THE EFFECT OF ENVIRONMENTAL COST AND MANAGEMENT SYSTEM ON ORGANIZATIONAL PERFORMANCE FOR MALAYSIAN MANUFACTURING INDUSTRY

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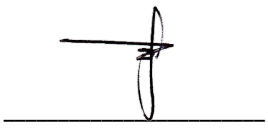

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ABSTRACT

The purpose of this study was to examine the effect of environmental cost (EC) and environmental management system (EMS) on organizational performance (OPM) for Malaysian manufacturing industry. The data were collected from 395 manufacturing companies in Malaysia using online questionnaire. This study utilized structural equation modeling technique to test the research hypotheses. The findings showed that there were positive and significant effect of EC on EMS (β=0.637, $p<0.001$), EMS on OPM (β=0.478, $p<0.05$), and EC on OPM (β=0.259, $p<0.001$). The findings also found that the indirect effect of EC on OPM (β=0.304, $p<0.05$) through EMS implementation. In addition, the study found that EMS has acted as a partial mediator between EC and OPM for Malaysian manufacturing industry. In conclusion, the main findings revealed that significant effect on OPM were derived from EC and EMS. The implication of this study contributes to the environmental management accounting literature by linking the EC on OPM through the implementation of EMS.

KESAN KOS DAN SISTEM PENGURUSAN ALAM SEKITAR KE ATAS PRESTASI ORGANISASI BAGI INDUSTRI PEMBUATAN DI MALAYSIA

ABSTRAK

Tujuan kajian ini adalah untuk menentukan kesan kos alam sekitar (EC) dan sistem pengurusan alam sekitar (EMS) ke atas prestasi organisasi (OPM) bagi industri pembuatan di Malaysia. Data telah dikumpulkan daripada 395 syarikat pembuatan di Malaysia menggunakan borang soal selidik atas talian. Kajian ini menggunakan teknik pemodelan persamaan berstruktur bagi menguji hipotesis penyelidikan. Dapatan kajian menunjukkan bahawa terdapat kesan positif dan signifikan EC ke atas EMS (β=0.637, $p<0.001$), EMS ke atas OPM (β=0.478, $p<0.05$) dan EC ke atas OPM (β=0.259, $p<0.001$). Dapatan kajian juga menunjukkan bahawa kesan secara tidak langsung EC ke atas OPM (β=0.304, $p<0.05$) melalui pelaksanaan EMS. Di samping itu, kajian mendapati bahawa EMS adalah pengantara separa antara EC dan OPM bagi industri pembuatan di Malaysia. Kesimpulannya, dapatan utama kajian menunjukkan kesan yang signifikan ke atas OPM adalah daripada EC dan EMS. Implikasi kajian ini menyumbang kepada literatur perakaunan pengurusan alam sekitar dengan menghubungkan EC ke atas OPM melalui pelaksanaan EMS.

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LIST OF ABBREVIATIONS

AE	Auditing and Evaluation
AGFI	Adjusted Goodness of Fit Index
AMOS	Analysis of Moment Structures
CA	Checking and Correction Action
CF	Customer Focus
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Indexes
EC	Environmental Cost
EFA	Exploratory Factor Analysis
EMAP	Environmental Management Accounting Practices
EMS	Environmental Management System
ER	Environmental Regulation
ES	Environmental Safety
FMM	Federation of Malaysian Manufacturers
FP	Financial Performance
GDP	Gross Domestic Product
GFI	Goodness of Fit Index
IO	Implementation and Operation
KMO	Kaiser Meyer Olkin
MC	Management Commitment
MIDA	Malaysian Investment Development Authority

MITI	Ministry of International Trade and Industry
OPM	Organizational Performance
OP	Operational Performance
PL	Planning
RMSEA	Root Mean Square Error Approximation
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Sciences
TLI	Tucker Lewis Index

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CHAPTER 1

INTRODUCTION

1.1 Background of Research

The manufacturing industry plays an important role in the Malaysian economy, as it contributes significantly to the gross domestic product (GDP). In Malaysia, the manufacturing industry contributed 22.80% to the GDP in 2016 (Hooi, 2016; Ministry of International Trade and Industry [MITI], 2017). In addition, the Malaysian government is targeting a GDP growth of between 5% and 6% per annum from 2016-2020 (Malaysian Investment Development Authority [MIDA], 2017). Thus, it is essential for the manufacturing industry in Malaysia to perform well, and contribute towards achieving the intended goal for the GDP.

