

# Environmental Management System in the Food and Beverage Sector: a Case Study from Malaysia

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In the final decades of the twentieth century the concept of sustainable development became an issue of growing interest to national governments, universities, industries, non-governmental organisations and the public. For developing countries in the global south the challenges of achieving sustainable development has brought into sharp focus the tension between delivering socio-economic prosperity whilst protecting and safeguarding environmental and ecological assets. The case of food is especially pertinent where food production occurs at considerable expense to the local and global environment. Within the food production supply chain, attention has been drawn to greenhouse gas emission as a result of large energy usage, chlorofluorocarbon from food refrigeration and embedded emissions once food is wasted. One way to address environmental impacts in the food and beverage (F&B) sector is to increase the adoption of environmental management system (EMS) in the production phase. This study highlights the main findings from empirical research to examine EMS adoption in the F&B manufacturing sector in Malaysia. Drawn from survey questionnaires by 42 companies, the research explores the companies' drivers, barriers, and incentives to the adoption of ISO 14001 standards and concludes with proposed strategies to improve the environmental performance of F&B companies and the industry as a whole. The important finding of this research is the implementation of ISO 14001 standards within Malaysian F&B sector is obstructed by the high implementation cost. Therefore, Malaysian government should increase the stringency of the environmental regulation alongside with the establishment of fiscal incentives to mitigate this barrier.

## 1. Introduction

Over the past decades, sustainable development has gained its prominence within various stakeholders, including government, academicians, industries, and societies (Agan et al., 2013). The manufacturing sector is one of the highest greenhouse gas (GHG) contributors and has received a strong pressure to mitigate their environmental impacts. GHG emissions from manufacturing sector highlight the exploitation of natural resources, wastes, large energy and water consumption, and pollutions. However, addressing sustainability issues within manufacturing industries has been debated extensively, most notably due to the negative companies perspective towards environmental improvement, which is considered as a cost burden and limiting their aim to grow.

The global food system has become more complex and energy intensive in the past decades. Within the food system, food production has been reported for contributing GHG emission from refrigeration process, large energy usage, food distribution and unsustainable agriculture process (Padfield et al., 2012). Food loss refers to wasted foods throughout the entire food system, from agricultural to food consumption in household (Papargyropoulou et al., 2014). In developing countries food loss are likely to happen during the post-harvest and production stages (FAO, 2013). Globally, food wastes accumulated in the landfill account for 46 % of the total solid waste (Hoorweg and Bhada-Tata, 2012), where methane gas and carbon dioxide will be formed as part of the anaerobic digestion of organic matters (Papargyropoulou et al., 2014). These types of gases are GHG emissions with methane potential to traps more heat 21 times than carbon dioxide (Papargyropoulou et al., 2014). FAO (2013) has predicted by 2050 global food production has to increase 60 % to fulfil the demands of significant population growth.

The rise of an official environmental management system (EMS) certification has followed the earlier initiative in 1992 Rio Earth Summit which emphasised the need for environmental commitment (Massoud et al., 2010). EMS refers to a holistic approach for an organisation to manage its environmental impacts (Agan et al., 2013). It allows an organisation to perform a continuous improvement on its environmental performance (Massoud et al., 2010). The standard provides a framework to ensure that an organisation meets their environmental objectives through a consistent control of operations (Massoud et al., 2010). ISO 14001 is the most widely adopted environmental standard worldwide. It is a voluntary management tool for an organisation to measure, evaluate, and improve its environmental performance (Jones et al., 2012). The standard mandates five requirements: environmental policy, planning, implementation, checking and corrective actions, and management review (Agan et al., 2013). The benefit of adopting the certification does not only lead to environmental performance improvement, but also to enhance organisational performance.. Furthermore, via the adoption of ISO 14001 standards, companies are also able to demonstrate their corporate environmental responsibility to discerning customers, thereby enables them to attract more buyers and build legitimacy with the stakeholders. In the recent years, the global adoption of ISO 14001 standards have been exponentially increasing. Hence, it can be argued that in the near future, the adoption of the standard will be the norm rather than exception.

To date, there has been little effort to investigate companies' behaviour towards ISO 14001 adoptions in Malaysia. In line with the Malaysian Prime Minister' commitment to reduce GHG emissions at 2009 Climate Summit in Copenhagen, this paper provides a useful starting point for governments to formulate a systematic strategy to create an effective implementation of ISO 14001 in the F&B sector. Drawing from literature reviews, the study develop a questionnaire-based study to identify companies' drivers, barriers, and incentives to adopt ISO 14001 standards. Further, the paper discusses the future trends of ISO 14001 adoptions in Malaysian F&B sector. The study also reflects on the potential supply chains exclusivity issue on SMEs. Finally, a proposed policy recommendation was formulated as a conclusion to promote environmental governance within F&B companies and industry as a whole.

