

Determining Factors for ISO14001 EMS Implementation among SMEs in Malaysia: A Resource Based View

Goh Yen Nee

Abstract—This research aimed to find out the determining factors for ISO 14001 EMS implementation among SMEs in Malaysia from the Resource based view. A cross-sectional approach using survey was conducted. A research model been proposed which comprises of ISO 14001 EMS implementation as the criterion variable while physical capital resources (i.e. environmental performance tracking and organizational infrastructures), human capital resources (i.e. top management commitment and support, training and education, employee empowerment and teamwork) and organizational capital resources (i.e. recognition and reward, organizational culture and organizational communication) as the explanatory variables. The research findings show that only environmental performance tracking, top management commitment and support and organizational culture are found to be positively and significantly associated with ISO 14001 EMS implementation. It is expected that this research will shed new knowledge and provide a base for future studies about the role played by firm's internal resources.

Keywords—ISO 14001 Environmental Management System, Malaysia, Resource based view, SMEs

I. INTRODUCTION

CURRENTLY, there is an increase number of Small and Medium Enterprises SMEs showing interest in the implementation of ISO 14001 Environmental Management System (EMS). This implementation is determined by certain factors. Nonetheless, this promising number of implementation from SMEs showed that they are cognizant on its firm environmental impacts and simultaneously be determined to gain variety of benefits through the implementation of ISO 14001 EMS. Knowing the fact that SMEs is an important segment of the Malaysia economy constituting about 99% of total business establishments [1], it is indeed crucial to get more SMEs to join in the bandwagon.

However, the implementation of ISO 14001 Environmental Management System (EMS) among SMEs in Malaysia is still small (only 118 SMEs being certified with ISO 14001 as up to 2009). Hence, it is vital to explore the determining factors for ISO 14001 EMS implementation among the SMEs in Malaysia given that knowledge about the ISO 14001 EMS implementation in Malaysia are scarce. Consequently, this study present considerable knowledge in this area and provide a base for future studies about the significant role played by firm's internal resources as this are the resources which are

important to SMEs. This research aimed to fill in this gap by exploring the determining factors for ISO 14001 EMS implementation among SMEs in Malaysia from the Resource based view.

II. LITERATURE REVIEW

A. ISO 14001 Environmental Management System (EMS)

An Environmental Management Systems (EMS) is defined as “part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects” [2]. EMS is relevant to firms as it deals with environmental issues in a holistic way and encouraged continuous improvement of environmental performance [3]. Empirical research has identified a number of dimensions in which EMS can be measured. A research by [4] has identified ten dimension of EMS in which it can be measured. EMS can be measured by a written, detailed environmental policy, proactive environmental policy, establishment of quantifiable environmental objectives, monitoring environmental costs and benefits, establishment of roles and responsibilities with respect to environmental programs, documented procedures for EMS, appropriate training for employees, environmental audit on a regular basis, reassessment of EMS on a regular basis, employee remuneration and promotion based on environmental objectives [4].

B. Resource Based View

Resource Based View (RBV) has been selected as the underlying theory in this study. According to Resource Based View (RBV) firms' resources can be grouped into three categories namely physical capital resources, human capital resources and organizational capital resources [5]. Physical capital resources are liked equipment, physical technology, performance tracking and formal EMS structure [5], [6]. These are the resources which related to the hard resources of a firm [6]. Interpretively, environment performance tracking and organizational infrastructure are more akin to physical capital resources since they are related to hard resources i.e. building, underground tank, drainage and communication lines.

Human capital resources comprised of training, experience of employees, knowledge or intelligence of employees and its relationship [5]. Top management commitment and support served more as human capital resources as they represented vision and insight of managers in a firm. Training and education, employee empowerment and teamwork served to be a function of human capital resources. Organizational capital resources included formal reporting structure in a firm,

Goh Yen Nee is a Senior Lecturer at Graduate School of Business, Universiti Sains Malaysia, 11800, USM, Penang, Malaysia (phone: +604-6535294; e-mail: gohyennee@gmail.com).

informal relation among groups within a firm or between firms with those in the environment [5]. Recognition and reward, organizational culture and organizational communication falls into the category of organizational capital resources as it served as controlling and coordinating system and informal relations within a firm. All of the nine resources here are the unique organizational capabilities which helped a firm to achieve competitive advantage such as through successfully implementing ISO 14001 EMS.

III. RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

The model comprises of ISO 14001 EMS implementation as the criterion variable while physical capital resources (i.e. environmental performance tracking and organizational infrastructures), human capital resources (i.e. top management commitment and support, training and education, employee empowerment and teamwork) and organizational capital resources (i.e. recognition and reward, organizational culture and organizational communication) as the explanatory variables. These variables are chosen based on the support from previous studies and their suitability in the context of ISO 14001 EMS implementation among SMEs in Malaysia.

A. ISO 14001 Environmental Management System (EMS)

Previous studies have identified a number of factors which determine the ISO 14001 EMS implementation in business firms. For instance, previous researchers [7] have conducted a survey questionnaire among Spanish industrial companies has identified a range of factors which are critical for ISO 14001. It comprised of experience with other systems, personnel training, low cost, adequate planning, management involvement, organizational flexibility, interest from customers, positive influence on profits and support from the public sector.

B. Physical Capital Resources

Environment performance tracking and organizational infrastructure are categorized as physical capital resources given that they are related to hard resources i.e. building, underground tank, drainage and communication lines. The argument that environmental performance tracking is determining factor on ISO 14001 EMS implementation has been discussed and explained by a number of researchers such as [8], [9], [10] and [6]. Besides, [11] highlighted that for environmentally friendly activities to take place; infrastructure must be created by a firm. Noting these, it can be explained that for a firm to implement ISO 14001 EMS successfully, organizational infrastructure must be available and present. Thus, this research proposed the following hypotheses:

H1: Environmental performance tracking has a positive and significant relationship with ISO 14001 EMS implementation.

H2: Organizational infrastructure has a positive and significant relationship with ISO 14001 EMS implementation.

C. Human Capital Resources

Human capital resources comprise top management commitment and support, training and education, employee empowerment and teamwork. According to [12], top management commitment to environmental management has a significant relationship with environmental management. [13] argue that in order to ensure a well functioning ISO 14001 EMS, involvement and support from top management is essential. Additionally, [14] highlighted that employee training in EMS implementation will lead to success as the ISO 14001 EMS standard is more on 'human capital intensive'. [15] gave their support that empowerment of employees is a key factor in the ability to be successful and decisive during the EMS implementation. Researchers have given their support on which EMS teamwork is necessary, a precondition, a necessity of a successful EMS and are basically responsible for the management of the entire ISO14001 EMS [16]. Hence, this research proposed the following hypotheses:

H3: Top management commitment and support has a positive and significant relationship with ISO 14001 EMS implementation.

H4: Training and education has a positive and significant relationship with ISO 14001 EMS implementation.

H5: Employee empowerment has a positive and significant relationship with ISO 14001 EMS implementation.

H6: Teamwork has a positive and significant relationship with ISO 14001 EMS implementation.

D. Organizational Capital Resources

Recognition and reward, organizational culture and organizational communication falls into the category of organizational capital resources as it served as controlling and coordinating system and informal relations within a firm. [17] highlighted that firms which incorporate rewards for environmental improvement especially in their performance evaluation system can expect a greater level of ISO 14001 EMS implementation. [10] stated that the most effective way to get employees involve and working together is by linking the reward system to efficiency and waste management. [18] determined from their research that there is a relationship between organizational culture and performance of the organization. Through a case study conducted at University of Gävle, Sweden, [13] supported that communication is one of the important factors for ISO 14001 EMS implementation. Besides, [15] and [10] also noted that communication play an important role in ISO 14001 EMS implementation. Therefore, this research proposed the following hypotheses:

H7: Recognition and reward has a positive and significant relationship with ISO 14001 EMS implementation.

H8: Organization culture has a positive and significant relationship with ISO 14001 EMS implementation.

H9: Organizational communication has a positive and significant relationship with ISO 14001 EMS implementation.

Based on the review of the relevant literature and discussion on the Resource Based View, a research model is developed.

The variables chosen to be included are parallel with the objectives of this study and ensure that the progress of this study stay true to its main focus. Fig.1 illustrates the research model and hypotheses which provides the foundation of this study.

