, there is a significant impact for the second variable on environmental performance (0.043). On the other hand, there is no potential impact for the second control variable (age) on financial performance (0.48).

H1a: A significant positive association exists between extent of using EMCS and environmental performance.

H1b: A significant positive association exists between extent of using EMCS and financial performance.

This study argues that the implementation of EMCS would improve environmental and financial performance, as stated in H1a and H2b. In contrast to the predictions, the results reported in Table 5.13 indicate that EMCS is not related to financial performance (path coefficient=-0.16, t-value=-1.41 and p-value=0.15), whereas EMCS is positively and significantly associated with environmental performance (path coefficient=0.316, tvalue=3.81 and p-value=0.05). These results support H1b but not H1a.

Hypothesis H2a: EMCS is positively associated with environmental proactivity.

The second relationship hypothesis is related to the effect of the joint implementation of EMCS on environmental proactivity. The hypothesis predicts that the implementation of EMCS is positively and significantly related to environmental proactivity (path coefficient=0.77, t-value=18.52 and p-value=0.05). Thus, hypothesis H2a is supported.

Hypothesis H2b: EMCS is positively associated with organisational culture.

This study also posits that the joint implementation of EMCS on organisational culture would have a positive effect, as formulated in H2b. The results reported in Table 5.13 show that EMCS is positively associated with organisational culture (path coefficient=0.387, tvalue=8.52 and p-value<0.05). Thus, H2b is partially supported.

This finding suggests that EMCS may foster environmental proactivity and organisational culture by supporting decision making, providing information and focusing attention. This finding also indicates that EMCS plays a significant role in supporting environmental implementation in the organisation.

Hypothesis H3a: Environmental proactivity is positively associated with environmental performance.

The study argues that environmental proactivity positively affects environmental performance (H3a). The results in Table 5.12 show a significant relationship between environmental proactivity and environmental performance (path coefficient=0.28, tvalue=0.077 and p-value<0.05). Thus, H3a is supported.

Hypothesis H3b: Environmental proactivity is positively associated with financial performance.

The study claims that environmental proactivity improves financial performance (H3b). The results in Table 5.13 show a significant relationship between environmental proactivity and financial performance (path coefficient=0.24, t-value=0.107 and p-value<0.05). Thus, H3b is supported.

Hypothesis H4a: Organisational culture is positively associated with environmental performance.

The study argues that the culture of the organisation improves financial performance . The outcomes in Table 5.13 indicate that organisational culture is related to financial performance (path coefficient=0.15, t-value=0.073 and p-value<0.05). Thus, H4b is supported.

Hypothesis H4b: Organisational culture is positively associated with financial performance.

The study maintains that environmental proactivity positively affects financial performance (H4b). The outcomes in Table 5.13show a significant relationship between organisational culture and financial performance (path coefficient=0.17, t-value=0.10 and p-value<0.05). Thus, H4b is supported.

Mediation effect:

The study predicts that developing and maintaining environmental capability (environmental proactivity, organisational culture) can improve and facilitate the implementation of EMCS. This study argues the unique, contingent role of environmental capabilities on the relationship between EMCS and performance, which is consistent with Journeault (2016). He argued that EMCS does not directly improve financial and environmental performance but indirectly does so by mediation variables which are environmental proactivity and organisational culture. Environmental proactivity and organisational culture mediate the relationship between EMCS and financial performance such that the relationship becomes significant and positive. These predictions are developed in H5a-b and H6a-b.

The mediation models were tested via bootstrapping, a procedure that empirically represents the sampling distribution of the indirect effect. In this procedure, the obtained sample of size n was used to represent the population and was resampled repeatedly throughout the analysis, similar to the original sampling process. To determine the presence of any significant mediation, we take into account if p is significant and if zero is not between the lower and upper bound, then the analyst can claim that the is an indirect effect. Previous studies rank bootstrapping amongst the most powerful approaches for testing intervening variable effects[1] (Williams & MacKinnon, 2008; MacKinnon et al., 2004). As

[1] The reason why it is worthwhile to learn how to use Amos (or other SEM programs) to test mediated models is bootstrapping may be more robust to violations of assumptions of normality.

one of its advantages, bootstrapping makes an inference based on the estimated indirect effect. Unlike the Sobel test, bootstrapping does not make any assumption regarding the sampling distribution of such indirect effect. The inference can be made without any standard error, thereby addressing the problem regarding how the standard error of the indirect effect can be estimated. Bootstrapping is a very general approach that can be used in any intervening variable model to generate inferences about indirect effects despite the complexities and the number of paths connecting X to Y.

Table 5.14 shows the results of environmental proactivity and organization culture as the mediating variables in the relationship between EMCS and environmental and financial performance.

Table 5. 14: Bootstrap result for indirect effects

Parameter	**Mediation variables**	**Estimate**	**Lower**	**Upper**	**P**
EMCS -> Environmental performance	Environmental proactivity	.671	.583	.781	.005
EMCS -> Environmental performance	Organization culture	.417	.359	.526	.004
EMCS-> financial performance	Environmental proactivity	.372	.307	.454	.006
EMCS-> financial performance	Organization culture	.898	.815	1.056	.001

Hypothesis 5a: EMCS is indirectly associated with environmental performance through its contribution to organisational culture capability.

Hypothesis 5b: EMCS is indirectly associated with environmental performance through its contribution to environmental proactivity capability.

