ENVIRONMENTAL MANAGEMENT SYSTEM AND ITS IMPACTS ON MANUFACTURING COMPANY'S PERFORMANCE IN MALAYSIA

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A report submitted in partial fulfillment of the
requirement for the award of the degree of
Bachelor of Mechanical Engineering

Faculty of Mechanical Engineering
UNIVERSITI MALAYSIA PAHANG

NOVEMBER 2008

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We hereby declare that we have checked this project and in our opinion this project is satisfactory in terms of scope and quality for the award of the degree of Bachelor of Mechanical Engineering

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I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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DEDICATION

To my beloved father and mother

Mr. Yusoff bin Yaakob
Mdm. Wan Hashnah binti Wan Hassan

To my supervisor

Mr. Muhamad Mat Noor

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim

First of all, I am grateful to Allah S.W.T for blessing me and give the healthy and strength to me in finishing my Final Year Project (FYP) successfully and obtain the objectives.

Then, I would like to say thank you to all of my family especially my parents which giving me full support and encouragement to finish this project. With a deep sense of gratitude, I wish to express my special thanks and appreciate to my supervisor, Mr. Muhamad Mat Noor who has supervised me for two semesters. Because of his guidance and open mind I have been able to complete the thesis. Precious thanks to the company's manager from 30 companies who were involved in this survey work to complete the project.

As always it is impossible to mention everybody here who had give impact to my project. Finally I want to thank to my friend and to all whose direct and indirect support helped me completing my thesis on time. Only Allah can repay your kindness.

ABSTRACT

The ways used to limit the environmental liabilities resulting from the utilization of the resources of the environment for wealth creation is through improving the environmental performance of corporations. Therefore, ISO 14001 Environmental Management Systems provides a framework for achieving this goal and would help firms integrate environmental values into their business operations and reduce liabilities. Sceptics think that, overall, EMS will not improve the world's environmental situation because it does not set environmental performance or technology criteria and only give little benefit to the company. This study addressed this as well as other related issues of EMS by using certified manufacturing sector in Malaysia as survey sample. This research was based on EMS implemented companies located throughout Malaysia. Questionnaires were used as the main research instrument. The questionnaire form sent through 3 methods that is telephone survey, e-mail survey and mail survey. This project will study about the benefit of the EMS in economic & environmental, customer satisfaction and impact of EMS implementation to the manufacturing sector in Malaysia. About 59% of company that implemented the EMS do care about the EMS effectiveness and have initiative to develop the potential of EMS. From this study, we can see the EMS not only increase the company performance, but also give alternative in integrating the awareness of environment and indirectly give benefit to the mankind.

ABSTRAK

Salah satu cara untuk mengehadkan kesan-kesan negatif kepada persekitaran yang disebabkan oleh penggunaan sumber alam yang digunakan untuk penghasilan ciptaan/produk baru adalah dengan meningkatkan system pengurusan dan prestasi syarikat atau firma dari sudut lebih mesra terhadap persekitaran.Oleh sebab itu ISO 14001 Environmental Management System (EMS) menyediakan rangka kerja untuk mencapai matlamat dan membantu syarikatdan firma dalam meningkatkan kesedaran terhadap nilai-nilai penjagaan persekitaran dalam setiap proses yang dijalankan dan mengurangkan tanggungan terhadap persekitaran.Meskipun. Golongan yang kurang percaya (skeptis) menggambarkan bahawa EMS tidak meningkatkan atau memberi kesan terhadap situasi persekitaran dunia kerana EMS tidak memastikan standard/piawaian penggunaannya dan menetapkan kriteria untuk teknologi yang digunakan dan hanya memberi sedikit manfaat kepada syarikat.Jadi projek ini memfokuskan kajian terhadap isu-isu yang berkait rapat dengan EMS dan menganalisa maklumat berdasarkan maklum balas daripada 30 syarikat dalam sektor pembuatan di Malaysia.Kajian ini merangkumi syarikat yang telah melaksanakan EMS dalam sistem pentadbiran syarikat.Senarai soalan (questionnaire form) telah digunakan sebagai bahan kajian yang utama.Jadi,skop projek ini adalah membuat kajian mengenai faedah pelaksanaan EMS dari segi ekonomi dan persekitaran, kepuasan pelanggan, dan kesan-kesan lain yang timbul.Kira-kira 59% syarikat yang melaksanakan EMS memberi penuh komitmen dan mempunyai inisiatif untuk meningkatkan potensi pelaksanaan EMS. Daripada kajian ini, EMS bukan sahaja meningkatkan potensi syarikat malah menyediakan alternatif untuk meningkatkan kesedaran terhadap EMS dan secara tidak langsung memberi kebaikan kepada manusia.

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LIST OF ABBREVIATIONS

CATI	Computer-Assisted Telephone Interviewing
CEN	Comite Europeen de Normalisation
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
ESH	Environmental, safety and health
FMM	Federation of Malaysian Manufacturers
GDP	Gross Domestic Product
HR	Human Resource
ILO	International Labour Organization
ISO	International Organization of Standardization
SEQ	Safety, environmental, and quality
TC	Technical Committee
TQM	Total quality management

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Occupational health and safety, environmental, and quality (SEQ) issues are commonly managed by three separate departments within organizations. Because of a number of commonalities in the three management systems, there could be a degree of overlap that might lead to inefficiencies. Organizations face the need to develop integrated systems for the management of these areas. By integrating these three management systems into one SEQ system, the duplication of effort could be minimized and the health and safety, environmental, and quality issues could be managed by one common proactive approach. The present paper examines how the requirements for training in different areas overlap and how an integrated training program may be developed. [1]

Health and safety management systems have a background in theory and in various interests among employers and workplace health and safety professionals. These have resulted in a number of national systems emanating from national standard-writing centers and from employers' organizations. In some cases these systems have been recognized as national standards. The contenders for an international standard have been the International Organization of Standardization (ISO) and the International Labour Organization (ILO). The quality and environmental management systems of ISO

indicate what an ISO health and safety management standard would look like. The ILO Guidelines on Safety and Health Management Systems, by contrast, are stringent, specific and potentially effective in improving health and safety performance in the workplace. [2]

The increasing environmental consciousness of the public, the statutory requirements due to government policies and regulations, and pressures from organized groups are traditionally considered to be the factors that sway companies to adopt an Environmental Management System (EMS) policy. The needs for environmental protection (such as waste minimization, pollution prevention, energy conservation and other health and safety issues) have been widely publicized. An increasing number of firms recognize that adopting an EMS is an integral part of the business strategy. Adoption of an EMS provided an effective guidance for companies to simultaneously establish, develop and review their business practices towards both corporate and environmental goals. [3]

Total quality management (TQM) has been one of the leading management strategies for enhancing the productivity of companies in industrialized countries in recent decades. TQM allows firms to obtain, on the one hand, a high degree of differentiation, satisfying customers' needs and strengthening brand image, and on the other, to reduce costs by preventing mistakes and waste of time and by making improvements in the corporation's processes. TQM requires a cultural change and the development of a number of components in an integrated way for a successful implementation.

However, Environmental Management System (EMS) is becoming an important tool in environmental monitoring and improvement. They are used worldwide by business, organizations and agencies to identify, monitor and control potential environment impacts. An EMS is actually a business requirement now for some industry sectors, notably the automotive, manufacturing and electrical industries. Additional

sectors and trade organizations are expected to follow their lead. There are different types of environmental management systems, and standardized EMSs are designed according to the principles of the international standard ISO 14001, the EC regulation eco-management and audit scheme (EMAS) or any that are similar to them. The main purpose of this type of EMS is to organize environmental work in such a way that an organization's environmental performance improves on a continual basis and get benefit from it. To achieve this goal, the organization maps its environmental impact and identifies the significant environmental aspects into an organization. They have to make sure that the investment on the Environmental Management System is not futile and give a lot of advantage in many aspects to the company. [4]

1.1 PROBLEM STATEMENT

The Environmental Management System (EMS) implementation in manufacturing sector in Malaysia is increasing currently. The adoption of an EMS may provide tangible and intangible benefits to company's environmental as well as economic performances. However, not all manufacturing sector do understand their needs. Sceptics think that, overall, EMS will not improve the world's environmental situation because it does not set environmental performance or technology criteria. [26] Further, they believe organizations that already have an established EMS will see little benefit from aligning their system with the EMS standard. So it is necessary to study about the benefit of the EMS and impact of EMS implementation to the manufacturing sector.

1.2 OBJECTIVE

(i) To investigate the impacts of EMS implementation on the manufacturing sector's performance in economic & environmental and customer satisfaction.

(ii) To examine the benefits of adopting the EMS; ascertain whether or not the benefits of EMS certification actually far outweighed its implementation cost.

(iii) To analyze the statistic of manufacturing sector that implement EMS in Malaysia.

1.3 SCOPE OF PROJECT

(i) Passes through a questionnaire form and get feedback for data collection.

(ii) This project will doing survey at 30 different manufacturing sectors in Malaysia.

(iii) Focuses on the performance and productivity of the company.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

Safety and health, environmental, quality and also financial management system is very important to an organizations and company. But people always see that financial is located at higher state and environmental at the lower state if a hierarchy of management system is draw. In this chapter, we will know the authority of environmental management in management system of a company. It is playing an important role in a system. If financial management is managing the finances of a company, and quality management is managing the quality of its products and processes, then it stands to reason that environmental management is managing the environment that the company operates in.

A management system can be seen as a way of improving (or establishing) these feedback loops in an organization. An EMS specially improves the feedback about a constantly evolving area: environmental protection. Continuing social awareness concerning the state of our environment is another aspect of 'sensitization' caused by better feedback loops. Obviously the more finely attuned an organization is to new developments, the better place it is to react, to plan and to improve ahead of any legal or market requirements.

2.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. An EMS is a voluntary management system for identifying, controlling and monitoring a facility's activities, which have potential environmental impacts. The framework provides structure and consistency for overseeing daily activities that shifts the environmental focus from reactive to proactive. Voluntary implementation of EMSs has increased throughout the world as industry and organizations realize their environmental and market place value.

