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Determinant Factor of Environment Management Practices: A Theoretical Framework

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Abstract

Over the last 15 years, there is an increasing growth of customers and regulators requesting enterprises to adopt the environmental management practices (EMP) and this matter becoming an interest for researchers and practitioners. This paper will propose an integrated model that combines the Model of External Influences on Environmental Awareness and Practices (MEAP) and Technology-Organization-Environment Model (TOE), the two theories that are most often used in environment and innovation studies. In this paper, a model is erected to indicate the relationship between TOE model, MEAP model and EMP adoption.

***Key Words*:** *Technological, Organizational, Environmental, General Awareness, Cost Benefit Awareness, Environmental Attitudes, Environment Management Practices*.

Introduction

The foundation of several previous new technology and innovation adoption studies was based on the theoretical frameworks derived from Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA); Ajzen's (1985) Theory of Planned Behaviors (TPB); Davis' (1989) Theory of Acceptence Model (TAM); Rogers's (1983,1995) Diffusions of Innovations (DOI) theory; Gadenne's (2009) Model of External Influences on Environmental Awareness and Practices (MEAP) and Tornatzky and Fleischer's (1990) Technological-Organizational-Environmental (TOE) model. Some of these theories are able to explain the organization level of innovation adoption, while others focused on the individual acceptance of new technology.

Background

Environment Management Practices (EMP)

An EMP or EMS (Environment Management System) is a tool for an organization's managing their impacts activities toward the environment. It provides a structured approach to plan and implement

environment protection measures. An EMP monitors environmental performance; similar to the way a financial management system monitors expenditure and income and enables for an organization to checks regularly company's financial performance. An EMP integrates environmental management into a company's daily operations, long-term planning and other quality management systems (Chavan, 2005; Marimon Viadiu, Casadesús Fa, & Heras Saizarbitoria, 2006; Zutshi, Sohal, & Adams, 2008).

EMP is one of the tools an organization can use to implement an environmental policy (Ann, Zailani, & Wahid, 2006; Chan & Wong, 2006; Fuong, 2010; Harangzó, Kerekes, & Zsóka, 2010). EMP illustrates an extension of the core principles of total quality programs to managing the environment (Florida and Davison, 2001). In other words EMP can be described as the systematic application of business management to environmental issues (Florida and Davison, 2001). In particular it involves the formal system and database which integrates procedures and processes for the training of personnel, monitoring, summarizing, and reporting of specialized environmental performance information to internal and external stakeholders of the firm (Melnyk, Sroufe andCalantone, 2003). Notably, it consists of 'a number of interrelated elements that function together to help a company manage, measure, and improve the environmental aspects of its operations' (Welford, 1996 as mentioned in Delmas, 2002). The documentation of this "environmental" information is primarily internally focused on design, pollution control and waste minimization, training, reporting to top management, and the setting of goals (Melnyk, Sroufe and Calantone, 2003).

An EMP is aiming to develop, implement, manage, coordinate and monitor corporate environmental activities to achieve two goals: compliance and waste reduction (Sayre, 1996). Compliance, for a firm, simply means reaching and maintaining the minimal legal and regulatory standards for acceptable pollution levels for the purpose of avoiding sanctions. For instance, failure to comply can result in increased costs such as fines, in extreme situations, issuance of cease and desist orders, and in increased external intervention in day-to-day operations (Melnyk, Sroufe and Calantone, 2003). Apparently, waste reduction goes beyond compliance and focuses a firm's activities on the dramatic reduction of negative environmental impact (Melnyk, Sroufe and Calantone, 2003). EMPs, actually, represent an organizational change within corporations and a self-motivated effort at internalization of environmental concerns into the objectives of the firm (Khanna and Anton, 2002).

