

ENVIRONMENTAL MANAGEMENT PRACTICES (EMPs) FOR SUSTAINABLE DEVELOPMENT IN MALAYSIAN FOOD PROCESSING SMEs

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Abstract: *The interest on environmental management has been notably increasing in the past few years and nowadays is considered to be a mainstream challenge for organizations. The involvement of SMEs in environmental friendly practices can be of particular significant as their total impact can be huge, caused by cumulative effects associated to large number of enterprises. Despite the fact that there is a growing awareness of the environmental impact caused by SMEs, this is not transformed into practice. SMEs consider themselves as too small to cause big impact to the environment. This can be seen from the slow adoption rate of formal environmental management system among SMEs in Malaysia. This study endeavours to determine the factors influencing intention to adopt EMPs among food processing SMEs by integrating two theories namely; (i) Technology-Organization-Environment (TOE) framework and (ii) Theory of Planned Behavior (TPB). Drawing upon the both theories, this study groups the determinant factors of TOE model into technological, organizational and environmental contexts; while the determinants factors of TPB are attitude, subjective norm and perceived behavioral control. The data were collected via email-based survey, which was sent to 633 owner-managers of food SMEs in Malaysia, and 118 usable samples were analyzed. Exploratory factor analysis (EFA) was used to identify latent factors affecting the intention to adopt EMPs. The results of EFA revealed eight factor solutions with eigenvalues greater than 1.0. Generally, these factors explained 83.45 percent of the total variance, which is considered as satisfactory. KMO measure of sampling adequacy was 0.910 indicating sufficient inter-correlations. Results suggest that the dominance of owner-managers' attitude (total variance: 47.72%) as the most important factor affecting the intention to adopt EMPs.*

Keywords: *Food Processing SMEs, Environmental Management Practices, Intention, TPB, TOE*

Introduction

Malaysia is one of the rapid developing countries in the global economy. Malaysia regenerated its economy from material production to one driven by trade. For that reason, international trade has become an essential part of Malaysia's economic engine particularly in the food industry. Succeeding the government's attention on the agriculture sector, the food processing industry in Malaysia has turned into a main component of the agro-based industry. Malaysian food industry is conquered by small and medium size enterprises. In the Industrial Malaysian Plan 2006-2020 (IMP3) term, the investment of food processing industry's target have been set at RM24.6 billion.

Nonetheless, the expansion in economy comes together with a few problems to the environment. Despite the essential contribution of food industry to the Malaysian economy, the development of food industry lead to serious environmental impacts, for example greenhouse gas emission, climate change, solid waste generation, which are subject to the quantity of resources used, waste generated and transport used in the processing system. As a result of rising human and industrial impacts on the environment, environmental issues has turned out to be more serious and wide-ranging. As stated by Edwards *et al.* (2009), processing and transportation of food stuffs contribute about 15% to 35% of greenhouse gas emissions in the food system. Nearly all of these emissions are associated to the energy utilized in the stage of processing and packaging, and are increasing since the international air freight upsurges with a greater global food supply.

As response to the environmental issues caused by the food industry, the level of awareness of the consumers regarding the health and safety aspects of food products are increasing. Consumers are currently in search of freshness, safety and healthier foods to have a healthier diet and lifestyle. Therefore, food producers should aware that consumers' purchasing behaviors have a strong correlation with environmental issues. Thus, due to the large number and the substantial influence that food processing SME have on the environment, their impact cannot be neglected. Even though, it is obvious that the influence of only one SME to the sustainable development of a region is rather insignificant, however, count upon as a group, they have a substantial effect on the quality of the development of a particular area, even greater than that of the larger companies on occasion. It is confirmed that, the larger the existence of SMEs in the economy or in a region, the larger their impact is on the level of sustainable economic development (Vargas, 2000).