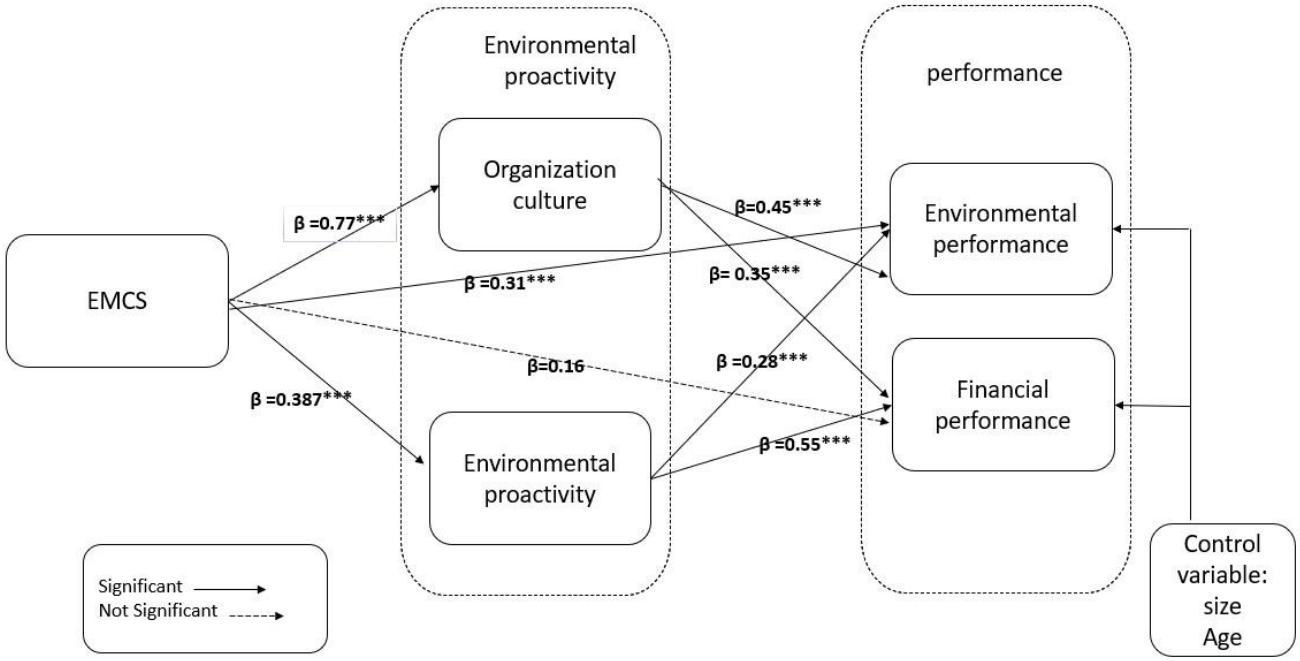
The results in Table 5.14 indicate that the mediating effect of organization culture on the relationship between EMCS and environmental performance is significant (Estimate= 0.42, Lower and Upper respectively (0.359,0.526) and p-value=0.004), Thus, H5a is supported. Similarly, environmental proactivity strengthens the relationship between

EMCS and environmental performance (Estimate= 0.67, Lower and Upper respectively (0.583,0.781) and p-value=0.005). Thus, H5b is supported.

Hypothesis 6a: EMCS is indirectly associated with financial performance through its contribution to organisational culture.

Hypothesis 6b: EMCS is indirectly associated with financial performance through its contribution to environmental proactivity.

The results in Table 5.14 demonstrate that organisational culture strengthens the relationship between EMCS and financial performance (Estimate= 0.898, Lower and Upper respectively (0.815,1.056) and p-value=0.001). Thus, H6a is supported. Similarly, environmental proactivity strengthens the relationship between EMCS and financial performance (Estimate= 0.372, Lower and Upper respectively (0.307,0.454) and p-value=0.006). Thus, H6b is supported.



5.6 Conclusion

This chapter describes the data analysis procedures, which include four major stages. The first stage uses descriptive statistics to provide a general profile of the survey samples provided in terms of respondent age, business unit and the sector to which they belong. The companies involved in this survey vary by industry. The second stage cleans the items, tests for outliers and missing values before performing an SEM analysis and investigates the assumptions of multivariate analysis by examining the data for their normality, linearity, common method variance, multicollinearity and sample size. The third stage assesses the quality of the measurement models, including the reflective models. The application of the CFA method demonstrates the reliability and validity of the reflective measurement model. At the final stage, when the measurement model is approved in terms of unidimensionality, reliability and validity, the structural model is tested to reach the best fit model, which represents the proposed framework in the research.

The SEM outcomes report strong evidence on the relationships between EMCS, environmental capabilities and performance. SEM finds positive associations between EMCS and environmental capabilities (environmental proactivity, organisational culture), and in turn, firm performance. SEM finds a positive relationship between EMCS and environmental performance but fails to support the relationship between EMCS and financial performance.

Chapter six: Discussion

6.1 Introduction

This research examined the association of EMCS with organisation culture, environmental proactivity and its related outcomes. This research developed a theoretical framework that tests several hypotheses on the impact of EMCS on environmental capabilities (organisation culture, environmental proactivity) and their impact on environmental and financial performance. This research also investigated the impact of environmental capabilities on environmental and financial performance. The proposed framework was developed based on the RBV and eco-efficiency theories.

With the use of the path analysis technique in structural equation modelling (SEM), the hypothesis relationships of EMCS, environmental capabilities and performance are presented in the results in Chapter 5. This chapter discusses and summarises the hypotheses and indicates whether the assessment of the results supported or rejected them with justification on the basis of the related literature review.

6.2 Discussion of research findings

The goal of this research is to examine the impacts of EMCS on environmental and financial performance and whether these impacts can be mediated by environmental capabilities (i.e., organisational culture, environmental proactivity). Another goal of this research is to examine the impact of EMCS on environmental capabilities. An analysis of the perspectives of managers from 251 large manufacturing companies in Jordan shows that mixed results were obtained for the hypothesised relationships.

The study results are discussed in three sections. In the first section, the relationship between EMCS and environmental and financial performance. In the second section, the primary focus is the relationship between EMCS and environmental proactivity and organisational culture. In the third section, a discussion of the mediating effects of environmental proactivity and organisational culture is given, as well as a discussion of

the impact of environmental proactivity and organisational culture on environmental and financial performance.

6.2.1 The direct effect between EMCS and Performance

A positive relationship between EMCS and environmental performance (H1a) is predicted in this study, and this prediction is supported by results. Thus, the use of EMCS is effective to improve environmental performance. The results in Table 5.13 suggest that increased environmental performance is partly due to the integration of environmental matters within EMCS. The EMCS provides appropriate accounting and ecological information that supports effective resource management. EMCS guides managers toward the primary areas of environmental concern and then supports the establishment of primacy on the basis of such concerns.

This result is consistent with the reasoning of eco-efficiency theory. Based on eco-efficiency, it is possible to increase the level of productivity and consequently reduce the cost while improving the environmental performance (Bebbington, 2001, Lehman, 2002). Schaltegger, 2003 argued that tracking environmental costs exposes the economic impact of improper use of environmental resources and dirty production processes. These efforts to decrease non-value-added costs contribute to the enhancement of environmental performance by reducing the effect on the environment.

Notably, the findings are consistent with those of other studies that have investigated this relationship. For example, Judge and Douglas (1998) conducted a cross-sectional survey of US firms to look at environmental considerations in the strategic planning phase as one form of the management control system. Their findings show that there is a relation between the level of strategic planning consideration and financial and environmental results. Likewise, According to Gadenne et al. (2012), there is a positive association between the use of environmental management policies and company environmental efficiency in a study of 314 Australian companies. Epstein and Wisner (2005) used data from a Mexican manufacturing facility to analyse the effect of numerous control practices on environmental compliance and found that some control practices—such as planning and compensation—have a positive effect on environmental performance. Furthermore, Spencer et al. (2013) offer support that of top management's commitment to EMCS is a

strong influence for the improvement of environmental performance. In addition, Henri, Journeault, and Brousseau (2017) examined the relationship between EMCS change and environmental performance among 78 manufacturing organizations in Canada at two points in time. The study concluded that changes leading to increased importance that was given to EMCS within an organization contributed positively to environmental performance.

