

The Adoption of Green Manufacturing Practices in Furniture Firms

Puteri Fadzline Tamyez, Norzanah Mat Nor, and Syed Jamal Abdul Nasir

1 Introduction

According to Gomes and Shian [1], manufacturing is much related to the 3D syndrome—dirty, dangerous and degenerative. It is unfortunate to acknowledge the progress of Malaysia in green technology that is 25 years behind Europe particularly in green building technology, water and waste management and the transportation sector. Green technology is not merely described as technology or processes that are environmentally friendly and applied principles of sustainability. According to Lee et al. [2], green management comprises interaction between corporate and environment which further brings an impact in the field of business and environment. Nature or green technology is a current key theme which continues to conquer interior works and the furniture industry [3].

Furniture is an example of products that constitute to one of the major causes of environmental problems [4]. The limitation and overexploitation of natural resources have forced green design to be advocated as the mainstream of the future direction to protect the environment and resources [3, 5]. Most greenhouse gases emissions, nature resources consumption and other environmental problems are caused by manufacturing industries. References [6, 7] introduce ‘green innovation’ which aims to radically produce green products that are not only ‘new’ from distinctive competitors but also ‘green’ enough to create an influence and to minimise environmental impact [8]. The economic growth, industrialisation and growing population in Malaysia have forced companies to pursue to green manufacturing practices [9, 10]. The National Green Technology Policy (NGTP2009) has been developed by the government to encourage manufacturers to lessen environmental problems [10]. Green practices are also among the seven

P.F. Tamyez (✉) • N.M. Nor • S.J.A. Nasir
Faculty of Business Management, Universiti Teknologi Mara, Shah Alam, Malaysia
e-mail: 120rahmat@gmail.com

thrusts outlined in the National Timber Industry Policy as a policy direction in marketing and promotion [11].

2 Methodology

A total of 49 usable responses out of 403 samples completed the open-ended questions. Arnon and Reichel [12] stated the necessity to include open-ended questions in order to draw out personal thoughts about the topic of interest. Samples involved are the small-, medium- and large-sized furniture managers in Malaysia. The majority of the respondents (93.5 %) are Chinese who fell in the age ranged of 40–49 years old. Most of the respondents had 21–30 years of experience in the furniture industry where the majority of them are managers but not owners. In terms of the size of firm, the majority of respondents belong to the medium-sized firms which constitute 35.2 %, followed by small-sized and a minority of large-sized firms which constitute 10.3 %. Content analysis was chosen as a method of analysing the data resulting from the open-ended question. According to Ref. [13], an ‘emergence of regularities’ needs to be achieved after an iterative process of identifying units of similar characteristics.

3 Results and Discussion

3.1 *Reluctance in Pursuing Green Processes*

A very large proportion of the participants (81 %) strongly claimed that they do not have any consideration to produce green products or green processes. This indicates a low possibility of adoption of green practices among the manufacturing firms. Lee [14] and Nawrocka [15] agreed to the notion and added that it is similar among SMEs that often have a narrow perspective on tackling green issues in an ad hoc manner.

This study is consistent with Valipoor and Ujang [16]’s study which revealed that most of their respondents are reluctant to sacrifice in changing their production facilities in order to pursue towards sustainable products. Factors that contribute to their hesitation are the lack of technology, proper facilities and appropriate suppliers. A similar study [17] added a lack of system of knowledge sharing and a large skill set of sustainable product design are some of the barriers to implement green products. This is also agreed by Ratnasingam et al.[18] and Ratnasingam and Wagner [19], and they stated that the lack of customer demand, no government regulation, lack of government incentives and lack of trained personnel to implement and maintain the system also contribute to the deterrents of the adoption of green manufacturing practices.

Not only that, Ratnasingam [20, 21], Ratnasingam et al. [18] and Ratnasingam and Wagner [22] investigated that ISO 14000 is less applied among the furniture firms and needs to be contemplated to evaluate whether the cost be reduced with the application of ISO 14000. Ratnasingam [21] added that ISO 14001 comprises important elements of an environmental management system which have been implemented by more than 130,000 organisations worldwide. A participant (No. 29) agreed to have consideration in producing green products depending on the market response and the additional cost that can be accepted by the customer. Another participant (No. 25) also had similar view and stated that their company has not put serious effort to implement this work or idea. The reason behind the reluctance of the retailers in pursuing green technology is their unwillingness in paying premium price for green furniture. Most buyers have the perception of purchasing cheaper furniture [1]. Some furniture buyers are not having any interest in purchasing sustainable products due to their unawareness on the benefits of the positive effects of green products and little realisation of sustainability to the public in Malaysia [16]. However, Adis et al. [23] argued that this is not the case for foreign buyers as they prefer certified environmentally friendly products from Malaysian firms. Noci and Verganti [24] revealed that advanced green manufacturing can only be carried out through implementation of high innovation capacity.