The manufacturing industry is one of the important sectors that can improve economic development (Rajala, Westerlund, & Lampikoski, 2016). The activities of the manufacturing industry significantly contribute towards economic development, and, thus the manufacturing industry plays a major role in terms of economic growth, especially in the global economy. Table 1.1 presents the share of GDP for various industries in Malaysia between 2014-2016.

Table 1.1

The Share of GDP in Malaysia

Economic Sectors	2014		2015		2016	
	% Change	Share of GDP (%)	% Change	Share of GDP (%)	% Change	Share of GDP (%)
Manufacturing	6.2	23.0	4.5	22.9	4.3	22.8
Agriculture	2.1	9.2	1.3	8.9	1.3	8.6
Mining	3.3	9.0	3.5	8.8	4.0	8.8
Construction	11.8	4.3	3.5	4.4	8.4	4.6
Services	6.5	53.5	5.7	53.8	5.4	54.0

As seen in Table 1.1, manufacturing contributed 22.80% of the GDP of the Malaysian economy in 2016 (Bank Negara Malaysia [BNM], 2017). The Malaysian manufacturing sector was also responsible for the manufacturing sales in 2018, which increased by 7.7% from RM66.6 billion in 2017 to RM71.8 billion in 2018 (Department of Statistics Malaysia, 2018). Thus, the manufacturing industry is acknowledged to be an important sector in the Malaysian economy.

Malaysia has realized that environmental management is important in the manufacturing industry (Sidin & Sham, 2015). This is because the Malaysian manufacturing industry is concerned about environmental issues, such as the waste of energy, materials, and costs pertaining to the environment to achieve sustainable development (Mokthsim & Salleh, 2014). Thus, the researcher chose the manufacturing industry in this study to improve the environmental management for Malaysian manufacturing industry.

Previous studies on environmental management accounting have been conducted in different industries based on various aspects (Setthasakko, 2010; Jalaludin, Sulaiman, & Ahmad, 2011; Abiola & Ashamu, 2012; Christ & Burritt, 2013; Smit & Kotzee, 2016), with increasing attention to the manufacturing industry. One of the practices that need to be considered in this study is Environmental Cost (EC). EC is one of the components of Environmental Management Accounting Practices (EMAP) in managing environmental activities in the organization (Rakos & Antohe, 2014). This is because the implementation of EC is still lacking in organizations, especially in developing countries like Malaysia. According to Jamil, Mohamed, Muhammad, and Ali (2015), there is still a lack of EC implementation concerning the environmental impact and environmental awareness in the manufacturing industry. The authors stated that EC is one of the important strategic management accounting practices to improve the performance in the manufacturing industry.

Furthermore, EC has been implemented in organizations to overcome the limitations of conventional management accounting in providing information relating to environmental management (Debnath, 2014; Ismail, Ramli, & Darus, 2014; Gunarathne & Lee, 2015; Ariffin, 2016; Song, Zhao, & Zeng, 2017). Christ and Burritt (2013) support that EC can manage the environmental activities in ways such as cost saving, improving environmental processes, and enhancing the environmental improvement of the organization. In this regard, EC is a practice that can assist organizations to manage environmental activities to achieve good performance, especially for Malaysian manufacturing industry. Thus, there is a significant gap in this study on EC to improve the environmental management for Malaysian manufacturing industry.

Previous literature, including Ferreira, Moulang, and Hendro (2010), Munteanu (2013), Tappura, Sievanen, Heikkila, Jussila, and Nenonen (2015), and Alkisher (2018), have studied the factors that influence EMAP. This study focused on four key drivers of EC: environmental regulation, environmental safety, management commitment, and customer focus. Environmental regulation is required by complying with the legislation; environmental safety refers to the environmental standards and safety requirements; management commitment refers to the involvement of employers and employees in improving the environmental management; and customer focus is defined as customer needs and satisfaction in achieving the environmental goals.

Given the implementation of EC in managing the environmental impact for Malaysian manufacturing industry, the adoption of an Environmental Management System (EMS) has begun to attract the interest of researchers in this study. EMS is a set of management processes that requires companies to identify, evaluate, and monitor the environmental impacts. EC plays a significant role in implementing the EMS in order to manage the environmental activities for Malaysian manufacturing industry. This is supported by Phan and Baird (2015) who indicate that EMS is a systematic approach for managing the environment in the manufacturing industry. Hence, EMS can be used for improving environmental management for Malaysian manufacturing industry.