In this study, we also investigated the relationship between EMCS and financial performance, and we predicted a positive relationship (H1b). This prediction is unsupported by data. Thus, the use of EMCS to improve financial performance is ineffective. However, this finding aligns with reports in previous studies on the lack of a direct effect of EMCS adoption on financial performance. For example, Henri et al. (2010) investigated the potential impact of EMCS system adoption on the economic performance of Canadian manufacturing companies, finding that EMCS and economic performance have no significant relationship. Likewise, Abdel-Maksoud et al. (2020) concluded that EMCS system adoption does not directly affect economic performance, but it can have an indirect impact through significant mediators. This is consistent with the findings of Carmona-Moreno et al. (2004), who surveyed the environmental strategies of 268 Spanish hotels and discovered that hotels that had better-developed environmental strategies were associated with higher environmental performance but not necessarily improved economic performance. Prior studies that found a relationship between MCS and financial performance examined MCS globally; in contrast, our results focus specifically on EMCS, i.e. the integration of environmental concerns within MCS. This approach suggests that a specific application of MCS may not directly affect financial performance but will instead affect an intermediary variable.

The lack of a direct relationship between EMCS and financial performance could be due to several reasons, one of which is the possibility that EMCS does not have a highly critical role in enhancing financial performance unless the practices and the culture of the organisation have been modified and improved.

6.2.2 Environmental management control system and environmental capabilities

Having provided evidence on the different relationships between EMCS and environmental capabilities (see chapter 3), this section discusses two hypotheses related to the link between EMCS and environmental capabilities (environmental proactivity and organization culture).

6.2.2.1 Environmental management control system and environmental proactivity

The result revealed a positive relationship between EMCS and environmental proactivity (H2a). Thus, the implementation of EMCS can directly contribute to the improvement of environmental proactivity. This finding supports recent observations on the important role of EMCS in improving environmental proactivity, which can help foster environmental proactivity by offering a platform for frequent face-to-face discussions and discussion to support the development of new environmental projects. Environmental proactivity relies on the information given by EMCS to help companies achieve resource efficiency by reducing energy consumption, reducing raw materials and costs, helping environmental managers learning about the product life cycle and producing high-quality products that lessen environmental impact (Behrend et al., 2009). Moreover, EMCS provides the relevant environmental information for the improvement of environmental proactivity that environmental managers can use to achieve multiple benefits. These benefits include increased satisfaction for customers, meeting stakeholders' demands, monitoring regulatory compliance to meet regulatory requirements, assessing green process and product performance across the value chain to meet green consumers' expectations, and controlling waste and emissions to secure good links with local communities and NGOs. The common use of EMCS also can encourage employees to participate in environmental judgement, facilitate their participation in environmental activities, and incentive good practices at work. With the use of EMCS, environmental managers can set both challenging and achievable goals to encourage a company to always pursue the improvement of its environmental performance. Evidently, an adequate environmental measurement system is able to improve the deviation analysis of goal-related results and year-on-year progression.

6.2.2.2 Environmental management control system and organization culture

This study also expected a positive relationship to exist between EMCS and organisational culture (H2b). The result provides compelling evidence to support this expectation. The results in Table 5.13 shows that EMCS may foster organisational culture by focusing attention, providing information, and supporting decision-making. In addition, an EMCS is used to ascertain that employee exhibit behaviour that abides by pre-established rules. Moreover, an effective EMCS helps organisations internalise the environmental values, which then become embedded in the organisation's rules, procedures and regulations. This idea further suggests the significant role of EMCS in providing support for internal environmental implementations. This result is consistent with the findings of Schein (1990) points out that culture is what a group learns over a period of time as that group solves its problems of survival in an external environment and its problems of internal integration. Consequently, an EMCS publishes an environmental strategy agenda to all employees, determines the scope of business activities (Pearce and David, 1987: p.109) and helps provide focus on key issues.

6.2.3 environmental capabilities and performance

6.2.3.3 The effect of Environmental proactivity and organization culture on Performance.

With the line of the important role of environmental capabilities in the company, (H3a and H3b) have predicted that companies that practise environmental proactivity have better environmental and financial performance. Both hypotheses have been supported (see table 5:13). As a consequence, it can be seen that it has aided organisations in improving the efficiency of their financial results. In addition, profitability depends on environmental capabilities or on the capability to satisfy customers. In this way, when the company has more efficient processes, a better reputation, or greater capabilities to meet customers' requirements, it might be able to compensate for investments and improve financial results. It is worth noting that the findings were consistent with other studies investigating this relationship (Alvarez-Gil et al., 2001; Sharma and Vredenburg, 1996; Lo'pez-Gamero et al., 2009; Clarkson et al., 2011; Guenster et al., 2011) and other research highlighting the importance of environmental strategy (e.g., Chen et al., 2015). These results show that environmentally proactive companies have other complementary assets that enhance the

value of their environmental activities, such as innovation, ability to communicate with stakeholders, or integration of environmental issues in other management areas, which led to improving both environmental and financial performance. “Win-win” opportunities exist for companies that take a proactive posture to implement environmental management practices.

Furthermore, this research expected a positive relationship between organizational culture and environmental and financial performance (H4a) and (H4b). The analysis provided compelling evidence to support these hypotheses. This is consistent with Lee and Yu (2004), who suggest that the cultural intensity of organisations is often linked to organisational success and that certain cultural elements that distinguish organisations from each other have a positive influence on organisational performance. Prajogo and McDermott (2011) examined 194 middle and senior managers of firms in Australia and identified adhocracy (developmental) culture as the only strong factor that predicts the performance of these firms. Denison and Mishra (1995) determined a positive correlation between a strong culture and short-term financial performance. Managers must be flexible, innovative and customer-oriented in the manufacturing industry, which response to a changing environment. There is, therefore, a strong sign that a sustainable competitive advantage can be achieved if managers in the factory implement an organisational culture, creating an environment that is flexible that can easily be modified to meet changing customer needs. Our results suggest that managers must also consider the values and beliefs of employees and their contribution to better performance.

6.2.3The mediation effect of environmental capabilities

This study provided different hypothesis on whether environmental capabilities mediate the relationship between EMCS and environmental capabilities (see chapter 3); this section discusses two hypotheses related to the link between EMCS, (environmental proactivity and organization culture) and (environmental and financial performance).