3.2 The Willingness of Firms in Pursuing Green Management

Hence, it is worrying that there is only small proportion of participants that could take their products to a higher level by meeting requirements to produce green products, using water-based or nontoxic finishing materials and using plantation wood rather than tropical wood. Green management has become fashionable and a trend among large firms [25]. Gomes and Shian [1] agreed that there is an increasing number of manufacturers instituting green practices in response to the market that is becoming highly competitive. Ratnasingam [21] added that more export-oriented manufacturing firms showed significantly higher degree of green manufacturing. This is agreed by a research made by Ratnasingam and Wagner [19] in Malaysia which stated that only 54 % of the respondents practised some green manufacturing practices and only 8 % adopted the ISO 14000 environmental quality management system. This is also supported by communities [26] which stated that the use of nontoxic, sustainably produced or recycled materials in a process is one of the common principles of environmentally sustainable design. A study has been made by Kozak et al. [27] about the acceptance of customers in Canada on the market potential of wood certification. It is found that not only most participants had little knowledge on environmental labelling of wood products, but also they were willing to purchase and pay a small premium for these products, assuming equivalent design and quality.

The emergence of green innovation derives in response to environmental requirement, rising customers and corporate environmentalism which is described as the responsive way [20, 28, 29]. Goals of higher profitability and cost efficiency are other elements that led to the rise of green innovation, described as proactive way [30]. Several steps were taken by some firms such as using recycled materials (participant No. 13). Another participant uses only plantation wood as a step towards sustainability (participant No. 3). This is also agreed by Gomes and Shian [1] revealing certified sustainable wood is the easiest green step adopted by manufacturers. Forest plantation is described as wood that is harvested from forests that is sustainably managed environmentally [27]. Nonetheless, according to Ratnasingam [21], rubber wood is not considered a sustainable source as its social obligation is not met, and as a result there is difficulty for the plantation to be certified. Sri Lanka rubber wood however is all certified and largely used among manufacturing firms.

Other participants apply water-based finishing (participant No. 41), do not use toxic material which is harmful (participant No. 22), and comply with the FLEGT regulation (participant No. 34). Coating materials are very dependent on market requirements. Low-toxicity furniture results to low volatile organic compound (VOC) production although there is scarce application on recycled metal or plastic among manufacturing firms [21]. According to Ratnasingam [21], there are issues in sustainability that include adhesives, preservatives, wood certification, and packaging. Adhesives, for example, require a much lower volatile content and in packaging it is a matter of using more recycled fibre.

3.3 Guidance for Firms to Adopt Green Manufacturing Practices

It is a challenge for SMEs to gain the international standard [14] for their lack of price premium for green furniture, the cost of adoption and the absence of stringent legislations which are contributing factors to the limitation in the adoption of green practices [21]. The point of issue is how to bring sustainability and green technology into the furniture industry. In countries like USA, UK and Japan, green furniture has been the latest concern in terms of environmental issues [31]. Benefits of green manufacturing practices include energy reduction, better working environment and reduction in waste [21]. In addition, it is proven that manufacturers committing to ISO 14000 standards have reduced their energy use by up to 17 % as well as reduced their waste [1].

Therefore, firms must take the first step by being aware of the benefits of green manufacturing. Ratnasingam and Wagner [19] and Ratnasingam [21] supported this notion and added that it is an important marketing criterion and increasingly used as a strategic marketing tool. In fact, being green is considered as being distinctive from other competitors as better resource utilisation is achieved by reducing waste

and pollution, as well as giving greater value to customers [32]. Additionally, extensive literature [33–36] reported that profitability of a firm could be enhanced by producing green innovative products.

Secondly, pursuing in owning certifications will allow firms to own their own green management. This is because certification plays an important role in determining the success of the wood industry, particularly in the wooden furniture products, which results to the willingness of consumers in purchasing value-added wood products [27, 37]. Certifications such as the International Standard Organization certification will increase a higher standard of promotion adoption [38]. However scholars argued that certification is unlikely to increase financial performance and only able to gain improved customer retention, satisfaction and positive public reputation [39].