EMS integrates the environmental issue with all organizational activities, by establishing principles which attempt to search for continuous improvement in the relationship between the company and its natural environment. In other words, an environmental management system is a set of intensive managerial processes, which require a company to identify measure and control its environmental impacts.[5] Environmental Management Systems refers to organization's structures for managing its processes or activities that transform inputs of resources into products or services which meet the organizations objectives, such as satisfying the customers' quality requirements, complying with regulations or meeting environmental objectives (ISO publications, 2005). An EMS has been defined by the British Standards Institute(1992) as 'The organizational structure, responsibilities, practices, procedures, and resources for determining and implementing environmental policy'.[6] It is a voluntary tool which can help corporations to control environmental impact arising from their operations. It helps to improve company's operation process, reduces liabilities resulting from poor compliance to environmental regulations and brings economic fortunes. It seeks to integrate environmental considerations into every aspect of a company's operations and make caring for the environment the responsibility of each employee.

Environmental management does not seek to manage the environment directly. Instead, it concentrates on the more indirect, but nonetheless effective, route of managing an organization's activities that give rise to impacts upon the environment. The focus of the work becomes the interaction between the organization and the environment, and the rather fluid interface between the two. It is the environmental aspect (as opposed to the financial or quality aspect) of an organization's activities, products and services that are the focus of management. [7]

2.1.1 Basic Elements of EMS

(i) Reviewing the organization's environmental goals;
(ii) Analyzing its environmental impacts and legal requirements;
(iii) Setting environmental objectives and targets to reduce environmental impacts and comply with legal requirements;
(iv) Establishing programs to meet these objectives and targets;
(v) Monitoring and measuring progress in achieving the objectives;
(vi) Ensuring employees' environmental awareness and competence; and
(vii) Reviewing progress of the EMS and making improvements.

2.1.2 Benefit of EMS

(i) Cost savings;
(ii) Reduced risk;
(iii) Increased operational efficiency;
(iv) Positive external relations and public image;
(v) Improved communication;
(vi) Greater employee stewardship;
(vii) Shared environmental solutions; and
(viii) Improved public relations.

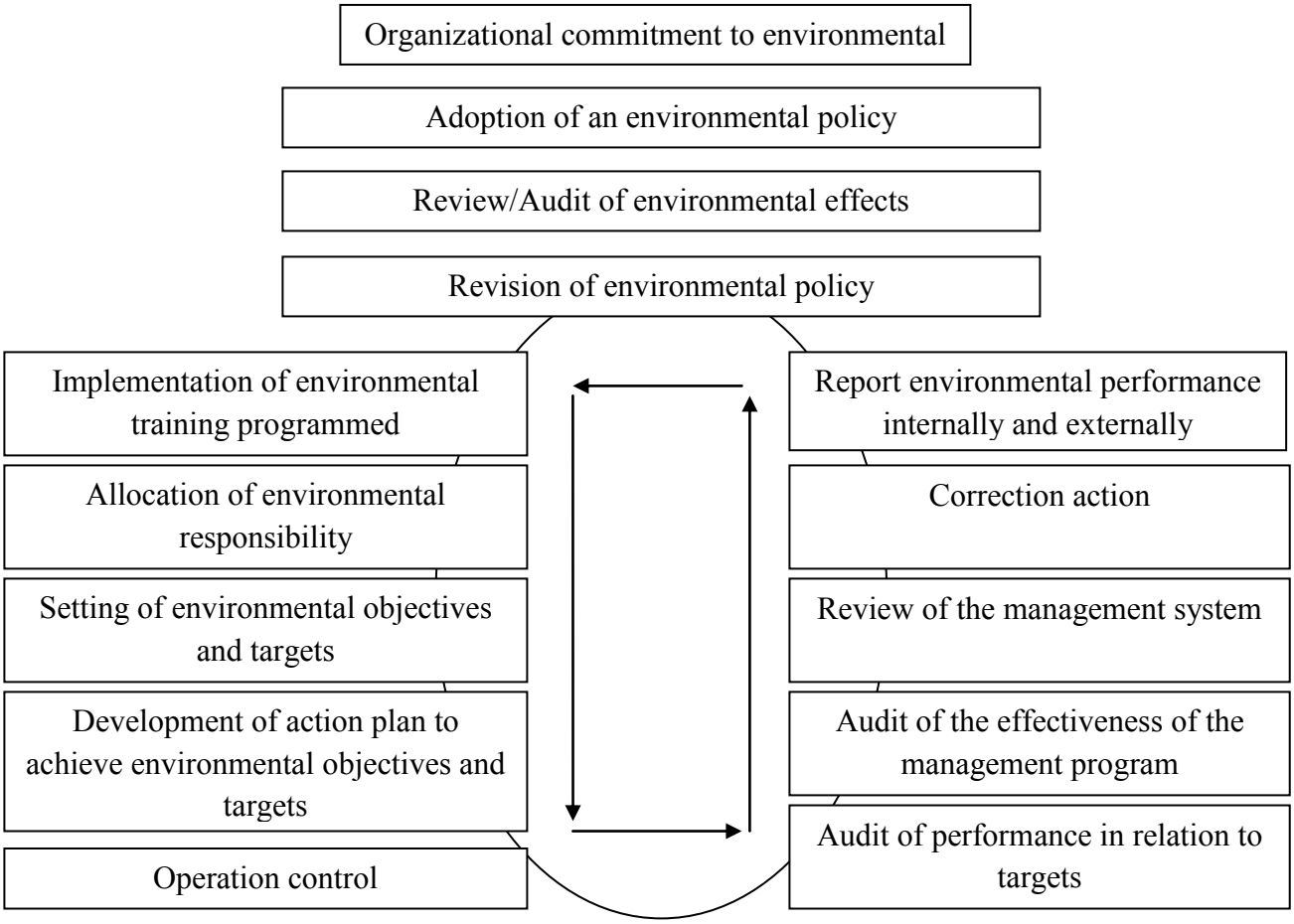

Figure 2.1: Type of system of effective EMS into an organization

2.2 REASONS TO IMPLEMENT EMS

There is much reason that encourages a company to implement the EMS. For the companies that are very concern with environment, EMS is very important in their operating system. The main factor that encourage the company to implement EMS are: [10]

(i) Organizational reasons;

(ii) Structure in the environmental management;

(iii) Enhancing following-up procedures;

(iv) Co-ordination and integration of environmental effort within the local authority;
(v) Obtaining better/more efficient organization;
(vi) Quality improvement;
(vii) Increased awareness for environmental issues;
(viii) Increased enthusiasm/engagement for environmental issues within the organization;
(ix) Security (preparedness for accidents);
(x) Direct environmental reasons;
(xi) Decrease the negative environmental impact;
(xii) Mapping the environmental impact;
(xiii) Save natural resources;
(xiv) Set a good example and marketing reasons;
(xv) Set a good example;
(xvi) Establishing an environmental profile;
(xvii) Demand from the public;
(xviii) Adaptation to the society;
(xix) Trust worthiness;
(xx) Marketing;
(xxi) Political reasons;
(xxii) Financial savings.

2.3 ISO 14001

Many will already heard of ISO 9000 and even more will have experience working within a management system design according to its principles. What will be more interest is it also called ISO 14001.The international standard for EMSs was first published by the International Organization for Standardization (ISO) in 1996 and was last revised in 2004.Its official catalogue title is ISO 14001: Environmental Management System-Requirement with guidance for use. As part of a wider agreement, the standard

has also been adopted as a European standard by the European standard making body, Comite Europeen de Normalisation(CEN).Within Europe, it is officially known as EN ISO 14001,to indicate its dual recognition. It is part of a series of standards produced by the ISO Technical Committee (TC) 207:`Environmental Management'.

ISO 14001 Environmental Management Systems is a blue print for the organizations management systems and is the only specification standard in the ISO 14000 series. It describes how an organization might manage and control its organizational systems so that it measures, controls and continually improves the environmental aspects of its operations (Krut and Gleckman, 1998). In fact, the major goal of the ISO 14000 and 14001 series is to support environmental protection and the prevention of pollution in harmony with socio-economic needs. It helps to improve and demonstrate organizations environmental performance through the presence of Certified Environmental Managers. It requires commitment to continual improvement and compliance with relevant legislations and regulations, but does not present environmental performance requirements.

ISO 14001 Environmental Management Systems is built on the framework of "plan, Do, Check and Act". In other words, it involves; environmental policy and planning; Implementation and operations, checking (evaluating) and corrective action and management review. Implementation and compliance to ISO 14001 Environmental Management Systems bestows certain benefits to organizations, such as reduces their waste and energy consumption; improved process, marketing with green labels, recoverable resources, as well as regulatory shift from command and control to cooperation. Generally, it will improve the quality of the environment and save cost/thereby increasing profitability.

Table 2.1: ISO 14000 series

STANDARD NUMBER	TITLE	RELEVANCE
ISO 14001	EMS: Requirement for use with guidance	Requirement is expressed in Clause 4.Useful additional guidance in annexes which are advisory only.
ISO 14004	EMS: General Guidelines on Principles, System and Supporting Technique	Useful background information on the approach to EMS installation
ISO 14015	Environmental Assessment of Sites and Organizations(EASO)	Guidance useful for self-assessment or pre-acquisition auditing
ISO 14020-14025	Environmental Labels and Declarations	Not directly relevant EMS implementation. Useful only to those interested in taking part in an eco-labeling scheme, or in making declarations concerning products and services with environmental aspects
ISO 14031	Environmental Performance Evaluation-Guidelines for Environmental Management	Very useful in establishing measurement for objectives and targets and environmental performance indicators as part of an EMS, or as a precursor to the installation of an EMS
ISO 14040-14048	Life Cycle Assessment	Could be useful in getting to grips with LCA as part of your IER
ISO 14050	Environmental Management: Vocabulary	Advisory, but very useful to ensure that everyone is using a common terminology. Especially useful to those managing multisite operations
ISO 14063	Environmental Communications	Guidance on the full range of environmental aspects of both internal and external communications

2.3.1 Benefits of ISO 14000

The top ten countries for growth in ISO 14001 certification (up to the end of 2002) were: Japan (+ 2497), China (1718), Spain (1164), USA (975), Italy (858), Sweden (660), Brazil (550), France (375), Germany (320) and Hungary (300). Japan, with plan from the government to potentially subsidize some of the costs for small and medium enterprises (SMEs) seems to be leading the way. [12] In Malaysia, 38 companies were registered with ISO 14001 by 1998, and the number has risen significantly to 83 in 1999.It is appears timely then to conduct an exploratory study on Malaysian firms implementing ISO 14000 Standards. It is particularly interesting to find out what would be the positive impacts or benefits associated with ISO 14001 certification.

