



**The influence of the implementation of Environmental
management systems in Chinese enterprises on the corporate
performance**

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Preface

Hereby I would like to thank my parents first, for encourage me to study in the Netherlands to accept advanced education and offer me financial support. I really appreciate both of you.

Secondly, I want to show my sincerely respect to both of my supervisors, they are: Mr. Postma and Ms. Bettine. During the whole final thesis process, supervisors guide me to do this research and provide me feedback again and again. Thanks for your patience to me.

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Management Summary

In order to face the increasing concern about environmental issues by consumers and market requests, the environmental management system (EMS) has been adopted by numerous companies all over the world. With the rapid development of economy, China also faces the serious environmental issues. According the statement of previous studies about the EMS implementation, the implementation of EMS has positive influence on the corporate performance for most companies.

The paper is guided by a main question what the influence of the implementation of Environmental management systems in Chinese enterprises on the corporate performance is. In order to answer this main question, the literature review methodology is employed in this paper. Through the literature review two main drivers for EMS implementation and two positive influences of EMS implementation in Chinese enterprises have been found. Meanwhile the main three barriers of EMS implementation in Chinese enterprises also have been pointed out in this paper.

The purpose of this research is to summarize the relationship between EMS implementation and corporate performances of companies and to point out the importance of EMS implementation in Chinese enterprises. It also gives the guide to Chinese enterprises.

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1: Introduction

1.1 Research Background

Latest news in the Environmental Leader, Comcast was confronted with the allegation that the company unlawfully disposed of hazardous waste. The investigation states that all the warehouse, dispatch facilities and customer service centers of Comcast unlawfully handled and disposed of various hazardous waste products, and sent these materials to local landfills without any permission. Comcast must pay 19.85 million dollars civil penalties and costs as well as an additional 3 million dollars which will be funded for projects furthering environmental and consumer protection and enforcement in California (J.L.Hardcastle, 2015).

However, previous news was reported that the environmental management system (EMS) of Crown Equipment has improved its environmental performance in order to achieve zero landfill. Based on the implementation experiences of EMS of Crown Equipment from several years, EMS not only improved its environmental performance and also improved customer satisfaction (J.L.Hardcastle, 2014).

It seems with the rapid development of economy, there are increasing considerations by consumers and market requests requiring the companies to concern environmental issues. The pressure from regulatory bodies, increased public awareness and media coverage of environmental issues and the awareness of the need to improve efficiency through reducing environmental costs forces organizations and companies need to proactively seek ways to improve their environmental management in order to enhance their environmental performances (Phan & Baird, 2015). In order to achieve the balance between the environment, society and the economy, and comply with the ISO 14001 standard which is published by the International Organization for Standardization (ISO), an environmental management system (EMS), “a systematic approach which requires the integration of environmental issues into every aspect of business management” is adequately implemented by many organizations and companies (Phan & Baird, 2015). There is a survey showing that by 2013 more than 301,647 organizations and companies in over 170 countries around the world had adopted EMSs as tools to improve their environmental performances (Phan & Baird, 2015).

Since adoption of the reform and opening policy in 1978 China as the largest developing country there was a fast growth through the late 20th century. Nowadays China already became one of the 10 largest economies just behind the US. With this rapid economic development, the environmental pollution has been increasing. For example, with the fast urban development the environmental pollution from construction has been increasing in China since the early 1980s. The result of previous research indicate that compared with a standard of 90 mg/m³ given by the World Health Organization, the level of total air-suspended particulates (TSP) which is considered as one of environmental indicators in 72% of the major Chinese cities, including the municipalities and the provincial capitals is two times higher than this standard, the level of TSP in those cities is already over 200 mg/m³ (Zeng, Tam, Tam, & Deng, 2005a). In order to reduce serious industrial pollution, to align with international norms and face the pressure from international markets and purchasers, Chinese government established the ISO14001 certification system in 1997 and fully applied this system in the second half of 1998 (Fryxell, Chung, & Lo, 2004b). According the survey by ISO in Figure 1 the number of ISO 14001 certificates was increasing from 9 to 35,416 in 14 years, China, ranking first in the list of top ten countries about the number of ISO 14001 certification, witnesses the process of implementation of EMSs (Qi et al., 2011a).

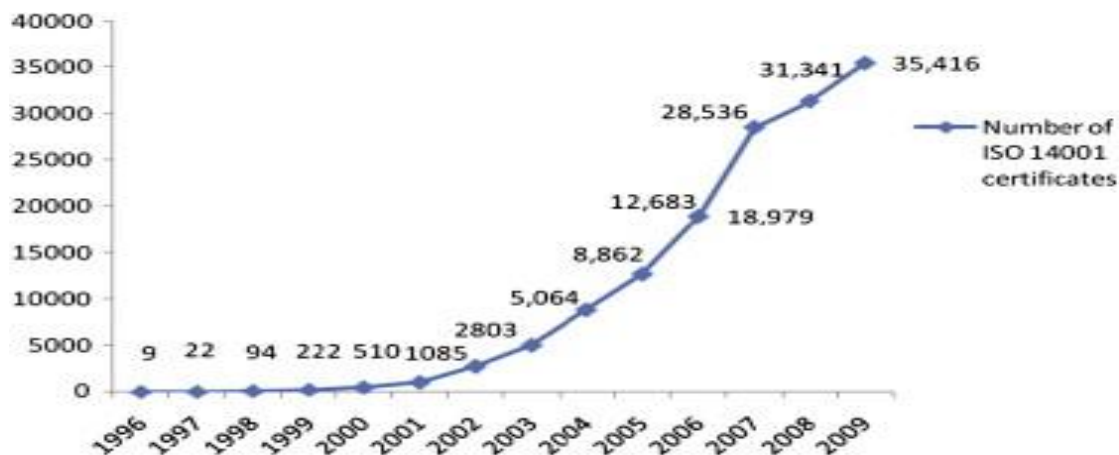


Figure 1: Time-related distribution of ISO 14001 certification in China

(Source form: Qi et al., 2011)

Recent survey shows that China already replaced Japan and the United States and became the world's largest country for ISO14001 adoption. There are 72,124 Chinese firms adopted ISO 14001 accounting by the Certification and Accreditation Administration of China (CAAC) in the end of 2011 (He, Liu, Lu, &

Cao, 2015a). However, the information in Figure 2 shows that except major provinces like Jiangsu, Zhenjiang, Guangdong, Beijing, Shanghai, etc. there is only 24% of the total number of certificates in other 21 provinces (Qi et al., 2011a).