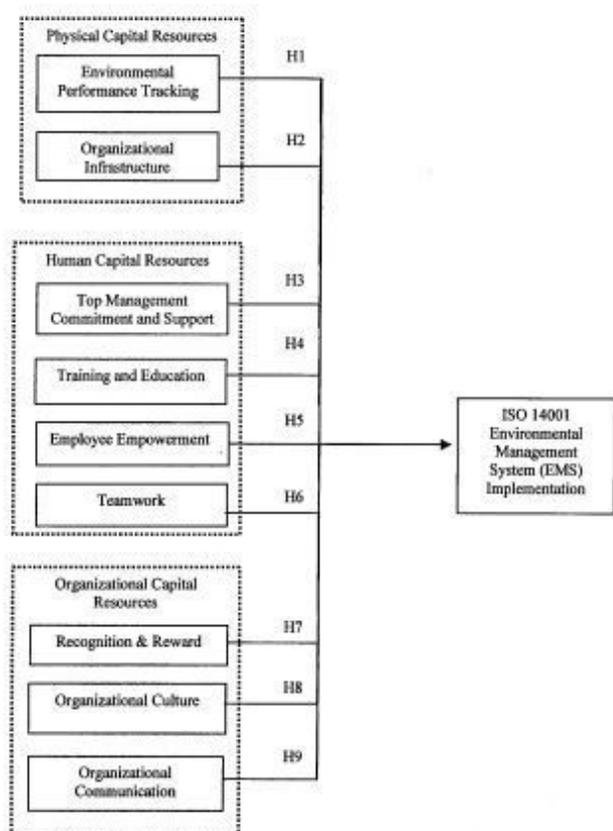


Fig. 1 Research Model

IV. METHODOLOGY

A. Sample and Method

A cross-sectional approach using survey was carried out to obtain quantitative data for statistical testing of the hypotheses. Self-administered mailed questionnaire surveys are employed in this study because of its advantage of obtaining response from a sample that is geographically dispersed, i.e. ISO 14001 EMS certified SMEs which are located throughout Malaysia. The unit of analysis in this study will be the individual firm. The term SMEs is defined as a manufacturing firm with 150 or fewer full time employees. The population of this study consists of all ISO 14001 EMS certified SMEs in Malaysia. This study used census as a method to obtain information from all the 118 SMEs certified with ISO 14001 EMS. Census is defined as a research study that consists of data about or from every number of a target population and may be the ideal approach for small populations [19]. Data collected was then analyzed using SPSS software version 18 where selected variables are subject to statistical analysis for data analysis and hypothesis testing.

B. Instrument

Table I described the overall measurement in this study. A five point Likert Scales ranging from Strongly Disagree (1) to Strongly Agree (5) is used to determine respondent's degree of agreement or disagreement that most closely reflects the current situation at their firm.

TABLE I
MEASURES AND SOURCES OF VARIABLES

No.	Variables	No. of Items	Sources
1.	Environmental Performance Tracking	6	Adapted from [6]
2.	Organizational Infrastructure	4	Adapted from [2]
3.	Top management commitment and support	6	Adapted from [20]
4.	Training and Education	6	Adapted from [21]
5.	Employee Empowerment	4	Adapted from [22]
6.	Teamwork	4	Adapted from [23]
7.	Recognition & Reward	4	Adapted from [21]
8.	Organizational Culture	5	Adapted from [24]
9.	Organizational Communication	5	Adapted from [24]
10.	ISO 14001 Environmental Management System	8	Adapted from [4]

V. RESULTS

A. Reliability

The reliability was checked by examining the Cronbach's α coefficient. As shown in Table II the values of Cronbach's alpha value ranges from 0.81 to 0.94 which is greater than the minimum value (i.e. 0.60) suggested by [25]. Therefore, it is concluded that the measured have acceptable level of reliability. To summarize, the construct from the questionnaires is suitable for measuring the instruments that mean to be measure. This showed that the instrument was sufficiently reliable and could consistently capture true score variability among respondents.