Technology-Organization-Environment (T-O-E)

Technology-Organization-Environment (TOE) framework of Tornatzky and Fleischer (1990) undertakes a generic set of factors to predict the likelihood of innovations adoption. The theory suggests that innovations adoption is influenced by technology development (Kauffman & Walden, 2001), organizational conditions, business and organizational restructuring (Chatterjee, Grewal, & Sambamurthy, 2002), and industrial environment (Kowtha & Choon, 2001). Technological context defines that adoption depends on the collection of technologies inside and outside the firm as well as the application's noticed relative advantage (gains), compatibility (both technical and organizational), complexity (learning curve), trialability (pilot test/experimentation), and observability (visibility/imagination). Organizational context apprehends firm's business scope, top management support, organizational culture, complexity of managerial structure measured in terms of centralization, formalization, and vertical differentiation and the quality of human resource (Jeyaraj, Rottman, & Lacity, 2006; Tornatzky & Fleischer, 1990). Environmental context conveys to facilitate and inhibited the factors in areas of operations. Substantial among them are competitive pressure, trading partners' readiness, socio-cultural issues, government encouragement, and technology support infrastructures (Al-Qirim, 2007; Jeyaraj et al., 2006; Scupola, 2003a, 2003b; Zhu & Kramer, 2005). The major problem of the T-O-E is that the theory is lack of the influences of behavioral, attitudes, awareness and benefits construct on technological and innovation adoption decision (Awa, Emecheta, & Ojiabo, 2012). However, integrating the T-O-E with other models such as the MEAP, with each theory

offering larger number of constructs than the original, provides finer theoretical lenses to the understanding of technological and innovation adoption behavior.

Model of External Influences on Environmental Awareness and Practices (MEAP)

Gadenne (2009) and Bansal (2000) believes that an external motivation or a third motivation for environmental responsiveness is individual concern (Gadenne, Kennedy, & McKeiver, 2009). Company owners may decide to adopt environmental-friendly processes and procedures regardless of whether they are required to do so by law, or whether they believe that the company profits will increase. Based on Theory of Panned Behaviour, individual behavior is believed to be affected by the beliefs and attitudes of the individual (Ajzen and Fishbein, 1980), and for others, management of the environment is an ethical issue. Usually those who are aware of environment issues and are concerned about the impact of their business on the environment will be more likely to act to reduce the impact of their business activities. Those who regard environmental management as an ethical issue tends to support environmental activist groups. Many companies involved in a combination of environmental activities, such as recycling, waste management or energy conservation without engaging in formal certification processes (Hillary, 1999) either because of moral concerns or because they see the economic benefits of such actions.

Various studies have reported that business owners are concerned about their environmental impact (e.g. Groundwork, 1995; Roberts et al., 2006; Tilley, 1999). However, empirical studies that relate attitudes to environmental performance have produced mixed findings. Schaper (2002) has found no relationship between positive personal environmental attitudes and positive environmental performance and Tilley's (1999) research also reported a gap between the attitudes of small business owners and their environmental behavior. However, Naffziger et al. (2003) and Gadenne et al. (2009) reported that managers with a high level of concern for the environment utilize more time and resources on environmental initiatives than those with a low level of concern.

According to Gadenne (2009), the mediating factor stage of the research design is to investigate the effect of environmental awareness and attitudes on environmental practices. These practices may be categorized as those relating to environmental systems, conservation, and support. The mediating factor will shows that the greater level of environmental awareness or cost benefits awareness in environmental management practices for an individual, the more likely they have a relatively higher level to adopt or implement the EMP (Gadenne et al., 2009). For the owner or a manager for the company that have positive environmental attitudes, the more likely they have a relatively higher level of environmental support services.