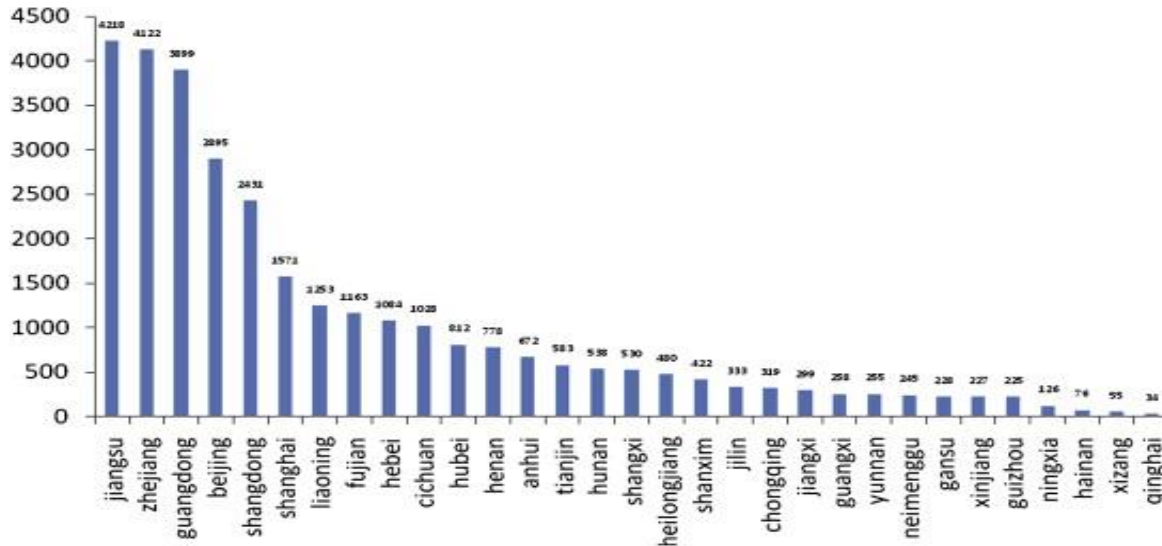


Figure 2: Regional distribution of ISO 14001 certification in China

(Source form: Qi et al., 2011)

Based on this distribution diagram, a conclusion is drawn that even though the implementation of EMSs is quite rapid and successful in China, the percentage of fulfilment of ISO 14001 in other minor provinces is still quite low. Therefore, to enhance the awareness of Chinese enterprises about environment issues related with company's operation and to improve the implementations of ISO14001 and EMSs in Chinese enterprises are still essential elements to the society and economic development.

1.2 Research Objective

Previous study by Alberti, Caini, Calabrese, and Rossi (2000) has already evaluated the costs and benefits of environmental management system using the direct and indirect analysis. The researchers analyzed Implementation costs, Certification and audit costs, and system maintenance costs of environmental management system. They also analyzed the benefits of environmental management system into two categories, economically quantifiable benefits and economically non-quantifiable benefits. Other scholars (Phan & Baird, 2015)

focused on the comprehensiveness of environmental management systems, and they by survey examined the influence of Non-Governmental Organization (NGO) and government pressures on the comprehensiveness of environmental management systems, and the impact of EMS comprehensiveness on environmental performance. Nawrocka and Parker (2009) used the data from a pool of 23 studies connecting environmental performance to environmental management systems in order to find the relationship between environmental performance and environmental management system. All previous researchers attempted to explain their viewpoint from different perspectives and contributed enormously to the implementation of environmental management systems.

This paper aims to summarize the general information about implementation of Environmental management systems in enterprises. Different from previous research, this paper focuses on the influence of implementation of Environmental management system in Chinese enterprise on the corporate performance. The paper will analyze relationship or evidences between the implementation of Environmental Management system and the corporate performance of companies. Then point out the factors that influence the implementation of Environmental Management in Chinese enterprise. At last, summarize the influence of the implementation of Environmental management system in Chinese enterprise on the corporate performance.

This paper may give some guidelines on how to implement the Environmental management systems in Chinese enterprise.

1.3 Research Question

After stating the objective of research, the main question as well as sub-questions will be given in this section. In order to explore the influence of implementation of Environmental management system in Chinese enterprise on the business performance, the main question is:

What is the influence of the implementation of Environmental management systems in Chinese enterprises on the corporate performance?

In order to answer the main question, the following sub-question has been made articulated:

- What are the reasons to expect a relationship or evidences between the implementation of Environmental Managements system and the corporate performance of companies?
- What factors according to the literature influence the implementation of Environmental Managements in Chinese enterprises?
- What are barriers of the implementation of Environmental Management in Chinese enterprises?

The first sub question is presented in order to give the overview of the influence of Environmental Management system on the corporate performance of companies globally or China. The second sub question has been put forward in order to research the cause of the relationship between the implementation of Environmental Management system and the corporate performance of companies, the importance of explaining the reason for the existence of such relationship and lead to illustration. The third question is suggested in order to summarize all the factors that influence the implementation of Environmental Management in Chinese enterprise.

1.4 Methodology

1.4.1 Literature review methodology

The contents analysis will use secondary sources and tertiary research.

Generally, the methodology consists of primary research, secondary research and tertiary research. The goal of research is to carry out literature reviews on the correlation between the implementation of Environmental Management system and the business performance of companies. The secondary research applied includes:

- Articles from journals
- Books (Text books, reference books)
- Theses and dissertation
- Websites

1.4.2 Article search method

The following journals provided most articles that are included in this research project:

- Journal of Environmental Management
- Journal of Cleaner Production
- Ecological Economics
- International Journal of Production Research
- Local Environment
- Environmental Management
- Journal of International Management

Identification of key words

In order to retrieve the relevant articles, the following key words and abbreviations have been used in various combinations: Environmental management system, EMS, ISO 14001, ISO 14001 standard, Environment management, Environmental performance measurement, China, Chinese enterprise, Comprehensive environmental management system, Business performance, Environmental performance.

Selection of Search engines

The following search engines have been used to identify abstract summaries of relevant articles:

- Google Scholar
- J-stor
- EBSCO
- ProQuest
- Science Direct

➤ Springer Link

1.5 Introductory Literature Description

Within this paper, the influences of the implementation of Environmental management system in Chinese enterprise on the corporate performance will be discussed. To answer the main question, it is required to identify what is the Environmental management system. Then, discuss how the Environmental Management system influences the corporate performance of companies globally or China according to the literature. Next, paper will focus the relationship between the implementation of Environmental Management system and the corporate performance of companies. Lastly, all the factors that according to the literature influence the implementation of Environmental Management in Chinese enterprise all the factors will be integrated to make a conclusion.