Previous research also suggests that the implementation of EMS can improve the environmental management in the manufacturing industry (Gonzalez, Sarkis, & Diaz, 2008; Massoud, Daily, & Bishop, 2011; Ronnenberg, Graham, & Mahmoodi, 2011). At the same time, EMS can improve the performance of the organization (Massoud et al., 2011; Khalili & Duecker, 2013). Thereby, EMS implementation is used in this study of the Malaysian manufacturing industry to improve environmental management and performance.

In relation to that, this study also focuses on Organizational Performance (OPM). OPM refers to the measurement of the outcome, which influences the extent of performance measurement used in organizations (Gomes, Mendes, & Carvalho, 2017). In particular, OPM measurement is essential in the manufacturing industry, particularly for Malaysian manufacturing industry (Al-Tit, 2017). Therefore, the

Malaysian manufacturing industry can achieve the organizational objectives, which, in turn, leads to an improvement in the OPM.

This study, therefore, proposes that EMS, as a mediating variable, influences the EC and OPM for Malaysian manufacturing industry. As such, this study utilizes the structural equation modeling technique to test the relationship between EC, EMS, and OPM for Malaysian manufacturing industry. In this regard, this study relies on the hypothesized structural model to examine the relationship between EC, EMS, and OPM.

1.2 Problem Statement

The manufacturing industry is an important and strategic industry in Malaysia to improve sustainability and ensure an increase in productivity (Hooi, 2016). According to The Star (2016), the environmental issues are related to the manufacturing ecosystem in Malaysia and also related to the technology in the manufacturing industry. However, in a developing country like Malaysia, environmental sustainability is still at an early stage in promoting environmental management practices (Sidek & Backhouse, 2014). In addition, Jamil et al. (2015) supported that manufacturing firms have not given much attention to EC implementation. Therefore, the manufacturing industry in Malaysia is chosen in this study to improve the EC.

Environmental issues have become of increasing concern in recent years at the national and international levels. Some of the focus on environmental issues such as air pollution, water, chemical waste, and global warming centers around the industrial activities. Since the 1980s, the accounting profession and accountants have begun to play an important role in attempting to solve the environmental problems and address the environment issues (Bouma & Veen, 2002; Christ & Burritt, 2013). The environmental issues are attracting increasing attention in Malaysia (San, Heng, Selley, & Magsi, 2018), with companies being requested to change their business practices to improve environmental activities. The main reason that many organizations are concerned about environmental issues is to improve efficiency, to achieve better financial gain, to reduce waste, to achieve cost savings, and to improve performance (Ong, Noordin, Kassim, & Jaidi, 2018).

OPM is a critical concern that is being pursued in the manufacturing industry (Mia & Winata, 2014; Lo, Wang, & Wah, 2016; Al-Tit, 2017). OPM is an integrated concept that provides the outcomes of the operations of manufacturing organizations. Several studies have found that OPM implementation is not only beneficial for the environment but also for the overall performance of the organization (Wadongo & Abdel-Kader, 2014; Wang, Bhanugopan, & Lockhart, 2015; Almatrooshi, Singh, & Farouk, 2016), particularly for Malaysian manufacturing industry. Hence, measuring OPM enables the Malaysian manufacturing industry to focus on the performance of the organization that needs to be improved through the implementation of EC and EMS.

Malaysia, like developed countries, has been dealing with the environmental issues such as pollution, which is caused by the activities of the manufacturing industry (Ismail et al., 2014). Environmental issues have been linked to the operational activities of manufacturing organizations (Smit & Kotzee, 2016; Solovida & Latan, 2017). As such, EC has become an important global issue that creates challenges for manufacturing organizations (Jamil et al., 2015). Hence, there is a need to ensure that the manufacturing industry embarks on EC to reduce the environmental problems. However, the concerns of the manufacturing industry about the environmental issues not only pertain to environmental management but also to the performance of the organizations.

EC is a challenge faced by management accounting related to environmental activities. The implementation of EC is still weak in terms of cost saving, environmental awareness, environmental legislation, and the lack of stakeholders' pressure in the manufacturing industry, especially in developing countries like Malaysia (Jalaludin et al., 2011; Jamil et al., 2015). According to Alkisher (2018), the drivers of EC are important among developing countries. Thus, this study focuses on the factors (environmental regulation, environmental safety, management commitment, and customer focus) that may influence the EC for Malaysian manufacturing industry.

