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# The Effects of Environmental Management System towards Company Financial Performance in Southern Region of Peninsular Malaysia

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## Abstract

Environmental concern and issues has been rising rapidly in the current industry. This has caused Malaysian firms now to put their focus on environmental issue and green technology. However, besides on focusing on produce more green product, firms should also focus on how to manage. Environmental Management System (EMS) is the suitable tool for an organization to manage their environmental issues and improve environmental impacts. This study presents evidence of company's performance which certified with ISO 14001. Despite the resources needed for EMS is high, there are few benefits include improving firm's production performance and reducing cost which will leads to enhance overall performance. Three companies certified with ISO 14001 were interviewed to obtain the response and opinions on the effects of implementing EMS within their organizations. Results shown that organization implemented EMS received many benefits and improvement. Although the cost of implementing EMS is high, the research still obtain positive results from companies with EMS. Based on the results received, it can conclude that EMS is the tool for organization to manage and overcome environmental issues and improve environmental performance. At the same time, companies are able to improve their overall performance other than only environmental. It is hope that this study able to encourage more Malaysia firms to implement EMS.

**Keywords:** Environmental Management System, Effects, Performance, Implementation

## 1 Introduction

Environmental issue is one of the major problem in the current world. Malaysia now faces a diverse range of environmental issue. The environmental issues are becoming more complex and challenging due to a few challenges such as emerging of new kind of products, changing in manufacturing process, regulations not updated, etc (Ahmad Kamarulnajuib, 2013). Therefore, the level of environmental concern has been growing in recent years. Firms and manufacturer now also focus more on environmental issue. Solving environmental issue has become a major aspect when creating an innovation. Industry focus on producing environmentally friendly products and service to the market. Although environmental awareness is increasing on product and services, management responsible behavior still low. Government has taken action by enforcing rules and regulations on environmental issues towards firms for their environmental responsibilities and to overcome the arising problems of environmental (52).

The most common pollution problem in the world right now will be greenhouse effect where the earth's temperature is rising and causes global warming. This has resulted that many consumers are aware of this problem and try to make a change in their purchasing behavior as they have highly influence and impacts on the environmental issues. Therefore many firm has make environmental issue as a part of strategic planning and management while producing their products (Donnelly et al., 2006, Maas, Schulster and Hartman, 2014). Organizations are starting to produce their product or services with aspect of environmental friendly to prevent more pollution occurs and worse. As stated by Graziela and Sergio, the companies and environment hold an undeniable

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relationship as the operation and production of companies can affect the environment in every way.

Lately, the awareness of how important to protect the environment has increasing among the society and causes business community to take environment issues seriously and vital in business (8, 33, 48, 62). This has resulted firm eagers to get recognition of these environmental demands by changing their product or services lifecycle, decrease production cost and reduce waste of production (2). Despite Malaysia has make great efforts of attracting foreign investor to come and invest on green industry, Malaysian consumers still lacks of environmental responsible behavior practices. Therefore, a study on how environmental management system can help to solve the world problem and create awareness is needed.

### *1.1 Environmental Management System (EMS)*

Environmental Management System (EMS) is a system designed to help organization manage their environmental impacts and improve environmental performance of their products and services. EMS can be considered as a framework for managing organization substantial environmental impacts. According Khanna and Anton (2002) EMS can be expressed as a makeover of an organization and motivation of making effort towards integrating environmental management practices in production to reduce pollution and continuous improvement. Environmental management system (EMS) is a continuous improvement way to organize, plan, making decision for all aspects of a firm's environmental performance and reducing negative impact on environment (24). The system is a tool that can help to manage current and also future environmental impact. An EMS is said to be a continual cycle of planning, implementing, reviewing and improving the processes and action that support the organization to achieve its business and environmental goals (Tonino, Gaetano, Fabrizio). An EMS integrates environmental management into an organization's daily operation, long term planning and quality management systems.

EMS can be also expressed as a tool to enhance the dedication of the organizations to comply with environmental laws and to prevent the pollution. Environmental management is a worthy investment for firms to commit for reducing environmental impact, which may also affect firm competitiveness, increase rate of productivity and efficient use of energy. EMS is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency (Tonino, Gaetano, Fabrizio). Environmental management system affects an organization's competitiveness by increasing the firm productivity with efficient use of resources and energy (35).

