

DOI: 10.21625/essd.v2i1.88

## **Implementing Environmental Management Systems (EMS) in Sarawak: Adoption Factors**

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### **Abstract**

In most organizations, Environmental Management Systems (EMS) adoption is based on a voluntary basis in which the adoption depends on the organization's aspirations for better environmental performance. Organizations are attracted by very practical benefits through implementation of EMS in their organizations. The primary purpose of an EMS implementation is to improve environmental performance continually in an organization. This research investigates the factors that drive the adoption of EMS by organizations in Sarawak. Empirical findings of a survey on the above in Sarawak organizations are presented. About 112 survey questionnaires invitations were forwarded to various organizations in Sarawak and a total of 47 responses (about 42.0%) were received. Walford (1995), in his assertion, said that sampling techniques require 10 percent or more of observations or sampling fraction so that they are to be considered representative of the total population. From this research, organizations which have implemented an EMS are mostly from larger organizations in Sarawak which have been established for more than 15 years with over 251 employees and more than one operating location. The results showed that ISO 14001 is the most common EMS frameworks adopted by organizations in Sarawak followed by Roundtable on Sustainable Palm Oil (RSPO). Among the EMS adoption factors in Sarawak, EMS implementation motivation and the role of top management are the most critical factors in EMS adoption in Sarawak. Besides, management support is also another essential factor for EMS adoption among Sarawak organizations followed by the current market orientation factor.

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### **Keywords**

ISO 14001; Implementation Motivation; Role of Top Management; Management Support; Current Market Orientation

## **1. Introduction**

There is no denying that our environment is constantly changing. As it changes, there is an increasing need to be aware of the environmental problems that surround it such as global warming, air and water pollution, increased carbon footprint, ozone layer and natural resources depletion, climate change, natural disasters, acid rain, genetic

modification and many more which affect every human, animal and nation on earth. Such environmental problems would cause disasters and tragedies, now and also in time to come, until and unless we look for the solutions to address the various issues seriously. EMS implementation in organizations can be a positive step to improve the global sustainability problem.

EMS is a framework that assists organizations to consistently review, evaluate and improve its environmental performance to achieve their environmental goals (USEPA, 2016). The very purpose of implementing an EMS is to enhance the environmental performance of organization. EMS implementation has provided measurable environmental and business performance improvements for organizations in many countries. According to Ho and Law (2015), EMS implementation has proven to be a practical way in enhancing environmental performance of an organization in Sarawak by ensuring that the organisation has effectively managed its environmental risks.

In most organizations, EMS adoption is based on a voluntary basis in which the adoption depends on organizations' aspirations for better environmental performance. Besides, in recent years, the growing environmental awareness and public concerns has prompted governments and industries of both developed and developing countries to change their status about environmental issues from being reactive to proactive (Marambanyika & Mutekwa, 2009). Therefore, to achieve sustainable development in the process of decision planning and making, resources and environmental considerations shall be integrated (WCED, 1987). Darnall et al. (2000) found that some other considerations, which are categorized as non-environmental such as enhancement of public relations, fulfilling customer demands and overall costs reduction also contributed greatly to encouraging organizations to adopt an EMS and seek certification. Govindarajulu and Daily (2004) found that adoption of EMS is also influenced by top management's commitment as well as organizational management's awareness of environmental protection (Russo & Fouts, 1997). Fryxell, Lo & Chung (2004) found that motivation and perceived benefits are also main factors for EMS adoption among organizations. The primary objective of this research is the identification and examination of factors that account for adoption of EMS by organizations in Sarawak. Earlier studies and literature have linked EMS implementation to improved environmental performance as a whole and subsequently motivate organizations to implement EMS as well. EMS implementation is also more common in European countries compared to Malaysia. Questions arise, for examples (1) if EMS implementation can lead to improved environmental performance in organizations which adopt EMS in comparison to non-adopters, why are there only a handful of organizations in Sarawak, Malaysia that are adopting EMS? (2) what are the major factors for Sarawak organizations to adopt an EMS? In this research, six adoption factors for EMS implementation in Sarawak were considered:

### **1.1. Role of Top Management**

Klassen (1993) viewed that the first thing that is required from an organization for the adoption of an EMS is the commitment from top management. Top management plays an important role in the integration of the organization's functional areas, which is giving direction and promotion. Urban and Star (1991) stated that top management has become a critical factor in implementing successful competitive strategies. Chin (1999) found that top management commitment played an important role for EMS implementation in Printed Circuit Board industry in Hong Kong.

### **1.2. Management Support**

Through the reorganization of organizational structure, environmental strategies can be formulated (Daft and Macintosh, 1984). Randall (1995) viewed that to incorporate good environmental practices in organization, it requires changes in organization, be it structurally, responsibilities delegation, personnel training, as well as the communications and control management. Decisions to advance environmental management actions is difficult to carry out especially in organizations whose managers who still think traditionally and are mentally defensive towards environmental practices, (Stone et al., 1997).