## 2. Method

This research utilised a questionnaire-based survey for the data collection process. The first part of the questionnaire is to draws basic companies information (e.g. companies name, employees size, type of commodities, products market). Secondly, the questionnaire investigates companies' perception towards EMS by asking them a closed-ended question related to familiarity with EMS, willingness to adopt EMS in the future, and awareness to environmental impacts. In the latter part, respondents were asked to identify the three most important drivers, barriers, and incentives for adopting ISO 14001 standards from the given list. A literature review was conducted beforehand to retrieve the list of these factors from previous studies. The questionnaires were distributed using mail, email, and site visit to 42 F&B companies in the Klang Valley area, Malaysia. The number of sample obtained in this study is relatively consistent with the previous study performed by Massoud et al. (2010) who studied 45 companies.

Reflects on the companies perspectives toward EMS, the research qualitatively investigate the future trends of ISO 14001 adoptions, whether or not – considering current situation in Malaysia – the adoption will increase in the foreseeable future. The discussion will also reflects on the emerging issue that occurs in the post-increasing adoption of ISO 14001 standards: a potential supply chain exclusion of uncertified SMEs in the export market. Moreover, the drivers, barriers, and incentives identified from the results is categorised into three following categories: 'most important', 'important', and 'less important'. These factors are discussed to deeply understand the companies' decision to adopt EMS by linking the perceived factors to the current political and environmental situation in Malaysia. Finally, as the current situation has been characterised, a policy recommendation for an effective implementation of ISO 14001 is constructed.

## 3. Data Analysis

The survey resulted in 42 returned and complete questionnaires. Drawn from the result, the study found that F&B companies in Malaysia comprise of a large number of SMEs (less than 50 workers) (81 %). Table 1 describe the type of F&B sector in Malaysia and the number of ISO 14001 certifications. The studied companies comprise large number of 'beverage & alcohol' sector (29 %), and followed by 'confectionary' (11 %), sauces (14 %), and 'salt, herb and spice' (10 %). The distribution is relatively consistent with the largest composition of Malaysian F&B sector, which is dominated by beverage processing, confectionaries, poultry, vegetables and fruit, and processed food (MIDA, 2013). Based on Table 1 it is suggested that the ISO 14001-certified companies only accounts for 5 % of the studied companies, where 8 % of certified

companies are from 'beverage & alcohol' sector, and 25 % of the certified companies are from 'salt, herb & spice' sector.

*Table 1: Malaysian F&B Sector Category and Number of ISO 14001 Certifications*

Sector	No. of Companies	% of Category	No. of ISO 14001	% Certification
Beverage and Alcohol	12	29 %	1	8 %
Confectionary	11	26 %	0	0 %
Sauces	6	14 %	0	0 %
Salt, Herb and Spice	4	10 %	1	25 %
Processed Food and Poultry	3	7 %	0	0 %
Fish products	2	5 %	0	0 %
Noodles	2	5 %	0	0 %
Oil and Fat	1	2 %	0	0 %
Vegetable Product	1	2 %	0	0 %
Total	42	100 %	2	5 %

Almost the entire studied companies (98 %) are aware of their environmental impacts and suggest that it is important for them to mitigate and reduce their environmental impacts. However, unsurprisingly, around half of the F&B companies in Malaysia are still ill-informed about ISO 14001 standards, either related to its benefits or its registration processes. More importantly, environmentally-oriented education in Malaysia has not been established well. Such conditions impede societies and industries to contribute on mitigating environmental degradation due to their insufficient knowledge and information.

To provide an insight into Malaysian F&B companies' decision towards ISO 14001 adoptions, the paper examined their drivers, barriers, and expected incentives to adopt the certifications. Table 2 present the drivers for Malaysian F&B companies to adopt ISO 14001 standards, with the most important drivers are to 'enhance company's image and reputation' (62 %) and to 'improve environmental performance' (60 %). Table 3 describe the perceived barriers to adopt the certification, with the most important barriers are 'high certification costs' (57 %), 'lack of in-house knowledge' (50 %), and 'lack of government support and incentives' (48 %). Table 4 describe the incentives for companies who adopt ISO 14001 standards. The most important incentives are 'special tax exemption for certified companies' (64 %), 'training and capacity building' (62 %), and 'enhance knowledge on ISO 14001' (58 %).