6.2.3.1 The mediation effect of (organization culture and environmental proactivity on environmental Performance)

This study predicted that organisational culture positively mediates the relationship between EMCS and environmental performance (H5a), and the results offer evidence that

organisational culture improves the positive link between EMCS and environmental performance. Organisational culture indirectly improves environmental performance by using different information provided by EMCS, including information about costs and benefits of products and processes, environmental impacts. This result is consistent with those of studies that highlighted the important role of organisational culture in providing individual employees with norms for behaviour in the company and serve as a tool for management to shape the company's direction. For example, Deal and Kennedy (1982) found that culture affects a company's ability to adapt to internal and external exigencies, motivates employees, improves productivity and has a significant impact on the functioning of the entire organisation.

Furthermore, this research predicted that environmental proactivity positively mediates the relationship between EMCS and environmental performance (H5b). Apparently, the alignment between EMCS and environmental proactivity improves environmental performance. This condition is achieved through cost reduction and differentiation, first mover advantage, and improved organisational commitment and learning, thereby subsequently improving environmental performance. This finding is broadly consistent with emerging literature on the role of environmental proactivity. According to many studies, environmental proactivity is able to provide firms with unique advantages. Environmental proactivity has also been conceptualised as a competitive capability that characterises the best environmental practices, which ensure that companies are ready for future changes in regulations and social trends (Walley et al.,1994) with the aim of improving, redesigning and/or transforming operations, processes and products to continuously avoid and address negative impacts on the natural environment.

6.2.3.2The mediation effect of organization culture and environmental proactivity on financial Performance

This study predicted that organisational culture and environmental proactivity positively mediate the relationship between EMCS and financial performance (H6a, H6b). The findings provide support for this prediction and suggest that organisational culture and environmental proactivity play a pivotal role in facilitating the implementation of EMCS. Also, the base model (see p 71) did not find a significant relationship between EMCS and

financial performance. In contrast, the revised model (see p73) finds a positive and significant relationship when environmental capabilities are integrated into the relationship between EMCS and financial performance by creating competitive advantage through cost savings or market differentiation. These findings suggest that certain EMCS or capabilities, such as organisational culture and environmental proactivity, can lead to a certain performance level (i.e., financial performance). At a more general level, this finding may suggest the possible influence of environmental management control systems and capabilities on financial performance.

The argument of the positive impact of organizational culture and environmental proactivity on the relationship between EMCS and both environmental and financial performance is in line with the RBV's logic. In Particular, the RBV argues that environmental capabilities have the ability to help achieve a competitive advantage in the organization and, consequently, its contribution to environmental and financial performance.

We tested the hypotheses (H5a–H5b) by using bootstrapping to investigate the mediating effects and found that environmental proactivity and organisational culture partially mediate the relationship between EMCS and environmental performance. Moreover, environmental proactivity and organisational culture fully mediate the relationship between EMCS and financial performance.

A comparison of these results with those of prior works shows that researchers have implemented various mediating variable to determine whether or not an efficient EMCS–performance link mechanism exists, such as environmental performance. Some researchers, such as Henri et al. (2010) and Journeault (2016), support the idea of the existence of direct and indirect relationships between EMCS and environmental performance. However, they did not support the existence of direct and indirect relationships between EMCS and financial performance, which is recognised as the main reason for the importance of further research in this direction.

6.2.3.3 The effect of Environmental proactivity and organization culture on Performance.

With the line of the important role of environmental capabilities in the company, (H6a and H6b) have predicted that companies that practise environmental proactivity have better environmental and financial performance. Both hypotheses have been supported (see table 5:13). As a consequence, it can be seen that it has aided organisations in improving the efficiency of their financial results. In addition, profitability depends on environmental capabilities or on the capability to satisfy customers. In this way, when the company has more efficient processes, a better reputation, or greater capabilities to meet customers' requirements, it might be able to compensate for investments and improve financial results. It is worth noting that the findings were consistent with other studies investigating this relationship (Alvarez-Gil et al., 2001; Sharma and Vredenburg, 1996; Lo'pez-Gamero et al., 2009; Clarkson et al., 2011; Guenster et al., 2011) and other research highlighting the importance of environmental strategy (e.g., Chen et al., 2015). These results show that environmentally proactive companies have other complementary assets that enhance the value of their environmental activities, such as innovation, ability to communicate with stakeholders, or integration of environmental issues in other management areas, which led to improving both environmental and financial performance. "Win-win" opportunities exist for companies that take a proactive posture to implement environmental management practices.

Chapter Seven: Conclusions

7.1 Introduction

This study sought to examine the effect of EMCS on environmental capabilities (organisational culture and environmental proactivity) and develop a framework that expands our knowledge of EMCS and performance using the eco-efficiency and RBV theories. This chapter provides an overview of the theoretical and practical consequences of research. It summarises the thesis limitations and provides guidance for future research.

7.2 Meeting the goals and objectives of the study.

This research examined the effect of EMCS on environmental capabilities (environmental proactivity, organisational culture) and the impact of EMCS on environmental and financial performance by mediating environmental proactivity and organisational culture. In addition, a framework was developed by using eco-efficiency and RBV theories; this framework advances our understanding of EMCS and performance. These two theories facilitated the investigation of the relationships of EMCS and its consequences. Several objectives were established to achieve the aim.

Table 7.1 summarizes each purpose as well as the chapters in which it was presented.

Objectives	**Chapter**
1. Identify the key constructs of this research by critically reviewing the environmental management control system, environmental proactivity, organizational culture, environmental and financial performance.	Chapter 2
2. Develop a framework that investigates the impact of environmental management control system on environmental performance using the mediation of environmental capabilities (organization culture, environmental proactivity.	Chapter 3

3.Evaluate and analyze the hypothesis relationships of the environmental management control system and environmental and financial performance via environmental capabilities as a mediator.	Chapter 4+5
4.Validate the proposed framework, and link the research results with the literature, conclude theoretical contribution and implications and developed recommendations for business managers that provide a better understanding of the environmental management control system followed by suggestions for future research.	Chapter 6+7

7.3 summary of the study investigation

This study looked at a variety of EMCS issues that were identified through an extensive and in-depth literature review, resulting in a new theoretical framework that helps to demonstrate the links in this study. This study examined the theoretical framework by distributing 251 survey to companies in the Jordanian manufacturing industry. It also included relations between the variables of the study in the theoretical framework.

The aim of the study is to examine the effects of EMCS on environmental capabilities, to examine the impact of environmental capabilities on environmental and financial performance and determine whether these effects can mediate the relationship between EMCS and performance. Also, this research aimed to examine the direct impact of the EMCS on financial and environmental performance.

SEM was used to analyse the survey questionnaires. The analysis results provide strong evidence of the relationship between EMCS and environmental performance. However, SEM was unable to support the link between EMCS and financial performance, and it found positive relationships between EMCS and environmental capabilities (organisational culture, environmental proactivity) and its impact on environmental and financial performance. Therefore, environmental capabilities were a mediator of the relationship between EMCS and environmental and financial performance.