TABLE II
RELIABILITY COEFFICIENTS

Variable	Number of Items	Cronbach's Alpha
Environmental Performance Tracking	6	0.89
Organizational Infrastructure	4	0.86
Top Management and Commitment	4	0.87
Training and Education	4	0.81
Employee Empowerment	4	0.84
Teamwork	4	0.86
Recognition and Reward	3	0.82
Organizational Culture	5	0.91
Organizational Communication	3	0.86
ISO 14001EMS	7	0.94

Note: All variables used a 5 point Likert scales with (1= Strongly Disagree, 5=Strongly Agree)

B. Hierarchical Multiple Regressions

In order to test the hypothesis, hierarchical regression analysis is conducted. Experience with other ISO certification (dummy variable, D_otherISOcert) and firm size (dummy variable, D_size) are created and used as a control variable in this study.

TABLE III
 RESULT OF HIERARCHICAL REGRESSION ANALYSIS

	Dependent Variable: ISO 14001 EMS implementation	
	Model 1	Model 2
<i>Control Variable:</i>		
Experience with other ISO certification (Yes =1, No =0)	.26	.38
Firm Size (Small =1, Medium 0)	.72	.15
<i>Independent Variable:</i>		
Environmental Performance Tracking		.30*
Organizational Infrastructure		.15
Top Management Commitment and Support		.28**
Training and Education		-.03
Employee Empowerment		.10
Teamwork		-.01
Recognition and Reward		-.32***
Organizational Culture		.29*
Organizational Communication		-.04
F Value	.64	6.40***
R ²	.02	.59
Adjusted R ²	-.01	.50
R ² Change	.02	.57
F Change	.64	7.53***

Notes: ***p<0.01; **p<0.05; *p<0.10

Table III presents the hierarchical regression results of control variables (experience with other ISO certification and firm size) and all the 9 determining factors for ISO 14001 EMS implementation. The results showed that three variables are found positively and significantly associated with ISO 14001 EMS implementation, namely, environmental performance tracking ($\beta = .30, p<.10$), top management commitment and support ($\beta = .28, p<.05$) and organizational culture ($\beta = .29, p<.10$). On the other hand, recognition and reward ($\beta = -.32, p<.01$) is found negatively and significantly associated with ISO 14001 EMS implementation. The results also revealed that training and education, teamwork, employee empowerment, organizational communication and organizational infrastructure did not associate any significant relationship ISO 14001 EMS implementation.

Hypothesis 1 posits that environmental performance tracking has a positive and significant relationship with ISO 14001 EMS implementation. This study has proven that the relationship was positively and significantly associated with ISO 14001 EMS implementation. The result is consistent with case study research by [26] where organizations seek environmental benchmarking to compare performance both across industries and among their own facilities is essential to

move business leaders closer to implementing ISO 14001 EMS.

Hypothesis 2 posits that organizational infrastructure has a positive and significant relationship with ISO 14001 EMS implementation. The results, however, contradicted with the evidence from literature. One possible justification for this contradictory result may due to organizational infrastructure is physical assets that already available and present in the firm and it is not easy to move or change like employees (human capital resources) who is more flexible in term of their attachment to the firm (e.g. resignation). In view of that, it is rational to say that once the infrastructure are build and established for the building, drainage and tanks, it is most likely that there will not be any major changes in the short term (e.g. expand the building or widen the underground tank). As this is a cross sectional study, data is collected only at one point in time which might not give a clear picture on the significant relationship of organizational infrastructure on ISO 14001 EMS implementation. Therefore, it is likely to say that this might be the rationale which causes the relationship to be not significant.

Hypothesis 3 posits that there is a relationship between top management commitment and support and ISO 14001 EMS implementation. The result showed that the relationship was positively and significantly associated with ISO 14001 EMS implementation. This relationship is consistent with previous research by [27] who agreed that top management play important role in influencing the implementation and adoption of EMS.

Hypothesis 4 posits that training and education has a positive and significant relationship with ISO 14001 EMS implementation. The results contradicted in which it showed that training and education have a negative and insignificant relationship with ISO 14001 EMS implementation. One possible clarification for this conflicting result may due to during the early stage of EMS implementation, organizations will undertake extensive employee training. In view of that, it is believed that employee who goes through an extensive training and education might feel tired and lack of the motivation to work for the successful implementation of ISO 14001 EMS in the firm [28].