To meet the requirements of EC, the implementation of EMS in the manufacturing industry can assist an organization in managing, measuring, and improving the environmental management of its operations (Low, Tan, Choi, &

Husna, 2015). Furthermore, EMS provides a guideline in the manufacturing industry to manage the environment (Phan & Baird, 2015). This is due to the aims of EMS implementation to encourage an organization to manage environmental issues more effectively. Hence, EMS implementation is necessary for improving the management system and OPM, particularly for Malaysian manufacturing industry.

EMS could provide a structured and systematic way to deal with organizational environmental issues to improve OPM. Companies can implement EMS as a valuable management tool with a benchmark to identify weaknesses in the existing management system (Zobel & Malmgren, 2016). Furthermore, EMS implementation can reduce environmental issues as well as to improve the OPM. Therefore, this study contributes to the knowledge base concerning the usefulness of EMS implementation for Malaysian manufacturing industry.

A study by Ong, Teh, Ng, and Soh (2016) suggested that more companies in Malaysia need to adopt EMS in improving OPM, especially for Malaysian manufacturing industry. However, the authors mentioned that EMS implementation has limitations in terms of procedures, legal compliance, and cost savings within the organizations. Thus, EMS as a mediating variable was chosen because EMS may relate to the EC and OPM in order to improve environmental management accounting for Malaysian manufacturing industry. Hence, EMS assists organizations to evaluate the implementation of EC and OPM for Malaysian manufacturing industry.

In this regard, this study relies on the contingency theory for the hypothesized structural model to examine the relationship between EC, EMS, and OPM (Islam & Hu, 2012; Mishra, 2013, Wadongo & Abdel-Kader, 2014; Shuhidan, Mastuki, & Nori, 2015; Otley, 2016). In explaining the hypothesized structural model, this study utilizes the structural equation modeling technique to examine the relationship between these variables. Therefore, the aim of this study is to examine the relationship between EC, EMS, and OPM for Malaysian manufacturing industry.

1.3 Research Questions

This is investigated through eight research questions, which are presented below:

1. Is there any significant relationship between environmental regulation and EC for Malaysian manufacturing industry?
2. Is there any significant relationship between environmental safety and EC for Malaysian manufacturing industry?
3. Is there any significant relationship between management commitment and EC for Malaysian manufacturing industry?
4. Is there any significant relationship between customer focus and EC for Malaysian manufacturing industry?
5. Is there any significant relationship between EC and OPM for Malaysian manufacturing industry?

6. Is there any significant relationship between EC and EMS for Malaysian manufacturing industry?
7. Is there any significant relationship between EMS and OPM for Malaysian manufacturing industry?
8. Does EMS mediate the relationship between EC and OPM for Malaysian manufacturing industry?

1.4 Research Objectives

Generally, the objectives of this study are to examine the relationship between EC, EMS, and OPM for Malaysian manufacturing industry using the structural equation modeling analysis. Accordingly, the objectives of this research are:

1. To examine the relationship between environmental regulation and EC for Malaysian manufacturing industry.
2. To examine the relationship between environmental safety and EC for Malaysian manufacturing industry.
3. To examine the relationship between management commitment and EC for Malaysian manufacturing industry.
4. To examine the relationship between customer focus and EC for Malaysian manufacturing industry.
5. To examine the relationship between EC and OPM for Malaysian manufacturing industry.

6. To examine the relationship between EC and EMS for Malaysian manufacturing industry.
7. To examine the relationship between EMS and OPM for Malaysian manufacturing industry.
8. To examine whether EMS mediates the relationship between EC and OPM for Malaysian manufacturing industry.

1.5 Research Framework

The research model aims to examine the relationship between EC, EMS, and OPM for Malaysian manufacturing industry. To understand the relationship between EC, EMS, and OPM for Malaysian manufacturing industry, the following hypotheses are used and tested. Figure 1.1 represents the research framework proposed by the researcher.