The implementation of EMS can be a source of competitive advantage for manufacturing companies who aim for international market. It is shown by Roy and Vezina (2001) that environmental initiatives can be used to increase a firm's innovative capability. The aim of EMS is to help organizations to reduce energy consumption, waste and the use of ozone depleting substances and produce more environmentally friendly products and improve its environmental impact and prevention of pollution (14). Environmental management system can be considered as strategic management or sustainable management as its purpose is to reduce environmental impacts and is a continuous improvement. The system is usually used by firms to monitor and control the environmental impacts that had caused by business activities.

## 2 Literature Review

### *2.1 Environmental Management System in Malaysia*

By implementing environmental management system in an organization indicates of owning a certification of environmental management system standard known as ISO 14001. The standard is determined by the International Organization for Standardization (ISO). The certification will be granted to organization with environmental awareness integrated into their management system with the purpose of reducing environmental footprint. Certification International Malaysia (11) has also stated that ISO 14001, the international standard for EMS is to help organization reduce their business' environmental footprint and decrease pollution and waste caused by the organization with compliance to rules and regulations of environmental.

ISO 14001 according to European Certification Group Malaysia (2017) is a worldwide acknowledged rules with purpose of handling environmental issues and aspects related to the organization and decrease their environmental impacts. Environmental management system is adopted globally, many countries government encourage firms to actively use environmental management system (45). The role of ISO 14001 is to fulfil customer needs and regulations requirements for environmental performance with continual process improvement. According to Melnyk et al (2003), EMS can be expressed as a guideline for an organization to develop, manage and control environmental impacts by reducing waste and compliance with regulations. Implementation of EMS provides lots of benefits from different aspect such as increase in productivity, competitiveness, profitability and improved corporate image (59, 64).

### 2.2 *Environmental Performance*

Environmental management system within an organization can affect significantly on the environmental performance. According to Da Silva and de Medeiros (2004), they have identify that environmental management assist the company to improve environmental performance, reduce cost, enhance corporate image with regulators and investors, decrease pollution, save resources and penetrate new markets. Hull and Rothenberg (2008) have stated that environmental and business activities cannot be accomplished simultaneously as there is relationship between them that they will affect each other. Goh, Suhaiza and Nabsiah (2016) have mentioned that implementing an ISO 14001 EMS will help the firm to improve economic performance and at the same moment enhance its environmental performance.

#### *2.2.1 Reduce Waste*

ISO 14001 provides a framework and guides on how to handle waste. With implementation of environmental management system, environmental aspects such as waste

will be identified and define on how to control and handle waste. An organization with certified ISO 14001 will look into and ensure their supply chain handle and manage their waste efficiently (32). According to the requirements in ISO 14001, companies will need to categorize their waste in hazardous or not and determine the ways to handle it compliance with legislation. Companies with certified ISO 14001 can use waste reduction policies, goals, training and reporting to meet ISO 14001 requirements (EPA, 2016). With the right support from environmental management system, an effective waste management strategy can be applied that will repay the investment (61).

#### *2.2.2 Reduce Environmental Impacts and Pollution*

Every product or service has an impact on the environment during all stages of its lifecycle (31). Activities during businesses occupy the main cause for environmental impacts. These aspect need to be considered and focus into their management and product or services. Thomas (2014) supported that environmental management system adoption has positive effects on energy use and waste production. Thus, with environmental management system, organizations are able to participate and make an effort on reducing environmental impacts.Based on ISO (2015) report, ISO 14001 has help to reduce environmental impacts significantly on cutting down carbon emissions, dust production and recycle on water. Environmental management structure motivates firms to prevent pollution by replacing inputs and make changes on processes (45). Activities that are carried out with the implementation of environmental management system are mainly focused on reducing the environmental loads such as reduce energy use, waste creation and release of chemical (39).

#### *2.2.3 Efficient Use of Resources*

Scarce resources has become a severe problem and organizations should now pay great attention of this aspect into their supply chains and production (53). World global resources is depleting over the period, scarce valuable resources caused conflicts in the market, all these environmental issues are resulted from the non-sustainable use of resources by man-generated activities (Marios Mavroyiannos). According to Croner's article (2014), environmental management system will ensure management to take note that there is sufficient resource are available to carry out their business activities. ISO 14001 as an international standard helps organizations to improve their environmental performance through more efficient use of resources (37). An environmental management system can assist a business in maximize efficient use of resources as it requires organizations to examine their practices and determine how their resources can be best managed (44). It is suggested by Stephen and Ilona (2006) that resources can be allocated more efficiently and effectively with the implementation of environmental management system.