Table 2.2: Summary of benefits of obtaining ISO 14000 registration

Benefit group	Benefit	Article/research
Clean/green operations	Minimize or eliminate waste	Melnyk et al. 2003 [5]; Hong Kong Industry Department, 1998 [6]; Pun et al., 1998 [7], Hong Kong; Fussler, 1996 [8]; Weissman and Sekutowski, 1991 [9], US.
	Reduced energy consumption	Christensen and Rasmussen, 1998 [10]; Pun et al. 1998 [7]; Weissman and Sekutowski, 1991 [9], US,
	Minimize the adverse impact on the environment, environmental improvement	Poksinska et al. 2003 [11]; Denton, 1994 [12].
Effective operations	Improved operational safety	Pun, 1998 [7], Hong Kong; Sayre, 1996 [13], US; Weissman and Sekutowski, 1991 [9], US.
	Improved material utilization efficiency	Christensen and Rasmussen, 1998 [10]; Weissman and Sekutowski, 1991 [9], US
	Improved process leading to cost-based competitive advantage	Miles & Covin, 1998 [14], Austria.
Profitability	Better financial performance	Cohen et al. 1995 [15]; US; Chapman, 1994 [16].
Competitive product/service	Environmentally friendly product that also meets customer needs has an advantage over their "non-friendly" competitors	Tibor, 1996 [17], US.
Market expansion	Firms can enhance their competitive position through effective environmental conservation	Hong Kong Industry department, 1998 [6]; Lee 1997 [18]; Sayre, 1996 [13], US; Lin, 1995 [19], Asia.
	Improved market share	Poksinska et al. 2003 [11].
Improvement in company image	Uplifted public image	Poksinska et al. 2003 [11]; Boiral & Sala, 1998 [27]; Aboulnaga, 1998 [20]; Chin et al. 1998 [21], Asia; Clements, 1996 [22], US; Pouliot, 1996 [23]; Sayre, 1996 [13], US; Lin, 1995 [19], Asia.
	Enhanced green image	Petroni, 2000 [24].
Improvement in management	Better communication with documented procedures and work instructions	Pun et al., 1998 [7]; Lau, 1997 [25]; Pearson et al., 1993 [26].
	Enhanced employee empowerment	Pun et al., 1998 [7]; Lau, 1997 [25]; Pearson et al., 1993 [26].
	Highly systematic process	Boiral & Sala, 1998 [27].
Public awareness	Managers and workers have become more aware of environmental issues at work and at home	Rondinelli and Vastag, 2000 [28].
Others	Enhance relationships between SMEs and their stakeholders	Morrison et al. 2000 [29]; Azzone et al. 1997 [30]; Polonsky, 1995 [31].

2.3.2 Benefits gained from ISO 14001 Registration for Malaysian companies

Basically, the benefits reported by the responding firms can be classified into three dimensions namely environmental benefits, competitive advantage, effective operation and improvement in the company's image. Table 3 summarizes the detailed results. It is also interesting to note that for each of the benefit listed above, there is no significant difference between industries. The only exception appeared to be the electrical/electronic industry as shown in the same table. The percentage of respondents acknowledging to have enjoyed the benefits listed was consistently lower than in other industries.

Table 2.3: Perceived benefits gained from ISO 14001 registrations by industry

	Type of industry					Total
	E/E	H/R	Metals	Plastic	Food	
Percentage with affirmative answer						
Better business control	76%	100%	–	100%	–	67%
Transparency/openness	92%	100%	100%	100%	–	94%
Marketing advantages	69%	100%	–	100%	–	61%
Cost reduction	85%	100%	100%	100%	50%	83%
Less injuries/environmental accidents	85%	100%	100%	100%	100%	88%
More research and development	46%	100%	–	100%	–	44%
Improvement in operations efficiency	46%	100%	100%	100%	100%	55%
Company's image improved	92%	100%	100%	100%	100%	94%
Improved work culture	92%	100%	100%	100%	100%	94%

2.4 ECO-MANAGEMENT AND AUDIT SCHEME (EMAS)

The Eco-Management and Audit Scheme is similar in structure to ISO 14001 and was launched in 1995.There are two major differences between EMAS and ISO 14001.First, the whole company can be certified to ISO 14001 whereas EMAS is generally a site-based registration system. Second, whereas any company from any business sector can use ISO 14001, EMAS is only available to those companies operating in industrial sector. As with ISO 14001, the EMAS standard required a planned, comprehensive and periodic series of audits of the EMS to ensure that it is effective operation, is meeting specified goals and continues to perform in accordance with relevant and standards. The peculiarity with EMS is that the policy statement, program, management system, and audit cycles are reviewed and validated by an external, accredited company. [13]

2.5 ASPECTS AND IMPACTS

This point is to define scope of the EMS and to focus management effort on those aspects that are classified as being significant. [14]

Aspect: The cause

-Element of an organization's activities, products or services that can interact with the environment. For example, using energy means burning fossil fuels and ultimately.

Impact: The effect

-Any change to the environment, whether adverse or beneficial.Wholly partially resulting from an organizations activities, product or services.

Table 2.4: Root cause of environmental effect

Environmental effect impact	**The root cause**
Global warming	The use of fossil fuels, the burning of which releases carbon dioxide. This could be, for example in heating system; electricity use; transport fuel and so on.
Ground water contamination	Pollution from toxic releases; increasing the biological or chemical oxygen demand through discharges; increasing the temperature of watercourses.
Special loss/habitat destruction	Development – new buildings, civil engineering, etc
Air quality	Processes that involve incineration; release of volatile compounds; release of toxic compounds.
Noise pollution	The operation of plant and equipment; transport issues and so on.
Contaminated land	Past historical activities on the site which may have been 'inherited' when the site was purchased.

2.5.1 Organizational Analysis

The organizational analysis start from raw materials until customer used. EMS requires that product parts be designed and manufactured from an environmental perspective. To satisfy the EMS requirements, engineers have to proactively improve or develop the business/operation processes in such a way that each manufacturing step is accomplished with the minimal environmental impact. [15]

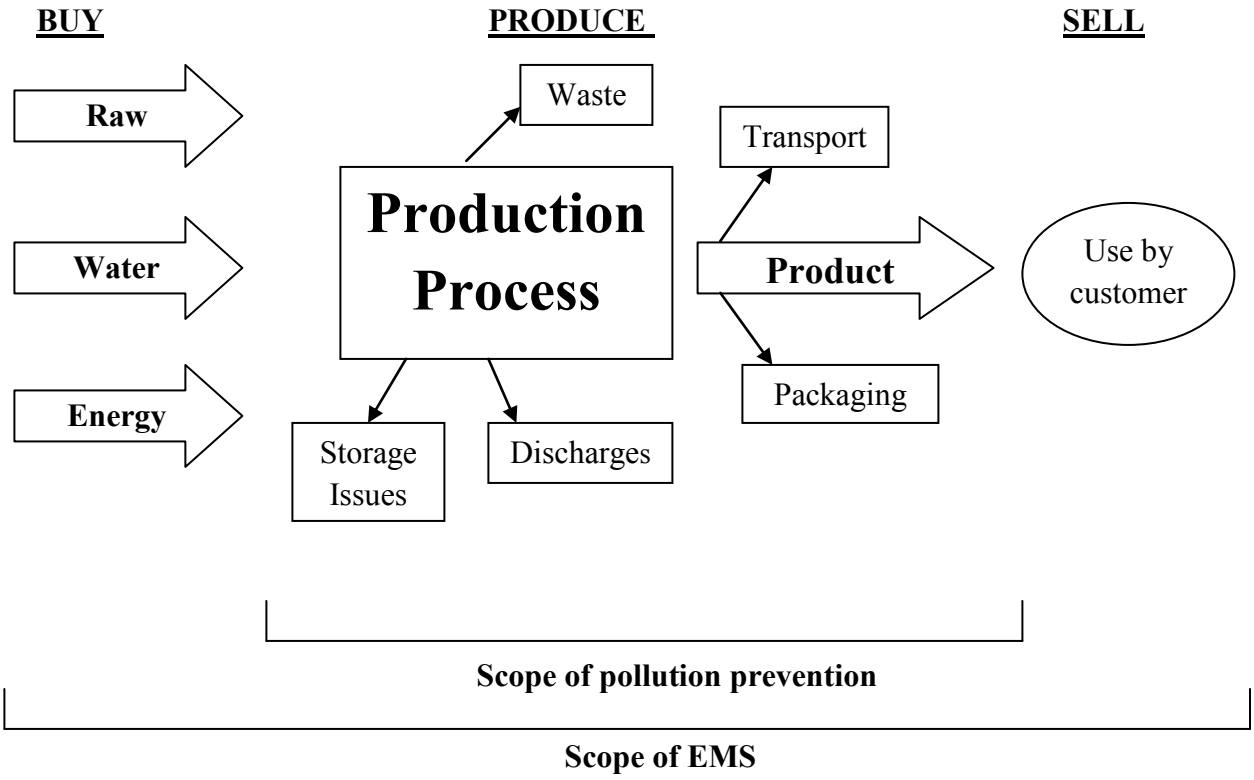

Figure 2.2: Organizational analysis of EMS

2.6 EMS FOR SMALL AND MEDIUM SIZED ENTERPRISES (SMEs)

Highly resourced large manufacturers have already implemented EMSs certified to ISO 14001 and/ or the eco-management and auditing system (EMAS) [16].As part of ISO 14001/EMAS specifications, these manufacturers must, and have been seen to, make specific demands and targets of environmental performance. In order to remain ahead of the competition, SMEs in these supply chains must obtain these appropriate ISO environmental standards before even being considered as contenders. There are also certain circumstances where there is a legal requirement for having an EMS. In Ireland, an EMS is a compulsory requirement for obtaining an integrated pollution control license [17].