Malaysian Timber Certification Council (MCTS) is an organisation that comprises two components: Forest Management Certification and Chain of Custody (CoC) Certification. This organisation assists in meeting demand for certified timber products [40]. Therefore, working closely with this organisation will hope to ensure market access for Malaysian timber products, particularly in improving environmentally sensitive markets. The increased consciousness on the environment in the global markets has led among stakeholders to take more responsibility and accountability to ‘green the industry’ [41]. Thus, more emphasis should be given in ensuring high quality and design on wooden furniture products, as well as sustainability which eventually gives a greater impact on business performance [42].

4 Conclusion

Marketing tools that are very commonly applied among manufacturing industries for waste reduction and process improvement initiatives are Total Quality Management (TQM) and Business Process Reengineering (BPR), Supply Chain Management (SCM) and Lean Manufacturing (LM). Designers also should take initiatives of making bold decisions on the application of resources, modes of consumption and the lifecycles of products and services [26].

According to Zhang and Wang [43], green product designs are undertaken through four stages: (1) process to improve technics, (2) waste recycling, (3) transformation products and (4) environmentally harmless in green product design. According to Callenbach et al. [44], technical and management skills of employees are a prerequisite in developing an innovation-focused environmental initiatives and programmes. Thus, consistent inspirations for employees need to be carried out to produce significant managerial implication. Moreover, an independent department needs to be established to ensure a smooth operation of green manufacturing practices adopted [14]. Green manufacturing practice is the way forward from producing the image to portray towards buyers and among competitors [23]. Low cost and differentiation are benefits that can be gained from green

manufacturing practices [45–47]. This concurs with Handfield et al. [48] 's study which stated that design-oriented sustainability that is applied in the production process and related with the bulk of the cost of product will bring a more competitive edge in the market. Noci and Verganti [24] suggest that a combination of a firm's innovation with technological capability will pursue to a greater advancement in their green management practices.

References

1. Gomes M, Shian YL (2012) Dr. Jegatheswaran Ratnasingam on green technology in furniture manufacturing. *Furnish Now*
2. Lee J, Park SY, Baek I, Le C-S (2008) The impact of the brand management system on brand performance in B–B and B–C environments. *Ind Market Manag* 37:848–855
3. Industry A o t G F (2013) Furniture trend report. FDM Asia, Shanghai New Eastern Media Co. Ltd, Shanghai
4. Datschefski E (2001) The total beauty of sustainable products. RotoVision SA, Switzerland
5. Mohamed S, Ibrahim ML (2007) Preliminary study on willingness to pay for environmentally certified wood products among consumers in Malaysia. *J Appl Sci* 7(9):1339–1342
6. Tseng (曾世昌) SC (2012) Green management approaches for manufacturing industries: framework and illustrative cases. Department of Business Administration, National Central University, China
7. Wong SK-S (2012) The influence of green product competitiveness on the success of green product innovation: Empirical evidence from the Chinese electrical and electronics industry. *J Innovat Manag* 15(4):468–490
8. Unruh G, Ettenson R (2010) Winning in the green frenzy. *Harv Bus Rev* 88(11):110–116
9. Eltayeb TK, Zailani S, Ramayah T (2010) Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: investigating the outcomes. *Resource, Conservation and Recycling*
10. Savita KS, Dominic PDD, Ramayah T (2012) Eco-design strategy among ISO 14001 certified manufacturing firms in Malaysia: green drivers and its relationship to performance outcomes. *IEEE* 1:154–159
11. Ministry of Plantation Industries and Commodities Malaysia (2009) National Timber Industry Policy, Putrajaya
12. Arnon S, Reichel N (2009) Closed and open-ended question tools in a telephone survey about "The good teacher": An example of a mixed methods study. *J Mixed Meth Res* 3(2):172–196
13. Lincoln Y, Guba E (1986) *Naturalistic inquiry*. Sage, Newbury Park
14. Lee K-H (2008) Corporate environmental management and practices of SMEs: the case of Korean manufacturing industry. *J Sustain Manag* 8(1):73–86
15. Nawrocka D (2008) Environmental supply chain management, ISO 14001 and RoHS. How are small companies in the electronics sector managing? *Corp Soc Responsibility Environ Manag* 15(6):349–360
16. Valipoor S, Ujang B (2011) Challenges of sustainable design in Malaysian furniture industry. In: 2011 International conference on environment and industrial innovation, IACSIT Press, Singapore
17. Richardson JI, Tand Sherwin C (2005) *Design and sustainability: a scoping report for the Sustainable Design Forum*, published by The Design Council, 27 June
18. Ratnasingam J, TH M, Ioras F (2008) An assessment of Malaysian wooden furniture manufacturers' readiness to embrace chain of custody (COC) certification. *Holz Roh Werkst* 66:339–343