**1.3. Motivation in EMS Implementation**

According to Rivera-Camino (2001), in European firms, the pressure groups that motivate organizations to adopt EMS are the national regulators (83.5%), followed by owners, management, and employees (70.15%). The third source of influence are international regulators, with an impact of 64.5%. The result (Table 1) revealed the level of influence (in %) that the pressure groups have on EMS implementation in European firms.

Table 1. Influence of pressure groups on EMS Implementation in European firms

Influence of pressure groups	Level of influence (%)		
	None	Moderate	High
National regulators	7.4	9.1	83.5
Owners, management, employees	12.4	17.45	70.15
International regulators	17.3	18.2	64.5
Voluntary agreements, local population, environmental organizations	18.75	25	56.2
Customers, competitors, consumer organizations, distributors, suppliers	25.16	17.74	47.06
Scientific institutions	27.1	34.0	38.9

From an ISO 14001 registered organizations survey conducted in Canada, the results revealed that most organizations were motivated to adopt ISO 14001 because they would like to have a positive environmental outlook, encouraging goodwill and integrity(Yiridoe et al., 2003). Based on the user rankings of factors influencing the adoption of ISO 14001 standard from the ISO 14001 Continual Improvement Survey 2013 (ISO, 2014), the commitment to environmental protection or conservation (2016) was the strongest environmental driver for ISO 14001 adoption. The second strongest environmental driver was the risk reduction of adverse environmental impact. Primary influences related to business management included customer requirements and public image. Figure 1 shows the results of the survey on the factors influencing ISO 14001 adoption.

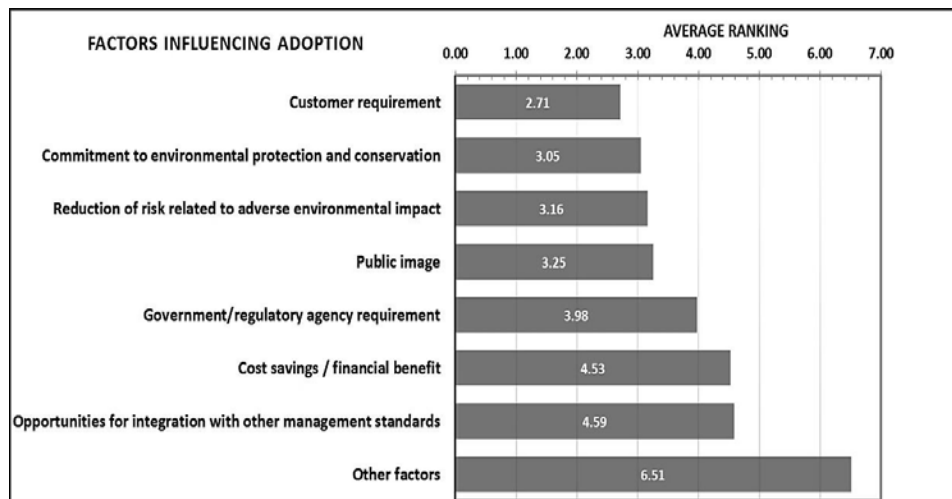


Figure 1. Results of ISO 14001 Continual Improvement Survey 2013: Factors influencing ISO 14001 adoption Source: ISO (2014)

**1.4. Current Market Orientation**

According to Maier & Vanstone (2005), in Germany, there are many organizations certified to use ISO 14001 and EMAS requirements because of the public has strong awareness on environmental issues. Besides, the high adoption rate is also because of some German companies that demanded their suppliers to have certified management systems. Based on an empirical study among organizations in Germany, USA, India and China (Dögl, 2015 &

Benham, 2015) regulatory, social stakeholders and market influences positively affect the organizations' corporate environmental responsibility practices. The study also pointed out that environmentally responsible behavior is increasing due to green technologies, products, communication as well as strategies. According to Bhattacharyya & Cummings (2015), the corporate environmental performance was getting more interest from the organizational stakeholders. He also viewed that environmental performance measurement is influenced more by its organizational system as well as the stakeholder relations rather than operational countermeasures and environmental tracking. Azzonea, Noci, Manzini, Welford & Young (1996) found that stakeholders also demanded environmental improvements as well as the evidence that these have been made. Therefore, there was a need for an integrated framework for environmental performance indicators. Fryxell, Lo & chung (2004) found the enhancement of the firm's reputation as the second main driver for ISO 14001 certification. Analysis by Azzonea, Bianchi & Noci (1997) highlighted that market pressures such as customers and public opinion requirements, competitors' actions, were the main trigger of the process towards environmental certification. In particular, firms were induced to obtain an environmental certification to improve relationships with stakeholders, shareholders and supply value chain partners. Environmental certification was considered as a useful tool with which to demonstrate to external factors the quality of their environmental systems and to improve their green image. Scott (2003) viewed that organizations can use ISO 14001 certification to benchmark the commitment level in their supply chain, for example, Kingfisher, a company that used ISO 14001 certification as an essential criterion, evaluated a few thousands potential suppliers within their supply chain. Schmidheiny (1992) viewed that business is responsible to change the world development direction, which would help the world sustainably develop.