In 1996, around 90% of European businesses were classified as small and medium-sized enterprises (SMEs) [18] and in 1998 there were 3.7 million businesses in the UK, of which 99% were small businesses employing less than 50 people and only 25 000 were medium sized employing between 50 and 249 people. [19] The environmental impact of small firms is not known either at national or regional levels. It is often and widely quoted that, as a sector, SMEs, could contribute up to 70% of all industrial pollution .[20]

2.7 MANUFACTURING SECTOR

The secondary sector of industry includes those economic sectors that create a finished, usable product: manufacturing and construction. This sector of industry generally takes the output of the primary sector and manufactures finished goods or where they are suitable for use by other businesses, for export, or sale to domestic consumers. This sector is often divided into light industry and heavy industry. Many of these industries consume large quantities of energy and require factories and machinery to convert the raw materials into goods and products. Some economists contrast wealth producing sectors in an economy such as manufacturing with the service sector which tends to be wealth consuming. Manufacturing is an important activity to promote economic growth and development. Nations which export manufactured products tend to generate higher marginal GDP(Gross Domestic Product) growth which supports higher incomes and marginal tax revenue needed to fund the quality of life initiatives such as health care and infrastructure in the economy. The field is an important source for engineering job opportunities. [21]

The Manufacturing sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. Establishments in the Manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment. However, establishments that transform materials or substances

into new products by hand or in the worker's home and those engaged in selling to the general public products made on the same premises from which they are sold, such as bakeries, candy stores, and custom tailors, may also be included in this sector. Manufacturing establishments may process materials or may contract with other establishments to process their materials for them. Both types of establishments are included in manufacturing. The materials, substances, or components transformed by manufacturing establishments are raw materials that are products of agriculture, forestry, fishing, mining, or quarrying as well as products of other manufacturing establishments. The materials used may be purchased directly from producers, obtained through customary trade channels, or secured without recourse to the market by transferring the product from one establishment to another, under the same ownership. The new product of a manufacturing establishment may be finished in the sense that it is ready for utilization or consumption, or it may be semi finished to become an input for an establishment engaged in further manufacturing. For example, the product of the alumina refinery is the input used in the primary production of aluminum; primary aluminum is the input to an aluminum wire drawing plant; and aluminum wire is the input for a fabricated wire product manufacturing establishment.

2.7.1 Manufacturing Sector in Malaysia

In an economy that grew by 5.4%, the Manufacturing sector emerged as the second fastest growing sector (after Services) for 2005. The Manufacturing sector in Malaysia continues to be an important contributor to the economy with an estimated contribution of over 31% to the national GDP. Manufactured products continue to dominate the Exports market with by accounting for over 77.4% of Malaysia's total exports in 2005. The size and nature of the Manufacturing sector explains itself on being a major contributor in the Employment sector by accounting for 28.4% of Malaysia's total employment in 2005.

Characteristic of a mature and dominant industry, the manufacturing sector demands a highly skilled and trained workforce to match the ever-increasing sophistication of the processes and techniques deployed. While academic institutions and training facilities have shaped up to churn out the right skilled workforce, it takes an experienced and industry knowledge driven Staffing team to match the workforce to the right opportunities available.

Table 2.5: Share of Gross Domestic Product by sector [23]

Sector	**1957(%)**	**Sector**	**1985 (%)**	**1990 (%)**	**1995 (%)**	**2000 (%)**
Agriculture and Mining	45	Agriculture	20.8	18.7	13.6	10.5
		Mining	-	-	7.4	5.7
Manufacturing and Construction	11	Manufacturing	-	-	33.1	37.5
		Construction	-	-	4.4	4.6
Services	44	Services	-	-	44.2	45.7

Table 2.6: Value-added shares of key industries in the manufacturing sector (%) [24]

Industries	1975	1985	1990	1996
Food, beverage, and tobacco	27.2	14.7	9.7	8.8
Textiles, clothing and footwear, and leather products	7.6	4.9	6.5	4.6
Wood products and furniture	8.9	6.2	7.2	6.8
Paper and printing	5.3	5.2	4.6	4.3
Chemicals	6.43	15.8	10.8	7.8
Petroleum and coal	2.9	3.2	2.6	2.5
Rubber	11.0	3.44	4.7	4.0
Non-metallic mineral products	3.6	6.1	4.9	4.1
Metal products	3.7	3.0	3.5	3.5
Machinery	3.1	2.0	3.9	5.6
Electrical machinery	11.1	15.1	21.5	30.5
Transport equipment	3.0	4.3	5.5	6.3

2.7.2 Gross Domestic Product of Malaysian's Manufacturing Sector

The gross domestic product, or GDP, of a country is one of the ways of measuring the size of its economy. GDP is defined as the total market value of all final goods and services produced within a given country in a given period of time (usually a calendar year). It is also considered the sum of value added at every stage of production (the intermediate stages) of all final goods and services produced within a country in a given period of time, and it is given a money value. [22]

The most common approach to measuring and understanding GDP is the expenditure method:

GDP = consumption + gross investment + government spending + (exports − imports), or,

$$GDP = C + I + G + (X-M)$$

"C" is equal to all private consumption, or consumer spending, in a nation's economy

"G" is the sum of government spending

"I" is the sum of all the country's businesses spending on capital

"NX" is the nation's total net exports, calculated as total exports minus total imports. (NX = Exports - Imports)

Table 2.7: Growth of output (Southeast Asia)

Country	Gross Domestic Product Average annual per cent growth		Agriculture Average annual per cent growth		Manufacturing Average annual per cent growth		Service Average annual per cent growth	
	1980-1990	1990-1998	1980-1990	1990-1998	1980-1990	1990-1998	1980-1990	1990-1998
China	10.1	11.2	5.9	4.4	10.4	14.7	13.5	9.4
Indonesia	6.1	5.8	3.4	2.6	12.6	8.8	7.0	5.4
Malaysia	5.3	7.4	3.8	1.3	8.9	10.8	4.2	7.6
Philippines	1.0	3.3	1.0	1.5	0.2	3.1	2.8	3.9
Singapore	6.7	8.5	-6.2	1.4	6.6	6.7	7.6	8.6
Thailand	7.6	5.7	3.9	2.6	9.5	7.7	7.3	5.4

2.8 STATISTICAL TOOL

Statistics are a tool, not an aim. Simple inspection of data, without statistical treatment, by an experienced and dedicated analyst may be just as useful as statistical figures on the desk of the disinterested. The value of statistics lies with organizing and simplifying data, to permit some objective estimate showing that an analysis is under control or that a change has occurred. Equally important is that the results of these statistical procedures are recorded and can be retrieved.

We start with statistical packages, i.e. a suite of computer programs that are specialized in statistical analysis, to enable people to obtain the results of standard statistical procedures without requiring low-level numerical programming, and to provide facilities of data management [25]

2.8.1 Pie Chart

A pie chart (or a circle graph) is a circular chart divided into sectors, illustrating relative magnitudes or frequencies or percents. In a pie chart, the arc length of each sector (and consequently its central angle and area), is proportional to the quantity it represents. Together, the sectors create a full disk. It is named for its resemblance to a pie which has been sliced.

Pie charts have a mixed reputation. They are popular in business and the media but many information designers have criticized the technique. Some claim that the pie slice shape communicates numbers less exactly than other possibilities such as line length. But this remains unclear in the context of proportions: for example, we have seen no studies that looked at the task of judging whether an item is more or less than 50%. It's also unclear whether exact communication of numeric values is the only evaluation criterion; at least one study indicates that use of a pie chart for analyzing a problem as opposed to a bar chart changes the way people think about the problem.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

In this chapter the basis frameworks of EMSs are discussed. This chapter will be most crucial part in completing this study course. The methodology shows the overall process of this project that is from EMS study until data analyzing and discussion. The population of this study comprises of all the manufacturing sector's companies operating in Malaysia that are registered under Federation of Malaysian Manufacturers (FMM). The objective of this research study is to examine the impact of EMS implementation on company's environmental and economic performance in Malaysia. The study will be looking at the data gathered from each company and treating each response as an individual data source.

For study work, there are a few methods that considered suitable for this study. The most important part is getting the right and sweeping response because this study is depending on the information from the survey. To get the precise and right information from the respondent, this study has preferred respondent from the department that is related to this study course. The best information will get from the Environmental, Safety and Health (ESH) department because that department having all of the information needed about the statistic of EMS implementation in that company.

Below is the flow chart showing a step by step of executing the investigation and detail more on will be explained later:

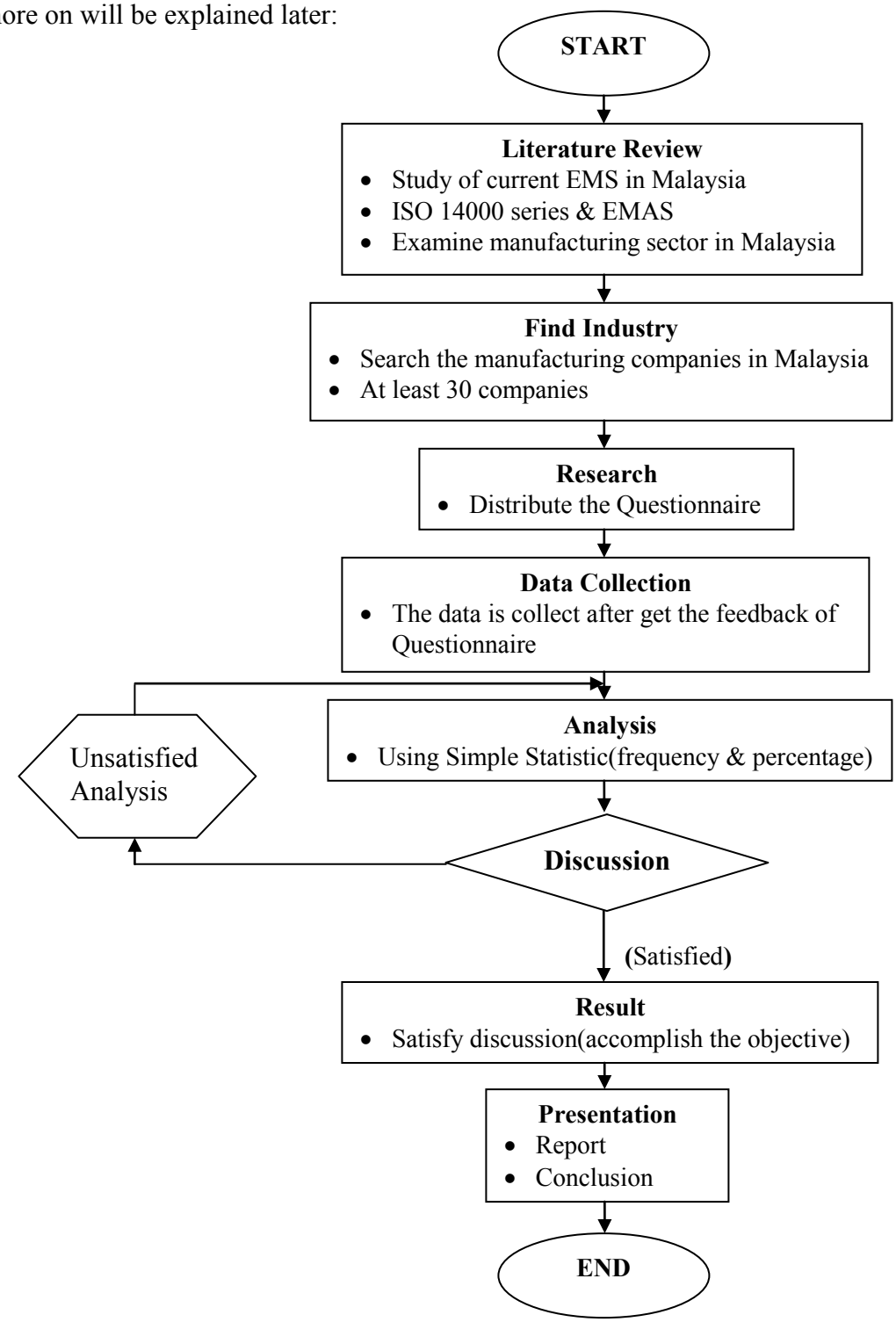

Figure 3.1: Methodology flowchart

3.1 LITERATURE REVIEW

The first stage of the flowchart started with the literature review. In the literature review, the study of current EMS in Malaysia is conducted. Also, understanding the function of ISO14001 and EMAS in EMS implementation. The examination of manufacturing sector is performing to know the current reputation of manufacturing sector in this country. All of the information for the literature review got from magazines, books, journals, and internet has been gathering all together.

3.2 FIND INDUSTRY

Find industry is performing to get the feedback of questionnaire from the companies selected. The selected company in this project is the companies that involve in manufacturing sector because this project only doing investigation on the manufacturing sector. About 30 companies are selected to fulfill the project's scope. The companies are located in Malaysia only. However, we must get the permission from the companies involved to get the data from their company.

3.3 RESEARCH

3.3.1 Survey

Survey research is one of the most important areas of measurement in applied social research. The dictionary meaning of survey is: "Survey is a technique for gathering information from a large number of users" .A "survey" can be anything from a short paper-and-pencil feedback form to an intensive interview. The advantages by using this survey method are :

(i) Cost: They are less expensive than interviews because they do not involve the cost of hiring, training, and employing skilled interviewers.

(ii) Efficiency: Surveys can be distributed in large numbers all at once, and involve less administrative time.

(iii) Anonymity: The respondent is assured of anonymity and privacy, and can therefore feel freer to provide honest responses.

3.3.2 Questionnaire

The questionnaire is a set of questions given to a sample of people. The purpose is to gather information about the people's attitudes, thoughts, behaviors, and so forth. The researchers compile the answers of the people in the sample in order to know how the group as a whole thinks or behaves. Questionnaires are often used by people who do political or market research. For example, if a politician wanted to know what voters thought about a particular issue, he or she could do a survey. The survey would ask about the voters' opinions related to the issue. Actually there are several methods of questionnaire survey can be adapted. The survey methods are;

(i) Personal interviews
(ii) Telephone surveys
(iii) Mail surveys
(iv) Computer direct interviews
(v) E-mail surveys
(vi) Internet/Intranet (webpage) surveys
(vii) Scanning Questionnaires

For some company, we get the feedback by visiting the company. Here, we will interview the responsible officer based on the questionnaire prepared directly. However, for other companies that we cannot be reach, we chose Mail surveys, E-mail surveys and Telephone surveys as survey methods. That survey methods are very suitable for this project because this project covering wide number of manufacturing companies.

Using a questionnaire with a random sample is a good way to find out the attitudes, thoughts, and behaviors of a large group of people. We can be more confident in generalizing our findings than we can be with a case study. In other words, because we have a group of people (random sample) instead of one case, we are surer that the findings apply to the population.

3.3.3 Mail Questionnaire

Mail surveys are a type of self-administered survey that are cost-effective and require less administrative time than interviews. Mail surveys are a good option when contacting a population that is likely to be responsive and when the objectives of the study do not require a survey instrument of complex design. The advantages by using mail questionnaire are :

(i) Cost: Mail surveys are among the least expensive. Mail surveys are self-administered, so there are no interviewing costs. In addition, bulk postage rates are relatively inexpensive.

(ii) Privacy and convenience: Respondents are able to complete the survey in the privacy of their own homes, which may make them feel more comfortable giving truthful answers. Respondents are also able to fill out the survey at their convenience. For this reason, they are not considered as intrusive as other kinds of interviews.

(iii) Lack of interviewer bias: This method removes the possibility that an interviewer's manner of asking a question may influence the respondent's answer.

(iv) Variation: The questionnaire can include pictures – something that is not possible over the phone.

1. Developing Sampling Strategy

(Who do you want to survey? How will you identify them and get contact information? How will you organize the survey population?)

2. Developing Questionnaire

(What information do you need to find out? What is the best way of asking questions in order to get the information that you need? How will you format the questionnaire?)

3. Collecting Data

(Includes mailing the questionnaires, tracking and reviewing completed surveys, and sending reminders to those who have not returned a questionnaire yet.)

4. Entering Data

(In order to analyze the data quantitatively, you will need to enter your data into computer storage so that statistical software can utilize it.)

5. Analyzing Data

(Making sense of the findings)

Figure 3.2: Steps Involve in Mail Surveys

3.3.4 E-mail Survey

Email surveys are both very economical and very fast. More people have email than have full Internet access. This makes email a better choice than a Web page survey for some populations. The advantages by using e-mail survey are:

(i) Speed: An email questionnaire can gather several thousand responses within a day or two.
(ii) There is practically no cost involved once the set up has been completed.
(iii) You can attach pictures and sound files.

(iv) The novelty element of an email survey often stimulates higher response levels than ordinary "snail" mail surveys.

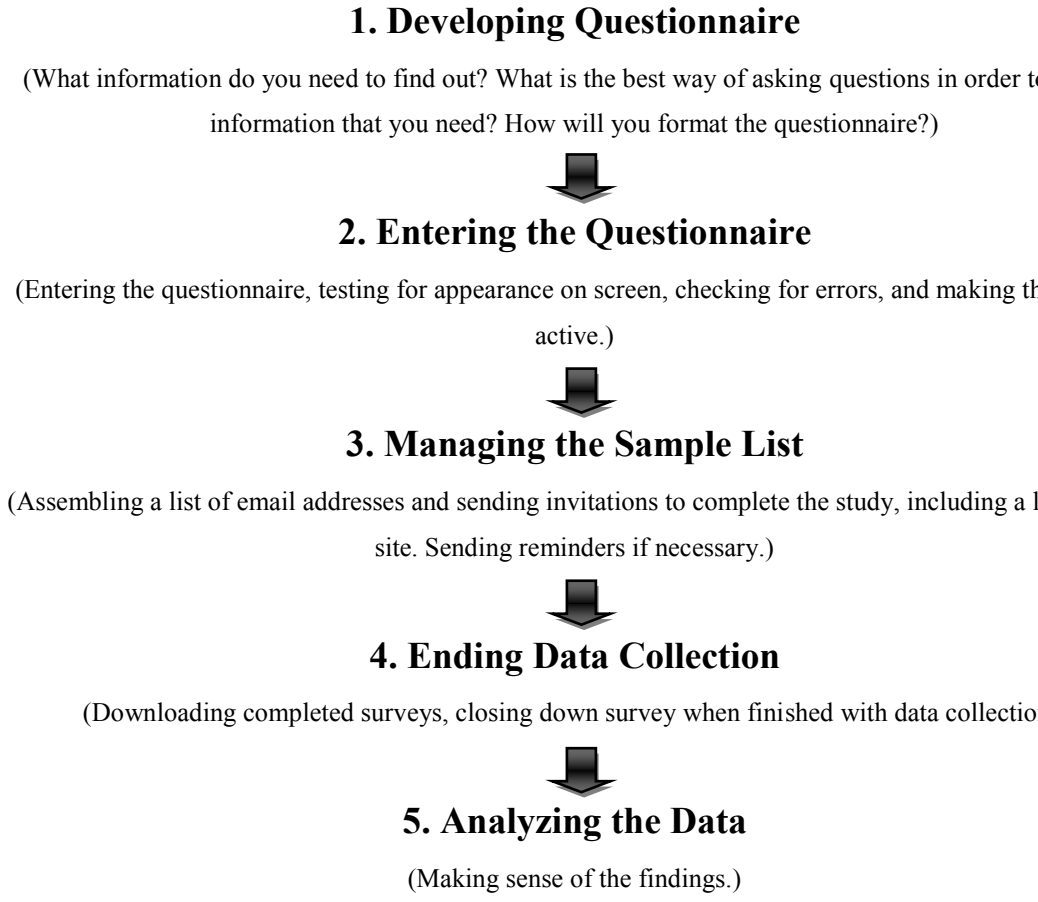

Figure 3.3: Steps Involve in E-mail Survey

3.3.5 Telephone Survey

Telephone surveys typically involve calling people during office hour or on weekends to ask a series of questions. Over the years, securing respondent cooperation for telephone surveys has become more difficult, with the increased use of telemarketing

and with more people screening their calls using answering machines. However, telephone surveys can be very useful when designed to control for demographic data and performed by skilled interviewers. They allow collection of a large body of data for a relatively low cost, and with a fairly high level of reliability. The advantages by using telephone survey are:

(i) People can usually be contacted faster over the telephone than with other methods. If the Interviewers are using CATI (computer-assisted telephone interviewing), the results can be available minutes after completing the last interview.
(ii) You can dial random telephone numbers of companies when you do not have the actual telephone numbers of potential respondents.
(iii) Skilled interviewers can often elicit longer or more complete answers than people will give on their own to mail, email surveys (though some people will give longer answers to Web page surveys). Interviewers can also ask for clarification of unclear responses.