19. Ratnasingam J, Wagner K (2009) Green manufacturing practices among wooden furniture manufacturers in Malaysia. *Eur J Wood Prod* 67:485–486
20. Ratnasingam J (2006) Transforming the South East Asian furniture industry. Irama Persada, Kuala Lumpur
21. Ratnasingam J (2013) Status of green technology application in the ASEAN furniture industry. In: Industry seminar Malaysian international furniture fair 2013, Putra World Trade Centre, Kuala Lumpur
22. Ratnasingam J, Wagner K (2010) The impact of ISO 14001 on the operations management of wooden furniture manufacturers in Malaysia. *Eur J Wood Prod* 68:479–481
23. Adis AHAA, Sidin SM (2008) Impact of environmental factors as moderator on export marketing performance in wooden furniture industry. *J Kemanusiaan* 11:24–35
24. Noci G, Verganti R (1999) Managing green product innovation in small firms. *R&D Manag* 1:3–15
25. Alberti M, Caini M et al (2000) Evaluation of the costs and benefits of an environmental management system. *Int J Prod Res* 38(17):4455–4466
26. Communities E (2009) Design as a driver of user-centred innovation: Commission Staff Working Document, Brussels
27. Kozak RA, Cohen DH, Lerner J, Bull GQ (2003) Western Canadian consumer attitudes towards certified value-added wood products: An exploratory assessment. *Forest Prod J* 54:21–24
28. Johnstone Hasç'ic, I, N., & Popp, D. (2010). Renewable energy policies and technological innovation: evidence based on patent counts. *Environmental and Resource Economics*, 45(1), 133–155.
29. Porter M (1991) American green strategy. *Sci Am* 264(4):168–176
30. Rennings K, Rammer C (2009) Increasing energy and resource efficiency through innovation: an explorative analysis using innovation survey data. *J Econ Finance* 59(5):442–459
31. Chin Soon N (2011) Malaysian furniture. Kuala Lumpur, Malaysia Furniture Entrepreneur Association
32. Porter M, van der Linde C (1995) Towards a new conception of environment competitiveness relationship. *J Econ Perspective* 9(4):97–118
33. Lieberman MB, Montgomery DB (1988) First-mover advantages. *Strat Manag J* 9(1):41–58
34. Kash DE, Rycroft RW (2000) Patterns of innovating complex technologies: a framework for adaptive network strategies. *Res Pol* 29(7–8):819–831
35. Nassimbeni G (2003) Local manufacturing systems and global economy: are they compatible?: the case of the Italian eyewear district. *J Oper Manag* 21(2):151–171
36. Chiou TY, Chan HK, Lettice F, Chung SH (2011) The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transport Res E* 47(6)
37. Cavusgil ST, Zou S, Naidu GM (1993) Product and promotion adaptation in export ventures: An empirical investigation. *J Int Bus Stud* 24(3):479–506
38. Abdul-Aziz Z, Chan JFL, Metcalfe AV (2000) Quality practices in the manufacturing industry in the UK and Malaysia. *Total Qual Manag* 11(8):1053–1064
39. Owari T, Juslin H, Rummukainen A, Yoshimura T (2006) Strategies, functions and benefits of forest certification in wood products marketing: perspectives of finnish suppliers. *Forest Pol Econ* 9(4):380–391
40. Council MTC (2013) The Malaysian timber certification scheme. Kuala Lumpur, Retrieved from www.mtcc.com.my
41. Morris M, Dunne N (2003) Driving environmental certification: Its impact on the furniture and timber products value chain in South Africa. *Geoforum* 35(2):251–266
42. Lee CY, Zhou X (2000) Quality management and manufacturing strategies in China. *Int J Qual Reliab Manag* 17(8):875–898
43. Zhang N, Wang J (2009) Under the new industrialization model innovation product design thinking. *IEEE*

44. Callenbach E, Capra F, Goldman L, Lutz R, Marburg S (1993) *Eco-management: the elmwood guide to ecological auditing and sustainable business*. Berrett-Koehler, San Francisco
45. Christmann P (2000) Effects of best practices of environmental management on cost advantage: the role of complementary assets. *Acad Manage J* 43(4):663–680
46. Porter M (1985) *Competitive strategy*. Free Press, New York
47. Shrivastava P (1995) The role of corporations in achieving ecological sustainability. *Acad Manag Rev* 20(4):936–960
48. Handfield RB, Walton SV et al (1997) Green Value chain practices in the furniture industry. *J Oper Manag* 15:293–315