Integration of the Technology-Organizational-Environment Framework (TOE Framework) and the Model of External Influences on Environmental Awareness and Practices (MAEP)

Innovation involves of any practices that is new to organizations, including installment or upgrading new equipment, products, services, processes, policies, and projects (Ho & Lin, 2012; C. Lin, Ho, & Chiang, 2009; C. Lin & Ho, 2011; C. Lin, 2011). It is important to understand the organizations' adoption behavior and identifying the determinants of innovation by distinguishing the types of innovation (Ho & Lin, 2012). Among numerous classification of innovation advancement in the related literature, the concept of administrative and technical innovation is commonly used (Damanpour, 1991; Henriques & Sadorsky, 2007, 2008). Organizational structure and administrative processes considered as an administrative innovations since it is indirectly related to the basic work activities of an organization and is more directly related to its management. While technical innovation pertains to products, services, and production process technology and it is related to basic activities and can concern either product or process (Damanpour, 1991). As adopting environment management practices involves implementing new or modified processes, techniques, or systems to reduce environment damages, the adoption behavior can be

regarded as a technical innovation process (Henriques & Sadorsky, 2008). In a study of the US printing industry by (Rothenberg & Zyglidopoulos, 2007), they argued that the adoption of any environment management practices as a technical innovation process, because applying environmental management criteria into corporate operations might require exploring new resource combinations and deploying existing resources in new ways. Therefore, the adoption of environment practices for the logistics companies can be regarded as a technical innovation process.

Various researchers have analyzed environment management practice adoption from the perspective of technical innovation; however, little empirical research analyzes the influences of technological, organizational, and environmental factors simultaneously (Damanpour, 1991; Dou, 1999; Hoffman, Parejo, Bessant, & Perren, 1998; Worthington & Patton, 2005). (Del Brío & Junquera, 2003) summarizes factors that influencing the adoption of environment management innovation in small and medium sized enterprises, including financial resources, management style, human resources, manufacturing activity, technological approach, innovative capacity, and external cooperation. In a study of the printing industry by (Rothenberg & Zyglidopoulos, 2007), they found that the adoption of environment management innovations was positively associated with the dynamism of the company's task environment. (Henriques & Sadorsky, 2007) found out that total quality management and external stakeholder pressure would increase the prospect that Canadian manufacturing companies to adopt cleaner technical innovations. Positively, these studies provide an insight into the influences of certain environmental and organizational factors on environment management innovation.

Furthermore, various explanations as to what factors influence innovation can be found in the literature. Their findings are relevant for modeling environment management practice adoption from the perspective of innovation. Literature on innovation suggests that the external environment, the capabilities of the organization, and the nature of technology are three general factors affecting the adoption of technical innovations (Damanpour, 1991; Dou, 1999; Hoffman, Parejo, Bessant, & Perren, 1998; Worthington & Patton, 2005). All in all, the adoption of technical innovations is affected by technological, organizational, and external environmental contexts and it is suitable to introduce the TOE framework in this study (Ho & Lin, 2012; Jeyaraj et al., 2006; Tornatzky & Fleischer, 1990).

According to the TOE model, there are three areas that an organization uses to determine how to take advantage of the new technology relating to businesses, which can influence the process of adopting, implementing and using technological innovations (Al-zoubi, 2013; Tornatzky & Fleischer, 1990). These are technological factors, organizational factors and environmental factors. The technological factors refer to the existing as well as new technologies relevant to the company. These factors play a significant role in the company's adoption decision as it determines the ability of the firm to benefit from environment management practices initiative. Examples are reduced wastage, and increased trained workers. Organizational factors refer to descriptive measures related to organization structure, financial support, managerial beliefs and top management support. The environmental context focuses on the external factors that drive firms to adopt new technology such as competition and government incentives and regulations. Although the TOE framework is applied to several innovation implementation research, the framework is better to be intregrated with other models preferably the Model of External Influences on Environmental Awareness and Practices (MEAP), with several reasons.

Firstly the the constructs in the adoption predictors in TOE framework is only apply to large organizations (Angeles, 2013; Awa et al., 2012; Tornatzky & Fleischer, 1990). With the integration of TOE and MAEP, the propose framework is suitable to be apply for individual level (Martins & Oliveira, 2008; Oliveira & Martins, 2011).