3.3.6 Measures

The questionnaires consist of three major sections. Section A consist about the information of the person who in charge of EMS implementation in an organization or company. Also, this section wants to examine the statistic of companies in Malaysia that implement EMS. Section B consists about the benefit of EMS and EMS in profit side. The respondents were then asked to assess their firm's systems using a 5-point scale (0 – "Strongly Disagree;" – "Strongly Agree"). 5-point scale has been used popular in research study to examine how strongly respondents agree or disagree with statements in questionnaire. Lastly, Section C consists about the performance of EMS implementation to the company. It required respondent to choose whether 'YES' or 'NO' as the answer. If 'YES' is chosen, means the respondent is agree with the statement, if 'NO' is chosen, means the respondent is disagree with the statement.

3.4 DATA COLLECTION

As the manufacturing sector is the second fastest growing sector in Malaysia and dominates the exports market with by accounting for over 77.4% of Malaysia's total exports, the choice of method has to be one that allows all of the Manufacturing Company to be surveyed. Since all the certified sites are located all over Malaysia, the mail survey and e-mail survey seems to be the most appropriate method. The use of postal questionnaire survey as a method of data collection has been very popular with researchers as it provides numerous advantages. A survey enables the collection of a sufficiently large and representative sample for analysis. After the survey is done, the data that contained the feedback of the questionnaire is collected.

Table 3.1: Shown the statistic of EMS implementation in Malaysia

EMS implementation	**No. of respondent**	**Duration implementation**				
		< 1yr	**< 3yrs**	**< 5yrs**	**< 10yrs**	**> 10 yrs**
EMS						

Table 3.2: Descriptive statistics benefit side of EMS implementation in economic/ environmental, customer satisfaction and implementation cost.

Item	Hypothesis	Strongly Disagree → Strongly Agree					Result
		1	*2*	*3*	*4*	*5*	
	Economic/Environmental	**Frequency**					
1	H1: improved the performance of your company.						
2	H2: reduced the cycle time of your company.						
3	H3: improved working conditions and safety of your company.						
4	H4: enhanced quality and investor in people system.						
5	H5: stimulated process, transport, raw materials and packaging changes.						
6	H6: enhanced cost, saving energy and waste reduction & efficiencies.						
7	H7: improved economic condition of the company						
8	H8: increased profitability of your company.						
9	H9: increased the revenue of your company.						
	Customer Satisfaction						
10	H10: created a positive public image.						
11	H11: increased your customer satisfaction toward your company.						

	Implementation Cost						
12 **13**	H12: required higher than expected staff cost. H13: Certification fees higher than expected.						

Table 3.3: Descriptive statistic of EMS level of awareness/performances

Question	*YES*	*NO*
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
TOTAL		

3.5 DATA ANALYSIS

After the data is collected, the data collection will be analyzed. Data Analysis is very important because all of the data will be interpret here. The data will be compared to the current performance of manufacturing sector in Malaysia to know the impacts of EMS to the manufacturing company. By using simple statistic that is frequency and

percentage, we will interpret the result from the pie chart. This interpretation will involved the 'How, Why, When, What, Who and Where' sequences. The discussion carried out from the results also assisted by the opinion and information given by the respondent. By using telephone survey, the interviewer can ask directly to the respondent about the issue and problems involved and get some opinion or solution from the respondents who are very experienced in this field. This is because the respondents are consisting of people who are responsible to handle and monitor the Environmental Management System (EMS) in the company.

3.6 DISCUSSION

The discussion is important because we want to know the status of the data analysis whether achieve the target and objectives or not. If the discussion is not achieving the objectives, back to the data analysis. If the discussion is well response, proceed to the result.

3.7 RESULT

Gather all of the information and data of the work. By reaching here, we consider the objective is accomplished.

3.8 PRESENTATION

Briefly state about the project from early stage until final stage in this project including the conclusion about the project and also state the ideas to improve the performance of manufacturing sector in Malaysia.

CHAPTER 4

RESULTS AND DISCUSSION

4.0 INTRODUCTION

This chapter will discuss more about the results which have been made regarding methodology project in chapter 3.The target of this chapter is to get the results regarding to the early objectives in chapter 1.To get the results, the survey questionnaire forms was sent to the 30 manufacturing companies in Malaysia.

A total of 80 survey questionnaire were sent out to the certified manufacturing companies throughout the nation. The survey questionnaire was sent through e-mail, mail and telephone survey. However by e-mail and mail survey was indicated very low respondent. Most of the respondent collected from telephone survey. Altogether, 32 sites responded to the survey and only 30 surveys taken regarding to the project scope. The survey giving a response rate of 37.5%, a relatively high percentage for studies conducted in Malaysia.

The data used were basically primary data collected directly through the use of survey questionnaires form. These data were analyzed using simple statistics (frequency and percentage) on the premise of which conclusions were drawn.

4.1 PROFILE OF RESPONDENTS AND COMPANIES

The respondents represented a variety of positions and functions including, Environmental managers, Quality managers, Executive managers, HR managers, safety and training managers, Environmental, safety and health (ESH) managers.

Respondents were asked to indicate their job titles. They occupy positions ranging from executive managers to environmental engineers/coordinators and staff. This diversity argues strongly in favor of the various kinds of the results. A large majority (40%) of the respondents are involved in the manufacturing of semiconductors and electrical goods. Remain percentage of respondent involved in manufacturing of automotive, plastic, steel and chemicals. Of the 30 sites that responded, 12 (40%) are wholly owned by foreign companies. The other sites belong to wholly local owned companies. The quite high percentage of foreign companies that are EMS certified may be an interesting issue to explore but that is not pursued here. Another interesting trend is that the longer is the firms operating in Malaysia, the tendency for them to achieve ISO 14001certification are higher.

4.2 DATA COLLECTION

SECTION A

Table 4.1: Survey's result on statistic of EMS implementation

	< 1 year	***< 3 years***	***< 5 years***	***< 10 years***	***> 10 years***
Sample	1	0	1	13	10

SECTION B

Table 4.2: Survey's result on economic/environmental, customer satisfaction and implementation cost

Item	Hypothesis	Strongly Disagree → Strongly Agree					Result
		1	*2*	*3*	*4*	*5*	
	Economic/Environmental	**Frequency(respondent)**					
1	H1: The implementation of Environmental Management System has improved the performance of your company.	0	0	5	14	11	Partially supported
2	H2: The implementation of Environmental Management System has reduced the cycle time of your company.	0	2	7	17	4	Partially supported
3	H3: The implementation of Environmental Management System has improved working conditions and safety of your company.	0	2	3	15	10	Partially supported
4	H4: The implementation of Environmental Management System enhanced quality and investor in people system.	0	1	11	15	3	Partially supported
5	H5: The implementation of Environmental Management System has stimulated process, transport, raw materials and packaging changes.	0	0	12	17	1	Partially supported

6	H6: The implementation of Environmental Management System has enhanced cost, saving energy and waste reduction & efficiencies.	0	1	4	18	7	Partially supported
7	H7: The implementation of Environmental Management System has improved economic condition of the company	0	1	5	18	6	Partially supported
8	H8: The implementation of Environmental Management System has been increased profitability of your company.	0	0	3	18	9	Partially supported
9	H9: The implementation of Environmental Management System has increased the revenue of your company.	0	0	5	18	7	Partially supported
	Customer Satisfaction	**Frequency(respondent)**					
10	H10: The implementation of Environmental Management System has created a positive public image.	0	2	5	17	6	Partially supported
11	H11: The implementation of Environmental Management System has increased your customer satisfaction toward your company.	0	0	5	19	6	Partially supported
	Implementation Cost	**Frequency(respondent)**					
12	H12: The implementation of Environmental Management System has required higher than expected staff cost.	2	10	15	3	0	Partially not supported

13	H13: Certification fees for Environmental Management System higher than expected.	0	13	14	3	0	Partially not supported

SECTION C

Table 4.3: Survey's result on level of awareness/performances

Question	**Frequency(respondent)**	
	YES	***NO***
1	19	11
2	25	5
3	12	28
4	24	6
5	8	22
6	1	29
7	14	16
8	19	11
9	30	0
10	30	0
11	13	27
TOTAL	**195**	**135**

4.3 DATA ANALYSIS

4.3.1 Statistic of EMS Implementation

	< 1 year	*< 3 years*	*< 5 years*	*< 10 years*	*> 10 years*
Sample	1	0	3	15	11

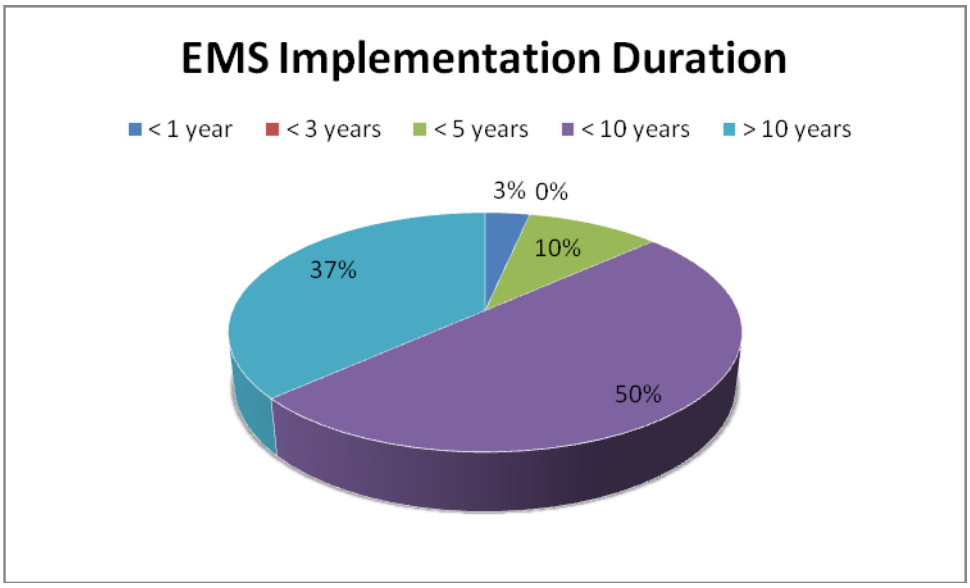

Figure 4.1: Percentage Analysis of statistic of EMS Implementation

From the survey, 15 companies that are 50% of survey was implement the EMS for less than 10 years. This statistic show that the EMS implementation for the companies in Malaysia is low compared to the other country. However this number still can be accepted because the EMS is new in Malaysia and still not been fully encouraged to the small firms and companies. The statistics also show that 37% of companies implement the EMS for more than 10 years. This is because most of the company in this percentage is multinational companies and owned by the foreign company. The multinational companies operated in big scale in their company's production and have been long time certified of EMS. For the remainder percentage is represented by the companies that are still new in EMS implementation. These companies are resulted from

the encouragement by government and business development organization to the new firm about the effectiveness and vantage by hire EMS in their business operation. This percentage is quite normal because Malaysia is a developing country and the percentage of EMS implementation in this country will increase by time due to the importance of Malaysia's business development and to attract the investor to make investment in this country. This situation will encourage business development in this country.