In spite of the crucial impact of SMEs to the environmental performance, as well as the various efforts by government and related agencies to promote the importance of environmental management practices (EMPs), the rate of SMEs that obtain formal environmental management systems has been generally low compared to large companies (Hillary, 2004). The prevailing issue among SME entrepreneurs with regards to environmental practices is familiarity and awareness of the environmental issues. The slow uptake of environmental management systems can be possibly influenced of various factors. In view of this, previous studies have shown that the EMPs, for instance ISO 14000, is driven by external and internal influences. The external influential factors includes pressure from policy maker, financial

institution, suppliers and environmental institution or group. Internal pressure on the other hand is exerted by the employees and owners or managers' attitudes and awareness.

SMEs run contrarily and withstand different challenges when adopting EMPs as compared to large companies. According to Boiral *et al.*, (2014), SMEs short of knowledge and awareness related to their impacts on the environment, and their natural character which resistance to government intervention and self-regulation causes them less probably to adopt EMPs. Other than that, the inadequate resources in SMEs might as well play a decisive role whether or not to adopt EMPs. In addition, the informal structure of SMEs, and the fact that they are personally managed by the owner, which put more priority on commitment and personal choice with regard to environmental management (Brammer *et al.*, 2012). Hence, it is important to figure out why SME adopt environmental management into their business organizations and how they go about doing so (Lee, 2009).

Given the existence of the environmental-related challenges faced by SMEs, there is an avenue for further studies on factors affecting the intention to adopt EMPs amongst small and medium-sized food processing firms in Malaysia. This article will discuss the underlying factors that led to entrepreneurs' intentions to adopt EMPs, while considering both organizational and individual determinants, which will provide further insight into their decision-making process, thereby helping us better understand their behaviors, which essential for the development of sustainable development strategies.

Objective of the Study

In view of the research problem which has been discussed in the earlier section, this study attempts to identify the factors influencing intention to adopt environmental management practices among food processing entrepreneurs in Malaysia.

Literature Review

Environmental management is portrayed as the management of the practices of an organization to reduce or to minimize the effect of their business activities on the environment. Thompson (2005) highlighted that environmental management responsibilities are consist of: (1) the minimization of waste; (2) energy conservation and management; (3) the management of fresh water resources; (4) wastewater management; (5) hazardous substances management, and (6) involving stakeholders, such as staff, customers and communities, in environmental issues. In general, EMPs can be interpret as the methods, strategies and techniques an organization adopts that are aimed at monitoring and controlling the outcome of its operations on the natural environment (Montabon *et. al.*, 2007).

Henriques and Sadorsky (2008) point out that practicing environmental measure into business operations consist of discovering new resource combinations and utilizing existing resources in new techniques, for that reason, EMP adoption which engage with executing new or modified processes, techniques, and systems to minimize environmental damages can be considered as a technological innovation. Previous studies on technological innovation proposes that the attributes of technology, the abilities of the organization and the external environment are three common factors influencing the adoption of new technologies (Tornatzky and Fleischer, 1990; Chau and Tam, 1997). All these three factors are believed to influence technological innovation in its hands-on application.

Numerous researchers have suggested several justifications with respects to the factors that influence firms' adoption of environmental practices (e.g., Alvarez-Gil *et al.*, 2007; Gadenne *et al.*, 2009). Among the factors are environmental regulation, stakeholder pressure, human resources, company size, and managers' characteristics, which found to be pertinent environmental and organizational factors commonly emerged in related research. In addition to organizational and environmental related variables, previous literature proposes that the characteristic of technology is a relevant features affecting the adoption of new technologies (Frambach and Schillewaert, 2002). Perceived innovation characteristics of a new technology such as relative advantage, compatibility, and complexity may influence its adoption (Rogers, 2003). Another factors that may influence the intention to adopt EMPs can be observe from the perspective of owners-managers. Some owners-managers either think of that their business has no impact on the environment or assume the magnitude of the impact to be small and thus unimportant (McKeiver and Gadenne, 2005). Furthermore, a lot of SMEs' owners-managers do not realize the negative impact of poor environmental practices, or the necessity to carry out an environmentally friendly operations, as an important subject for their business (Studer *et al.*, 2008). Certain owners-managers with favorable attitude toward environment and an enthusiasm to enhance their environmental practices, however, do not regularly transform this worldview into action (Redmond *et al.*, 2008).