Secondly, TOE framework is not aiming to offer a concrete model describing the factors that influence the adoption process; it is rather for classifying factors in their respective context (Ven & Verelst, 2011). With the integration framework from the MAEP model, contruct of MAEP will further the studies examining the intention behavior to adopt innovation towards environment (Kumar, 2012).

Thirdly, Henderson (2102) suggest that future researchers would reflect whether the significance of technological, organizational, and environmental variables change based on internally or inter-organizationally adoption (Henderson, Sheetz, & Trinkle, 2012).

Fourthly, Although the TOE framework covers the technological aspects and also explores their organizational and environmental contexts, its does not cover the perception and attitudes aspects on adopting the new technology (Wan Nur Syahida & Azwadi, 2013). With the construct from MAEP, the variables covers the perception and attitudes aspect.

Fifthly, the TOE framework has consistent empirical supports in the study of supply chain related to new IT technologies. Nevertheless, management information systems researchers have often stated that due to different technologies' characteristics, the TOE models often need to be extended to incorporate different variable beyond the TOE framework (Chong & Chan, 2012). Since EMP is a new technology or innovation, the proposed framework will cover the variables on innovation adoption.

Sixthly, researcher describe that the TOE framework as a generic theory, thus they have seen little need to adjust or refine the theory itself (Baker, 2011; Zhu & Kramer, 2005). With the proposed framework, the integration of TOE and MAEP will offers more alternatives for researchers to research on technology adoption (Chong & Chan, 2012).

Seventhly, the TOE framework may have seen relatively little evolution because it has been viewed as aligned with other explanations of innovation adoption rather than offering a competing explanation to them (Baker, 2011). Since every technologies and innovations have different characteristics, the construct of both framework would cover the need of the studies on technology adoptions (Chong & Chan, 2012).

Finally integrating TOE with other models offering larger number of constructs than the original and provides richer theoretical lenses to the understanding of adoption behavior (Awa et al., 2011).

Accordingly, it has been suggested that a integration can be accomplished when the strength of some of the most widely used theories in adoption research for explaining individual behaviour {e.g., Model of External Influences on Environmental Awareness and Practices (MEAP), Theory of Technology Acceptance Model (TAM), Theory of Technology Acceptance Model 2 (TAM2), Theory of Planned Behavior (TPB), and Unified Theory of Acceptance and Use of Technology (UTAUT)} could be combined with the strength of a TOE framework to describe organizational behaviour (Baker, 2011).

The Model of External Influences on Environmental Awareness and Practices (MEAP) is a suitable model to be integrated with TOE framework in this research because for several reasons. The reasons are, the recent literatures on technology adoption by businesses suggests that most research are based on the Model of External Influences on Environmental Awareness and Practices (MEAP) (Bajwa, Garcia, & Mooney, 2004; Gadenne et al., 2009; Hoogendoorn, Guerra, & van der Zwan, 2015; Sharma & Gadenne, 2014; Tan, Smyrnios, & Xiong, 2014). Although the MEAP model on focuses on environment awareness and attitudes, the MEAP model are highly applicable in predicting adoption behaviour of the firm in considering new technology (Bajwa et al., 2004; Hoogendoorn et al., 2015; Tan et al., 2014; Wan Nur Syahida & Azwadi, 2013). The MEAP model will focus on technological perspective which based on perceptions and attitudes, and have commonly been used as groundwork for new technology implentation

at the individual level (Oliveira & Martins, 2011). Additionally, the MEAP model is a well-researched intention model that has been proved successful in predicting and explaining behavior across a wide variety of domains (Gadenne et al., 2009). Nevertheless there is scarce research concerning adopting any environment management practices or environment management system that use the MEAP as a base theory to explain the behavioral intention of individuals (C. Lin & Ho, 2011).

Proposed model of environmental management practices adoption.