Table 4.4: Analysis of EMS implementation according to type of company

S/No	Type/Nature of Company	Frequency	%
1	Transnational/Multinational companies	12	40
2	Government owned companies	0	0
3	Private companies	18	60
	Total	**30**	**100**

Analysis of implementation/compliance with ISO 14001 EMS by companies shows that out of a total of 30 companies that indicated their EMS performance. There was 12 of the 30 are from the transnational (multinational) companies, while 18 are private companies and there were no public companies involved in this survey. It was also discovered that almost all the companies studied had Environment and Safety departments, yet they had problems with compliance and implementation.

4.3.2 Level of Awareness/Performances of EMS

S/No	Awareness/Performance Rating	Frequency of Response	%
1	Fully aware	195	59
2	Not aware	135	41
	Total	**330**	**100**

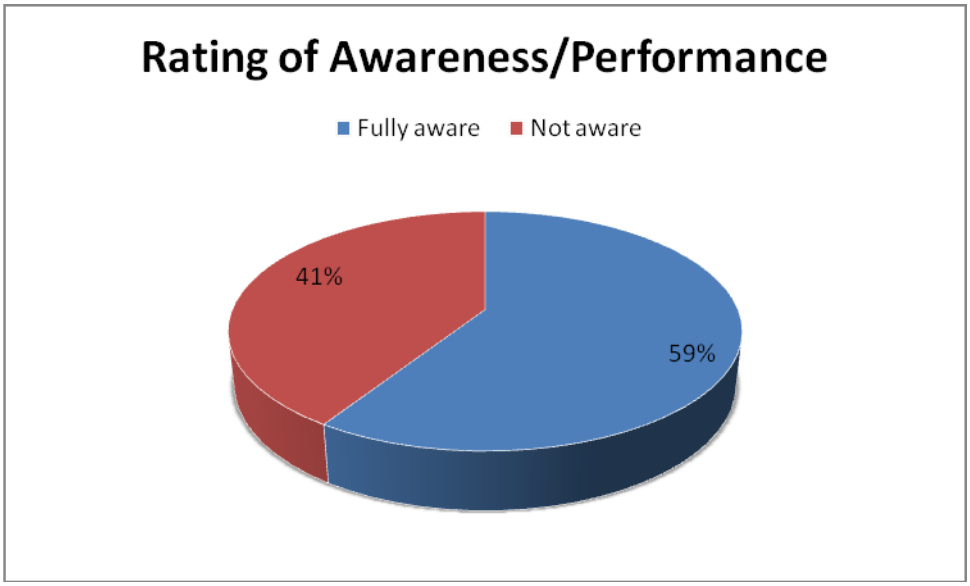

Figure 4.2: Percentage Analysis of the Level of Awareness / Performance of ISO 14001 EMS

Successful attainment of ISO 14000 has a large, positive impact on the perceived efficiency and effectiveness of the EMS. This is because ISO 14000 greatly improves every dimension of performance. To achieve the successful of performance, the company must realize the roll and importance of ISO 14001 EMS. Analysis of level of awareness/performance of companies about ISO 14001 EMS reveal that about 59% of the 30 manufacturing companies studied are fully aware, while 41% claim no awareness of ISO 14001 EMS performance in their company. From the survey carried out, it is evident that even though many companies claim to know about ISO 14001

Environmental Management System, only a few actually appreciate the benefits of its implementation. Also, many corporations have set up environment and safety departments but some of them are merely cosmetic in approach. In other words, they are there to fulfill legislative requirements. In fact, the finding on the level of awareness and adoption of environmental management systems is a testimony to the negative business culture of companies in this part of the world. The companies must see this situation clearly because this is one of the reasons that bring into low performance of EMS implementation. In advanced country, almost all company has implemented the ISO 14001 EMS. Malaysia will take some time to achieve that level because EMS implementation is not widely implemented in Malaysia currently.

4.3.3 Rating of Performance in Economic/Environmental

Rating	***1***	***2***	***3***	***4***	***5***
Total Frequency	0	7	55	150	58

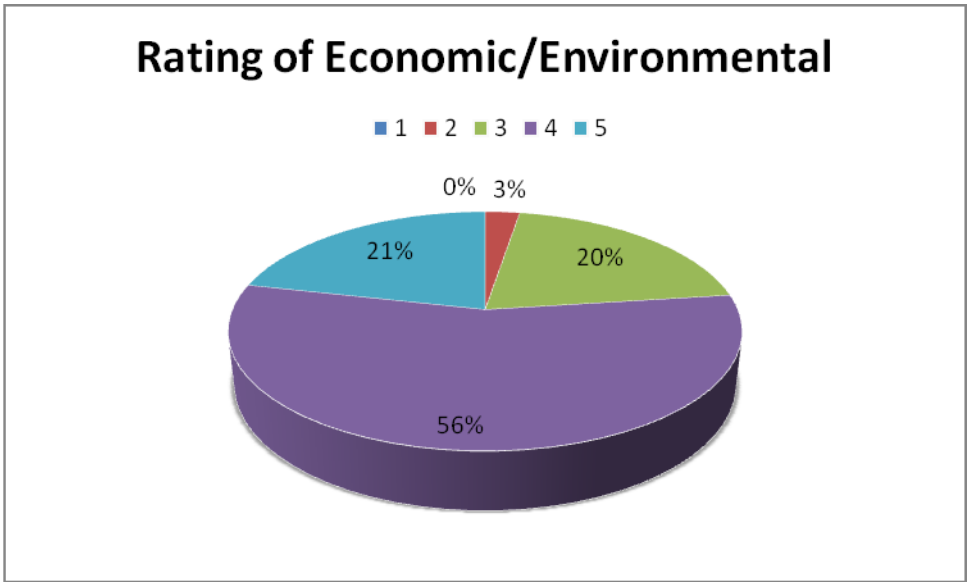

Figure 4.3: Percentage analysis of the rating of performance in economic/environmental

In the economic/environmental side, the survey shows that EMS implementation give many benefit in profit side. More than 50% of respondent agree that the EMS implementation has influence the company's performance in economic.21% of respondent shows that they are very confident about the effectiveness of EMS implementation in business running system. Our results seem to mirror those of other studies conducted in developed countries. Specifically, the study found that ISO 14001 certification is perceived to impact both economic and environmental performances positively. This large percentage positively indicates that the EMS must be adopted by all company in Malaysia. From the survey also reported an enhanced company reputation as well as significant waste reduction at their plants. Thus, the argument put forth by some critics that the ISO 14001 is merely a formality or an empty label that have no other benefits apart from image building and public relations, is thus not supported by the results of our study. Further, respondents felt that putting in place an ISO 14001 EMS have led them to explore alternative technologies and procedures in their production processes.

4.3.4 Rating of Customer Satisfaction

Rating	*1*	*2*	*3*	*4*	*5*
Total Frequency	0	2	10	26	12

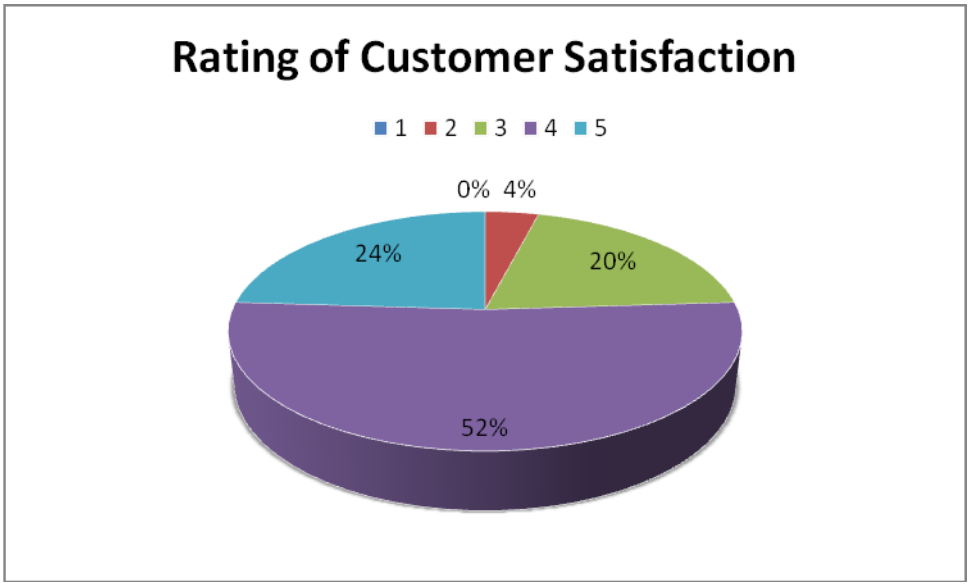

Figure 4.4: Percentage Analysis of the Rating of Customer Satisfaction

One of the priorities in business deal is customer satisfaction. From the survey conducted, 52% of the respondent stated that the EMS implementation give them more option to increase the trust of customers toward their business credibility. The customers will evaluate the company's output directly by using the product.24% of respondent is very happy with the result of EMS implementation to the customer satisfaction. However, there was slight respondent who not respond like others. Actually, there are many reasons that causing this situation. One of the reason is the company have problems about lack of skilled manpower that hinders EMS implementation. Most companies lack skilled personnel in their Environment departments. This situation will result in the output and processes.