1.6 Study contribution

This paper contributes to the Chinese firms which want to implement the Environmental Management system to improve the company's corporate performance, as well as those Chinese companies that still do not have the awareness about the importance of implementation of Environmental Management system.

This paper will also contribute to academic field about the implementation of Environmental Management system in China, since this paper solely focuses on the relationship between the implementation of Environmental Management system and the corporate performance of companies, and illustrates all the factors that according to the literature influence the implementation of Environmental Management in Chinese enterprise.

1.7 Paper outline

This paper consists of three chapters. In the first chapter, we introduced the research background, research objective and defined our main question, sub-question. Besides, methodology is also introduced in this chapter. In the second

chapter, we will describe the influence of implementation of Environmental Management system on the corporate performance of companies globally and the relationship between the implementation of Environmental Management system and the corporate performance of companies in China. Finally, in the third chapter, we will give answer to our research question and make a conclusion. Before we started this research, dozens of articles have been read first. All the articles that are related to topic have been noted and made a simple conclusion for those articles. Therefore, it will be found or quoted easily for subsequent part of this research paper.

2: Environmental management system

2.1 Definition of Environmental management system (EMS)

An EMS is defined by the International Organization for Standardization as that part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing implementing, achieving, reviewing and maintaining an environmental policy in order to reduce negative environmental impact and improve management control of a firm (Nishitani, 2010). There are a wide range of benefits that can be provided by the implementation of an effective EMS such as the improvement of environmental performances, internal management, stakeholder satisfaction, access to capital, competitive advantage and company image; the reduction of EPA (Environmental Protection Agency) inspection, overhead costs, capital costs, insurance costs, regulatory noncompliance and associated fines. In addition, a potential non-tariff trade barrier is also avoided (Curkovic, Sroufe, & Melnyk, 2005).

The establishment of an EMS is based on the framework which is provided by ISO14000. The ISO14000 series were published by the International Organization for Standardization (headquartered in Geneva, Switzerland) as the standard for the international Environmental Management System (EMS) in 1996 and revised in 2004. The series were based on the need for improving environmental quality as expressed at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992 (Nishitani, 2009). The aim of this series are through full integration of environmental and business management to encourage companies to manage their environmental issues in more proactive way and goes beyond compliance (Curkovic et al., 2005). The ISO14000 family of standards includes ISO14001—Environmental Management Systems: specification with guidance for use, 14004—Environmental Management Systems: general guidelines on principles, systems and supporting techniques, 1410—Guidelines for Environmental Auditing: general principles, 1411—Guidelines for Environmental Auditing: Audit procedures and 1412—Guidelines for Environmental Auditing: qualification criteria for environmental auditors (Quazi, Khoo, Tan, & Wong, 2001).

However The ISO14001 is the only specific standard for an EMS and also

provides the core requirements for developing and implementing an EMS. The ISO14001 is one of the most popular voluntary environmental standards in the world. Until 2012, 285,844 firms have had the ISO14001 certification worldwide (McGuire, 2014). According to the pervious study, there are basic structural elements of an EMS focusing on five major components set by the ISO 14001, based on a simple “plan–do–check–act” framework as shown in Fig.1:

- Establish and adopt an appropriate environmental policy which includes a commitment of prevention of pollution to the organization.
- Identify all the environmental aspects of a facility’s operations, policy and legislative requirement to determine priorities and objectives for environmental improvement and establish a set of programs to implement those.
- Develop a system including a clear structure of accountability and responsibility for environmental management, an environmental planning throughout the all of the organization’ activities, training programs for improving the environmental awareness and competence for all employees and appropriate communications with relevant internal and external parties to establish an EMS.
- Create a system to check and correct action including monitoring and measurement, reporting non–conformance, correcting and preventing action, recording information with regard to environmental management and EMS audits.
- Build a management review process in order to identify the resulting of environmental performance, reassess the suitability; effectiveness and adequacy of the EMS and improvable aspects of the system (Rondinelli & Vastag, 2000).

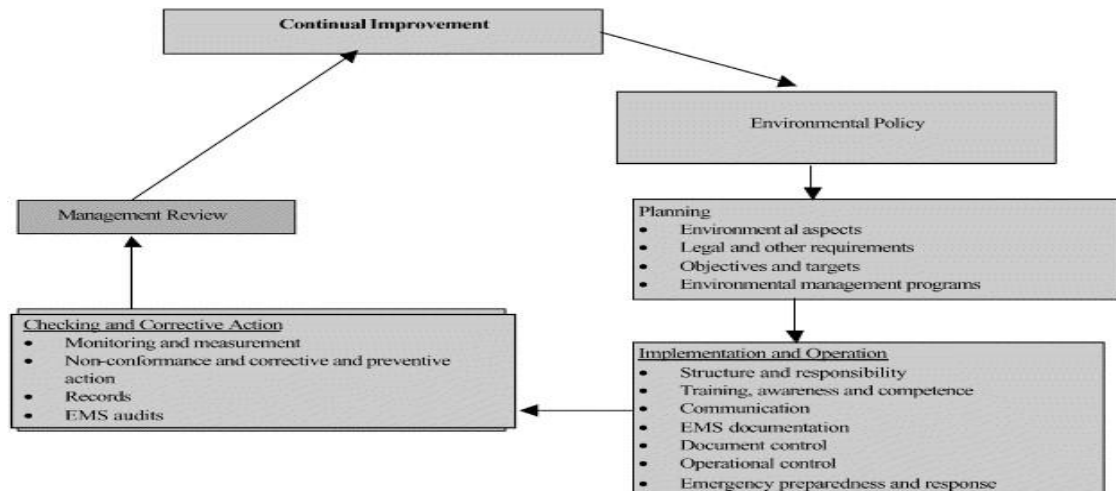


Fig.1: Environmental management system model Source: Adapted from Ritchie and Hayes, [2, p. 20] (Quazi et al., 2001).

2.2 Motivation of adoption of EMS

Although ISO14001based EMS is not a legal requirement for corporations, ISO14001 based EMS has been extensively adopted by numerous firms. Until 2013, the ISO14001 has been accepted by 250,000 thousand organizations as a dominant standard (Halila & Tell, 2013). There are many researchers analyzing the motivations of corporate executives to adopt ISO 14001 based EMS.

The most common external driver for implementation of EMS's in companies is improvement of corporate image. With the increasing public concern of environment, environmental performance of enterprise is being seen as an important element to affect corporate image for all companies around the world. The research of the International Institute for Sustainable Development pointed out the public corporate image of social responsibility can be assisted by adopting an EMAS registered- or ISO14001-certified EMS (Morrow & Rondinelli, 2002). A significant motivation for implementation of an EMS's and ISO certification is improvement of corporate image among consumers, investors and the surrounding communities affected by environmental externalities (Barla, 2007).