This research expands our understanding of EMCS implementation and its impact on environmental and financial performance by emphasising the critical role of (environmental proactivity and organization culture). It also has a number of managerial principles that can help business managers make more educated decisions. The important theoretical and practical implications of this research are illustrated in the following subsections.

7.4 Contributions of the research

According to the discussions above, this research contributes to theory by rooting its theoretical framework in the EMCS literature. Moreover, this research contributes to the industry by providing recommendations that would offer support to managers in achieving and sustaining environmental management in their organisations. This section summarises the research's theoretical and practical contributions.

7.4.1 Theoretical contributions

Firstly, this thesis developed a theoretical framework on the basis of an intensive literature review from the EMCS, environmental capabilities, and environmental and financial performance. This literature review provided guidance for this thesis in developing a combined theoretical framework for EMCS, including shared knowledge between EMCS and the environmental capabilities, including organizational culture and environmental proactivity as a mediator variable, and performances. Nevertheless, this research may be the first of its kind to integrate EMCS, organisation culture, environmental proactivity, and environmental and financial performance. To the best of the researcher’s knowledge, no other existing study combines and empirically investigates the above constructs. Therefore, this research added a broader view to the existing knowledge in the MCS and EMCS literature by offering different results from business managers’ perspectives.

Secondly, most prior related works were performed in the context of developed countries. Thus, MCS researchers argue that drawing generalised conclusions from these results is difficult and that further investigations in various contexts are necessary (Henri et al., 2010). In response to this call, this study was conducted in a non-Western context and is the first of its type for the country of Jordan; the importance of this feature was previously

highlighted. The methodology presented in this study should cover the way for related studies of this nature in the non-Western context.

Thirdly, this study differs from most previous literature that investigates the impact of EMCSs on environmental and financial performance. This study enters a black box and provides a broad view of how EMCSs influence organisational development to contribute to environmental and financial performance. In fact, this study determined that the improvement of environmental capabilities could be the missing link between the adoption of EMCSs and their effect on the environmental and financial performance of a company.

Fourthly, this study contributes to research on environmental capabilities by featuring the indirect role of the two most popular capabilities—organisational culture and environmental proactivity—on environmental and financial performance. More specifically, this study provided a comprehensive and nuanced understanding of the role and influence of these two capabilities by explaining how they reinforce and enable the effective implementation of environmental and financial performance through an examination of their mediating effects on the relationship between EMCS and environmental and financial performance. This holistic and distinctive view offers an understanding of the specific characteristics and the relative importance of each capability in the implementation of EMCSs, which has not been previously elaborated in this context.

7.4.2 Practical contributions

This study makes a significant impact on business practices by showing the ability of EMCS to improve financial and environmental performance. The strategic importance for managers to adopt EMCS is highlighted by their ability to cultivate environmental capabilities such as environmental proactivity and organisation culture, which contribute not only to the creation of competitive advantage but also to environmental development. This idea impresses upon managers that adopting such systems may be the basis for addressing the challenges brought about by the global economic crisis and climate change.

In consideration of the growing importance of environmental management in organisations, managers should be mindful of the significance of integrating control systems within their environmental capabilities to transform environmental strategy into

environmental actions. In particular, this study offers empirical evidence that supports the notion that the integration of EMCS within environmental proactivity and organisational culture facilitates the communication of environmental intentions and values throughout the organisation, highlights the environmental priorities of the organisation, and motivates employees and sustains their enthusiasm for active monitoring. This model improves our knowledge of the use and not the existence of tools and systems when environment-related decisions are being made and during the identification of the genesis of environmental capabilities.

According to the empirical findings, senior management has a central and proactive role in signalling the importance of environmental management as organisational activity. The results thus suggest that the emphasis on an EMCS, including the recognition of environmental concerns in corporate mission statements, provides a meaningful avenue for promoting the internal legitimacy of environmental goals and objectives. In addition, EMCS appears to play an important role in supporting the decision-making activities of subordinate managers and employees in transforming short-term eco-efficiency into a lasting competitive advantage.

Another implication is that the managers in Jordan appear to be familiar with the importance of embedding environmental aspects into their firms' MCS, i.e. EMCS. Such familiarity can be expressed by broadening environmental performance indicators to include aspects related to budget and incentives, which can support the existing EMCS framework in manufacturing firms. Overall, our findings offer empirical evidence in the emergent quest for a stronger EMCS and present lessons that may support Jordanian firms that are implementing or are planning to implement EMCS. Furthermore, they highlight the perceived role of environmental regulatory bodies in Jordan and in firms' environmental performance, thereby possibly contributing to the development of future relevant regulations.

Finally, on the basis of the above presentation, top management should cooperate to share the responsibility of attaining sustainability. Organisations have varying practical responses to the challenges of the environmental system because every organisation has a

specific nature of work. The following section presents the research limitations, which may restrict the generalisability of this research.

7.5 Limitations of the research

Although the results of this research are significant in the environmental management research, there are inherent limitations in this study that can serve as fertile grounds for future research on EMCS and the broader literature on environmental capabilities. Firstly, the conceptual model was tested using a sample from large manufacturing companies operating in Jordan. Although this setting helped to control industry, it limits the generalizability of the results due to industry and culture-specific characteristics. Future research can replicate the study in different settings, including other countries and in the service industry. Moreover, although current research has suggested that large companies are more affected by the environment, further research should adopt the understanding provided by this research to look at the environmental management control system in small and medium-sized firms.

Secondly, this study used cross-sectional data to test the proposed conceptual model, which, although extensively used in previous accounting research, is nevertheless limited in spotting possible causal relationships among the endogenous and exogenous variables. A promising avenue for future research, therefore, would be through adopting longitudinal data to identify causal relationships. In addition, environmental performance and financial performance were captured by self-report data collection method from the environment and business managers perspective. Future research can address this limitation by collecting objective data, e.g., level of emissions or actual return on investment.

Thirdly, although this research targeted multiple informants (e.g., environment and business managers) as participants to attain their perceptions regarding the research relationships, this research did not establish the value of using the difference between their perceptions on the research associations. Therefore, further research should consider the differences (agreements and/ or disagreements) in perceptions for both environment and business managers. In addition, this research collected data from participants through a quantitative method approach. Therefore, there is a need to conduct future research based on a qualitative approach, such as interviews.

Fourthly, two environmental capabilities have been analyzed as the first order in this study (organization culture and environmental proactivity). Future research could examine the second order of these variables to check which type of organization culture (Hierarchy culture, Market culture, clan culture and Aldhocracy culture) or environmental proactivity (Planning and organizational practices, operational practices and communicational practice) contribute between EMCS and performance.