Therefore, based on the review of the previous research, this study will investigate the intention to adopt EMPs among food processing SMEs in Malaysia from the viewpoint of technical innovation. Furthermore, this study apply two theories to develop the research framework and further divided the factors that affecting intention to adopt EMPs into four main aspects namely technological context, organizational context, environmental context and individual context (attitude, subjective norms and perceived behavioral control).

Research Framework

The underpinning structure of this study can be explained by two main theoretical framework which is Technology Organization Environment (TOE) Model and Theory of Planned Behavior (TPB).

Technology-Organization-Environment (TOE) Model

The Technology-Organization-Environment (TOE) framework of Tornatzky and Fleischer (1990) employs a generic set of factors to estimate the probability of innovations adoption. The TOE framework is an organizational level theory that describes three main components of a firm's context that may influence the decision to adopt an innovation. These three contexts are discussed as below:-

Technological Context

The technological context has its origins in Technology Acceptance Model (TAM) (Davis, 1989), the Decomposed Theory of Planned Behavior (DTPB) (Taylor and Todd, 1995) and Diffusion of Innovation (DOI) Theory (Rogers, 2003). Each three of these innovation adoption theories have been verified by an extensive number of research in both organizational and individual contexts (Choudhury and Karahanna, 2008; Kim *et al.*, 2010). Based on the innovation theories stated above, the present study utilized three of the main attributes of

innovation to pinpoint the technological factors that influence a firm's decision to adopt EMPs. These attributes are; (i) relative advantage; (ii) complexity and; (iii) compatibility. This is due to the fact that these three factors have constantly been found to be more significant in affecting adoption behavior of technological innovation than other factors (Rogers, 2003).

Organizational Context

The organizational context is originated from the theory of Dynamic Capabilities (Teece and Pisano, 2003) and Stakeholder theory (Freeman *et. al.*, 2010). These theories specify that organizational factors have significant influences in firms' adoption of organizational innovations. According to these theories, organizations are differ in term of their internal resource settings and procedures, which consecutively influence their capability to react to internal and external challenges and their total performance. The present study draws on two constructs consist of (i) organizational support which is evaluated based on the extent of the company's resource supports and leaders' attitudes towards environmental issues (Tornatzky and Fleischer, 1990) and; (ii) the quality of human resources was evaluated subject to the learning and innovative capabilities of employees (Scupola, 2003, Lin and Ho, 2011).

Environmental Context

The environmental context is introduced based on the institutional theory which give attention on the firms' reactions to institutional pressures inside their operational environments (Scott, 1995). Scott (1995) classified the institutional restriction into three main categories; (i) regulative (coerced through laws, rules, and sanctions); (ii) normative (prescriptively imposed through certification, accreditation or codes of conduct); and (iii) cultural-cognitive (mimetic logic of action and common beliefs). This research adopts four constructs from previous researches referring to Institutional Theory. The first construct is customer pressure which is refer to normative isomorphism made from assumption that firms should be aware of response from their customers. The second of these is regulatory pressure which is refer to coercive regulatory isomorphism, as the authority use laws, persuasion, rules and pressure to encourage compliance. The third construct is government support which refer to government involvement in promoting technological innovation. The fourth construct is environmental uncertainty which can be pictured as unanticipated changes of customers, competitors and technology.