### *2.3 Financial Performance*

Nakao et al. (2007) studied the relationship between environmental performance and financial performance with calculation method of financial variables. Rowland-Hones et al (2005) supported the relationship between environmental performance and financial performance due to findings of pollution reduction will lead to future cost savings by increase efficiency, reduce costs and decrease future liabilities. ISO 14001 considered to be the most popular environmental management system, there is an undeniable relationship between ISO 14001 adoption and financial performance. Thus, this have caused many companies in Malaysia are motivated to implement such standard (46). ISO 14001 certification is able to affect positively on financial performance of organizations. The results of Hrafnsdottir (2011) studies shown that organizations with environmental management system or environmental certification ISO 14001 had positive financial performance.

#### *2.3.1 Increase Profit*

ISO 14001 decreases environmental related costs thus increase organization profits as well as opening up more business opportunities. In the early years, increase profitability was the main factor for organizations to implement environmental management system (19). Based on El-Zeind (2012), he reviewed that organizations with ISO 14001 certification can experience increase in profit due to reduction in expenses. Studies by Renato, Bruno, Valcemiro and Aridelmo (2012) have shown that organizations that implemented environmental management system get higher net income than those without EMS. Thus, this indicates that organizations that implement environmental management system tend to increase their economic-financial results. Furthermore, the study from Hibiki and Arimura (2016) also revealed that ISO 14001 raised the market value of organization by reducing environmental impact and therefore the risk of liability caused by environmental pollution will lead to an increase in organization's profit on a long-term basis.

#### *2.3.2 Reduce Cost*

Cost can be reduced with environmental management system because implementation of EMS can lead operations and management performed effectively and efficiently (Lillah and Struwig, 2016). Environmental management system as a systematic approach to meet business goals with environmental aspect contributes in the benefits of reduced costs (22). Environmental management system helps organization to use their energy and resource efficiently and effectively can helps to reduce cost as they are related to each other. Energy efficiency and costs are closely related to operating cost which lead to financial performance of organization will be affected by their environmental approach (13). Moreover, Organizations with implementation of environmental management system will also have better design and environmental friendly of operational processes for example installing energy-efficient lighting systems (49).

#### *2.3.3 Increase Firm Assets*

Environmental management system is reported to have an ability to increase the value of asset in an organization. The results of Li and Wu studies (2017) have shown that the adoption of environmental management system brings increase in total asset. The requirements of environmental

management system will push organizations to increase investment in their manufacturing process and enhance their techniques thus this leads to higher total assets. According to Wu and Zhou (2011), an organization which invested in environmentally assets compliance with environmental regulations can maximize in utilization of the assets that improve the environment with their operating activities. Moreover, Lee, Noh, Choi and Rha study (2014) shown that the implementation of ISO 14001 increased a firm's total assets, liabilities and ratio in long run. Besides increasing a firm's asset, ISO 14001 also protects the company, assets, shareholders and directors (10).

### *2.4 Corporate Performance*

Pan (2003), Sambasivian and Ng (2008) have find out that benefits of environmental management system can be categorize into enhance corporate image and reputation, motivate employees, profitability, performance, opportunity and customer dedication to the company. Corporate social responsibility awareness is increasing rapidly and has become one of the most important concept in business strategy (40). As suggested by Quairel and Capron (2010), public not only focus on organization economic performance but also concern about their responsible towards individuals, the society and the natural environment. Organization is aslo able to build a solid foundation of relationship with their supply chain parties and community (50).

#### *2.4.1 Increase Firm Image and Value*

A good image of corporate image can increase the value of organization. It can determine the amount of suppliers willing to partner with desired organizations and customers that are willing to purchase the products or services. With a certification of ISO 14001, the organization is able to boost their image and value (Anne et al., 2006). ISO 14001 is able to enhance an organization's reputation by presenting commitment to best practice. With the certification of ISO 14001, it indicates that the organization is qualified for recognition and will increase it creditability among suppliers. One of the main drivers for certification ISO 14001 is to enhance firm's reputation (21). According to Rossignol (2017), environmental management system is able to improve an organization's image with public, regulators, lenders and investors. ISO 14001 certifications is able to improve company reputation and confidence of stakeholders through strategic communication about the implementation of environmental management system.