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Appendix A: Data Collection Ethical Approval

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom

www.brunel.ac.uk

15 May 2019

LETTER OF APPROVAL

Applicant: Miss Hebah Almajali

Project Title: The influence of environmental management control system on environmental and economic performance

Reference: 16904-LR-May/2019- 19061-1

Dear Miss Hebah Almajali

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor David Galleur

Chair

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London

Appendix B: the questionnaire

Dear Manager

I am writing this latter to ask for your help with my PHD thesis in management accounting, which I am at present conducting at Brunel University in the United Kingdom. As part of it, I am required to collect data from the country of Jordan. My research topic concerns the impact of environmental management control system on environmental and financial performance in manufactories firm in Jordan.

I would be very grateful if you could please complete the attached questionnaire. I am aware that your time is extremely valuable. I will be very happy to provide you with the summary of my findings.

I am also confirming that ethical committee in Brunel University London by which ethically approves the questionnaire –as a researcher- I am obligated to ensure that all participants and organizations will be completely anonymous, and all replies be used solely for the purposes of this research. Although optional, participation would be highly appreciated. Feel free to contact me if you have any inquiries.

Sincerely,

Hebah Almajali

PHD researcher

Brunel University London

1633044@brunel.ac.uk

Part one: general information

1-indicate your current job title:

2- Gender: ☐ Male ☐ Female

3-Number of employees ☐ Micro-enterprise (less than10) Small ☐ (between 10-49) ☐ Medium (from 50 to 249) ☐ Large (250 and more)

4-Your age ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐

5- your experience in the job ☐ less than two years ☐ 3-6 years ☐ 7-10years ☐ More than 11years

6-the industry in which your company is working?

Textile and readymade Garments industries	Paper, carton and office equipment industries
Therapeutic industries and medical supplies	Food, agricultural and animal stock industries
Engineering, electric and information technology industries	Construction industry
Plastic and rubber industry	Wood and furniture industries
Chemical industries and cosmetic preparations	Mining industries
Other (please specify): _____	

7-Company year of establishment job ☐ less than two years ☐ 3-6 years ☐ 7-10years ☐ More than 11years

Part two: environmental management control system, environmental performance, economic performance, organization culture, environmental strategy proactivity

These statements relate to environmental issues in your organisation. Please indicate the extent to which you agree or disagree with the following:

EMCS is categorization of five different management control practices: planning controls (PLAN), cybernetic controls (CYB), reward and compensation controls (REW), administrative controls (ADM), and cultural controls (CULT).

No.	**Environmental management control system**					
	Planning controls					
1.	Environmental issues are explicitly considered within the company's strategic planning process.	1	2	3	4	5
2.	Environmental personnel participate influentially in the company's strategic planning process	1	2	3	4	5
	Cybernetic controls					
3.	The organization uses environmental performance indicators to monitor internal compliance with environmental policies and regulations	1	2	3	4	5
4.	The organization uses environmental performance indicators to provide data for internal decision making.	1	2	3	4	5
5.	The organization uses environmental performance indicators to motivate continuous improvement.	1	2	3	4	5
	Reward and compensation controls					
6.	The environmental indicators are important in reward systems.	1	2	3	4	5
7.	environmental performance indicators are weighted on par with economic performance indicators					
	Administrative controls					
8.	the importance of a natural environmental management manual for internal use in your organization.	1	2	3	4	5
9.	The importance periodic natural environmental audits in your organization					
	Cultural controls					
10.	Our firm has a clear policy statement urging environmental awareness in every area of operation.	1	2	3	4	5
11.	Environmental preservation is a high priority activity in our firm.	1	2	3	4	5

Please indicate the extent to which environmental practices have led to various types of benefits (e.g. a reduction in material costs, increased productivity, better relationships with stakeholders, overall company reputation). Where (1= contribution, 5=very large contribution).

NO.	**Environmental performance**					
1.	Improved process innovations	1	2	3	4	5
2.	Increased knowledge about effective ways of managing operations	1	2	3	4	5
3.	Increased productivity	1	2	3	4	5
4.	Increased process/production efficiency	1	2	3	4	5
5.	Reduction in process/production costs	1	2	3	4	5
6.	Improved product quality	1	2	3	4	5
7.	Improved products innovations	1	2	3	4	5
8.	Reduction in material costs	1	2	3	4	5
9.	Reduction in costs of regulatory compliance	1	2	3	4	5

Please indicate the performance of your organization over the past twelve months. Where (1=well below average, 5=well above average).

No.	**Economic performance**					
1.	Return on investment (ROI)	1	2	3	4	5
2.	Operating profits	1	2	3	4	5
3.	Cash flow from operations	1	2	3	4	5

The following statements relate to the integration of environmental concerns into your organisation's decision-making processes. Please indicate the extent to which you agree or disagree with the following:

No.	**Environmental proactivity**					
	Planning and organizational					
1.	environmental goals are linked with other corporate goals	1	2	3	4	5
2.	There is a formal reporting position between those responsible for environmental affairs within our organisation and our organisation's senior executives	1	2	3	4	5

3.	Well defined environ-mental responsibilities	1	2	3	4	5
4.	Full-time employees de-voted to environmental management	1	2	3	4	5
5.	Natural environment training programs for managers and employees	1	2	3	4	5
6.	Systems for measuring and assessing environ-mental performance	1	2	3	4	5
	OPERATIONAL PRACTICES					
9.	Designs focused on reducing resource consumption and waste generation during production and distribution	1	2	3	4	5
10.	optimizing materials exploitation Acquisition of clean technology/equipment	1	2	3	4	5
11.	Environmental criteria in supplier selection	1	2	3	4	5
12.	Recyclable or reusable packaging/ containers in logistics	1	2	3	4	5
13.	**COMMUNICATIONAL PRACTICES**	1	2	3	4	5
14.	Regular voluntary information about environmental management to stakeholders (customers, regulators, host 1communities etc.)	1	2	3	4	5
15.	Environmental evaluations for new investments	1	2	3	4	5

Please indicate the degree to which your company emprises Organizational culture. Where ((1) strongly disagree and (5)strongly agree).