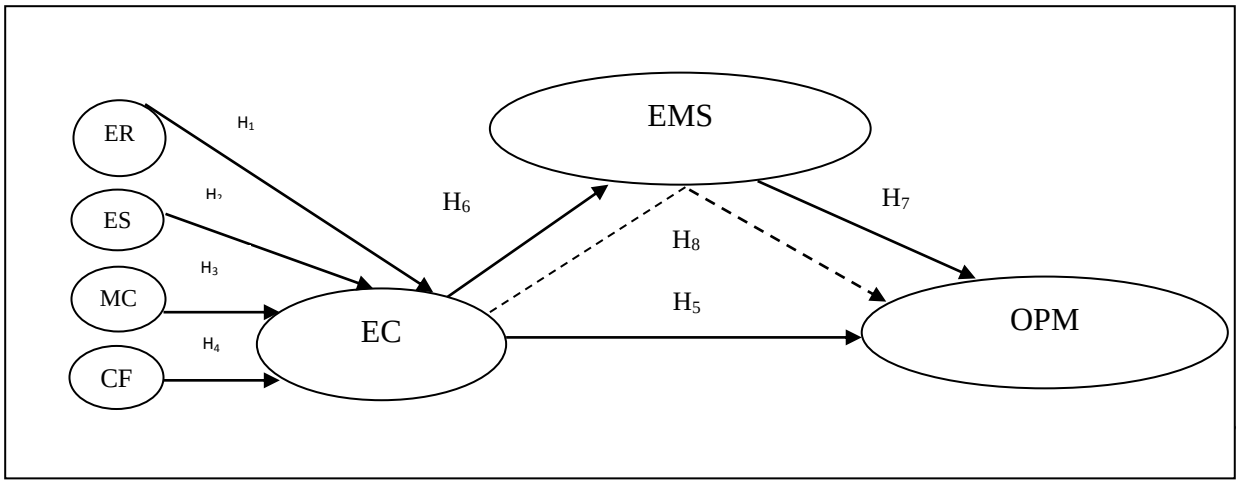

Figure 1.1. Research Framework

As seen in Figure 1.1, seven hypotheses have a direct relationship (H_1, H_2, H_3, H_4, H_5, H_6, H_7) and one hypothesis (H_8) has an indirect relationship. Thus, this study aims to examine the relationship between EC, EMS, and OPM using the structural equation modeling analysis.

1.6 Research Hypotheses

The research hypotheses focus on the eight hypotheses of this study, as follows:

H_1: There is a positive and significant relationship between environmental regulation and EC for Malaysian manufacturing industry.

H_2: There is a positive and significant relationship between environmental safety and EC for Malaysian manufacturing industry.

H_3: There is a positive and significant relationship between management commitment and EC for Malaysian manufacturing industry.

H_4: There is a positive and significant relationship between customer focus and EC for Malaysian manufacturing industry.

H_5: There is a positive and significant relationship between EC and OPM for Malaysian manufacturing industry.

H_6: There is a positive and significant relationship between EC and EMS for Malaysian manufacturing industry.

H_7: There is a positive and significant relationship between EMS and OPM for Malaysian manufacturing industry.

H_8: EMS has a mediating effect on the EC and OPM relationship for Malaysian manufacturing industry.

1.7 Significance and Contributions of the Research

From the theoretical perspective, this study suggests that the contingency theory can contribute directly to improve EC, EMS, and OPM for Malaysian manufacturing industry. This study empirically examines the drivers of EC (environmental regulation, environmental safety, management commitment, and customer focus). This study also examines the relationship between environmental regulation and EC, the relationship between environmental safety and EC, the relationship between management commitment and EC, and the relationship between customer focus and EC.

This study also examines the relationship between EC, EMS, and OPM for Malaysian manufacturing industry. In terms of the theoretical aspects, EMS is the mediating variable in the relationship between EC and OPM for Malaysian manufacturing industry. In addition, this study tests the mediation effect of EMS between EC and OPM. The implementation of EMS is significant for Malaysian manufacturing industry. Hence, this study fills the theoretical gap by examining the relationship between EC, EMS, and OPM.

From the practical perspective, this study will benefit the Malaysian manufacturing industry and related government agencies in terms of guidelines to achieve better EC, EMS, and OPM. Thus, this study fills the practical gap by providing a reliable and useful reference for the EC, EMS, and OPM for Malaysian manufacturing industry. For the methodology perspective, the instruments in this study may be valuable tools to evaluate EC, EMS, and OPM for Malaysian manufacturing.

Therefore, the research findings would provide new insights for the environmental management accounting areas including EC and EMS in order to improve OPM for Malaysian manufacturing industry. Apart from these contributions, the research outcome can provide useful guidance for future researchers in this research area. Table 1.2 presents the contributions of the research.