In this research, a modified version of the Technology-Organizational-Environmental Framework (TOE) (Tornatzky & Fleischer, 1990) and the Model of External Influences on Environmental Awareness and Practices (MEAP) (Gadenne et al., 2009) have been developed for researching the adoption of environment management practices. Based on the TOE framework, it covers the aspects of an enterprise's context that influence the process by which it adopts and implements a technological innovation or new technology system (Tornatzky & Fleischer, 1990). While in MAEP, the intention to use a "system" is explained by attitudes toward the general awareness of an environment management, the awareness of cost benefits implement environment management and the environment attitudes towards environment management (Ajzen, 1985). TOE or MAEP have both been widely used among researchers and found to be very useful in explaining consumers' attitudes and intentions toward a given behavior (Awa et al., 2012; Min, 2008; Oliveira & Martins, 2010; Pavlou & Chai, 2002; Yoon, 2011). MAEP is a general theory of human awareness and behavior towards environment while TOE is specific to innovation adoption. Studies on acceptance of new technology indicate that traditional adoption models need to be extended and modified to better explain the adoption of the innovations (Ervasti & Helaakoski, 2008).

This study modifies TOE by integrate the construct from MAEP. Therefore, this research will explore the influences of technological, organizational, and environmental factors and the mediating factors of environment and awareness attitudes on the adoption of environment management practices in Malaysia logistics industry.

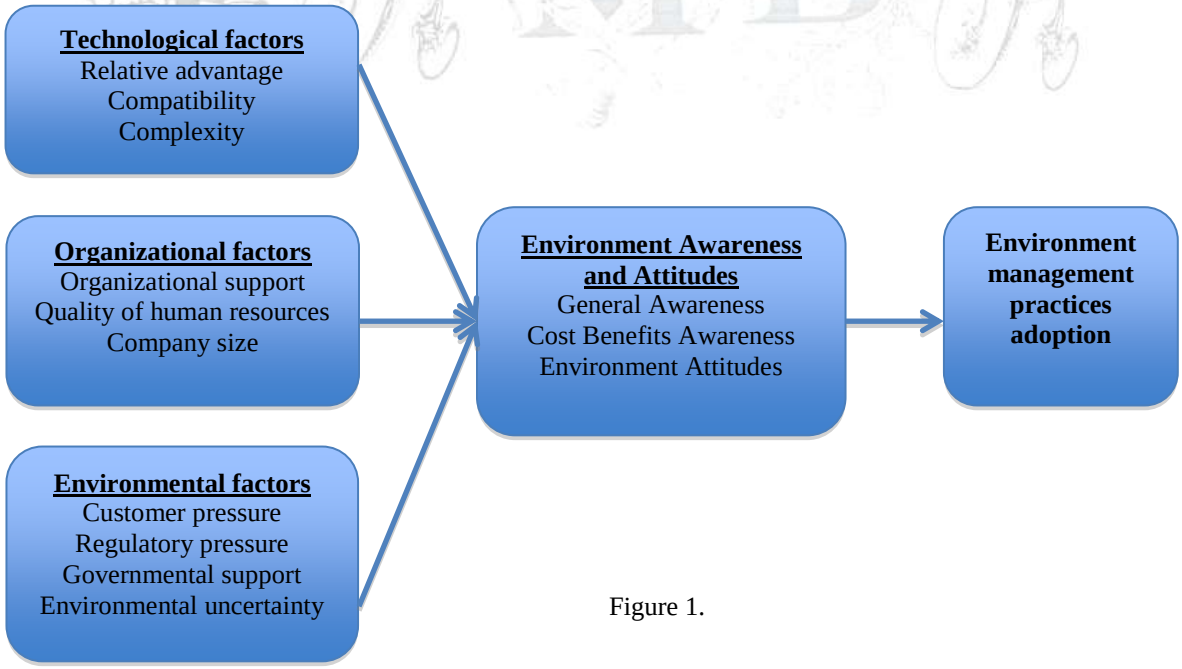

Figure 1.