Theory of Planned Behavior (TPB)

Ajzen (1980) first introduced Theory of Planned Behavior (TPB), which focus on decisions of volitional behavioral and the objective behind related behavior. TPB was established due to the limitations of the Theory of Reasoned Action (TRA) to cope with behaviors under which people had incomplete volitional management (Ajzen, 1991). As stated in the TRA, intention to perform a specific behavior is coordinated by the subjective norm and by the attitudes of a person. A person's attitude approaching a behavior is directed by the evaluation and beliefs about the outcomes of implementing the behavior. In contrast, subjective norm is described as the people's influence encompassing the person in relation to executing a particular behavior (Davis, 1989). TPB contrasts from TRA in its additional construct of perceived behavioral control, which is explained as the individual's perception regarding the difficulty or ease of performing a particular behavior.

In this study, three main variables of TPB were analyzed. The first variable is the owners-managers attitudes towards environment, which are came up of their belief they acquire in their lifetime. The second variable is subjective norm, which referring to how others or people who are important to the owners-managers can affect their intention pertaining to environmental friendly concept. The third variable is perceived behavioral control, defined as owners-managers' behavior or factors which will make the behavior easy or more difficult to perform (Ajzen, 1991).

Conceptual Framework

Using the integrated frameworks of TOE and TPB, this study hypothesize that there are significant relationship between technological, organizational, environmental, attitude, subjective norm and perceived behavioral control and the intention to adopt EMPs. In this study, there are twelve independent variables including; (i) Relative Advantage; (ii) Complexity; (iii) Compatibility; (iv) Organizational Support; (v) Quality of Human Resources; (vi) Customer Pressure; (vii) Regulatory Pressure; (viii) Government Support; (ix) Environmental Uncertainty; (x) Attitude; (xi) Subjective Norm and (xii) Perceived Behavioral Control. Meanwhile, the dependent variable is intention to adopt EMPs. The proposed conceptual framework is as illustrated in Figure 1 below.

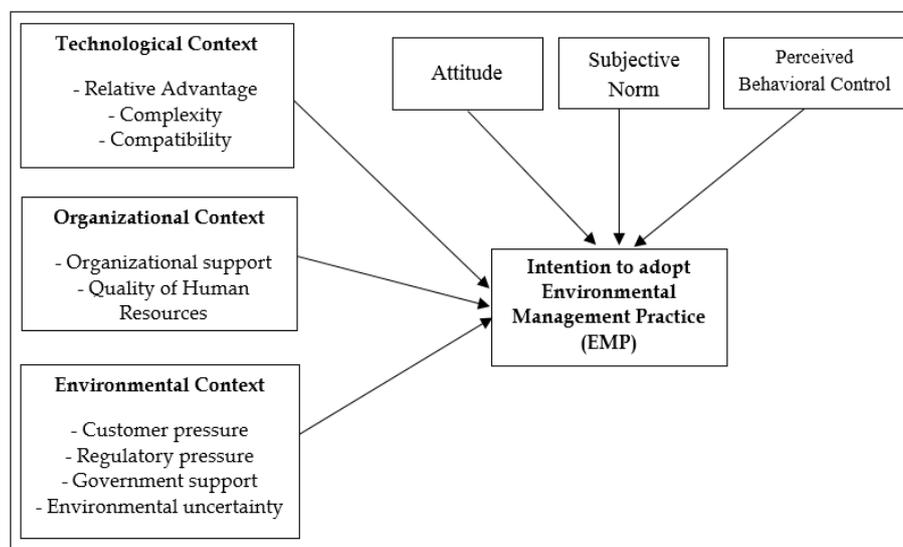


Figure 1: Conceptual Framework for Intention to Adopt Environmental Management Practices

Research Methodology

Data Collection

The data were collected via electronic mail (e-mail) questionnaires to food processing SMEs in Malaysia. The samples were selected from directory of SME Corporation Malaysia, with total population of 824 food processing companies. These companies were contacted by means of telephone to inquire whether they are agree to participate in the survey and if they are agree, the names of the respondents and their e-mail addresses will be recorded. Out of the 824 companies, only 633 companies agreed to participate in the survey. Questionnaires were sent to the sampled companies' managers or senior managers who are familiar with the company's environmental activities. One week after the questionnaires were mailed, follow-ups call were conducted to check whether the respondents received the questionnaire and thank them for their assistance. Afterward, in every two weeks, a friendly reminders were send to the

respondents' email addresses to remind them the importance of their responses. Of the 633 samples, 136 companies completed the questionnaires. Due to the incomplete information, 18 unusable questionnaires were omitted and 118 respondents were analyzed in the study.

