

Green technology awareness: A case of Malaysia

Fadhlor Rahim ¹, Haslinda Musa ²

¹ Universiti Teknikal Malaysia Melaka

Abstract: In the context of technology, the organization should be well fitted to implement green practice. Environmental practices have been well studied but only a few studies have presented the green innovation practices of corporate firms in Malaysia. This study focused on the awareness of green practices which were concerted upon organizational (Training Program), environment (Government Regulation & Policies) and individual context (Knowledge). A total of 108 questionnaires were returned out of 200. Reliability analyses were applied to test reliability of the instrument. Meanwhile, regression analysis was applied to determine the predicted factors for green practices towards the awareness of green practices. The results of the analysis indicated knowledge of employees as the most influencing factors to the awareness of green practices. For the practicality of this study, green technology is anticipated to be well implemented when these practices are understood.

Keywords: Green Technology; green Practice

1. Introduction

1.1text

An industrial sector through its role in society has contributed significantly to pollution and exploitation of the environment. The impact of climate change in the future will be a challenge in order to maintain sustainability of a state[1]. To ensure the sustainability of social life, green practices become a liability to the industrial players. Numerous multinational enterprises are investing in researching and developing green products, establishing standards restricting the use of hazardous substances, and requiring suppliers to provide products that are free of hazardous materials at all levels of a supply chain[2]. In Malaysia, the government introduces energy policy to ensure the sustainability of energy, environment, economy and social. Besides, firms need to implement firm-oriented green innovation as well as customer-oriented green innovation in order to increase their performance[3–5]. Although many studies agree that performance of an organization is very much depending on its characteristics of innovation adopted[6–8], green technology application has been regarded as a strategic industry in the 21st century which will accelerate more of its success. In terms of technology, green practice is a development and application of products, equipment and systems used to conserve the natural environment and resources, which minimize and reduces the negative impact of human[9]. The areas of engineering management become a pillar to practices of the green technology. Engineering management concentrates on the application of engineering principles for effective planning and efficient operations of managing manufacturing or industrial operations[10].

Creating awareness of green technology and its practices to employees can increase knowledge and reduce the negative impact on the environment[11, 12]. The purpose of this study is to identify the relationship between the influencing factors of awareness for green practices among green technology firms in Malaysia and also -identify the factor that most influence the awareness and practices among staff in the firms. Figure 1 shows the conceptual model of the study. This study focused on organizational context (training program), environment (government regulation and policy) and individual (knowledge of the executives). Therefore, H1, H2 and

Copyright © 2018 Fadhlor Rahim et al.

doi: 10.18063/esp.v3i1.674

This is an open-access article distributed under the terms of the Creative Commons Attribution Unported License

(<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

H3 had positive relationship between training program, government regulation also knowledge and awareness of green practice[13, 14].

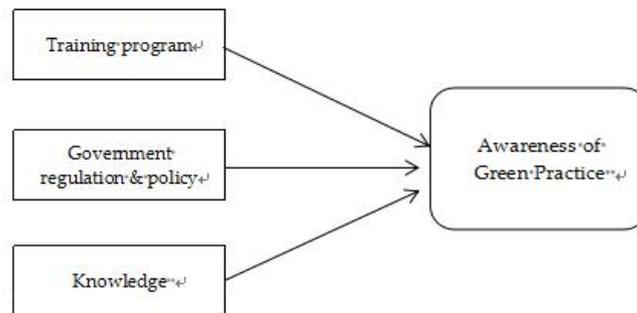


Figure 1: Conceptual model

2. Literature review

An awareness of green practices should be developed by organizations to ensure employees have basic understanding on it. However, use of green practices may add complexity to the process and require an amount of learning and training program[15]. Due to that, an effectiveness of training programs developed by organization will improve the green practices among employees and suppliers[16].

Furthermore, government regulations are significant drivers to achieve the green practices in firms[17] because of legislation made by government. For example, governments encourage the adoption of Green IT by legislations that create the framework for the low carbon economy[18]. Moreover, political issues also give the effect for the green practices whereby political pressure comes from government regulations[19].

Knowledge of green practices has been a crucial factor in order to implement green practices. Pro-environmental approach requires knowledge and skills of employees to create an emotional involvement in green practices[20]. Another scholar asserted that to achieve the desired environmental performance, skills and knowledge of employees are essential because lack of knowledge brings failures to the implementation of green practices[21].