*Table 2: Drivers for ISO 14001 Adoptions*

Priority	Count (N = 42)	%	Drivers
Most important	26	62 %	• Enhance company's image and reputation
	25	60 %	• Improve environmental performance
Important	16	38 %	• Following international industry trends
	15	36 %	• Costs saving
	14	33 %	• Meet customers demand
Less important	11	26 %	• Use as a marketing tool
	8	19 %	• Remove export barrier
	6	14 %	• Meet company requirements

*Table 3: Barriers to Adopt ISO 14001*

Priority	Count (N = 42)	%	Barriers
Most important	24	57 %	• High certification costs
	21	50 %	• Lack of in-house knowledge
	20	48 %	• Lack of government support and incentives
Important	13	31 %	• No clear benefits
	13	31 %	• No legal requirement
	12	29 %	• No customers demand
Less important	8	19 %	• Time demand
	6	14 %	• Not required for export
	5	12 %	• Not set as a priority by top management

Table 4: Expected Incentives for ISO 14001 Adoptions

Priority	Count (N = 42)	%	Incentives
Most important	27	64 %	• Special tax exemption for certified companies
	26	62 %	• Training and capacity building
	22	52 %	• Enhance knowledge on ISO 14001
Important	13	31 %	• Establishment of environmental regulations
	12	29 %	• Provision of soft loans
	11	26 %	• Public-private partnerships
Less important	4	10 %	• Establishment of national research institute

## 4. Discussions

### 4.1 Understanding Companies' Decision to Adopt ISO 14001

In this section, the study seek to understand the factors which influence Malaysian F&B companies' decision to adopt ISO 14001 standards. Overall the study found that the two certified companies are multinational companies and export their products to Japan, United States and Australia, where these countries have the largest number of ISO 14001 certifications. Nishitani (2010) and Deutsch et al. (2013) suggest that certified companies are likely to require their suppliers to certify with a specific environmental standard. As mentioned in the previous section, most F&B establishment in Malaysia are SMEs, which mostly target local market and non-eco-sensitive export market, the study confirm that – in relation to the low environmental awareness within Malaysian civil societies – weak demand-side pressures have shaped low number of adoption of ISO 14001 in Malaysia.

Further, the finding suggests that Malaysian F&B companies recognise the importance of the ISO 14001 standard as a tool to gain competitive advantages through image and reputation enhancement. Chiang et al. (2011) suggest that developing image and reputation is important to build legitimacy with stakeholders, thereby leading to an expansion both in the local market or international ones. However, in this case, the market expansion is likely to be more significant within international level, simply due to low environmental awareness within Malaysian societies. Therefore, the study suggests a weak relation between ISO 14001 standards and increasing local customers demand towards the products. Developing local public knowledge is important to improve their awareness toward environmental problems, thus Malaysian F&B companies are facing a stronger pressure to disclose themselves to an environmental standard. Furthermore, Malaysian F&B companies are aware of their environmental impacts, where to 'improve environmental performance' is regarded as one of the most important drivers for adopting ISO 14001 standards.

It is perhaps unsurprising that 'remove export barrier' is not perceived as the principle driver in the study because the majority of export destination of Malaysian F&B companies is not to eco-sensitive countries, which most notably Indonesia, Thailand, Singapore, United States, and China (MIDA, 2013). However, this could also be an important driver for Malaysian F&B companies to expand their export destination to such countries, like Europe and Japan (Nishitani, 2010), which requires suppliers to meet environmental standard. This is, however, corresponds to the argument where customers in eco-sensitive countries are likely to pay more to get green products (Bellesi et al., 2005).

Going further, Malaysian government has established extensive environmental policies and regulation, most notably National Environmental Policy, Climate Change Policy, and Environmental Quality Act 1974 (NRE, 2014). In addition, the current development of National Strategic Plan on Food Waste Management is expected to bring major changes on food waste management in Malaysia. In general, the strategic plan will provides centralised food waste treatment facilities and minimise direct landfill disposal. However, weak enforcement, lack of coordination, and low civil societies' attitudes toward environment remain the biggest challenges for implementing these policies effectively. This evidence points toward the low number of ISO 14001 adoptions in Malaysia – in this case F&B sector. This is perhaps unsurprising given the cost of registration for ISO 14001 is around USD 24,000 to USD 128,000 and annual maintenance cost ranges between USD 5,000 to USD 10,000 (Nishitani, 2010), with very little financial assistances have been provided to the companies who plan to certify. In light with this, the research suggests 'high certification costs' and 'lack of government support and incentives' as the most important barriers for F&B companies in Malaysia. Furthermore, theoretical evidence suggest that lack of knowledge as one of the major barriers for adopting ISO 14001 standards (Sambasivan and Fei, 2008), yet the study also confirms that 'lack of in-house knowledge' is the main barriers to adopt the certification.