Another essential external factor for adoption of EMS's is compliance with government regulation. For example the direct incentives from governments for adoption of EMS and ISO certification serve as a motivation. In some cases, extensively and voluntarily adopting environmental certification in an industry

could be regarded as a proactive action for more strict regulations (Barla, 2007). An investigation of 50 private and public organizations analyzed the main reason why 89% of the publicly corporations and 67% of the private companies develop EMS as environmental projects, and the result indicates that to satisfy their parent organizations in the United States is the contributory factor . Seeking EMS certification is strongly driven by the anticipation of improvement of regulatory compliance or obtaining regulatory benefits (Morrow & Rondinelli, 2002).

Market pressure from external stakeholders such as customers, competitors and suppliers is also an effective driver for adopting of ISO 14001–certified EMS. The study by Bansal and Howard classified the drivers for corporate environmental sustainable development, giving a direct indication that the market drivers are mostly from external pressures which are directly affecting the competitiveness of the corporation (Zutshi & Sohal, 2004b). As an example, SGS–Thomson Microelectronics, which is a global semiconductor company, adopts both ISO14001 and EMAS (Environmental Management and Auditing Scheme) in order to maintain their competitive position in the United States, even in Europe and to ensure that their suppliers and contractors also operate in an environmental responsible ways (Morrow & Rondinelli, 2002).

Moreover, cost reduction is internal reason for companies seeking the certification of ISO14001. Advocates of ISO14001 claim that improvement of efficiency and reduction of costs in energy, materials, fines and penalties can be brought by adoption of pollution prevention programs and throughout implementation of EMS (Morrow & Rondinelli, 2002). In order to achieve the balance between environmental object and the primary goals of companies, the ISO14001–certified EMS as an international instrument has been chosen by most enterprises. The pervious study state that through ISO14001, companies can achieve the environmental objectives and cost reduction which means reduction of environmental impact, improvement of operational efficiency and effectiveness provided by ISO14001 (Nishitani, 2009).

The reduction of liability risks also works as an internal motivation for companies to implement the ISO14001 based EMS. The evidence of the studies by Anton et al. and Khanna and Anton argue that companies with a large number of Superfund sites (a proxy for liability cost awareness) have more attempts to adopt comprehensive EMS in US (Barla, 2007). The Proponents of ISO14001 strongly support that a certification of international standard can

assist the shareholders, government regulatory agencies, insurance companies, and financial institutions to evaluate corporations' environmental performance in order to reduce risks (Morrow & Rondinelli, 2002).

In addition, there are also other motivations of implementation of ISO14001 based EMS such as the responsibilities for environment from highly environmental companies. Based on the interview of 214 manufacturing companies' executives in Pennsylvania by Florida and Davidson, the most important motivation is the responsibilities for environment in highly EMS adopted companies (Morrow & Rondinelli, 2002).

To conclude, through the analysis of previous studies and researches, the main motivations for adopting ISO14001-certified EMS can be categorized into external aspect which includes improvement of corporate image, regulatory compliance, market pressure from external stakeholders and internal aspect consisted of cost reduction and reduction of liability risks.

2.3 EMS in China

China as the largest developing country in the world has rapidly developed since adoption of the reform and opening policy in 1978 and nowadays has already become one of the 10 largest economies. But with this highly economic development, China has serious issues on environmental aspects, such as overexploitation of ground water, generation of solid and industrial wastes, destruction of the ecosystem, and other problem related to land, water, and air (Zeng, Tam, Tam, & Deng, 2005b). The condition of natural environment in China has already become one of the most serious global concerns. The recent researches show that China is the largest emitter of greenhouse gasses (McGuire, 2014), and China has already become one of the most endangered urban and rural environment in the world (Zeng et al., 2005b).

Fortunately, Chinese government has paid significant attention to tackle those environmental issues and enacted laws on environmental protection. Since the 1980s, several environmental laws have been polished by Chinese government including the ratification of Environment Protection Act, Water Pollution Protection Act, Air Pollution Protection Act, Solid Wastage Pollution Protection Act and Noise Pollution Protection Act. Those regulations bring the instructions for companies to strengthen environmental protection (Zeng et al., 2005b).

Moreover, Chinese government has taken further steps to finance state-owned large and medium-sized corporations in technological overhaul in order to reduce environmental pollution, and shut down many small-sized companies which only has obsolete technology and equipment (Zeng et al., 2005b).

Since the launch of the ISO14000 series in 1996, the ISO 14001 certification as one of the most popular ways for demonstration of environmental friendly has been obtained by numerous organizations. The ISO 14001 is rapidly accepted in China, until 2012 there are 91,950 certifications issued in China. Nowadays China has become the largest adopter of ISO14001 in the world (McGuire, 2014). The adoption of ISO 14001 is strongly encouraged by the Chinese government (W. Zhang, Wang, & Wang, 2014).

Based on the result of pervious analysis of the main motivations for the implementation of environmental management in Chinese corporations, there are two main drivers pointed out by most scholars: Firstly, the pressures from stakeholders such as customers, competitors, suppliers and investors especially from international market are the one of the main motivation for implementation environmental management. The companies adopt ISO14001 in order to satisfy the customers who prefer green products to achieve more benefits and ISO14001certification also helps to overcome the green trade barrier set by the developed countries and establish cooperative relationship among multinational companies to achieve an increasing export trade (He, Liu, Lu, & Cao, 2015b). The previous researches by Qi et al. claimed to fulfill the international market demand is found to be the major motivation for obtaining the ISO14001 certification in the construction industry in China and the ISO 14001 certification is not only a facility to improve environmental behavior of company but also a signal of higher environmental performance to their customer (Qi et al., 2011b). The similar research about environmental management of companies in Wujin County located in the most developed area in China indicates that pressure from community, customers demand and the international supply chain purchasers are the most effective drivers for the implementation of environmental management in companies in this region (B. Zhang et al., 2008). The survey of 108 Chinese corporations including five different categories of the ownership which are joint venture, state-owned, sharing holding, private and others, analyzes that 52% of the enterprises have chosen access to the international market as first and second motivations. The respondents from joint ventures claim that because their products are export

oriented, EMS for their enterprises is more important than those enterprises focusing on domestic market (Zeng et al., 2005b).