### **1.5. Implementation Support**

According to Azzone et al. (1997) who conducted an empirical study on EMS certified companies in Italy, these companies have significant availability of implementation support. The analysis revealed that they have well qualified human resources who were able to understand the environmental implications of products and processes and efficient research and development departments which enable them to introduce innovative solutions when necessary. In the event that internal facilities are insufficient, the companies could take advantage of resources at headquarters level as there was a high level of internationalization. Environmental certification also induced all firms analysed in Italy 1997 to develop formal and codified audits to verify environmental performance trends in a particular area of activity.

### **1.6. Organizational Culture**

In Japan, many organizations have adopted ISO 14001 due to Japan's earlier experience with ISO 9000. In the beginning, Japanese organizations that implemented ISO 9000 found that it was slow as they considered they already have very good quality standard. However, due to request from European and US customers who requested Japanese suppliers to register themselves with ISO 9000, massive Japanese firms had implemented ISO 9000 to avoid losing business opportunities. Therefore, when ISO 14001 was introduced, Japanese firms had adopted ISO 14001 standard to a high degree. With that, Japan has more than 5500 ISO 14001 registrations by December 2000, including manufacturing and service firms, schools, universities and government agencies. There is a similar experience with ISO 9000 in Taiwan, which also encouraged firms to proactively seek ISO 14000 registration (Corbett & Russo, 2001). In Italy, most EMS certified companies already have a total quality management system prior to adopting an EMS. In particular, the sample firms have been assisted by their existing quality procedures, which have been adjusted to accommodate the environmental issues, thus allowing them to save time and money (Azzonea et al., 1997).

## 2. Material and Methods

The research methodology structure entailed the following target: determination of the EMS adoption factors among organizations in Sarawak, where the adoption factors are chosen through the researcher's experience as well as factors that several other literature had suggested which had important roles in determining adoption of an EMS. The source of information and the relevant research techniques that were employed to achieve the targets mentioned above include, but are not limited to, the following:

- Primary sources of information: questionnaire with a total of seven sections; informal interviews with Environmental Management System Representatives (EMR) from several organizations from Sarawak, Malaysia, government or government-linked bodies, such as Department of Standards Malaysia and SIRIM-QAS International (2015) as well as a few other accredited certification bodies certifying EMS.
- Secondary sources of information: the literature, retained documented information of EMS of one of the organization in Sarawak, Malaysia, data from International Organization for Standardization (ISO)(2014) Department of Standards Malaysia and SIRIM-QAS International.

### 2.1. Sampling Design

The population of this study is only comprised of organizations in Sarawak that are certified with EMS under SIRIM QAS International Sdn. Bhd.; certified to EMS under other accredited certification bodies accredited to Department of Standards Malaysia, United Kingdom Accreditation Services (UKAS) and others and registered under Sarawak Manufacturers' Association (SMA).

The Department of Standards Malaysia (DSM, 2015) has a total of 13 accredited certification bodies for Environmental Management Systems (EMS). The statistics, which were updated from quarter 3, year 2015 show that the total number of EMS accredited certification or certified organizations in Malaysia is 1,137 organizations. SIRIM QAS International Sdn. Bhd., as the main DSM accredited certification body for EMS has issued a total of 723 EMS certifications in Malaysia, which comprises of about 40 percent of the total EMS certificates under DSM (SIRIM QAS, 2015). Out of the total 723 EMS certificates, a total of 38 EMS certificates were issued for 32 organizations in Sarawak. The researcher has invited all the 32 organizations from Sarawak to participate in the survey questionnaire and or informal interview regarding their EMS implementation.

Besides, to increase the reliability of this research, the researcher has invited the other 20 EMS certified organizations from 12 other accredited certification bodies accredited to Department of Standards Malaysia, United Kingdom Accreditation Services (UKAS) and other accreditation bodies to participate the study. The researcher has randomly selected 60 organizations from the list of Sarawak Manufacturers' Association members, or about 30 percent of the total 204 organizations from SMA list. Walford (1995) in his assertion said that sampling techniques require 10 percent or more of observations or sampling fraction so in order to be considered representative of the total population.

### 2.2. Data Collection Method

One of the key source of information for this study is through the data gathered and or data analysis performed from questionnaire with title, "SURVEY ON IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT SYSTEMS". The questionnaire was prepared in hardcopy as well as softcopies such as in the format of Microsoft Word and PDF format sent through email and or hand carry to targeted respondents. Besides, the researcher has prepared the same questionnaire online using the Google Forms template for those who prefer to reply online. The online questionnaire can be found through the link, <http://goo.gl/forms/5eChN1jRvH>. Besides having to choose the most suitable answer(s) on the different items in the questionnaires to measure the variables, a 5 point Likert scale was used, which is described as 1 - Strongly disagree, 2 - Disagree, 3 - Neutral, 4 - Agree and 5 - Strongly

agree.