No.		**Organizational culture:**					
1.	Market culture	Our organization is very results oriented. A major concern is with Getting the job done. People are Very competitive and achievement oriented.	1	2	3	4	5

2.		The leadership in our organization is generally considered to exemplify a non-onsense, aggressive, results- oriented focus.	1	2	3	4	5
3.		The management style in our organization is characterized by hard-driving competitiveness, high demands, and achievement	1	2	3	4	5
4.		The glue that holds our organization together is the emphasis on achievement and goal accomplishment	1	2	3	4	5
5.	Adhocracy Culture	Our organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	1	2	3	4	5
6.		The leadership in our organization is generally considered to exemplify entrepreneurship, innovation, or risk taking.	1	2	3	4	5
7.		The management style in our organization is characterized by individual risk taking, innovation, freedom, and uniqueness.	1	2	3	4	5
8.		The glue that holds our organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	1	2	3	4	5
9.	Clan culture	Our organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.	1	2	3	4	5
10.		2. The leadership in our organization is generally considered to exemplify mentoring, facilitating, or nurturing.	1	2	3	4	5

11.		3. The management style in our organization is characterized by teamwork, consensus, and participation.	1	2	3	4	5
12.		4. The glue that holds our organization together is loyalty and mutual trust. Commitment to this organization runs high.	1	2	3	4	5
13.	Hierarchy Culture	Our organization is a very controlled and structured place. Formal procedures generally govern what people do	1	2	3	4	5
14.		2. The leadership in our organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency	1	2	3	4	5
15.		. The management style in our organization is characterized by security of employment, conformity, predictability, and stability in relationships.	1	2	3	4	5
16.		The glue that holds our organization together is formal rules and policies. Maintaining a smooth-running organization is important.	1	2	3	4	5

Thank you for taking the time to complete this questionnaire

دراسه لنظم التحكم في الإدارة البيئية وأثرهاعلى لأداء البيئي والاقتصادي للمصانع الاردنيه

هذا الإستبيان يتكون من سته اقسـام ويستغرق 15 دقيقة للإجابه عليه

كل المعلومات ستكون سرية للغايه

تعليمـــــــــــــــات

التعليمات التالية ستساعدك في تعبئة الاستبان:

الرجاء العلم بأن أي معلومات ستزودها بالاستبيان ستكون سرية للغاية ولن تستخدم إلا لغايات البحث العلمي.

الرجاء الإجابة على جميع الأسئلة حتى إذا كان بعضها متشابه.

الرجاء الإجابة على الأسئلة بشكل يعكس الوضع أو التطبيق الحالي لشركتكم وليس كما تتمنى أو تخطط لها أن تكون بالمستقبل.

إذا لديك أية أسئلة أو تعليقات حول الاستبيان الرجاء عدم التردد والإتصال بالباحث عن طريق:

البريد الإلكتروني: 1633044@brunel.ac.uk

الشكر الجزيل لتعاونكم ومساعدتكم

دراسه لنظم التحكم في الإدارة البيئية وأثرهاعلى لأداء البيئي والاقتصادي للمصانع الاردنيه

سـيدي المـدير/ سـيدتي المـديرة :

أكتب هذه الرسالة لأطلب مساعدتكم في أطروحة الدكتوراه في المحاسبه الإدارية التي أقوم بها حاليًا في جامعة برونيل لندن بالمملكة المتحدة. وسأكون ممتنًا جدًا لو تفضلتم بإكمال الاستبيان المرفق. كما أنني أؤكد أن الاستبيان معتمد من قبل اللجنة الأخلاقية للبحث العلمي في جامعة برونيـل لنـدن والتي من خلالها ألتزم كباحث دكتوراه بضمان أن المعلومات التي ستقدمونها ستكون سرية ولن يسمح بالإطلاع عليها وستستخدم فقط لأغراض البحث العلمي. نقدر لكم تعاونكم معنا في هذه الدراسة وأنا على أتم الاستعداد لتزويدكم بنسخة من نتائج الدراسة بعد إتمامها لتعم الفائدة.

تهدف هذه الدراسة الى تفهم وجهة نظر الاداره العليا في المصانع الأردنية تجاه موضوع نظم التحكم في الإدارة البيئية وأثرها على الأداء البيئي والاقتصادي للمصانع الاردنيه

هذا وقد تم اختياركم ضمن عينة عشوائية للمشاركه في هذا المسح وسيمثل رأيك الموضوعـــي أهمية كبيرة في تحقيـق أهداف الدراســة.

شاكريم لكم حسن تعاونكم ومساعدتكم

الباحــث

هبه عبدالكريم المجالي

جامعة برونيل لندن- المملكة المتحدة

القسم الأول: المعلومات الشخصية والوظيفية

ما هو المسمى الوظيفي الحالي الخاص بك	

الجنس			
ذكر	◯	انثى	◯

ما هو عمرك ؟					
29-20	◯	39-30	◯	49-40	◯

ما هو عدد الموظفين في المصنع ؟			
اقل من 10	◯	49-10	◯
249-50	◯	اكثر من 250	◯

منذ متى وانت في موقعك ؟							
اقل من سنتين	◯	6-3 سنوات	◯	10-7 سنوات	◯	اكثر من 11 سنه	◯

الى اي قطاع صناعي تنتمي لها المصنع ؟			
صناعات الورق والكرتون والمعدات المكتبية	◯	صناعات النسيج والملابس الجاهزة	◯
الصناعات الغذائية والزراعية والحيوانية	◯	الصناعات العلاجية واللوازم الطبية	◯
صناعة البناء والتشييد	◯	الصناعات الهندسية والكهربائية وتكنولوجيا المعلومات	◯
صناعات الخشب والأثاث	◯	صناعة البلاستيك والمطاط	◯
صناعات التعدين	◯	الصناعات الكيميائية ومستحضرات التجميل	◯
غير ذلك (يرجى التحديد)_____			

ما هو عمر المصنع ؟							
اقل من سنتين	◯	6-3 سنوات	◯	7- 10 سنوات	◯	اكثر من 11 سنه	◯

نظام التحكم في الاداره البيئيه

تتعلق هذه البيانات بالقضايا البيئية في مؤسستك. يرجى توضيح مدى موافقتك أو عدم موافقتك على ما يلي:

نظام التحكم في الإدارة البيئية: عبارة عن حزمة من الإجراءات الرسمية المعتمدة على المعلومات والتي يستخدمها المديرون لتوضيح الأنماط في أنشطة المؤسسة. يتكون نظام التحكم في الاداره البيئيه من خمس ممارسات وهي :ضوابط التخطيط , الضوابط المعرفيه ,ضوابط المكافأت والتعويضات, الضوابط الاداريه والضوابط الثقافيه.