#### *2.4.2 Create Awareness and Responsibility among Employees and Suppliers*

Regarding to ISO 14001 standard (30) organizations hold a responsibility to make sure employees involved in activities that cause environmental impact have received proper education and training. With environmental management system framework on environmental aspects, employees are able to fulfil the expectations of their top management and stakeholders by presenting their commitment and responsibilities to the environment (23). Based on Neville Clarke Organization official website (2015), ISO 14001 Environmental Management System is able to enhance the thinking and understanding on the importance of environmental issues by all within the organization. TÜV Rheinland (2017) also stated that the main of environmental responsibility is to raise awareness for environmental issues among your staff to minimize environmental impacts. With the knowledge of knowing environmental management system, employees are able to function and carried out task given with different environmental responsibilities in new position (32).

#### *2.4.3 Competitive Advantage Can Be Sustained*

Competitive advantage is what makes an organization better and differentiate from competitors in customers' minds (4). According to QMI SaiGlobal (2009), organizations are able to gain competitive advantage through environmental management system by presenting their environmental commitment to customers who are greater concern to environmental performance of their suppliers. Competitive advantage can be gained by interaction with stakeholders on environmental responsible compliance with legal and regulations and can affect positively on financial results (25). Environmental management system standards help organization to innovate more products, enhance management system process, compliance with rules and regulations and improve firm reputation among investors, customers and public (9). Environmental variable integrated into innovation of products or services can be the source of competitive advantage (41).

### *2.5 Conceptual Framework*

Environmental management system can affect a company performance from different aspect such as environmental, financial, and corporate. The relationship between implementation of environment management system and company performance is expressed in a conceptual framework as shown in figure:

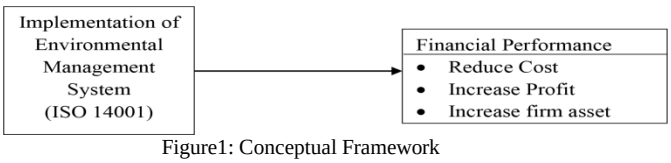


Figure1: Conceptual Framework

## 3 Methodology

### *3.1 Location of Research*

Johor and Melaka are states of Malaysia located in the Southern Region of Peninsular Malaysia. Johor is considered to be the second developed state in Malaysia after Kuala Lumpur. As it is located next to Singapore, many cargos and export activities are done in Johor. While Melaka is known as the historic state as there are many historic buildings remain in Melaka. Despite that, the manufacturing industry in Melaka is growing rapidly. There are many international firms are investing in Melaka and Johor. Manufacturing firms are starting to build plants and basing their production line in Melaka and Johor. Johor will be a strategic location for firms which invest in exporting their products to other countries as Johor own ports. The Star Online (Mar 7, 2017) has reported that a local public-listed manufacturing firm has decided to

pour in RM500mil worth of investments in Johor. Besides that, in 14 Oct 2017 The Star Online once published an article of Johor poised to become preferred investment hub. In order to become the new regional economic power house. On the other hand, based on an article of *Bernama (May 8, 2017)*, Melaka has received more than RM20 investments of projects by global firms in the past four years. Melaka got offers from various industries that are interesting to invest in Melaka. *The Star Online* (Aug 9, 2017) has reported that Melaka has become the attractiveness of the Malaysia as a competitive location for firms to emerge into Asean. There are many well-known firms in Melaka such as Texas, Infineon, Mamee, SunPower and etc. For an instance, Infineon has decided to further expand their firm in Melaka by investing a RM240 million facility. In 2015, Melaka has also received an investment of RM 35.7 billion and 791 projects in the manufacturing sector since 1980. Besides that, Melaka state government also making effort to attract more international investments to the state. There are a few foreign companies invested in Melaka and Johor are large scales. This indicates that there will be more activities carried out and environmental issues in Johor and Melaka will be increasing as there are more production line.

### *3.2 Sample*

The study will be undertaken as qualitative research. It consists of one-to-one interviews with three companies involving professionals or expertise in the field of environmental management system. The results and opinions collected are from companies certified with ISO 14001 and employees with manager level or person who is in charge of ISO 14001 is interviewed. The data from the interviews will be counted as a result for the interviewer as an approach to the research. Interviewees job position in their respective company need to be associated with environmental management system. The field of questions to be conducted in the interview will cover the research objectives regarding the effect of environmental management system towards the company based on the aspect of waste, recycling and design practices. Qualitative research in the role of theory means inductive that generates theory, while in terms of ontological orientation qualitative is considered constructionism (34).