4.3.5 Rating of Implementation Cost

Rating	*1*	*2*	*3*	*4*	*5*
Total Frequency	2	23	29	6	0

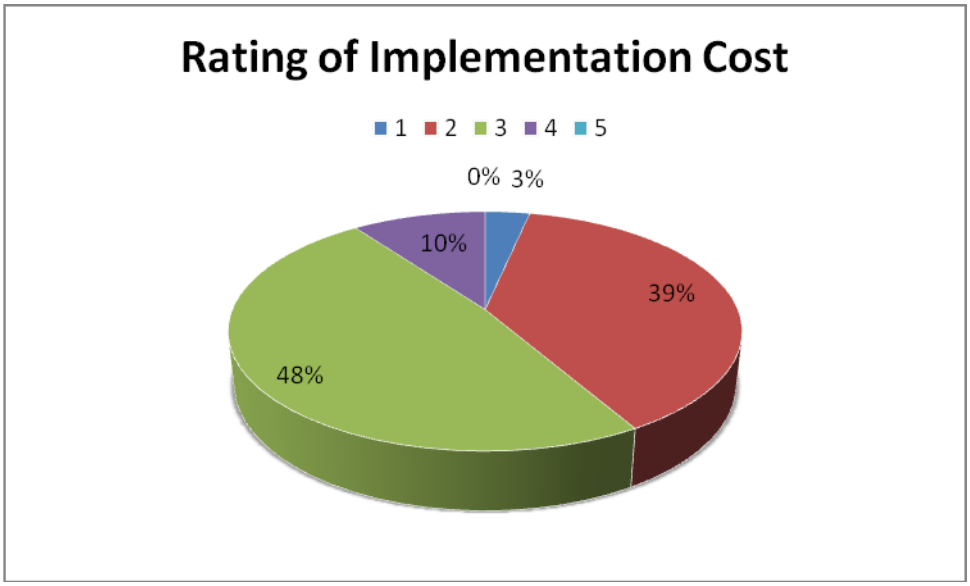

Figure 4.5: Percentage Analysis of the Rating of Implementation Cost

The high cost of ISO14001 implementation might actually result in the redirection of resources away from investment in more environment friendly processes. It is also part of interests of this research to investigate whether or not the benefits of certification actually exceed its costs. From the survey conducted, almost half of respondent show that they are not fully confident about the EMS certification actually far outweighed its implementation cost. 10% of respondent stated that the implementation cost for EMS is high and give little benefit to the companies. The remainder percentage shows that they are really agree that the EMS implementation is far outweighed its implementation cost. However, we must know that the EMS is newly introduced in Malaysia. Statistic shows that most of the companies in Malaysia have implemented the EMS for less than 10 years. The survey rating actually gives positive

number in EMS identification in Malaysia. So, we cannot expect high confident level for the companies to adopt EMS as part of their operating system due to the duration of EMS implemented in Malaysia. Many companies perceive EMS implementation as a complex system with high cost of implementation. To some of them, it is the responsibility of the multinationals or larger companies. In other words, the system is meant for the 'big players'. It is very possible that many of the companies have not done a critical Cost-Benefit analysis of implementation/compliance to the management systems. In most cases, some companies embarked on EMS implementation but the system was interrupted and resources diverted to core business activities. The issue here is that ISO 14001 EMS is still a new experience yet to be fully understood by companies in the developing countries. Nevertheless, some emphatically agrees with that proponents of the standard that is the implementation and registration process is well worth the expenditure of resources, and benefits derived from the process are tangible, exceeded expectations - and all at an affordable cost.

CHAPTER 5

CONCLUSION

5.0 INTRODUCTION

This study has achieved the all the objectives which are to investigate the impacts of EMS implementation on the manufacturing sector's performance in economic & environmental and customer satisfaction, to examine the benefits of adopting the EMS and to analyze the statistic of manufacturing sector that implement EMS in Malaysia.

This study also has provided some empirical evidence that ISO 14001 certification has positive impact to firms' performance, specifically on perceived economic impact, perceived environmental impact and perceived customer satisfaction. Although ISO 14001 is not the only way to effectively manage environmental affairs, and registration to ISO 14001 does not itself guaranty outstanding business results, our study has shown that it, in fact, has provided strong impact and benefits to the overall posture of the company. One very important element of ISO 14001 is that the EMS must continually improve. This study can be reference for the new firms or companies that in doubt about the effectiveness of EMS implementation because it involved some expenses to operate. For the developing country like Malaysia, the effort to become an advanced country must be first overcome by having strong economic sector that gives permanent profit for a long time to the country. So, if totally companies in Malaysia

have implemented the EMS, we can achieve the target to become an advanced country in the shortest time.

5.1 RECOMMENDATION

The benefits of complying and implementing ISO 14001 Environmental Management Systems cannot be compromised or over emphasized. It will help to limit environmental liabilities arising from the utilization of resources of the environment for wealth creation through improvement of environmental performance of corporation. In other words it will help firms integrate environmental values into business operations, reduce liabilities and increase profit margin.

Although ISO 14001 EMS is still a new innovation in the developing world, but awareness level and implementation is far from being encouraging. Against this backdrop, the following are recommended as probable strategies for improving implementation and compliance with ISO 14001 Environmental Management Systems:

(i) Intensified enlightenment/awareness campaigns on ISO 14001 EMS. This could be done through jingles in the media houses, stakeholder forum, workshops and seminars. With this both the companies and other stakeholders become aware of the need and benefits of its implementation. More so, awareness, of other stakeholders could also increase their sensitivity to environmental issues and increase their pressures on companies to implement and adopt EMS. Generally, level of environmental education and awareness is low in the developing countries; therefore there is need for general environmental enlightenment and education.

(ii) Incentives to complied and certified companies. These incentives could be inform of tax holidays and or awards. This would encourage those implementing the system and motivate others. Also small firms are to be encouraged to set up their systems at their own scale as they would improve over time. The entire

operations must not be certified at a time. In other words, the implementation could be in phases.

(iii) There is the need to set machinery in motion for the training of qualified and certified environmental auditors as well as strengthen legislations on environmental performance and compliance.

(iv) The government has to realize their role to encourage the number of company to implement EMS. Even though the companies are not owned by government, but for the goodness to the country, the government must give help or initiative to the company (especially new firms) to achieve the standard level of ISO 14001.

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APPENDIX A

SURVEY QUESTIONNAIRE

Survey Questionnaire on Environmental Management System and its Impacts on Manufacturing Company's Performance in Malaysia.

My name is Sahrul Alam Bin Yusoff (MA05040) from Faculty of Mechanical Engineering of University Malaysia Pahang (UMP). This Questionnaire is part of my research for my Final Year Project 1.The main objective of this project is to investigate the impacts of Environmental Management System (EMS) implementation on the manufacturing sector's performance in Malaysia. This project focuses on economic, environmental and customer satisfaction. Your company was selected as one of the 50 companies in Malaysia to fulfill this questionnaire. The feedback from your company is important for my analysis work. Actually, I hope the feedback of the questionnaire can be return to me within 2 weeks from the date your company receive this questionnaire. The cooperation from your company is much appreciated.

1. COMPANY DATA

Company : _____

Address : _____

_____

Contact person : _____

Telephone : _____ Extension: _____

Telefax : _____ Telex : _____

2. COMPANY STRUCTURE

Branches or depots/subsidiaries;

in Malaysia : _____

in other countries : _____

Main products: _____

Main raw materials and purchased parts used or processed:

_____

Manufacturing process: _____

SECTION A

(The questions in this section are to define the statistic of manufacturing companies in Malaysia implementing Environmental Management System application out of 50 samples)

	YES	NO
1) Does your organization implement Environmental Management System?		
2) Does your organization have a named officer responsible for Environmental Management System? If 'yes', please state the position and qualifications of that person: Position : _____ Qualifications: _____		

3) When did your company first start implement EMS applications? (Please 'X' your answer)

☐ Less than 1 year ago

☐ Less than 3 years ago

☐ Less than 5 years ago

☐ Less than 10 years ago

☐ More than 10 years ago

4) What were your company primary reasons for choosing EMS applications?

_____

_____

_____

SECTION B

(The questions in this section are to ascertain whether or not the benefits of EMS certification far outweighed its implementation cost and give profit to company and the customer satisfaction.)

(Please bold or underline in one of the boxes next to each statement.)

		Strongly Agree →				
		1	**2**	**3**	**4**	**5**
Benefit of Environmental Management System in Economic/Environmental						
1	The implementation of Environmental Management System has improved the performance of your company.	1	2	3	4	5
2	The implementation of Environmental Management System has reduced the cycle time of your company.	1	2	3	4	5
3	The implementation of Environmental Management System has improved working conditions and safety of your company.	1	2	3	4	5
4	The implementation of Environmental Management System enhanced quality and investor in people system.	1	2	3	4	5
5	The implementation of Environmental Management System has stimulated process, transport, raw materials and packaging changes.	1	2	3	4	5
6	The implementation of Environmental Management System has enhanced cost, saving energy and waste reduction & efficiencies.	1	2	3	4	5
7	The implementation of Environmental Management System has improved economic condition of the company	1	2	3	4	5
8	The implementation of Environmental Management System has been increased profitability of your company.	1	2	3	4	5
9	The implementation of Environmental Management System has increase the revenue of your company.	1	2	3	4	5

Benefit of Environmental Management System in Customer Satisfaction						
10	The implementation of Environmental Management System has created a positive public image.	1	2	3	4	5
11	The implementation of Environmental Management System has increased your customer satisfaction toward your company.	1	2	3	4	5
Benefit of Environmental Management System in Implementation Cost						
12	The implementation of Environmental Management System has required higher than expected staff cost.	1	2	3	4	5
13	Certification fees for Environmental Management System higher than expected.	1	2	3	4	5

SECTION C

(The questions in this section are to define the awareness/performance of EMS to the company)

(Please 'X' your answer.)

	YES	**NO**
1. Do you perform environmental management reviews at planned intervals?		
2. Do you review the suitability of your environmental management system?		
3. Do you review the adequacy of your environmental management system?		
4. Do you review the effectiveness of your environmental management system?		
5. Do you assess opportunities for improvement?		
6. Do you assess whether or not your environmental management system should be changed?		
7. Do you carry out environmental management reviews by examining your inputs?		

8. Do you examine your compliance with legal and other environmental requirements?		
9. Do you examine the overall environmental performance of your organization?		
10. Do you examine recommendations for improving environmental performance?		
11. Do you have an environmental action plan in place to reduce your adverse impact on the environment?		

14. Outline in the box below the specific environmental impacts associated with providing the product/service and what steps are being taken to minimize them:

Thank You for Your Cooperation