Secondly compliance with the regulation of Chinese government is another essential driver for adopting ISO-14001 certified EMS. With the great attention from Chinese government to environmental protection and compulsory environmental inspections on companies, the incentive of Chinese companies to adopt the ISO14001 standard is environmental regulatory compliance and governmental environmental inspection (He et al., 2015b). In fact, according to the Statistics, till the end of 2002 all national companies with the ISO14001 certification had closer relationship with government agencies. The ISO14001 certifications are employed as instrument not only to develop the export-led economy, but also to help those stagnant state-owned corporations (Fryxell, Chung, & Lo, 2004a). The study of motivations for 128 firms with ISO 14001 certification in Beijing, Shanghai and Guangzhou claims that the ISO 14001 certification has a positive influence on complying with government regulation. Most of companies paid more attention to the regulation compliance rather than improvement of other aspects. This indicates that Chinese firms with ISO 14001 certification consider ISO 14001 certification as a signal to government (McGuire, 2014). Moreover, for the companies with the ISO 14001 certification may get financial subsidies and technical support from the local government (He, Liu, Lu, & Cao, 2015)

In short, the ISO14001 certification as the most popular international standard is adopted by numerous enterprises, and China has the largest number of certified corporations in the world. In general the main drivers of the implementation of ISO14001 based EMS can be categorized into two aspects including market and regulatory drivers. The foreign customers and international supply chain, purchasers' demand, governmental regulations and support, as well as increasing public environmental awareness are the main motivations for implementation of ISO 14001 based EMS of most Chinese corporations.

3: The positive influence of EMSs on corporate performance

3.1 Corporate environmental performance and Business performance

There is long-lasting controversy concerning the impact of environmental performance on firm performance. Some researchers claim that the environmental performance of company does not link with its financial performance and has negative influence on financial performance. However numerous empirical studies indicated that corporate environmental performance has positive influence on the corporate operation efficiency, reduction of corporate operation risk, and improvement of corporation's reputation (Qi et al., 2014).

In recent years, the stakeholders such as governments, non-governmental organizations, local communities, consumers, trading partners, employees, investors, financial agencies, and stockholders of companies are aware of corporate environmental management, especially in developed countries (Iwata & Okada, 2011). The employees, suppliers, competitors, community, government agencies, non-government organizations (NGO) and any other interested parties are identified as a part of organizations EMS stakeholders (Zutshi & Sohal, 2004a). According to the stakeholder theory, the stakeholders of an organization can influence organization's performance or be influenced by organization activities. Furthermore the strategic management theory pointed out the success of an organization based on its management of its stakeholders, is achieved by creating value and satisfying their needs and expectations (González-Benito, Lannelongue, & Queiruga, 2011).

Based on the classification by Buysse and Verbeke, the pressures of environmental are proactively exerted by regulatory stakeholders (public authorities, industry or trade associations), internal primary stakeholders (corporate headquarters, shareholders and investment funds, management employees, non-management employees, labor unions), external primary stakeholders (household consumers, commercial buyers, suppliers of goods and services, banks and other lenders), and secondary stakeholders (environmental groups or organizations, neighborhood/community groups and organizations) (González-Benito et al., 2011). The most obvious external stakeholders associate with environmental issues and coercive pressures are regulatory bodies and government. Corporations obey the regulations of the government in order to relieve the threat of government legal action, penalties and fines. In addition,

the weak relation with regulatory stakeholders made enterprises more vulnerable to the individual or class action lawsuit which will have negative effect on the public image and customer reputation of organization (Sarkis, Gonzalez-Torre, & Adenso-Diaz, 2010). Moreover, the environmental performance of supplier has become an important criterion in selection for organization. More than 65% of the respondents regard ISO 14001 certification as requirement or considering requirement for their supply chain in the survey of ISO 14000 Information Centre which indicated the significance of suppliers' adoption and registration of ISO 14001 (Zutshi & Sohal, 2004a). Other external stakeholders such as environmental groups, neighborhood groups, the media and labor unions can persuade public and pressure enterprises to implement proactive environmental management. Under this circumstance, the good relation with community stakeholders has been seen as "social license" in order to get more competitiveness than their competitors (Sarkis et al., 2010).

3.2 Positive influence of EMS

Many previous studies indicated that there are positive relationship between EMS and corporate environmental performance. For example, the research in the metal industry pointed out the ISO 14001 has positive influences on safety of worker, emissions and energy consumption reduction (Radonjic & Tominc, 2007). Another study in the pulp and paper industry identified that the enterprises with the ISO 14001 certification have better performance on the reduction of biological oxygen demand (BOD) and total suspended solids (TSS) (Barla, 2007). The survey on ISO 14001 certified firms in the automotive sector not only indicates that there are improvements in the environmental performance such as resources usage and water emission but also suggested that the increasing corporation commitment on environmental aspects can be led by the implementation of EMS (Comoglio & Botta, 2012). Moreover there are many ways to classify the benefits of EMSs implementation. The author studied EMSs and the smaller enterprises, then categorized the benefits made by EMS implementation into internal benefits which include the organizational, financial and people benefits, and external benefits such as commercial and environmental benefits (Hillary, 2004). Another study focused on ISO 14001 certification in Brazil and distinguished the benefits as four groups—productivity, financial, market and societal benefits (Gavronski, Ferrer, & Paiva, 2008). Moreover, the research by Link and Naveh (2006) stated that the benefits

of EMS implementation can be divided by environmental performance and business performance. To summaries literature review of previous studies, many common benefits of EMS implementation can be identified. This article employs the way that the benefits of EMS implementation on environmental performance and business performance are classified.

3.3 Positive influence of EMS on environmental performance

According this definition of ISO 14001 certificated EMSs by the International Organization for Standardization:

“An Environmental Management System (EMS) is a structured approach to addressing the environmental bottom line. ISO 14001 is the world's most recognized EMS framework ... that helps organizations both to manage better the impact of their activities on the environment and to demonstrate sound environmental management.” (Gavronski et al., 2008)

The EMSs have been generally seemed as a tool to manage environmental issues within companies. The obvious benefits generated from EMS implementation reflect on environmental performance of corporations and are analyzed by various literatures. Furthermore the study which is focusing on the connection between environmental performance and EMS identified the definitions of environmental performance in two different categories. One of these definitions is focusing on the index fingers about usage of resource, waste generation and consumption of emissions or water in operational performance. Another definition refer environmental benefits which can be led by complying with government regulations, reduction of waste, cost savings and competitive advantage from implementation of EMS (Nawrocka & Parker, 2009b).