## 4 Data Analysis

### *4.1 Discussion*

Research Objectives: To identify the effects of implementing EMS towards company financial performance. Three firms, covering a range of industries, were compared using the Wilcoxon signed-rank test at a 96 percent confidence level with a critical value of 10. The results are summarized in Table I and clearly show that none of the tested criteria is below the critical value. Therefore, this hypothesis could not be rejected for any of the financial indicators. This result shows that the market does not concentrate the costs of EMS execution significant. Based on this explanation, it can be summarized that the results of the financial analysis show that the cost of reducing environmental effect does not significantly weaken a company's profitability.

## 5 Recommendations

### *5.1 Conclusion*

The research is to study the effects of environmental management system towards company performance in Southern region of Peninsular Malaysia. It was shown in many studies indicate that firms certified with ISO 14001 also means implemented environmental management system can bring variety of benefits for an instance increased market share, benefits for stakeholders, reduce risks, reduce costs and increased productivity.

| Open Code | Properties | Respondents' Words |
|---|---|---|
| Reduce Cost | Saved a lot of money | 1. "It can improve our financial performance and help us saved a lot of money" (Krishnan) |
| | Cheap | 2. "…and this filter detergent normal dish washer is very cheap" (Baha) |
| | Save more than twenty thousand per month | 3. "…also the purchase of dish washer very cheap" (Krishnan) |
| | Cost is reduced | 4. "We were able to save more than twenty thousand per month" (Krishnan) |
| | Trend also dropping | 5. "Our cost is reduced lots and trend also dropping" (Baha) |
| | Saved nearly 200K per month | 6. "…we saved lots of money with this method. We have saved nearly 200K per month since this implementation" (Baha) |
| | Cost reduction | 7. "It is more towards contribution towards cost reduction" (Baha) |
| | Cost of manufacturing reduced | 8. "Therefore, when we are able to save lots of energy also indicate cost of manufacturing is reduced" (Baha) |

Table 1: Results of statistical testing

| | Positive Σ | Negative Σ | Remarks |
|---|---|---|---|
| P/E Ratio | 17 | 32 | Positive, not rejected |
| ROE | 20 | 34 | Positive, not rejected |
| ROA | 27 | 33 | Positive, not rejected |
| Profit Margin | 31 | 30 | Negative, not rejected |
| Operating Margin | 17 | 38 | Positive, not rejected |
| ROSF | 25 | 27 | Positive, not rejected |

The research has shown that there are direct and indirect financial benefits can be obtained with the implementation of ISO 14001 at all levels of an organization. Based on the results, it is shown that through the implementation of environmental management system, it significantly affected costs of firms by reducing environmental impacts by their activities. It is shown in a study that implementation of EMS also can gain competitive advantage which will be reflected in positive financial results (18).

Based on respondent's response on the question regarding financial performance, both three respondent gave positive answer of implementing environmental management

system in their organization is able to reduce cost through reducing waste, increase profit by reduce raw material. Although certification of ISO 14001 may cost them high but they are able to save more such as Konica Minolta had saved more than twenty thousand per month. Respondent from Hitachi Chemical also mentioned that they are able to save up to 200K per month by carry out the activities with implementation of ISO 14001. However, there is different perspective from Mr Jerald from Teck Wah Paper Products. He mentioned that the cost to implemented environmental management system is high because there are many fees to pay and follow up.

Besides than affecting financial performance, implementation of environmental management system also has great impact on environmental performance. The effects on environmental performance is the second research objective of this study. According to ISO (2014) survey results, the most critical issues that required more care were decreasing and controlling pollution, plan strategies for efficient use of resources and reducing waste and pollution. With ISO 14001, firms are able to find out and evaluate the environmental aspects associated to the life cycle of products and services to come out with a plan for solving the environmental issues.

Due to the arising environmental issues and impacts of manufacturing activities, every firms play an important role and hold responsibility in helping to solve the problem and make an effort to resolve it. Firms interviewed in this studies has took action on their corporate social responsibility on environmental. For an instance, Konica Minolta focused on reducing their waste. They have set a target of zero waste and 100% recycled. With implementation of environmental management system, they have achieved 96% currently. Hitachi Chemical focused on their water and gas management. They have been reuse and recycle their water and chemical substances to as a source of energy. In this way, they are able to reduce the usage of natural resources and at the same time save the environment.