Figure 1 above illustrates the research framework of the study. The technological factors include the relative advantage, compatibility, and complexity of green practices; the organizational factors include organizational support, quality of human resources, and company size; and environmental factors include customer pressure, regulatory pressure, governmental support, and environmental support. For the mediating factors include environment attitude, general awareness and cost benefits awareness. As this article aims to analyze the influences of technological, organizational, environmental, and environment awareness and attitudes factors on environment management practices adoption, the potential relationships between the proposed determinant factors will not be considered in the current study.

Hypothesis Development

Based on the foregoing review of the literature, it is hypothesized that the factors of technological, organizational and environmental factors have impact on environmental awareness and attitudes, which in turn are associated with the environment management practices adoption. The diagram in Figure 1 illustrates the relationships between the theoretical constructs and variables under analysis in this research. Figure 1 shows the fourteen theoretical constructs representing by five main factors of technological factors, organizational factors, environmental factors, environmental awareness and attitudes factors and environment management practices adoption factors. Technological factors include relative advantages, compatibility and complexity factors. Organizational factors include organizational support, quality of human resources and company sizes. Environmental factors include customer pressure, regulatory pressure, governmental support and environmental uncertainty. Environmental awareness and attitudes support includes environmental attitudes that represent behavioral attitudes, general awareness that represent subjective norms and cost benefits attitude represent perceived behavioral control. Based on the proposed research model, the following hypotheses were formulated:

H1 : The environment management practice's technological factors (TF) has a significant effect on Environmental Awareness and Attitudes (EAA) for Malaysian logistics companies.
H2: The environment management practice's organizational factors (OF) has a significant effect on Environmental Awareness and Attitudes (EAA) for Malaysian logistics companies.
H3: The environment management practice's environmental factors (EF) has a significant effect on Environmental Awareness and Attitudes (EAA) for Malaysian logistics companies.
H_4: The Environmental Awareness and Attitudes (EAA) has significant effect on Environment Management Practices Adoption (AEMP).
H_5: The environment management practice's technological factors (TF) has significant effect on Environment Management Practices Adoption (AEMP).
H_6: The environment management practice's organizational factors (OF) has significant effect on Environment Management Practices Adoption (AEMP).
H_7: The environment management practice's environmental factors (EF)has significant effect on Environment Management Practices Adoption (AEMP).

Research Methodology

Study Area: Malaysian Freight Forwarders

Freight forwarders are specialized firms in the logistics chain and can be classified into "ocean freight forwarders" and "air forwarders". In the initial stages of forwarding, freight forwarders provide clearing and forwarding services as an agent of the shipper. At the intermediate level, they make available services such as cargo consolidation, road haulage, and customs clearance. At the final stage, they can also provide door-to-door services as multimodal transport operators (Llanto & Navarro, 2012; Tambovcevs & Tambovceva, 2010). Freight forwarders offer all or a limited range of services depending on their size,

number of personnel, and number of branches. Many freight forwarders handle both exports and imports, and may also act as customs brokers. They can offer the following specific services to traders (Davies, 1981; Llanto & Navarro, 2012; Markides & Holweg, 2006; Robert, Joe, & Gregory, 2003):

- Advising on the best routes and relative shipping costs
- Booking the necessary space with a shipping or airline company
- Arranging with the exporter for packing and marking of the goods to be exported
- Consolidating shipment from different exporters
- Handling customs clearance abroad
- Arranging marine insurance for the shipment
- Preparing export documentation
- Translating foreign language correspondence
- Scrutinizing and advising on ability to comply with the letter of credit.

Federations of Malaysian Frieght Forwarders (FMFF)

Federations of Malaysian Freight Forwarders (FMFF) was registered in September 1987 as a National Association representing the Freight Forwarders in the logistics industry. In 2000, the Ministry of Transport endorsed and recognized FMFF as a national Association to represent the logistics industry. Current membership in FMFF nationwide is about 1091 members with several applicants pending approval. FMFF membership as per State association is as follows'-

- SFFLA - 589 company members.
- JOFFA - 241 company members.
- PFFA - 115 company members.
- KKFAA - 52 company members.
- SFAA - 84 company members.
- LFFA - 10 company members.