Finally, the most important incentives reported in this paper are 'special tax exemption for certified companies', 'training and capacity building', and 'enhance knowledge on ISO 14001'. This argument

corresponds with the perceived barriers to adopt the ISO 14001 standard, which may potentially overcome the barriers if the government successfully established these incentives schemes. In light with this, this paper argues that the current situation in Malaysian F&B companies is the need for a financial and educational assistance due to the insufficient investment capital and lack of knowledge on ISO 14001 either in the pre-registration period or in the post-registration period.

#### **4.2 Future Trends of ISO 14001 Adoptions within Malaysian F&B Companies**

According to ISO (2012), the number of ISO-certified companies in food and beverage sector is 136, and increased in 2014 to 151 certified companies, with average annual growth rate of 6.5 % (ISO, 2014). The certification growth in Malaysia F&B sector is far below the average growth in the sector globally (11 %). Drawn from the survey, around 67 % of non-certified large companies are considering themselves to implement ISO 14001 standards, while there are around 56 % of SMEs do. However, although there are quite high number of companies is considering the implementation - given the same political and regulatory environment in Malaysia - this paper argues that the future adoption of ISO 14001 certified companies will unlikely to change due to the lack of understanding and knowledge on the ISO 14001 standard, which this study confirms that only around half of the companies surveyed are familiar with the standard. The study suggests that the Malaysian industries are still facing both weak demand-side pressure and supply-side incentives to adopt ISO 14001 standards. Provided with expensive registration costs and unclear tangible benefits from adopting ISO 14001, Malaysian F&B companies are still unsure whether or not the adoption of this standard will improve their organisational performance.

#### **4.3 Do ISO 14001 standards create exclusive supply chains?**

Considering that this paper creates an effective implementation of the ISO 14001 standard which likely leads to the increasing adoption rate within Malaysian F&B companies, the research also reflects on the unintended impacts of this issue. The authors noted that the positive impacts of the increasing uptake of ISO 14001 standards on the economic performance has been widely discussed in various academic articles (Nga, 2009). However, question marks remain over the potential exclusion of SMEs - who do not have a specific environmental certification - in the food export market. This is followed by theoretical evidence that there are a growing number of ISO 14001-certified companies require their suppliers to adopt a specific environmental standard (Nishitani, 2010). This issue creates a divide between multinational companies who can afford to certify with ISO 14001 standards with SMEs who do not have such certification. The study found that the two multinational companies studied are certified with ISO 14001 standards and export to eco-sensitive countries such as Japan, United States, and Australia. On the contrary, uncertified SMEs' market is limited to local market.

On reflection it is suggested that Malaysian government should consider enforcing both demand-side pressures and supply-side incentives, particularly on SMEs since large corporation tends to move more swiftly towards ISO 14001 adoptions due to their export requirement. SMEs, which largely focus their products on local market, require supply-side incentives, both financial and technical ones. Therefore, this will increase SMEs capability to adopt ISO 14001 standard, which potentially increase their participation on the export market. However it is also argued that in the future, local market in Malaysia will likely to require such adoption due to the increasing trends of sustainable products.

### **5. Conclusions and Policy Recommendations**

This paper examine the drivers, barriers, and incentives for Malaysian F&B companies to adopt ISO 14001 standards. The finding highlights the decision to adopt ISO 14001 is highly based on their motivation to improve organisational performance by enhancing their image and reputation as well as high environmental awareness. However, these drivers are not supported by an extensive support by Malaysian government. The study found that 'high certification costs', 'lack of in-house knowledge', and 'lack of government support and incentives' as the main barriers. Considering cheap labour wages and raw materials, Malaysian F&B companies do not perceive the ISO 14001 standard as an important tool to reduce operational costs, but rather act as a disincentive to their organisational performance. The finding suggests that only large corporations have adopted an ISO 14001 certification, whereas no SMEs have adopted the standard. The study predicts that situation will unlikely to change in the foreseeable future, simply due to the lack of supply-side incentives and lack of knowledge on the ISO 14001 standards. To conclude, although Malaysian F&B SMEs are aware to their environmental impacts, they do not have much support, either financial or technical ones to adopt the standards.