Nunnally and Bernstein (1994) recommended that when a measuring instrument is used for data collection, the subjects used should be those for whom the instrument is intended. Therefore, the respondents targeted in this study through the questionnaire were the organizations' Environmental Management Representatives (EMR), Safety, Health and Environment (SHE) managers, and other directors or executives whose jobs are related to environmental issues. A cover letter from the researcher's academic supervisor was attached together with the questionnaire to request the targeted respondents to reply. Besides, the researcher has made personal telephone calls to most of the targeted respondents and to some, personal meet up appointments to explain to them personally the purpose of the questionnaire. Informal interviews were conducted through informal meetings and other means of telecommunication with selected EMR (about 65% from the total respondents) of the certified organizations who have responded to the questionnaire.

### 3. Result and Discussions

The results of the research show that organizations which have implemented an EMS, more than half (66.7%) of them are from larger organizations in Sarawak with over 251 employees, about 28.6% of them are from organizations with 51 to 250 employees and only 1 of them is from an organization with a total of 10 to 50 employees. A possible reason for this distribution of sizes is that there is less available human resource, finance and time allocated for EMS in medium and smaller organizations than in larger organizations. As for the total number of operating location for organizations with an EMS implemented, more than half (52.4%) of the total organizations have more than one operating location. Besides, most of the respondent's organizations (about 80.9%) with an EMS implemented have been established for more than 15 years.

**Figure 2** shows the role of top management in organization planning to implement an EMS as well as in organization with an EMS. Different elements on the role of top management are getting a total of at least 62.5% to 100% of the respondent's organizations from both categories to agree and strongly agree on. The findings confirmed the view of \$ that the commitment from top management is required for the adoption of an EMS as well as for EMS implementation. The findinul (Chin, 1999) also showed that 100% of the respondents agree and strongly agree that it is the decision of the top management to implement EMS in their organization and confirmed the literature by Urban and Star (1991) that top management has become a critical factor in implementing EMS.

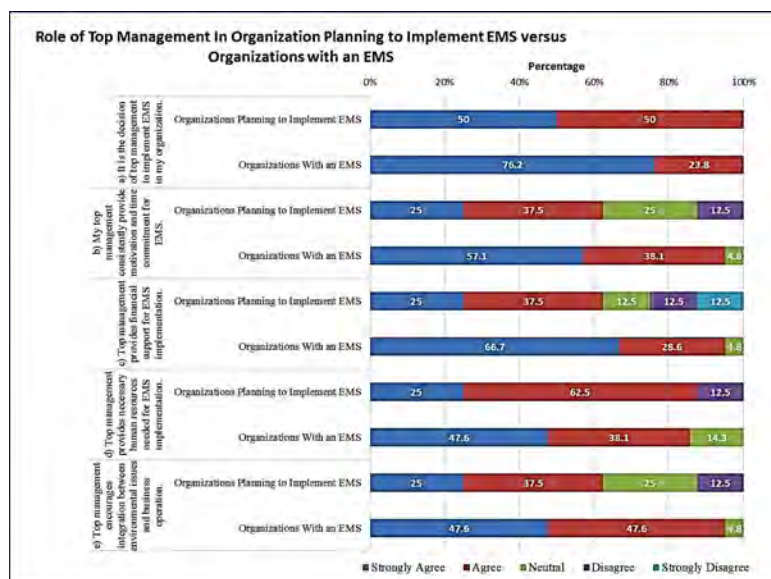


Figure 2. Role of Top Management

**Figure 3** shows the importance of management support in organization planning to implement an EMS as well as in organization with an EMS. Different elements on management support are getting a total of at least 50% to 100% of the respondent's organizations from both categories to agree and strongly agree. The finding confirmed to the literature by Randall (1995) who viewed that to incorporate good environmental practices in an organization, it requires changes in organization, be it structurally, responsibilities delegation, personnel training, as well as the communications and control management. Stone, Joseph & Blodgett (2004) viewed that managers' mentality and decisions are essential to advance environmental management actions. And generally, organizations which have implemented an EMS strongly agree more than organizations which are planning to implement an EMS that management support is an essential factor for EMS adoption in organizations.