الرقم	نظام التحكم في الاداره البيئيه	لا اوفق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
	ضوابط التخطيط					
1	يتم النظر بشكل صريح في القضايا البيئية ضمن عملية التخطيط الاستراتيجي للشركة	1	2	3	4	5
2	يشارك موظفو البيئة بفعالية في عملية التخطيط الاستراتيجي للشركة	1	2	3	4	5
	ضوابط المعرفه					
3	تستخدم الشركة مؤشرات الأداء البيئي لمراقبة الامتثال الداخلي للسياسات واللوائح البيئية	1	2	3	4	5
4	توفير البيانات لاتخاذ القرارات الداخلية	1	2	3	4	5
5	النفقات البيئية مفصلة في ميزانية المنظمة	1	2	3	4	5
	ضوابط المكافآت والتعويضات					
6	المؤشرات البيئية مهمة في أنظمة المكافآت	1	2	3	4	5
7	يتم قياس مؤشرات الأداء البيئي على قدم المساواة مع مؤشرات الأداء الاقتصادي	1	2	3	4	5
	الرقابة الإدارية					
8	أهمية دليل الإدارة البيئية الطبيعية للاستخدام الداخلي في مؤسستك	1	2	3	4	5
9	هناك عمليات تدقيق بيئية طبيعية دورية في مؤسستك	1	2	3	4	5
	الضوابط الثقافية					
10	لدى شركتنا بيان سياسة واضح يحث الوعي البيئي في كل مجال من مجالات التشغيل	1	2	3	4	5
11	الحفاظ على البيئة هو نشاط ذو أولوية عالية في شركتنا	1	2	3	4	5

الأداء البيئي

يرجى الإشارة إلى المدى الذي أدت به الممارسات البيئية إلى أنواع مختلفة من الفوائد من عدم المساهمة = 1 إلى مساهمة كبيرة جدًا = 5

الرقم	الأداء البيئي	عدم المساهمة بشكل كبير	عدم المساهمة	محايد	تساهم	مساهم بشكل كبير
1	تحسين الابتكارات العملية	1	2	3	4	5
2	زيادة المعرفة حول طرق فعالة لإدارة العمليات	1	2	3	4	5
3	زيادة الإنتاجية	1	2	3	4	5
4	زيادة كفاءة العملية / الإنتاج	1	2	3	4	5
5	تخفيض في تكاليف العملية / الإنتاج	1	2	3	4	5
6	تحسين جودة المنتج	1	2	3	4	5
7	تحسين ابتكارات المنتجات	1	2	3	4	5
8	انخفاض في تكاليف المواد	1	2	3	4	5
9	تحسين سمعة الشركة	1	2	3	4	5

الاداء الاقتصادي

يرجى الإشارة إلى أداء شركتك خلال الأشهر الـ 12 الماضية من أقل بكثير من المتوسط = 1 إلى أعلى بكثير من المتوسط = 5.

الرقم	الاداء الاقتصادي	اقل بكثير من المتوسط	اقل من المتوسط	محايد	اكثر من المتوسط	اكثر بكثير من المتوسط
1	العائد على الاستثمار	1	2	3	4	5
2	الربح التشغيلي	1	2	3	4	5
3	التدفقات النقدية من العمليات	1	2	3	4	5

روح المبادره البيئيه :

تتعلق العبارات التالية بدمج الاهتمامات البيئية في عمليات صنع القرار في مؤسستك.
يرجى توضيح مدى موافقتك أو عدم موافقتك على ما يلي:

الرقم	روح المبادره البيئيه	لا اوافق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
1	ترتبط الأهداف البيئية بأهداف الشركة الأخرى	1	2	3	4	5
2	هناك منصب رسمي لإعداد التقارير بين المسؤولين عن الشؤون البيئية داخل مؤسستنا وكبار المديرين التنفيذيين في مؤسستنا	1	2	3	4	5
3	موظف بدوام كامل مخصص لإدارة البيئية	1	2	3	4	5
4	التدريب البيئي الطبيعي للمديرين والموظفين	1	2	3	4	5
5	أنظمة لقياس وتقييم الأداء البيئي	1	2	3	4	5
6	المعايير البيئية في اختيار المورد	1	2	3	4	5
7	اختيار طرق النقل الأنظف	1	2	3	4	5
8	أنظمة الاسترداد وإعادة التدوير	1	2	3	4	5
9	ركزت التصميمات على تقليل استهلاك الموارد وتوليد النفايات أثناء الإنتاج والتوزيع					
10	عبوات / حاويات قابلة لإعادة التدوير أو قابلة لإعادة الاستخدام في مجال الخدمات اللوجستية					
11	اقتناء التكنولوجيات / المعدات النظيفة / الخضراء	1	2	3	4	5
12	لمعايير البيئية في اختيار الموردين					
13	معلومات طوعية منتظمة حول الإدارة البيئية لأصحاب المصلحة (العملاء والمنظمين والمجتمعات المضيفة 1 وما إلى ذلك					
14	التقييمات البيئية للاستثمارات الجديدة					

الثقافه التنظيميه :

يرجى الإشارة إلى الدرجة التي تؤكد بها شركتك على الثقافة التنظيمية على نطاق يتراوح من لا أوافق بشدة = 1 للموافقة بشدة = 5

الرقم	الثقافه التنظيميه	لا اوفق	محايد	اوافق	اوافق بشدة
	الثقافة التتسويقيه				
1	شركتناتسعى نحو تحقيق الاهداف التسويقيه	2	3	4	5
2	تعتبر القيادة في شركتنا نموذجًا للتركيز الشديد على النتائج.	2	3	4	5
3		2	3	4	5
4	تؤكد شركتنا الإجراءات التنافسية والإنجاز	2	3	4	5
	ثقافه العشيره				
5	منظمتنا هي مكان شخصي للغاية. إنها تشبه الأسرة الممتدة.	2	3	4	5
6	تعتبر القيادة في منظمتنا بشكل عام مثالاً على التوجيه	2	3	4	5
7	يتميز أسلوب الإدارة في مؤسستنا بالعمل الجماعي والإجماع والمشاركة.	2	3	4	5
8	تشدد مؤسستنا على التنمية البشرية. لا تزال الثقة والانفتاح والمشاركة مستمرة.	2	3	4	5
	الثقافه الديمقراطيه				
9	منظمتنا هي مكان ديناميكي وريادة الأعمال.	2	3	4	5
10	يتميز أسلوب الإدارة في مؤسستنا بالمخاطرة الفردية والابتكار والحرية والتفرد.	2	3	4	5
11	تؤكد مؤسستنا على الحصول على موارد جديدة وخلق تحديات جديدة.	2	3	4	5
12	تعرف مؤسستنا النجاح على أساس وجود أكثر المنتجات تميزًا أو أحدثًا	2	3	4	5
	ثقافة التسلسل الهرمي				
13	منظمتنا هي مكان خاضع للرقابة ومنظم للغاية.	2	3	4	5
14	تعتبر القيادة في مؤسستنا بشكل عام مثالاً على كفاءة التنسيق أو التنظيم أو التشغيل السلس	2	3	4	5
15	تؤكد منظمتنا على الثبات والاستقرار	2	3	4	5
16	يتميز أسلوب الإدارة في مؤسستنا بأمان علاقات العمل	2	3	4	5

الرجاء اضافه اي تعليقات اخرى _____

اشكركم لاستكمال الاستبيان

نتوقع الانتهاء من هذه الدراسة تقريبًا بحلول سبتمبر 2021. يرجى الإشارة إلى ما إذا كنت ترغب في الحصول على ملخص موجز لنتائج الدراسة؟ نعم , لا

اذا كانت الاجابه نعم الرجاء كتابه البريد الالكتروني

البريد الالكتروني _____