Table 1.2

Contributions of the Research

	Contributions of the Research
Theoretical	1. EMS as mediating variable in the relationship between EC and OPM based on the contingency theory. 2. The relationship between environmental regulation and EC. 3. The relationship between environmental safety and EC. 4. The relationship between management commitment and EC. 5. The relationship between customer focus and EC. 6. The relationship between EC and OPM. 7. The relationship between EC and EMS. 8. The relationship between EMS and OPM. 9. EMS mediates between EC and OPM.

Table 1.2 (continued)

Practical	1. EMS is significant in the Malaysian manufacturing industry; and 2. Guidelines for EC, EMS, and OPM in the Malaysian manufacturing industry.
Methodology	1. The instruments may be valuable tools to evaluate EC, EMS, and OPM.

1.8 Scope and Limitations of the Research

In this study, the researcher is interested in analyzing the mediating influence of EMS between EC and OPM for Malaysian manufacturing industry. This study is carried out to examine the relationship between EC, EMS, and OPM using structural equation modeling analysis for Malaysian manufacturing industry.

This study has a number of limitations that need to be addressed in future research. Firstly, the population and sample of the survey respondents only target the Malaysian manufacturing industry. Secondly, this research only uses the survey technique and is only conducted in the Malaysian manufacturing industry.

Regarding the research methodology, this study is only based on the quantitative approach. However, the researcher considers that there is a greater scope for investigation of the EC and EMS on the OPM relationships. Thus, it is expected that the results of this study will give valuable insights into the relationship between EC and EMS, and the OPM for Malaysian manufacturing industry.

1.9 Operational Definitions

The operational definitions of each variable are adapted from previous studies. The definitions of the terms in this study are as follows:

1.9.1 Environmental Cost (EC)

EC is one of the components of EMAP. Rakos and Antohe (2014) defined EC as one of the instruments of EMAP to ensure company compliance with lower costs. This is to provide efficient decision-making for the EC, particularly for Malaysian manufacturing industry. Hence, EC includes all the costs related to the environmental impacts of the company's operations.

1.9.2 Environmental Regulation

Environmental regulation refers to measuring and achieving the environmental objectives and goals through environmental evaluation of the company operations, and compliance with the legislation and rules (Ntalamia, 2017). Thus, environmental regulation is required in EC by complying with the legislation, particularly for Malaysian manufacturing industry.

1.9.3 Environmental Safety

Environmental safety is important in determining a safe and healthy environment. Environmental safety refers to the safety awareness to enable industries to conduct their operations in a secure environment to improve organizational performance (Schaltegger, 2018). This is because environmental safety can be applied by complying with the environmental standards and safety requirements in the company's operations. Thus, the Malaysian manufacturing industry can implement ES regarding the EC requirements.

1.9.4 Management Commitment

Management commitment refers to the involvement of employers and employees to achieve organizational goals. According to Setthasakko (2015), management commitment can support EC regarding environmental issues, environmental activities, and environmental programs in the organization. Therefore, management commitment is one of the drivers for EC to improve the environmental management of the Malaysian manufacturing industry.

1.9.5 Customer Focus

Customer focus is one of the dimensions that organizations need to give attention to in order to meet the customer requirements. Customer focus is defined as the customer needs and customer satisfaction in achieving the organizational goals (Gibassier &

Alcouffe, 2018). Hence, it is important for the organization to integrate with customer focus in EC as well as improve customer satisfaction and to meet customer requirements, particularly for Malaysian manufacturing industry.

1.9.6 Environmental Management System (EMS)

EMS is a systematic approach to address environmental issues to improve the management system. According to Phan and Baird (2015), EMS refers to the procedures, tools, and structure in implementing the environmental policy for improving environmental management. Thus, EMS encourages the Malaysian manufacturing industry to comply with the environmental policy.

1.9.6.1 Planning

Planning refers to the process of determining the environmental aspects and compliance requirements. Famiyeh, Kuttu, and Anarfo (2014) stated that planning is used to determine the environmental policies and strategies in the company in terms of the environmental aspects, legal requirements, and objectives of the target and program. In this study, planning is a fundamental step that can be used to improve EMS for Malaysian manufacturing industry.