3. Methodology

A convenience sampling which is a type of non-random probability sampling technique was utilized. The study used questionnaires through survey. Questionnaire consists of two parts which is part A for demographics profile and part B for awareness of green practices. Demographics profile contained gender, length of service and departmental function in the company. Factors in influencing green practices contained training program, government regulation and policy and knowledge of employees. Part B was measured by 5-point Likert scale. These items were measured using a Likert scale ranging from 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. A total of 200 questionnaires were distributed via email but only 108 were returned.

In terms of statistical analysis, the study applied descriptive analysis to measure the distribution of the demographics of the respondents. Reliability analyses were applied to test the instrument. Moreover, correlation analysis was applied to examine the relationship between green practices and their awareness. Regression analysis was applied to determine the predicted factors for green practices towards awareness of green practices.

4. Results and discussions

Table 1 shows the distribution of demographic profile of respondents. Most respondents are male (51.85%), followed by female (48.15%). Respondents who served between 6-10 years were the most responded to the study

which was 46.30%, followed by below than 5 years (25.93%), 15 years and above (18.52%), and those with length of service between 11-15 years responded the lowest which was 9.26%.

A Cronbach alpha greater than 0.60 is generally accepted for exploratory research to indicate reliability for the measurement although a value greater than 0.70 is preferable[22, 23]. Hence, the instruments were reliable for the study. For reliable test, Cronbach ' s alpha for all variables were acceptable for training program, 0.620 (acceptable); government regulation & policy, 0.750 (acceptable); and 0.950 (excellent) for knowledge of employees.

Based on correlation analysis, employee ' s knowledge showed the highest correlation which was 0.902., followed by government regulation and policy with 0.758. Meanwhile, training program (0.601) showed the lowest correlation to the awareness of green practices. Furthermore, the analysis showed H1, H2 and H3 were supported by analytical analysis. Regression analysis showed R2 =0.408 which implied that the knowledge of employees contributed most whereby explained 40.8% of the variability of the awareness of green practices. Government regulation and policy explained 38.5% of the awareness of green practices. Meanwhile, training program explained the lowest (15.4%) which contributed to the awareness of green practices. Table 2 shows a summary of the analysis.

This study has revealed the existence of a highest significant correlation between employee knowledge (0.902) and awareness of green practices. The correlation analysis has interpreted a very strong positive correlation between employee knowledge and awareness of green practices. According to this analysis, the result shows there was a significant relationship between independent and dependent variable of this study. The study is supported by Drejer[24] whereby, knowledge is a crucial tool to the implementation of technology innovation in the organizational. Shi et. al.,[25] indicated the lack of knowledge on green technology and the durability of green materials.

	Frequency	Per cent
Gender	108	100.0
Male	56	51.85
Female	52	48.15
Departmental Function	108	100.0
HR	45	41.67
Operation	20	18.52
Marketing & Sales	35	32.41
Technical support	4	3.70
Others	4	3.70
Length of service	108	100.0
<5	28	25.93
6-10	50	46.30
11-15	10	9.26
>15	20	18.52

	Frequency	Per cent
Gender	108	100.0
Male	56	51.85
Female	52	48.15
Departmental Function	108	100.0
HR	45	41.67
Operation	20	18.52
Marketing & Sales	35	32.41
Technical support	4	3.70
Others	4	3.70
Length of service	108	100.0
<5	28	25.93
6-10	50	46.30
11-15	10	9.26
>15	20	18.52

Table 1: Distribution of respondents

Variables	Reliability Analysis	Correlation Analysis	Regression Analysis (R ²)	Hypotheses
Training Program (H1)	0.620	0.601* *	0.154 **	supported
Government regulation & policy (H2)	0.750	0.758* *	0.385 **	supported
Knowledge (H3)	0.950	0.902* *	0.408 **	supported

***Correlation is significant at the 0.01 level (2-tailed)*

Table 2: Summary of the analysis

5. Conclusion

In conclusion, the results of the analysis indicated knowledge of employee as the most influencing factors for the awareness of green practices. For the practicality of this study, green technology is anticipated to be well implemented when these practices are understood. The study has limited samples; more companies should have been participating in

the survey of green technology. More samples with more assorted qualities would have profited the study. Another conceivable change in the study could have been interviewing directly participants. This method could have included imperative subjective information and more prominent understanding into the participants' idea and assessments.