Management system such as ISO 14001 is to aid an organization to control their processes better by increasing effectiveness and operational efficiency (29). ISO 14001 is the tools for firms who desired to manage their environmental and ethical responsibilities to its customers, employees and world (36). Results from a study by Bin Ni (2015) shown that when firms obtained environmental certificate-ISO 14001, the organizations raise the awareness of environmental protection and make an effort to control their polluting behavior.

Firms are able to receive better access to the global market and less inspections from the government. This was also supported by data collected through qualitative interviews from companies certified with ISO 14001. They have mentioned in interview regarding how environmental management system able to improve their products and make their products to be unique and gain competitive advantage. Furthermore, both three companies also stated that the relationship with their customers and suppliers also improved with environmental management system.

Based on the results received from respondent and analysis in coding qualitative method, it is shown that results collected and analyzed fulfill the research question and objectives of this research. Responses have provided answer and opinions that match three research objectives with the themes of financial performance, environmental performance and corporate performance. Therefore, this research is considered to be success as desired outcome achieved and targeted objectives are fulfilled. However, there are some limitations of this research such as time and location studied. This research only covers the Southern Region of Peninsular Malaysia, Johor and Melaka. It is due to time constraint and only few companies are managed to interview. Thus, it is hope that this research can be further studied by expanding the research location and time allocated for research.

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## References

1. Akira Hibiki TH. ENVIRONMENTAL POLICIES AND FIRM-LEVEL MANAGEMENT PRACTICES IN JAPAN, 2016.
2. Alfred AM, Adam RF. Green management matters regardless. Academy of Management Perspectives. 2009;23(3): 17-26.
3. Alperstedt GD, Bulgacov S. Environmental management, strategic practices and praxis: a study in Santa Catarina industrial companies. BAR-Brazilian Administration Review. 2015 Sep;12(3):288-308.
4. Amadeo K. (2017, October 31). What Is Competitive Advantage? Three Strategies That Work. 2017; Retrieved from The Balance:
5. Bernama. Malacca to target more foreign, 2015.
6. Bernama. Melaka receives more than RM20b in investment within four years. 2017; Retrieved from The Malay Mail Online: http://www.themalaymailonline.com/malaysia/article/melaka-receives-more-than-rm20b-in-investment-within-four-years#YFTtAF20DTaQkWTV.97
7. Bin Ni HT. Does ISO14001 raise firms' awareness of environmental protection?—Case from Vietnam, 2015.
8. Bonilla SH, Almeida CM, Giannetti BF, Huisingh D. The roles of cleaner production in the sustainable development of modern societies: an introduction to this special issue. Journal of Cleaner Production. 2010 Jan 1;18(1):1-5.
9. BSI Group. Comment on standard for phased Implementation of environmental management systems. 2016; Retrieved from BSI: https://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2016/august/Comment-on-standard-for-phased-implementation-of- environmental-management-systems/
10. Certification Europe. ISO 14001 Environmental Management System. 2017; Retrieved From https://www.certificationeurope.com/certification/iso-14001-environmental-management-certification/
11. CIM. What is ISO 14001. 2010; Retrieved from Certification International Malaysia: http://www.cimalaysia.com.my/environment/
12. circular economy thinking across the supply chain. 2015;Retrieved from Energy and Environment: https://ee.ricardo.com/news/iso-14001-%E2%80%93-the-new-changes-will-encourage-improve
13. Cusack D. Community-based Ecotourism and Sustainability: Cases in Bocas del Taro Province, Panama and Talamanca, Costa Rica. Journal of Sustainable Forestry. 2008; 157-165.