According to these two different definitions of environmental performance, there are four main positive influences on environmental performance. The first obvious impact is the material savings through the implementation of EMSs. This influence can be achieved by better waste minimization and materials recycling processing, saving from usage of electricity, water, gas and raw materials recycling (Zutshi & Sohal, 2004b). For example, Ford Motor Company reports that through implementation of the EMS, Ford reduced almost 757,000 liters daily water consumption, improved the rate of returnable packaging

process from 60% to 99% and eliminated their production of boiler ash (Morrow & Rondinelli, 2002).

The second impact is the reduction of operating cost brought by EMSs implementation, which contributes to energy savings, reduced storage and handling of material costs, reduction of packaging costs and lower insurance costs (Petroni, 2001). The survey which analyzed the results of 116 manufacturing corporations in the United States showed that the implementation of ISO 14001 certified EMS had positive and important influence on the efficiency and effectiveness in all aspects of performance except operational lead times. Those companies which achieved certain level of certification have more responsibility on environment and more efficient operation process (Morrow & Rondinelli, 2002).

The third impact is the reduction of environmental management costs. This reduction can be generated from waste disposal costs, environmental liability, fines and penalties (Petroni, 2001). The experiences of EMS implementation in the Honda Transmission Manufacturing of America facility in Ohio indicated that the rate and associated costs of environmental and safety incidents have been reduced. Furthermore, the improvements of waste production, wastewater generation, recycling, lighting control, reusable packaging process and energy consumption also can be introduced by the implementation of EMS (Morrow & Rondinelli, 2002).

The last impact is the improvement of working climate. This can be reflected on the enhancement of employees' environmental awareness and their own responsibility for environment (Petroni, 2001). The increasing employees' environmental awareness as most remarkable improvement is identified by the study of Alcoa's Mt. Holly plant. The waste management activities in many departments are encouraged by the employee train programs in order to enhance their employees' own responsibility of environmental improvements (Morrow & Rondinelli, 2002).

Overall, there are four aspects of positive influence on environmental performance can be led by EMSs implementation including material savings, reduction of operating cost, reduction of environmental management costs and improvement of working climate.

3.4 Positive influence of EMS on business performance

The implementation of EMS not only has positive influence on corporate environmental performance but also encourages the improvement of corporate business performance. An empirical analysis of the effects on companies' economic performance of Implementing EMS pointed out beside the influence on environmental performance of corporations, the positive impact such as enhancement of companies' public image and reputation, better market competitiveness due to the increasing satisfaction of customers and improvement of production processing through participation of employees and process innovation also can be contributed by EMSs implementation on business performance (Nishitani, 2011).

The goal of business performance is to maximize the profit and to be responsible for the responsibilities of organizations to their shareholders. Moreover the business performance may comprise of market performance and financial performance by pervious researches (Yang, Hong, & Modi, 2011). Market performance is the corporation capacity for fulfilling the customer demands and an assessment of effectiveness of the marketing function. With the increasing environmental requirements from final customers and better recognition of environmental certification by public, environmental management such as ISO 14001certificated EMSs may be a new approach to improve the market performance of corporation (González-Benito & González-Benito, 2005). Financial performance can be identified as significance financial profits generated from business activities. There are many other uncertain elements involved, but competitive advantage which is led by proactive environmental management can be considered as a corporate financial improvement (González-Benito & González-Benito, 2005).

The first influence is on the improvement of corporate market position both in International and domestic markets. With the increasing registration of ISO 14001which is forced by international market demands, the ISO 14001 registration is not only as legal instrument to compliance with multinational trade agreements, but also helps corporation to prevent from multiple permits, registrations and inspections in order to access international trade. Beside the international market demands, ISO 14001 may become the precondition to assist corporations in fulfilling domestic customers' requirements for international environmental standards (Petroni, 2001). Especially the foreign customers are an essential stakeholder group which is promoting the ISO 14001

registration, demonstrating that foreign customers prefer the suppliers with the ISO 14001 certification more in the participation of their global supply chain (Nishitani, 2010).

The second influence is on the improvement of enterprises' image and reputation. This influence can be brought by environmental liability exposure reduction which contributes to approval from regulators and more opportunities to participate in government projects and international scientific committees. Efficient communication with customer about environment friendless allows companies to have better perception about their own product and operations, and a favorable relationship with companies shareholder and other investors especially on obtaining of business loans and debt from those financial institutions which employs ISO 14001 certification to measure the environmental performance of companies (Petroni, 2001). This influence also can be introduced by reduction of pressure from secondary stakeholders such as non-governmental organizations and social group. The proactivity environmental management is commonly found in companies which face higher pressures from community stakeholders and the certification as a symbol of environmental conscious for companies to the public (Castka & Prajogo, 2013).

The third influence is on the improvement of customer satisfaction. ISO 14001 certification not only encourages improvement the quality of company's products but also serves as third party verification to guarantee this for public (Petroni, 2001). With the circumstance of increasing customers' need for visible signal of friendly environmental management, there is an increasing customers' concern about the quality of the natural environment in their purchasing decisions, the ISO 14001 certification has been deemed as a reliable environmental protection signal to consumers, especially when the two parties are physically distant (Qi et al., 2011b).

EMSs also have positive influence on the improvement of operational processes. This influence is due to the improving usage of raw materials, improvement of safety and the increased participation of employees (Zutshi & Sohal, 2004b). IBM points out the environmental awareness and environmental activities participation of employees and contractors can be improved by registration of ISO 14001 certification. The ISO 14001 certificated EMS has been seen as disciplined tolls to evaluate their value in order to achieve the consistent and effective corporate environmental management and create chances of continual improvement (Morrow & Rondinelli, 2002).

The last influence is on the improvement of risk management in practices. This improvement is mainly reflected on the compliance with regulations. As a widely accepted system by governments, the implementation of EMSs not only maintains corporations' regulatory compliance ability, but also improves corporations' compliance management procedure (Petroni, 2001). As consequences of violating an environmental regulation or environmental accident, companies not only have to pay fines and penalties from governments, but also may face the risks of losing trust and reputation or boycott of goods. Those risks obviously have negative impact on the companies' business performance and evaluation of a firm's future profits (Iwata & Okada, 2011).

To summarize, the five positive influences of EMSs implementation on business performance which are improvement of corporate market position, enterprises' image and reputation, customer satisfaction, operational processes and risk management.

3.5 Positive influence of EMS on Chinese enterprises

As mentioned before, the main motivations for implementation of ISO14001 certified EMSs in Chinese enterprises are the pressures from stakeholders such as customers, competitors, suppliers and investors especially from international market and compliance with the regulation of Chinese government. Obviously, the implementation of ISO14001 certified EMSs has positive influence on those aspects of Chinese enterprises. The main positive influence of EMSs implementation in Chinese enterprises can be categorized into the improvement of competitiveness and regulation compliance of Chinese enterprises.