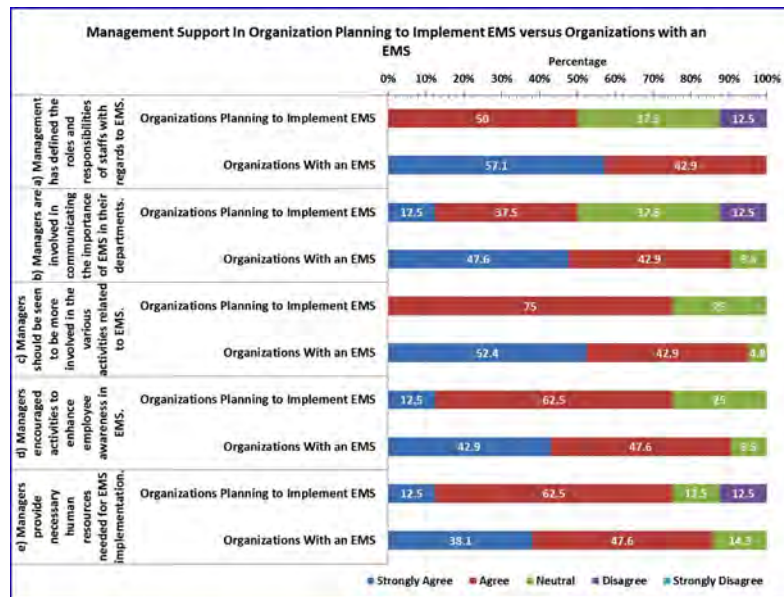


Figure 3. Management Support

**Figure 4** shows the importance of EMS implementation motivation factor in organization planning to implement an EMS as well as organization with an EMS. Different elements on motivation are getting a total of at least 87.5% to 100% of agree and strongly agree from both categories of respondents. Among the elements under motivation factor, 100% of the respondents strongly agree that EMS is believed to be able to reduce waste and pollution and strongly agree and agree that EMS has positive impact on organization's environmental performance and also adoption of EMS enhances the organization's relationship with authorities and communities.

**Figure 5** shows the importance of the current market orientation factor in organization planning to implement an EMS as well as in organization with an EMS. Different elements on current market orientation are getting a total of at least 50% to 87.5% of agree and strongly agree from respondents in both categories. Among the elements under the current market orientation factor, a total of 87.5% of respondents from the category of organizations are planning an EMS and a total of 85.7% of respondents from the category of organizations are implementing an EMS, they strongly agree and agree that EMS is able to fulfill the current legislation enforced by local authorities. This result confirmed the literature by Dögl (2015) that regulatory, market and social stakeholders have positive influences towards the firms' corporate environmental responsibility practices. Apart from that, a total of 75.0% of respondents from the category of organizations are planning an EMS and a total of 81.0% of respondents from the category of organizations are implementing an EMS, they strongly agree and agree that EMS is for the purpose of dealing with consumer-driven green demand as well as market pressures. This result confirmed the study by Dögl (2015) who pointed out that environmentally responsible behavior such as green technologies, products, communication and strategies were requested by companies' stakeholder in an increasing trend and by Azzonea et al. (1997) who highlighted that market pressures such as customers and public opinion requirements, competitors' actions, were the main trigger of the process towards EMS certification.