14. Daughtry K. Environmental Management Systems. A Review of Available Standards and A Survey on Implementation in Swedish Organisations, 2014.
15. El-Zeind C. ISO 14001 – benefits. 2012; Retrieved from Sustainable Business Tool Kit: https://www.sustainablebusinesstoolkit.com/iso14001-benefits/
16. Eng Ann G, Zailani S, Abd Wahid N. A study on the impact of environmental management system (EMS) certification towards firms' performance in Malaysia. Management of Environmental Quality: An International Journal. 2006 Jan 1;17(1):73-93.
17. European Certification Group Malaysia. ISO 14001 about the standard. 2017;Retrieved from ISO Certification: http://www.iecmalaysia.com.my/iso-certification/iso-14001-certification.html
18. Ferron RT, Funchal B, Nossa V, Teixeira AJ. Is ISO 14001 certification effective?: an experimental analysis of firm profitability. BAR-Brazilian Administration Review. 2012 May;9(SPE):78-94.
19. Fielding S. ISO 14001 Brings Change and Delivers Profits. 2000;Retrieved from Quality Digest: https://www.qualitydigest.com/nov00/html/iso14000.html
20. from The Star Online: https://www.thestar.com.my/business/business-news/2017/08/09/infineon-opens-rm240m-facility-in-melaka/
21. Fryxell GELC. Influence of motivations for seeking ISO 14001 certification on perceptions of EMS effectiveness in China. Environment Management. 2004.
22. George E, Pataki EM. (n.d.). Understanding and Implementing and Environmental Management System.
23. Green Hotelier. Environmental awareness and training. 2007;Retrieved From http://www.greenhotelier.org/our-themes/community-communication-engagement/environmental-awareness-and-training/
24. Gwen Christini MF. Environmental Management Systems and ISO 14001 Certification for Construction Firms. 2004.
25. Henri J, Giasson A. Measuring environmental performance: a basic ingredient of environmental management. CMA MANAGEMENT. 2006;80(5):28.
26. Hrafnsdóttir, H. The effects of environmental strategic planning on competitiveness in Icelandic production companies. M.Sc., University of Iceland. 2011.
27. https://www.thebalance.com/what-is-competitive-advantage-3-strategies-that-work-3305828
28. Hull CE, Rothenberg S. Firm performance: The interactions of corporate social performance with innovation and industry differentiation. Strategic Management Journal. 2008 Jul;29(7):781-9.
29. Hutchens Jr S. Using ISO 9001 or ISO 14001 to gain a competitive advantage. Intertek white paper/[Tekst]–http://www. intertek. com. 2010.
30. ISO. Achieving environmental focus with ISO 14001:2015. Retrieved from International Organization for Standardization: https://www.iso.org/2015/11/Ref2013.html
31. ISO. New ISO standard to reduce environmental impacts of products and services. 2011;Retrieved from International Organization for Standardization: https://www.iso.org/news/2011/09/Ref1469.html
32. John H, Statzer MJ. Key Issues on Design, Value and Implementation. Environmental Management Systems. 2011.
33. Kanji GK. Architecture of business excellence in the public and service sectors. Total Quality Management. 2008 Apr 1;19(4):399-415.
34. Ladner S. Intro to Research Methods: Research Strategy. 2008; Retrieved from Sildeshare: https://www.slideshare.net/sladner/intro-to-research-methods-research-strategy-presentation-584449
35. Lundgren TZW. Firm performance and the role of environmental management.Journal Environment Management, 330341. 2017.
36. Magnolias Consulting. An Environmental Management System - ISO 14001:2015. 2017.
37. McKinnon RC. Risk-based, Management-led, Audit-driven, Safety Management Systems. London: Taylor and Francis Group. 2017.
38. Melnyk SS. Assessing the impact of environmental management system on corporate and environmental performance. Journal of Operations Management. 2003; 329-351.
39. Mitsugu Satou SK. http://www.nevilleclarke.com/malaysia/ISO_14001_Environmental_Management, 2005.
40. Moura-Leite RC, Padgett RC. Historical background of corporate social responsibility. Social Responsibility Journal. 2011;7(4): 528-539.
41. Murillo-Luna JL, Ramón-Solans-Prat JC. Which competitive advantages can firms really obtain from ISO14001 certification?. Journal of Industrial Engineering and Management (JIEM). 2008;1(2):104-18.
42. Musa Z. Johor poised to become preferred investment hub. Iskandar Puteri: The Star Online. 2017.
43. Neville Clarke. Overview of ISO 14001 Environmental Management System. 2015;Retrieved from http://www.nevilleclarke.com/malaysia/ISO_14001_Environmental_Management
44. Ngucha M. Environmental Management Systems. 2017;Retrieved from Integrate Sustainability: https://www.integratesustainability.com.au/blog/view-more.php?id=62
45. Nicole Darnall YK. Which types of environmental management systems are related to greater environmental improvements?. 2011.
46. Ong TG. ISO 14001 Certification and Financial Performance of Companies. 2015.
47. Pan JN. (2003). A comparative study on motivation for and experience with ISO 9000 and ISO 14000 certification among Far Eastern countries. Industrial Management and Data Systems. 2003;103(8): 564-578.
48. Pedroso A, Cella-de-Oliveira FA, Dutra IS, Morozini JF. Processo ou ações de ecoeficiência em empresas da cadeia produtiva agroindustrial da suinocultura de Toledo - Paraná, Brasil. Capital Científico. 2012;10(1): 1-17.
49. Perkins T. (n.d.). How an Environmental Management System (EMS) helps create a sustainable business. Retrieved from Business Cases Studies: http://businesscasestudies.co.uk/travis-perkins/how-an-environmental-management-system-ems-helps-create-a-sustainable-business/costs-and-benefits-of-introducing-the-environmental-management-system.html
50. QMI SaiGlobal. ISO 14001 Environmental management. 2009.
51. Quairel-Lanoizelée F, Capron M. La responsabilitésociale d'entreprise. La découverte. 2010.
52. Rezaee Z, Elam R. Emerging ISO 14000 environmental standards: a step-by-step implementation guide. Managerial Auditing Journal. 2000 Feb 1;15(1/2):60-7.
53. Ricardo . ISO 14001 – The new changes will encourage improved
54. Rossignol A. Implementing ISO 14001 is not only a response to pressure from external stakeholders, including government. 2017;Retrieved from Network for Business Sustainability: https://nbs.net/p/iso-14001-how-ems-adds-value-to-firms-05d915fb-0ed8-4628-a6ef-fb7355532aca
55. Rowland-Jones R, Pryde M, Cresser M. An evaluation of current environmental management systems as indicators of environmental performance. Management of Environmental Quality: An International Journal. 2005 Jun 1;16(3):211-9.