1.9.6.2 Implementation and Operation

Implementation and operation are utilized to determine the proper procedures for reducing the environmental impact or improving environmental regulations in the company. Implementation and operation refer to the EMS documentation including environmental policies, regulations, and procedures of environmental activities (Murmura & Bravi, 2017). Therefore, implementation and operation are important to identify EMS documentation, document control, operational control, and training and awareness in determining the environmental procedures for Malaysian manufacturing industry.

1.9.6.3 Auditing and Evaluation

Auditing and evaluation are one of the EMS dimensions in this study. The auditing and evaluation function in EMS are provided to the structures of effective management, particularly for improving environmental management (Searcy et al., 2012). Hence, auditing and evaluation are one of the components of EMS that can manage the procedures of the environmental management effectively.

1.9.6.4 Checking and Correction Action

Checking and correction action describe how the EMS can maintain and improve the problems related to the environmental issues. According to Hariz and Bahmed (2013), organizations need to comply with the procedures in taking checking and correction

action to address the environmental impact. Hence, checking and correction action are to ensure that the company's objectives are being fulfilled and to resolve environmental issues and correct the problems, particularly for Malaysian manufacturing industry.

1.9.7 Organizational Performance (OPM)

OPM can be measured to increase the company's performance, particularly for Malaysian manufacturing industry. OPM is used to measure the performance outcomes for organizational improvement (Gomes et al., 2017). Thus, OPM is an important performance measurement to enhance the company's performance, especially for Malaysian manufacturing industry.

1.9.7.1 Financial Performance

Performance measurement through financial performance has been used to evaluate the organization's financial matters. The financial performance measures indicate the organizational strategy, evaluation, and outcomes that contribute to OPM (Wahba & Elsayed, 2015). Hence, financial performance plays a key role in improving OPM, particularly for Malaysian manufacturing industry.

1.9.7.2 Operational Performance

Operational performance refers to the performance measurement to assess and monitor the operations of the activities. The measurement of operational performance can help the organizations to improve the manufacturing operations, such as quality, cost, and processes (Modgil & Sharma, 2016). Regarding this, operational performance is one of the dimensions for the manufacturers to measure the OPM, particularly for Malaysian manufacturing industry.

1.10 Organization of the Thesis

The thesis contains five main chapters; the summary of this chapter is discussed as follows:

Chapter 1: Chapter 1 begins with the background of the research. It includes the Malaysian manufacturing industry, EC, EMS, and OPM. This chapter also consists of the problem statement, research questions, research objectives, research framework, research hypotheses, significance and contributions of the research (theoretical, practical, and methodology), scope and limitations of the research, operational definitions (EC, EMS, and OPM), and organization of the thesis.

Chapter 2: Chapter 2 discusses the literature review from the previous studies. This chapter starts with the introduction, followed by the underpinning theory based on the contingency theory. This chapter also provides the management accounting perspectives, OPM overview, OPM dimensions (financial performance and operational performance), overview of EMAP, definition of EMAP, drivers of environmental cost (environmental regulation, environmental safety, management commitment, and customer focus), EMS overview, EMS dimensions (planning, implementation and operation, auditing and evaluation, and checking and correction action), the development of the research hypotheses (the relationship between EC, EMS, and OPM), and, lastly, the chapter summary.

Chapter 3: In this chapter, the methodology is discussed. This includes the introduction of this chapter; research design; questionnaire development; measurement of items; validity; expert validation; pilot study; exploratory factor analysis for EC, EMS, and OPM dimensions; KMO and Bartlett's test results; total variance explained results; rotated component matrix results; reliability analysis; population and sampling; data collection procedures; data analysis procedures; hypotheses testing; and, lastly, the chapter summary.

Chapter 4: In this chapter, the findings are discussed. The introduction in this chapter gives an overview of the findings. The first part of the research findings concerns the response rate; data screening analysis; descriptive statistics for EC, EMS, and OPM dimensions; confirmatory factor analysis; findings of the relationship between EC, EMS, and OPM; and, lastly, the chapter summary will be presented.

Chapter 5: In this chapter, the recommendations and conclusions are discussed. The discussion is based on the research objectives in the correspondence with the findings of the study and those of previous studies. The eight objectives of the study are discussed based on the relationship between EC, EMS, and OPM. The discussion of the research findings of this study focuses on the eight hypotheses of which there are seven direct relationships and one indirect relationship. This discussion towards the research findings is aligned with the research objectives of this study. This chapter also discusses the implications of the research, limitations of the research, recommendations for future research, and, lastly, the chapter summary is presented.