First, the ISO14001 certificated EMSs have positive influence on competitiveness of Chinese enterprises especially in international market. China is the largest manufacturer in the world and has been identifies as the "workshop of the world" by many analysts. The range of products covers 10 manufacturing sectors such as toys, televisions, textiles and clothing, footwear, iron and steel, and the fourth-largest exporter in the world (Yeung & Mok, 2005). The reason why most of export-oriented Chinese manufacturing companies certificate international standards such as ISO is to fulfill market requirements in order to enhance and maintain their competitiveness in international market which can be supported by the interview of presidents and managers in 22 manufacturing companies located in Guangdong and Zhenjiang provinces (Yeung & Mok, 2005). It is

reasonable to believe that the ISO14001 certificated EMSs as a permit to assist Chinese enterprises with more competitiveness in the global market.

Another positive influence on business performance of Chinese enterprises can be found in terms of regulation compliance. It is different from the ISO14001 as voluntary standard in Western countries. This international standard is highly recommended by Chinese government as a major policy instrument for Chinese enterprises, especially for state-owned enterprises (Fryxell et al., 2004a). The ISO 14001 certification can act as a signal for environmental regulation compliance in order to reduce the government inspections and enhance the opportunities of obtain financial subsidies and technical support by local government (He et al., 2015a). It is obvious that those underlying benefits are brought by ISO14001 certificated EMSs implementation, thus having positive impact on daily operation of enterprises.

Furthermore, a similar survey which considered the five benefits of ISO14001 certification such as the improvement in internal operations, corporate management, marketing effects, supplier relations and cleaner production, which meanwhile covered different forms of Chinese enterprises such as joint venture, state-owned, sharing-holding, private and other certified enterprises, analyzed that with regard to improvement in internal operations, the environmental management standardization and environmental awareness improvement has been chosen by 50% and 39% of respondents. For the corporate management, more than half of respondents believe that the improvement of resources saving and waste reduction are the main benefits in this aspect. In the aspect of marketing effects, improvement of corporate image and confidence from customers are highly considered as benefit from ISO14001 certification by most respondents. Moreover, in terms of supplier relations, the enhancement of suppliers' environmental awareness is chosen by respondents as the most important benefit. For the last cleaner production aspect, 81% of respondents agree that there is an obvious improvement on cleaner production of corporations (Zeng et al., 2005b).

4. Barriers of EMSs implementation in Chinese enterprises

Although the implementation of EMSs has positive influence on enterprises' corporate performance including environmental performance and financial performance, there are several barriers in the EMSs implementation. The barriers for the environmental management process can be categorized as industrial barriers (including instance technical information, capital costs, configuration of current operations, competitive pressures and industry regulations) and organizational barriers (such as instance employee attitude, poor communication, past practice and inadequate top management leadership) (Zutshi & Sohal, 2004b). Similar research pointed out the expected human and financial resources are the main barriers for implementation of EMSs (Hillary, 2004). In China, The unclear financial benefits and increasing short-term costs along with the shortage of resource and capability are the key barriers for proactive implementation of environmental management in Chinese manufactures (Zhu & Geng, 2013). The research indicated that the major barriers for environmental management implementation in Hong Kong construction industry lies in increase in management cost, lack of trained staff and expertise, lack of sub-contractor, lack of client support and time-consuming for improving environmental performance (Shen & Tam, 2002). The another study of EMSs in the hotel industry in Hong Kong stated that the top three barriers for EMSs implementation are respectively implementation and maintenance costs, lack of both professional advice as well as knowledge and skills (Chan, 2008).

The cost of adopting EMSs is commonly considered as the first barrier for the implementation of EMSs. The adoption of this system will bring the high cost of capital and of environmental investments which includes the auditors' fees, documentation preparation time and cost of regulation compliance. Moreover, the expected benefits to make up for those costs such as pollution reduction, improvement of corporate image and new contracts cannot always be brought by the implementation of this system (Post & Altman, 1994). Normally the investment in order to obtain the ISO14001 certification ranges from 50000 to 100000 Euro which is determined by size and branch of the industry. Furthermore, the degree of 'pre-standard' of environmental management is also regarded as a factor that influences this investment. For example, the companies that already have experiences on standardized management systems such as ISO 9000 series will reduce the set up cost and can implement EMSs more easily. By contrast, those without such experiences on this area have to invest more in order to fill the gap and meet the requirement of EMSs (Steger,

2000). A previous study pointed out the implementation and maintenance costs of EMSs are main barrier acknowledged by most hotels in Hong Kong, for the main reason that the implementation and maintenance of EMSs may lead continuous costs and even a financial liability to hotels, which contributes to the unimplemented of EMSs in most hotels (Chan, 2008).

Corporation culture is an important aspect to determine the effective of EMSs implementation in enterprises. The attitudes of top management is an important element which determines the stop or start of implementation of EMSs in SMEs, but the corporate attitudes and company culture in SMEs are normally negative towards EMSs (Hillary, 2004). SMEs (Small and medium enterprises) normally just have limited human and financial resources and have difficulties attracting new capital, as most SMEs are short-term orientation whereas the investments of environmental practices have long term influence. However, SMEs hold the opinion that environmental responsibility does not have positive influence on their business but the lead to extra costs (Granly & Welo, 2014). The result of survey about the factors affecting implementation of EMSs in China indicates that the first factor is environmental consciousness of top leader and middle management. Environmental consciousness of top and middle management, one of seven essential factors, to a large extend, affects an effective proactive environmental management in companies. In fact, the EMSs implementation would not be successful without the support from top and middle management (Zeng, Tam, Tam, & Deng, 2005). Rooted with the local business culture in Hong Kong, the contractors only focus on the costs and benefits around short term results but often ignored the value of the potential benefits which will occur in the near future (Shen & Tam, 2002). Moreover, the essential prerequisites of effective environmental protection are legal system and legal enforcement. Although Chinese government already has made large improvement on the laws of environment protection, the stringency of legal enforcement still is not strong enough in China, especially when the local government has direct interest on the local companies, those companies which are violating the environmental laws usually are not to be punished (Zeng et al., 2005).