56. Roy MJ, Vezina R. Environmental performance as a basis for competitive strategy: opportunities and threats. Corporate Environmental Strategy. 2001 Dec 1;8(4):339-47.
57. Samah RA. Infineon opens RM240m facility in Melaka. 2017;Retrieved
58. Shah MF. RM500mil investment for Johor. Kota Tinggi: The Star Online. 2017.
59. Simpson DF, Power DJ, Samson D. Greening the automotive supply chain: a relationship perspective", International Journal of Operations and Production Management. 2007;27(1): 28-48.
60. Stephen Tinsley IP. Environmental Management Systems: Understanding Organizational Drivers and Barriers. New York: Taylor and Francis Group. 2006.
61. Stojanovic S. 7 steps in handling waste according to ISO 14001. 2016;Retrieved from Advisera: https://advisera.com/14001academy/blog/2016/11/07/7-steps-in-handling-waste-according-to-iso-14001/
62. Surjono DW. A sustainable production and consumption and the role of cleaner production. International Journal of Academic Research. 2011;3(4): 176-179.
63. TÜV Rheinland. Set an example for environmental responsibility with our ISO 14001certification. 2017;Retrieved from https://www.tuv.com/malaysia/en/iso-14001-certification.html
64. Zhu Q, Sarkis J, Geng Y. Green supply chain management in China: pressures, practices and performance. International Journal of Operations & Production Management. 2005 May 1;25(5):449-68.

## Abbreviation

BOD = Biochemical Oxygen Demand
BS = British Standards
CNG = Compact Natural Gas
$CO_2$ = Carbon Dioxide
EMS = Environmental Management System
GATT = General Agreement on Tariffs and Trade
GS = General Standards
HCJ = Hitachi Chemical Johor
HQ = Head Quarters
ISO = International Standards Organization
MS = Malaysia Standards
NCR = Non Conformance Report
OFI = Opportunity for Improvement
PDCA = Plan, Do, Check, Act
PSM = Projek Sarjana Muda
SAJ = Syarikat Air Johor
SHE = Safety and Health Environment
SIC = Smart Industrial Centre
SIRIM = Standards and Industrial Research Institute
WI = Work Instructions
P/E Ratio = Price to Earnings Ratio
ROE = Return on Equity
ROA= Return on Assets
Profit Margin = Net Operating Income/Sales
Operating Margin = Earnings before Interest and Taxes/Sales
ROSF = Return on Shareholder Fund