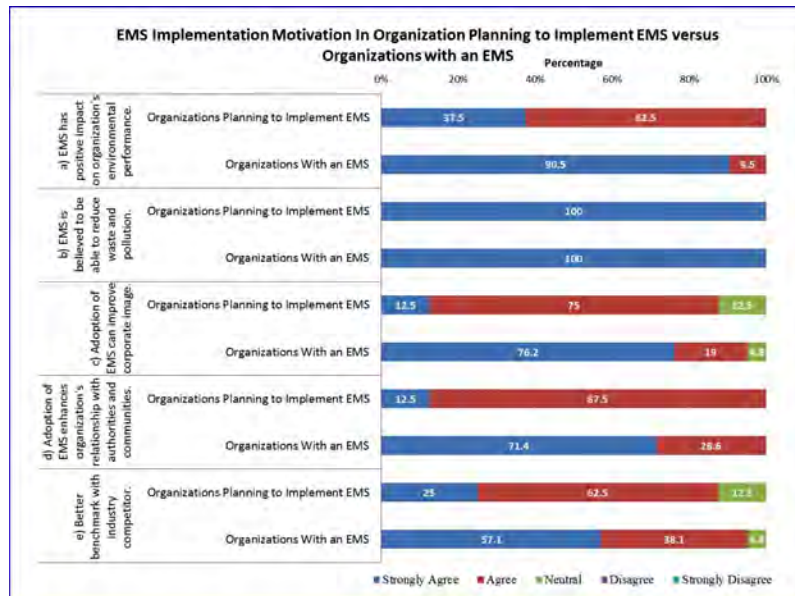


Figure 4. Implementation Motivation

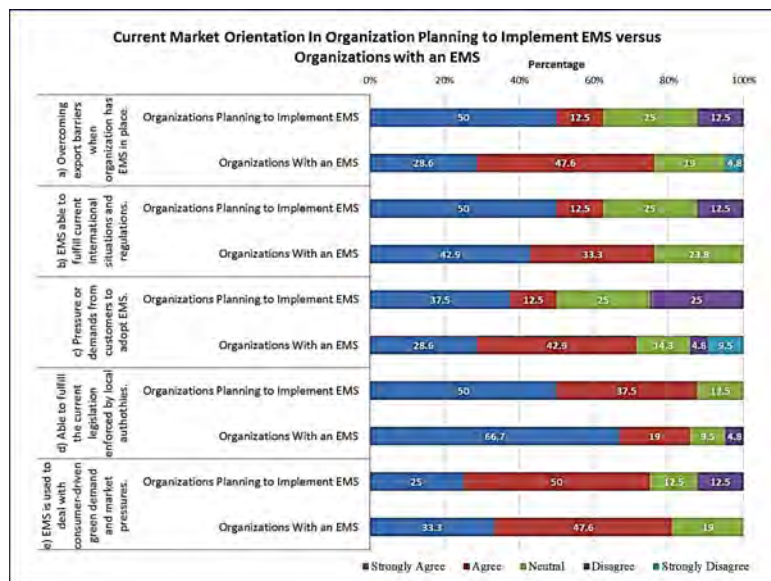


Figure 5. Current Market Orientation

**Figure 6** shows the importance of the implementation support factor in organization planning to implement an EMS as well as in organization with an EMS. Different elements in implementation support are getting a total of at least 12.5% to 95.2% of agree and strongly agree from respondents in both categories. Among the elements under implementation factor, a total of 50.0% of respondents from the category of organizations are planning an EMS and a total of 95.2% of respondents from the category of organizations are implementing an EMS, they strongly agree and agree that there have been ongoing supports for EMS implementation in their organizations. However, with regards to the elements concerning internal audit programs being ongoing as well as the program showing continual improvement, organizations which are planning to implement EMS, a total of 50.0% to 62.5% of the respondents strongly disagree and disagree about it. However, a total of 95.4% of the respondents from the category of organizations which had implemented an EMS strongly agree and agree about the same matter. The difference in this response is because in organizations which had implemented an EMS, internal audit is a mandatory requirement to abide. These results also show that both categories of respondents have different opinions in implementation support factor as EMS adoption factor. Organizations which have implemented an EMS viewed (85.7% to 95.2% of them strongly agree and agree) the implementation support as very essential for



successful EMS adoption. This result confirmed the literature Azzonea (1997) that EMS certified companies have significant availability of implementation support, be it in the internal audit program, resources sharing and support from the headquarters, qualified human resources and supports.