References

1. Chu S and Majumdar A. Opportunities and challenges for a sustainable energy future. *Nature* 2012; 488(7411): 294–303.
2. Hu AH and Hsu C. Critical factors for implementing green supply chain management practice, *Manag. Res. Rev.* 2010; 33(6): 586–608.
3. Woo C, Chung Y, Chun D, *et al.* Impact of green innovation on labor productivity and its determinants: An analysis of the Korean manufacturing industry, *Bus. Strateg. Environ.* 2014; 23(8): 567–576.
4. Musa H, Nursyairalia S, AR Yunus, *et al.* The Characteristics of Users in the Adoption of Low Loss Microwave Transmission Glass: A Conceptual Paper, *Procedia - Soc. Behav. Sci.* 2016; 219: 548–554.
5. Musa H and Chinniah M. Malaysian SMEs Development: Future and Challenges on Going Green, in *Procedia - Social and Behavioral Sciences* 2016; 224: 254–262.
6. Musa H, Li SC H, Abas ZA, *et al.* Adoption Factor of Mobile Marketing: The Case of Small Medium Enterprises (SMEs) in Malaysia, *Int. Rev. Manag. Mark.* 2016; 6(7): 112–115.
7. Musa H, Rahim NA, Azmi FR, *et al.* Social Media Marketing and Online Small and Medium Enterprises Performance: Perspective of Malaysian Small and Medium Enterprises, *Int. Rev. Manag. Mark.* 2016; 6:1–5.
8. Musa H, Taib MS M, Li SCH, *et al.* Drop-shipping Supply Chain : The Characteristics of SMEs towards adopting it 2016; 11(11): 2856–2863.
9. KETTHA. Definition of Green Technology by KETTHA (Ministry of Energy, Green Technology and Water), Green Purchasing Network Malaysia 2010. [Online]. Available: <http://www.green-technology.org/what.htm>
10. Nambiar A. Challenges in Sustainable Manufacturing in Proceedings of the 2010 International Conference on Industrial Engineering and Operations Management 2010: 10–15.
11. Azmi FR, Musa H, Shahbodin F, *et al.* Implementation of green human resource management in Malaysia. in Proceedings of Mechanical Engineering Research Day 2017: 257–258.
12. Azmi FR, Musa H, Abdullah AR, *et al.* Analyzing the awareness of green technology in Malaysia practices, in Proceedings of Mechanical Engineering Research Day 2017: 252–254.
13. Min H, Galle WP. Green purchasing practices of US firms, *Int. J. Oper. Prod. Manag* 2001; 21(9): 1222–1238.
14. Chan ESW, Hon AHY, Chan W, *et al.* What drives employees' intentions to implement green practices in hotels? The role of knowledge, awareness, concern and ecological behaviour, *Int. J. Hosp. Manag* 2014; 40: 20–28.
15. Lin CY and Ho YH. Determinants of Green Practice Adoption for Logistics Companies in China, *J. Bus Ethics* 2011 ;98(1): 67–83.
16. Sarkis J. A boundaries and flows perspective of green supply chain management, *Supply Chain Manag. An Int. J.*, 2012; 17(2); 202–21.
17. Diabat A and Govindan K. An analysis of the drivers affecting the implementation of green supply chain management, *Resour. Conserv. Recycl* 2011; 55 (6): 659–667.
18. Chen AJ, Watson RT, Boudreau E, *et al* Organizational Adoption of Green IS & IT: An Institutional Perspective, in *ICIS Proceedings* 2009; 1–18.
19. Molla A and Abareshi A. Organizational green motivations for information technology: Empirical study, *J. Comput. Inf. Syst* 2012; 52(3): 92–102.
20. Renwick DWS, Redman T, Maguire S. Green Human Resource Management: A Review and Research Agenda, *Int. J. Manag. Rev.* 2013 ; 15(1): 1–14.
21. Mudgal RK, Shankar R, Talib P, *et al.* Modelling the barriers of green supply chain practices: An Indian perspective, *Int. J. Logist. Syst. Manag* 2010: 7(1): 81–107.
22. Hair J, Black W, Babin B, *et al.* Principles of marketing research. Blackwell Business 1994.
23. Bagozzi R, Principles of marketing research. Blackwell Business 1994.
24. Drejer I. Identifying innovation in surveys of services: a Schumpeterian perspective, *Res. Policy* 2004; 33(3): 551–562.
25. Shi Q, Zuo JR Huang, *et al.* Identifying the critical factors for green construction - An empirical study in China, *Habitat Int.* 2013; (40) :1–8.