Data Analysis

The current study used IBM SPSS to analyze the data. Exploratory factor analysis (EFA) is done to test the trend of gathering among variances to re-confirm the accuracy of the theoretical framework. EFA is a statistical technique that is employed to reduce data to a smaller set of variables and to explore the underlining structure of the data. It is also used to identify the structure of the relationships between the variables based on Kaiser-Meyer-Olkin (KMO) measure. If KMO has values ranging between 0.5 and 1.0 and sig. is smaller than 0.5, it indicates the factor analysis is appropriate for the study. For the purpose of this study, the general criteria are accepted of items with loadings of 0.4 or greater. The factor loadings with a value above 0.4 can be considered as important, whereas those greater than 0.5 are seen as very significant (Sharma, 1996).

Results and Discussions

Descriptive Analysis

Of the 118 respondents, 59.3% of the respondents were male and 40.7% were female. Respondents ranged in age from 30 to 63 years and majority of them belongs to 40 to 49 years old category (41.5%). Most of the respondents had tertiary education which were bachelor degree holder (39%), and 27.1% were diploma holder. 70.3% of SMEs can be categorized as small-sized enterprises and 29.6% were medium-sized enterprises, and more than half of the firms were private limited company (50.8%), majority were established between year 2001 until 2010 (39%). In addition, 72.9% of the SMEs indicated their annual sales revenue is ranged between MYR300,000 to MYR15 million. While, 15.3% reported that their revenue is greater than MYR15 million, and 11.9% of SMEs obtain revenue less than MYR300,000.

Exploratory Factor Analysis

Seventy six items were analyzed to discover the latent structure of correlations between each items. In total, the KMO criterion value of 0.910 suggested an excellent sample adequacy. The Bartlett's test of sphericity yielded significant value for chi-square (chi-square = 8937.551, P = .000) (refer to Table 1) indicating the appropriateness of correlation between the variables in order to apply factor analysis. The communalities are all above 0.3, further affirming that every item shares some common variance with other items. Based on all of these indicators, factor analysis is considered to be appropriate for all 76 items.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.910
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	8937.551
	1431
	.000

Principal axis factoring analysis was used to identify and compute composite scores for the initial twelve factors used in this study. Solutions for all these factors were analyzed using the promax rotation of the factor loading matrix. Furthermore, using scree test criterion, out of

twelve factors, only eight were suggested for retention. All expected factors emerged fairly cleanly except for some factors, namely “subjective norm, customer pressure, relative advantage and compatibility” which some items in these constructs were loaded as one factor. Items which were cross-loaded were removed and only items with factor loadings larger than 0.6 are retained for the analysis. Accordingly, a total of 20 items were excluded from the analysis. In the end, 55 items were retained in the final analysis.

Table 2 presents the eight-factored solutions, together with factor loadings for each item and the percentage of variance explained. The eight interpretable factors explain 47.72%, 9.47%, 7.37%, 5.08%, 4.77%, 3.81%, 2.77% and 2.47% of the variance respectively. In general, these factors explain 83.45% of the total variance. This value is considered as acceptable as it is higher than average consideration percentage of variance explained at 60.0 percent or less in the social science fields (Hair *et al.*, 2010).