Lack of human resources is another barrier for EMSs implementation. With the decrease of the company size, lack of human resources and multifunctional nature of staffs is increasing, lack of knowledge and expertise on environmental issues and the low awareness of positive influences brought by the environmental practices are accompanied by companies' staffs' unwillingness of spending time on the tasks that are not involved in the daily activities (Granly &

Welo, 2014). The internal barrier is lack of employees and top management's environment commitment. The less communication, trainings, qualifications and indeterminate environmental responsibilities in human resources are the internal difficulties for implementation of EMSs (Poksinska, Dahlgard, & Eklund, 2003). Well defined responsibility on environmental management is another aspect for EMSs implementation. The relationship between responsibility, right and benefit have not been well defined in the traditional planning economy system in state-owned Chinese companies, as they only have a few formalized reward programs in order to improve the awareness of employees on environmental issues (Zeng et al., 2005). The absence of particular organizational department or insufficient organizational structure also is an internal barrier for implementation of EMSs. Environmental protections practices function well in the organizations which have adequate structures and environmental commitment throughout all levels of the organization (María Luz Martín-Peña, Eloísa Díaz-Garrido, 2014). The lack of professional advice is another barrier for EMSs implementation. The hotels which are without professional advice may cause the misunderstanding of EMSs standards such as many guidelines of ISO standards, and those hotels do not have relevant knowledge and skill to formulate standards in order to implement EMSs based on their own organizational culture (Chan, 2008).

5. Conclusion

With the increasing concern about corporate environmental management by the public, the ISO 14001 certificated EMS's is widely adopted by numerous enterprises around world as proactive way in order to improve their environmental performances. China as a one of the 10 largest economics, the rapid economic development has brought serious environmental pollution in China. The ISO14001 certification is also extensively accepted by most of Chinese enterprises after Chinese government established the ISO14001 certification system in 1997 and China already becomes the largest adopter of ISO14001 in the world.

At the beginning, this paper has generally defined EMSs, introduced ISO14001 standard and provided five basic structural elements of an EMS based on the ISO14001 certification through literature review. Moreover, this paper analyzed the main motivations for implementation of EMS's in companies both in international level and in China. At the international level, the main motivations for adopting ISO14001-certified EMS can be categorized into external aspect which includes improvement of corporate image, regulatory compliance, market pressure from external stakeholders and internal aspect consisting of cost reduction and reduction of liability risks. For Chinese enterprises, the main drivers of the implementation of ISO14001 based EMS can be categorized into two aspects including market and regulatory drivers. The foreign customers and international supply chain, purchasers' demand, governmental regulations and support, as well as increasing public environmental awareness are the main motivations for implementation of ISO 14001 based on EMS of most Chinese corporations.

Furthermore, this paper analyzed the positive influence of EMSs on corporate performance from three different aspects including the positive relationship between corporate environmental performance and business performance, the positive influence of EMSs both on environmental and business performance. Firstly, corporate environmental performance has positive influence on corporate business performance. To face the growing awareness of stakeholders such as governments, non-governmental organizations, customers and suppliers on corporate environmental management and according to the stakeholder theory and the strategic management theory, the stakeholders of an organization have significant influence on organization's performance, as fulfilling their stakeholders' needs and expectations is essential requirement for

a successful organization. Secondly, there is a positive influence of EMSs on environmental performance which can be reflected in four aspects including material savings, reduction of operating cost, reduction of environmental management costs and improvement of working climate. Moreover, there are also five positive influences of EMSs implementation on business performance which are improvement of corporate market position, enterprises' image and reputation, customer satisfaction, operational processes and risk management. At last, this paper pointed out the positive influence of ISO14001 certificated EMSs in Chinese enterprises which can be mainly categorized into the improvement of competitiveness and regulation compliance of Chinese enterprises.

Although the implementation of EMSs has positive influences both on corporate environmental performance and business performance, in the final part of this paper several barriers for implementation process of EMSs in Chinese enterprises has been mentioned. The cost of adopting EMSs, negative corporation culture on environmental issues and lack of human resources are indicated as the three main barriers for EMSs implementation by most literatures and Chinese enterprises.

6. Recommendation Policies

In order to overcome the main barriers of EMSs implementation which are mentioned before, there are several recommendations for the preparation and implementation phases of EMSs in Chinese enterprises.

In the preparation phase of EMSs implementation, the documentation which aims to provide the best practices procedures and systematic guidelines for all staff within the companies is one of the most essential procedures for implementation of ISOs such as 9000, 14000 series. In order to enhance the understanding of ISOs and efficiency of EMSs implementation, companies need to have internal trainings such as overview and awareness training, assessors training and pre-audit training which can be provided by consultants to get the workforce involved during the early stage and to reduce the transaction costs of ISOs implementation (Yeung & Mok, 2005).

In order to reduce the costs of EMSs implementation which is the main barrier for most companies, the cooperative implementation structure can be suggested as a way to reduce costs of EMSs implementation especially for the small and median size companies. Companies which have financial difficulties in implementing EMSs by themselves could establish or joint a cooperative to share the costs for EMSs implementation such as training cost (Seiffert, 2008). As for Lack of human resources, the managers of enterprises can establish a forum which is a network platform in order to help managers to tackle the difficulties in implementation of EMSs and to discuss work problems and solution based on a trust atmosphere (Halila & Tell, 2013).

Moreover, even though Chinese government's great attention on the environmental issues and ISO14001 certification is highly accepted by most Chinese enterprise, there are still needs of improvements including mandatory, encouraging and supporting policies for Chinese government in order to promote Chinese enterprises to adopted ISO14001 certificated EMSs which are identified by the study of Zeng, Tam, Tam, & Deng (2005). In the mandatory aspect, Chinese government not only has to establish a proper legal framework in order to connect the local regulations with national standards but also need to build a channel to address the public complaints. For the encouraging policy, Chinese government can provide soft loans or short term subsidies in order to help some Chinese enterprises to overcome the financial and technology barriers. When it comes to the supporting policy, Chinese government should

organize training courses of EMSs implementation in order to enhance the environmental awareness of the top management in Chinese enterprises and to employ the experience of those ISO 14001 certified companies to demonstrate the positive influence of EMSs implementation on corporate financial performance(Zeng et al., 2005b).

7. Limitations and future research propositions

The clearest limitation of this study is only focusing in one single country. The result of study is potentially influenced by some macroeconomic and cultural elements in China, because China is the largest manufacturer in the world and Chinese enterprises pay more attention on the international market.

Another limitation is related with the research methodology. Because the literature review is the only methodology used in this study, the findings in this study are based on the previous studies. Also some measures of business performance used in this study might include some subjective opinion from perceptions of managers.

Despite the positive influence of the implementation of EMS on the corporate performance, its impacts on the performance of enterprises in China still need more assessment. For the future studies, there is a need for more detailed assessments and statistics on the relationship among the implementation of EMS, the operation of industry and the environment for a better understanding of the level of EMS in China. Also with the rapidly adoption of ISO14001 certificated EMS in Chinese enterprises, evaluation of changes also can be addressed in the future researches.

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