FMFF is affiliated to International Federation of Freight Forwarders Association (FIATA), Asean Freight Forwarders Association (AFFA), Federation of Asia Pacific Air Cargo Associations (FAAPA), Malaysian National Shippers Council (MNSC). FMFF participates in many government forums such as Dialogues with Ministry of International Trade and Industry (MITI) and Ministry of Finance (MOF), Customs Liaison meeting, MOT, MLC, Trade and Facilitation Action Council (MITI) and provides industry views and inputs for policy makers' consideration. FMFF members plays an important role in Malaysia 3PL sectors (Llanto & Navarro, 2012), this research chooses all the members as a the correspondent for the survey.

Sample and Data Collection

To examine the influences of proposed factors on environmental practice adoption, this research is using the survey methods of Dillman's principles for questionnaire construction and survey implementation called The Dillman Total Design Method. Dillman views the process of sending questionnaire to prospective respondents and getting them to complete the questionnaire and return it as a special case of ''social exchange.'' Based on the exchange theory, Dillman developed sets of survey procedures that may be applied to achieve higher response rates (Egbuche, Zhang, & Ukaga, 2008). The procedures collectively referred to as Total Design Method (TDM), consist of:

1. Send a personalized advance-notice letter to participants

2. Approximately one week later, send the complete survey package with a cover letter, instructions, and the questionnaire and include a return envelope with postage
3. Approximately one week letter, send a follow-up postcard to the participants
4. Two weeks later, send a new cover letter, questionnaire, and return postcard to those who have not responded
5. Send a final contact (possibly by registered post) to request completion of the survey.

The results of sending the questionnaire to the participants are as follows:

Table: 1

No.	Action	Result
1	Sent personalize advance-notice letter	1144
2	Returned (relocation)	15
3	Cant find address	10
4	Send the complete survey package with a cover letter, instructions, and the questionnaire and include a return envelope with postage	1119
5	Returned unanswered	30
6	Returned questionnaire up till 20/2/2014	204

A pilot survey was conducted for pre-testing the survey questionnaire and the TDM survey methodology. Pre-testing the questionnaire aimed at detecting problems with its validity and reliability. This study sought to determine whether the words in each question were properly understood, using intended question measurement, respondents' interpretation and range of response (Melnyk, Sroufe, & Calantone, 2003), where appropriate questions used an open-ended format. Pilot survey respondents were specifically asked to identify which questions they found difficult to answer and why, as well as how much time they took to answer the questionnaire. They were also asked to provide comments and suggestions about improving the questionnaire. The pilot survey was conducted exactly as the main survey although on a smaller sample scale. The pilot survey was conducted on a ten representative sample drawn from a list of logistics companies provided by Federations of Malaysian Freight Forwarders. After two follow-up contacts, six companies responded, the study recorded a good response of 60%.

Questionnaires were mailed to these sampled companies' owners or senior managers who are familiar with the company's environmental activities. Two weeks after the questionnaires were mailed, a follow-up to the sampled companies was conducted to remind them of the importance of their responses and thank them for their assistance. In total, 204 usable completed questionnaires were returned. The overall response rate is 18.2 percent. Most logistics companies in Malaysia is belong to small and medium-size enterprises (FMFF, 2015). To evaluate the non-response bias, the wave analysis was used which assumed that late respondents tend to be more similar to non-respondents than early respondents in mail surveys (Armstrong & Overton, 1977). The non-response bias was tested by comparing respondents who responded readily to the survey with those who responded after the follow-up step was taken. Comparisons of survey results that were received after the mailing and after the follow-up revealed no significant differences between the two groups in the level of variables. Therefore, the non-response bias is not significant in this research.