The study suggests that Malaysian government should increase the stringency of their environmental regulation, particularly to enforce SMEs to participate in the adoption of environmental standard. However,

this strategy should be executed along with supply-side incentives establishment to increase their capability to adopt ISO 14001 standards, and potentially increase the participation of SMEs in the supply chains. Government should also engage with industries in order to enhance their knowledge on environmental management. Likewise, similar strategy should also be performed to the public to increase environmental awareness among Malaysian civil societies, thereby creating stringent demand-side on green products within local market. Financial incentives should also be provided by Malaysian government in order to assist companies with high certification and maintenance costs. To date, environmental standard in Malaysia only covers green product certification, 'Eco-Labeling Scheme'. Although generally eco-labelling is accepted within international market (Dröge, 2001), however, since the standard is a product certification, it does not promote environmental practices in its management system. Reflects from 'Eco-Labeling Scheme' certification cost, the standard is affordable by SMEs. It is suggested that Malaysian government may formulate a national standard to promote environmental practices in the management system, which can be an affordable alternative EMS for SMEs.

## References

- Agan Y., Acar M.F., Borodin A., 2013, Drivers of environmental processes and their impact on performance: a study of Turkish SMEs. *Journal of Cleaner Production*, 51, 23-33
- Bellesi F., Lehrer D., Tal A., 2005, Comparative advantage: the impact of ISO 14001 environmental certification on exports. *Environmental Science & Technology*, 39(7), 1943-1953
- Chiang S.Y., Wei C.C., Chiang T.H., Chen W.L., 2011, How can electronics industries become green manufacturers in Taiwan and Japan. *Clean Technologies and Environmental Policy*, 13(1), 37-47
- Deutscha N., Drávavölgyib T., Ridegb A., 2013, Note on the Development of Sustainable Supply Chain Strategy. *Chemical Engineering Transactions*, 35, 655-660
- Dröge S., 2001, Ecological labelling and the World Trade Organization <[www.econstore.eu](http://www.econstore.eu)> accessed 05.06.2016
- FAO (Food and Agriculture Organization), 2013, Food wastage footprint impacts on natural resources: summary report <[www.fao.org](http://www.fao.org)> accessed 19.05.2016
- FAO (Food and Agriculture Organization), 2013, Food wastage footprint impacts on natural resources: summary report <[www.fao.org](http://www.fao.org)> accessed 19.05.2016
- Hoorweg D., Bhada-Tata P., 2012, What a waste: a global review of solid waste management <[www.worldbank.org](http://www.worldbank.org)> accessed 18.05.2016
- ISO (International Organization for Standardization), 2012, ISO survey 2012 <[www.iso.org](http://www.iso.org)> accessed 25.05.2016
- ISO (International Organization for Standardization), 2014, ISO survey 2014 <[www.iso.org](http://www.iso.org)> accessed 25.05.2016
- Jones N., Panoriou E., Thiveou K., Roumeliotis S., Allan S., Clark J.R.A., Evangelinos K.I., 2012, Investigating benefits from the implementation of Environmental Management Systems in a Greek university. *Clean Technologies and Environmental Policy*, 14(4), 669-676
- Nga J.K.H., 2009, The influence of ISO 14000 on firm performance. *Social Responsibility Journal*, 5(3), 408-422
- NRE (Ministry of Natural Resources and Environment), 2014, Environment <[www.nre.gov.my](http://www.nre.gov.my)> accessed 31.08.2016
- Massoud M.A., Fayad R., El-Fadel M., Kamleh R., 2010, Drivers, barriers and incentives to implementing environmental management systems in the food industry: a case of Lebanon. *Journal of Cleaner Production*, 18(3), 200-209
- MIDA (Malaysian Investment Development Authority), 2013, Food industry in Malaysia <[www.mida.gov.my](http://www.mida.gov.my)> accessed 31.05.2016
- Nishitani K., 2010, Demand for ISO 14001 adoption in the global supply chain: An empirical analysis focusing on environmentally conscious markets. *Resource and Energy Economics*, 32(3), 395-407
- Padfield R., Papargyropoulou E., Preece C., 2012, A preliminary assessment of greenhouse gas emission trends in the production and consumption of food in Malaysia. *International Journal of Technology*, 3, 56-66
- Papargyropoulou E., Lozano R., Steinberger J.K., Wright N., Ujang Z.B., 2014, The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106-115
- Sambasivan M., Fei N.Y., 2008, Evaluation of critical success factors of implementation of ISO 14001 using analytic hierarchy process (AHP): a case study from Malaysia. *Journal of Cleaner Production*, 16(13), 1424-1433