The Factor 1 constituting seven items associated with the degree to which a person has a favorable or unfavorable evaluation towards EMPs and was named as “Attitude”. According to the result, there were items that do not emerge as separate factors, namely as “Subjective Norm & Customer Pressure” which is the second factor. Both of these factors refer to the influence of other parties on an individual’s decision whether to adopt or not the EMP. Factor 3 consisted of seven items related to which the adoption of EMPs is observed as difficult to understand and use, and the factor was named as “Complexity”. Factor 4 suggested a latent structure constituting qualities of human resources in an enterprise which are helpful to adopt EMPs, it was termed as “Quality of Human Resources”. Factor 5 was named as “Environmental Uncertainty” which comprises of five items associated with the unexpected changes in customer preferences, technological development and competitive behavior perceived by the owner-manager of an enterprise. Factor 6 was labelled as “Government Support” which refers to the policies, initiatives and everything that is provided or organized by the government to accelerate the rate of adopting environmental friendly practices. Factor 7 is contained of six items which associated with the government regulation (e.g. procedures, standards, incentives and laws) that require individual or organizational compliance. This factor was labelled as “Regulatory Pressure”. Lastly, another item that loaded as single factor was “Relative Advantage & Compatibility” which is the eighth factor. The integration of these two factors further specifies that, cost-saving benefits and increase in firm’s competitiveness, are not perceived as advantageous to the owner-manager in implementing EMPs, if they are not compatible with the firm’s belief and values.

Table 2: Results of Exploratory Factor Analysis (EFA)

Factor	Items	Loading	Variance (%)
1	Attitude		47.72
	ATT1	.767	
	ATT2	.939	
	ATT3	.901	
	ATT4	.968	
	ATT5	.874	
	ATT6	.848	
	ATT7	.852	
2	Subjective Norm & Customer Pressure		9.47
	SN2	.696	
	SN3	.795	
	SN4	.886	
	SN5	.709	
	SN6	.787	
	CP1	.750	
	CP2	.890	
	CP3	.849	
	CP4	.789	
	CP5	.830	
	CP6	.862	
	3	Complexity	
CX1		.960	
CX2		.932	
CX3		.921	
CX4		.924	
CX5		.944	
CX6		.887	
CX7		.737	
4	Quality of Human Resources		5.08
	QHR1	.749	
	QHR2	.824	
	QHR3	.856	
	QHR4	.868	
	QHR5	.862	
	QHR6	.903	
5	Environmental Uncertainty		4.77
	EU1	.928	
	EU2	.956	
	EU3	.925	
	EU4	.965	
	EU5	.955	
6	Government Support		3.81
	GS1	.905	
	GS2	.912	
	GS3	.913	
	GS4	.863	
	GS5	.816	
7	Regulatory Pressure		2.77
	RP1	.702	
	RP2	.802	
	RP3	.794	
	RP4	.743	
	RP5	.632	
	RP6	.702	
8	Relative Advantage & Compatibility		2.47
	RA5	.782	
	RA6	.670	
	COM2	.803	

Conclusions

This study concludes that, out of twelve constructs, intention to adopt environmental management practices (EMPs) can be influenced by eight extracted factors through exploratory factor analysis. These factors are derived from two theories namely Technological-Organizational-Environmental (TOE) model and Theory of Planned Behavior (TPB). Based on the findings, the most important factors that influence intention to adopt EMPs is the attitude of owners-managers with the total variance of 47.72%. This indicated that the owner-manager's appraisal of the benefits of adopting EMPs will determined their attitude (favorable or unfavorable) toward EMPs and further influencing their behavioral intention to implement it.

Hence, in order to ensure the success of EMPs implementation, it is essential to build awareness among the entrepreneurs regarding the environmental impact of their business to the environment. As the number of food manufacturers in Malaysia has grown substantially, there is a high need for the manufacturers to adopt EMPs in their daily operation. An extensive understanding regarding the likelihood of EMPs adoption from the perspective of SMEs will help the policy makers and industry players in formulating strategies to promote environmental management system and further increase the rate of adoption.

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