Hypothesis 5 posits that employee empowerment has a positive and significant relationship with ISO 14001 EMS implementation. The result from this study demonstrated that employee empowerment have a positive and not significant relationship with ISO 14001 EMS implementation. The result is contradicted with previous research. One probable reason for this inconsistent result may due to there are some other factor which influence empowerment and is not captured in this study which cause the results to be not significant. For instance, [29] have conducted a study on antecedents and outcomes of empowerment in which there are many factors influence empowerment. This factors can be grouped into individuals (i.e. tenure, age, gender, self-concept, locus of control, self efficacy and self esteem), group (i.e. leader

approachability, group effectiveness, worth of group, mutual influence and trust) and organizational (e.g. position in the hierarchy, organizational climate).

Hypothesis 6 posits that teamwork has a positive and significant relationship with ISO 14001 EMS implementation. However, the findings of this study portrayed otherwise with teamwork having a negative and not significant relationship with ISO 1401 EMS implementation. One possible justification for this inconsistent result is the size. [30] stated that a project team which is smaller in size will leads to greater cohesion amongst the members and improved the success of project implementation. In addition, [31] also stressed that a team with 10 or more members cannot perform high quality teamwork. Similarly, [32] commented that if there are more than 10 members in a team, team communication and coordination is obstructed. In this study, the higher number in the teamwork, the less likely that ISO 14001 EMS implementation will be successful may have been a result of the larger team size among the firms.

Hypothesis 7 posits that recognition and reward has a positive and significant relationship with ISO 14001 EMS implementation. The findings from this study showed that recognition and reward have a negative and significant relationship with ISO 14001 EMS implementation. One possible explication is that although firms give a very attractive reward system for employee but if there are no clear guidelines on what are the rewards and punishment imposed, the ISO 14001 EMS implementation will most likely to be not successful. This may also due to some of the reward system may encourage risk taking among employee in solving environmental issues. That is, the higher the risk, the higher the reward and may be the harsher is the punishment for mistakes make by the employee [33]. In similar vein, EMS in hotels also revealed that there is a negative influence between the employees' recognition and the implementation of environmental management practices in hotels [34].

Hypothesis 8 posits that organizational culture has a positive and significant relationship with ISO 14001 EMS implementation. The result was consistent with the evidence from literature. [17] highlighted that EMS requires culture transformation for successful implementation. [35] found out that organizational culture play a significant role in determining ISO 14001 adoptions. In addition, findings from the qualitative research by [36] identified that organizational culture played an important role for the ISO 14001:1996 implementation.

Hypothesis 9 posits that organizational communication has a positive and significant relationship with ISO 14001 EMS implementation. The results showed that organization communication have a negative and not significant relationship with ISO 14001 EMS implementation. The result is contradicted with the evidence from literature. One possible explanation for this inconsistent result is due to lack of open communication and active participation from lower level employees. As argued by [37] to achieve a successful

implementation of ISO 14001 will require commitment from employees where environmental responsibilities must be clearly defined and communicated to them. Distortion might happen if information is overload among the employees (e.g. ISO 14001 documentation, record and etc) and if insufficient time is given to them to implement ISO 14001 EMS if they themselves did not understands fully the underlying concept in ISO 14001 EMS.

VI. CONCLUSION

This study has addressed nine determining factors categorized in physical, human and organizational capital resources on the ISO 14001 EMS implementation among SMEs in Malaysia. Nine hypotheses were tested and only three hypotheses were supported in this study. This study demonstrated that organizational capital resources have an overriding influence on ISO 14001 EMS implementation. Recognition and reward and organizational culture have a significant relationship with ISO 14001 EMS implementation. This help to advance managers' understanding of the importance and values of these groups of resources on ISO 14001 EMS implementation. In brief the survey methodologies used in this study had several limitations. Firstly, the sample size is small where only 61 ISO 14001 EMS certified SMEs are used to run statistical test. It is strongly encourage testing the framework to a bigger sample size to perform an external validity by checking with other set of samples in order to strengthen the arguments. Therefore, the results of the study must be interpreted with caution. Secondly, since cross-sectional data are used in this study, it is incapable to validate the direction of causality as imply in the theoretical framework. As a result, conclusions concerning causality need to be done in cautious.

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Goh Yen Nee is a Senior Lecturer at Graduate School of Business, Universiti Sains Malaysia. She received her Master of Business Administration (MBA) from Northern University of Malaysia and a Doctor of Business Administration (DBA) from Universiti Sains Malaysia. Her research interest is in marketing, green marketing, consumer behaviour and environmental sustainability management.