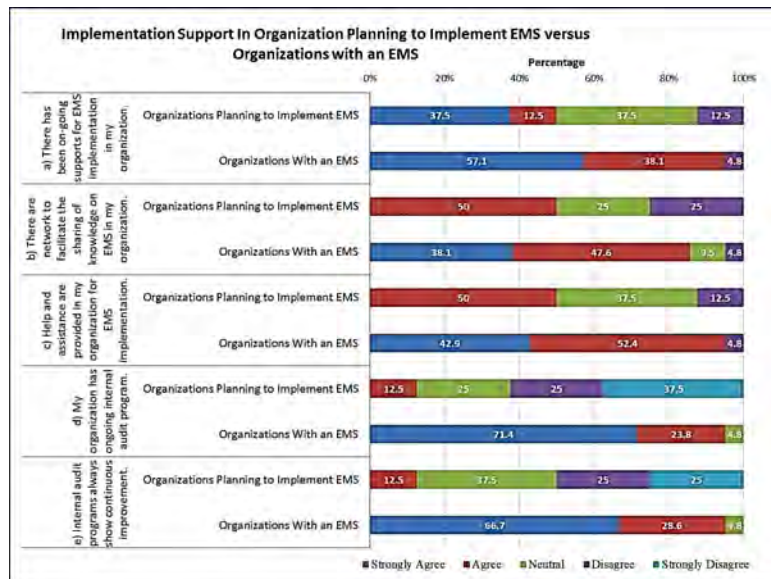


Figure 6. EMS Implementation Support

**Figure 7** shows the importance of the organization culture factor in organization planning to implement an EMS as well as in organization with an EMS. Different elements in organization culture are getting a total of at least 12.5% to 95.2% of agree and strongly agree from respondents in both categories. Among the elements under the organization culture factor, a total of 87.5% of respondents from the category of organizations are planning an EMS and a total of 80.9% of respondents from the category of organizations are implementing an EMS, they strongly agree and agree that prior EMS implementation, there were other management systems such as ISO 9001, OHSAS 18001, ISO 22000 implemented in their organizations. This is a similarity among the two categories of respondents, in their opinion. This result confirmed the literature by Corbett and Russo (2001) who said that ISO 14001 adoption in Japan and Taiwan was high due to both countries' earlier experience with ISO 9000 quality requirements and the experience also had encouraged firms to proactively seek ISO 14000 registration. Besides, this is confirmed by literature by Azzonea (1997) who has written that in Italy, most EMS certified companies already have a total quality management system prior to adopting an EMS. In particular, the sampled firms have been assisted by their existing quality procedures, which have been adjusted to accommodate the environmental issues, thus allowing them to save time and money. However, with regards to the matter that employees are equipped with necessary knowledge and skills for EMS implementation, only 12.5% of respondents from organizations which are planning to implement EMS agree while the other 50% of the same disagree about it. However, there are 85.7% of the respondents from the category of organizations which had implemented an EMS strongly agree and agree about the same matter. Besides, another matter with regards to organization culture, which has bigger differences compared to both categories of Respondents, is about awareness of environmental issues is cultivated in the organization through communication from management, training and campaigns. About 50% of respondents from organizations which are planning to implement EMS agree while the other 12.5% of the same disagree about it. However, there are 95.2% of the respondents from the category of organizations which had implemented an EMS strongly agree and agree about the same matter. The difference in this response is because, in organizations which had implemented an EMS, trainings regarding the EMS requirements and EMS awareness in general are normally given to the employees in the organizations. And the experiences in managing an EMS throughout the years would increase the knowledge and skills of the users of the EMS.

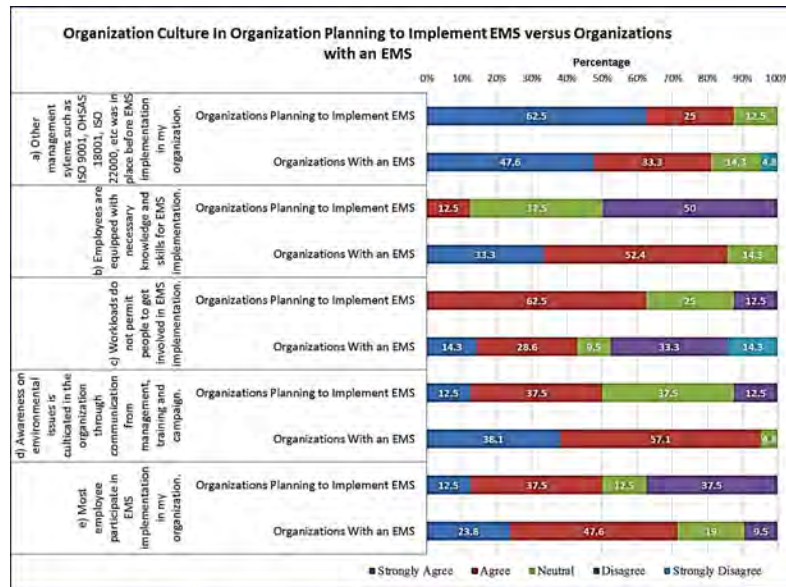


Figure 7. Organization Culture

#### 4. Conclusion

From this research, organizations which have implemented an EMS are mostly from larger organizations in Sarawak which have been established for more than 15 years with over 251 employees and have more than one operating location. ISO 14001 EMS is the most accepted and well-known EMS in Sarawak at the present moment. As for the adoption factors investigated, EMS implementation motivation and the role of top management are the most critical factors in EMS adoption in Sarawak. The results show that under a motivation factor, 100% of the respondents strongly agree that EMS is believed to be able to reduce waste and pollution, they strongly agree and agree that EMS has a positive impact on the organization’s environmental performance as well as the fact that adoption of EMS enhances the organization’s relationship with authorities and communities. Besides, 100% of the respondents also agree and strongly agree that it is the decision of the top management to implement EMS in their organization. Management support is also another essential factor for EMS adoption among Sarawak organizations followed by current market orientation factor. Both of the factors drove at least 50% of their respondents to strongly agree and or agree to the respective elements. Both adoption factors, namely implementation support and organization culture, are getting a total of 12.5% to 95.2% of agree and strongly agree from respondents in various elements.

#### 5. Acknowledgments

The authors acknowledge the funding of this research by the Ministry of Education in Malaysia through MyBrain 15, the facilities provided by Universiti Malaysia Sarawak, as well as to the respondents of the questionnaires.

#### References

1. Azzone, G., Noci, G., Manzini, R., Welford, R. and Young, C.W. (1996). Defining Environmental Performance Indicators: An Integrated Framework. *Business Strategy and the Environment*, 5(2), pp. 69-80.
2. Azzone, G., Bianchi, R. and Noci, G. (1997) Implementing environmental certification in Italy: managerial and competitive implications for firms. *Eco-Management and Auditing*, 4(3), pp. 98-108.
3. Bhattacharyya, A. and Cummings, L. (2015) Measuring Corporate Environmental Performance – Stakeholder Engagement