This research utilizes SPSS 23.0 as the tool to conduct descriptive analysis, factor analysis and reliability analysis. Then SPSS AMOS 20.0 is used to depict the structural equation model (SEM) of the environment management practices adoption theoretical model, as well as calculate and test the path coefficients. SEM now is broadly used in the realms of psychology, pedagogy, statistics and marketing, and is also more and more applied in tourism research. SEM can test and estimate the casual relations in theoretical model, so it is available in this research.

Questionnaire Design

In order to ensure the content validity of the measurement instrument, the questionnaire was developed in a two-stage process. Firstly, an initial questionnaire was designed based on a review of literature analyzing similar theoretical constructs as well as a discussion with two experts in environmental management. The initial questionnaire were based on the research of green practices adoption (C. Lin & Ho, 2008, 2011; C. Lin, 2011) and research on awareness and practices (Gadenne et al., 2009). Secondly, the initial questionnaire was modified by 6 logistics managers' suggestions to ensure that each item adapts to the logistics industry and is interpreted as expected. Afterward, the final version of the questionnaire was administered to sample logistics companies with business models conforming to the logistics services.

The questionnaire contains two parts; part one is the company's basic information, and part two is technological factors, organizational factors, environmental factors, environmental awareness and attitudes factors and the adoption of environmental management practices. Besides the company's basic information, the other items measuring participants' perceptions of their companies' technological, organizational, environmental factors, environmental awareness and attitudes factors, and the adoption of environmental management practices were measured using seven-point Likert scales anchored by "strongly disagree" and "strongly agree". Likert scales have been frequently used to measure participants' attitudes towards specified statements. The participants were asked to what extent they agreed or disagreed with the statement of each item. The adoption of environmental management practices was measured according to the willingness to adoption of environmental management practices. Because the intention to adopt a new technology would be positively associated with the actual behavior in adopting the technology (Ajzen, 1985; Davis, 1989), this research assumes that logistics companies will be more likely to adoption environmental management practices if they have stronger willingness.

Part one is the background of the company, background of the participant, company's capital and the company's experiences in implementing or adopting EMP. Part two, is the 47 items or questions, which are measured based on a seven point Likert scale ranging from 1 to 7, where 1 = Strongly disagree; 4 = Neutral; 7 = Strongly agree.

Limitations

Because the questionnaire survey was used, a limitation to this study is that the results may suffer from the respondent bias. Participants may modify their responses to be socially acceptable or to appear rational and logical. For example, respondents would not incriminate themselves by suggesting they do not support their employees or that they do not or could not learn. Nevertheless, the fact that the survey was voluntary and anonymous may have minimized this problem to some extent. Another limitation of this study is that the samples used in the survey were drawn from a list of logistics companies provided by Federations of Malaysian Freight Forwarders (FMFF), so the samples may not represent all logistics companies in Malaysia.

Discussion and Conclusion

This research is proposing a new conceptual adoption model based on the Technological-Organizational-Environmental (TOE) theoretical framework and the Model of External Influences on Environmental Awareness and Practices framework. Through conducting an in-depth literature review, the researcher uncovered initial concepts, constructs, and a set of preliminary detriments that may influence knowledge map adoption. The proposed conceptual model for the adoption of EMP was founded by integrating two theories, the TOE framework and the MEAP framework. The factors covering six broad contexts (technological, organizational, environmental, general awareness, cost benefit awareness, environment

attitude) that could potentially influence EMP adoption. As stated above the literature argues that the majority of the current research of EMP and innovation adoption generally focuses on the technical aspects of adoptions with a particular lack of discussion on the factors that influencing the adoption of EMP. Therefore, we believe this model can offer a valuable tool for managers to understand the factors that influencing the adoption of EMP in order that they could proactively design further strategy to improve their employee's attitudes to adopt EMP. So far, the initial research model is still untested. Thus, developing an instrument for survey and testing of the research model is crucial for future research.

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