4. Evaluation. *Business Strategy and the Environment*, 24(5), pp. 309-325.
5. Chin, K.S. (1999) Factors Influencing ISO 14000 Implementation in Printed Circuit Board Manufacturing Industry in Hong Kong. *Journal of Environmental Planning and Management*, 42 (1), pp. 123-134.
6. Corbett, C. J. and Russo, M. V. (2001) The Impact of ISO 14001. *ISO Management Systems*, (December 2001), pp. 23 – 29.
7. DAFT R.L. and MACINTOSH N.B. (1984) The nature and use of formal control systems for management control and strategy implementation. *Journal of management*, 10(1), pp. 43-46.
8. Darnall, N., D.R. Gallagher, R.N.L. Andrew and D. Amaral. (2000) Environmental management systems: Opportunities for improve environmental and business strategy? *Environment Quality Management*, 9(2), pp. 107-115.
9. Department of Standards Malaysia (DSM) (2015) Accreditation [WWW] Department of Standards Malaysia. Available from: <http://www.jsm.gov.my/accreditation#.V1VOMPI97IU> [Accessed 19/12/15].
10. Dögl, C. and Behnam, M. (2015) Environmentally Sustainable Development through Stakeholder Engagement in Developed and Emerging Countries. *Business Strategy and the Environment*, 24(6), pp. 583-600.
11. FRYXELL, G.E., LO, C.W. and CHUNG, S.S. (2004) Influence of motivations for seeking ISO 14001 certification on perceptions of EMS effectiveness in China. *Environmental Management*, 33(2), pp. 239-251.
12. Govindarajulu, N. and Daily, B. F. (2004) Motivating employees for environmental improvement. *Industrial Management & Data Systems*, 104(4), pp. 364-372.
13. HO, L.L. and LAW, P.L. (2015) Impact of Implementation of ISO 14001 Environmental Management Systems on Environmental Performance: A Case Study. *International Journal of Engineering Research and Science & Technology*, 4(1), pp. 80-90.
14. International Organization for Standardization (2014) ISO 14001 Continual Improvement Survey 2013: Executive
15. Summary. Geneva: International Organization for Standardization.
16. Klassen R.D. (1993) The integration of environmental issues into manufacturing: toward an interactive open-systems model. *Production and Inventory Management Journal*, 34(1), pp. 82-88.
17. Maier, S. & Vanstone, K. (2005) Do good environmental management systems lead to good environmental performance? London: Ethical Investment Research Services (EIRIS)
18. Marambanyika, T. and Mutekwa, T. (2009) Effectiveness of ISO 14001 Environmental Management Systems in Enhancing Corporate Environmental Sustainability at Unilever South East Africa in Harare, Zimbabwe. *Journal of Sustainable Development in Africa*, 11(1), pp. 280-297.
19. NUNNALLY, J.C. and BERNSTEIN, I.H. (1994) *Psychometric theory*, Issue 972. McGraw-Hill, pp. 94.
20. Randall, R. (1995) *Randall's Practical Guide to ISO 9000: Implementation, Registration and Beyond*. Addison Wesley: Reading, MA.
21. Rivera-Camino, J. (2001) What motivates European firms to adopt environmental management systems? *Eco-Management and Auditing*, 8(3), pp. 134–143.
22. RUSSO, M.V. and FOUTS, P.A. (1997) A resource based structure on corporate environmental performance and profitability. *Academy of Management Journal*, 40(3), pp. 534-559.

23. Schmidheiny, S. (1992) *Changing Course: A Global Business Perspective on Development and the Environment*. MIT Press.
24. Scott, P. (2003) Management systems and sustainable development. *ISO Management Systems*, September – October 2003, pp. 27-32.
25. Stone, G., Joseph, M. and Blodgett, J. (2004) Toward the creation of an eco-oriented corporate culture: a proposed model of internal and external antecedents leading to industrial firm eco-orientation. *Journal of Business & Industrial Marketing*, 19(1), pp. 68-84.
26. Sirim Qas International Sdn. Bhd. (2015) Malaysian Certified. [WWW] SIRIM QAS. Available from: <http://www.malysiancertified.com.my/MgmtCertification.aspx>. [Accessed 17/12/15].
27. URBAN G.L. and STAR S.H. (1991) *Advanced Marketing Strategy*. Prentice-Hall College: Englewood Cliffs, NJ.
28. United States Environmental Protection Agency (2016) Learn About Environmental Management Systems. [WWW] U.S. Environmental Protection Agency. Available from: <https://www.epa.gov/ems/learn-about-environmental-management-systems> [Accessed 27/07/16].
29. Walford, N. (1995) *Geographical Data Analysis*. New York: John Wiley and Sons.
30. World Commission on Environment and Development (1987) *Our Common Future*. New York: Oxford University Press.
31. Yiridoe, E.K., Clark, J.S., Marett, G.E., Gordon, R. And Duinker, P. (2003) ISO 14001 EMS Standard Registration Decisions Among Canadian Organizations. *Agribusiness*, 19(4), pp. 493-457.