

Factors Influencing Green Purchasing Adoption in Malaysian Construction Companies

Nurul Huda Abdul Hadi ^{a,b*}, Mohd. Wira Mohd. Shafiei ^a, Radzi Ismail ^a

^aSchool of Housing Building & Planning, Universiti Sains Malaysia, 11800 Penang Malaysia

^bCentre of Studies for Building, Department of Built Environment Studies and Technology, Universiti Teknologi MARA Perak Branch, Seri Iskandar, 32610 Perak, Malaysia.
nurulhudaabdulhadi@gmail.com

The construction of buildings and other infrastructures has many environmental impacts and contributes significantly to climate change. Construction companies are likely to adopt green purchasing practices because of increased environmental sustainability pressures. This problem is mainly due to inefficient construction practices and the construction industry's lack of green purchasing practices. Thus, this study aims to investigate the factors influencing green purchasing (GP) adoption in Malaysian construction companies. Green purchasing in the construction industry was studied through extensive literature analysis and a questionnaire survey. A questionnaire was distributed to representatives of registered construction companies with the Construction Industry Development Board (CIDB). The results display that government regulation, stakeholder pressure, top management support, corporate factor, material supplier, subcontractor relationship, and expected business benefits are seven factors that could motivate the organisation's adoption of green purchasing practices. The regulators and policymakers, statutory bodies, government-linked corporations (GLCs), construction companies and suppliers might find these factors beneficial in improving green purchasing.

1. Introduction

The construction of buildings and other infrastructures, like many human activities, has many environmental impacts and contributes significantly to climate change (UNEP, 2017). Construction and building together account for 36% of global final energy consumption and 39% of energy-related carbon dioxide (CO₂) emissions when upstream power generation is included (IEA-GSR, 2017). The construction industry has significant environmental effects by using vast amounts of non-renewable resources and materials, especially in new construction (Wong et al., 2016). The construction industry is crucial to the Malaysian economy and its growth. (CIDB, 2015). In Malaysia, residential and commercial buildings consume 15 per cent of total energy and are a key contributor to greenhouse gas emissions (Energy Commission, 2014). To address this issue, the Malaysian government makes an effort to encourage sustainable and green construction adoption.

One of the initiatives is MyHijau Programme which green purchasing is a strategy for managing environmental concerns. Green Technology Master Plan (GTMP 2017) targeted the number of registered green products and services under the MyHIJAU Programme. Registered green products and services will be identified in the MyHIJAU Directory as a guide for green purchasing. Since the nation needs to achieve at least 20% government procurement to be green and concurrently, the private sector will also be encouraged to emulate government efforts in green purchasing (Economic Planning Unit, 2015). However, in Malaysia's construction sector, this principle is still lacking in increasing knowledge among industry practitioners of the green purchasing capability to deliver green projects (Bohari, 2017). Impediments to improving environmental performance in construction projects are frequently encountered by contractors (Wong et al., 2016). Among the challenges Malaysian construction companies face in adopting green purchasing practices are the limited promotion and guidance and enforcement and mandate from authorities (CIDB, 2015). In order to assist practitioners in integrating environmental initiatives and to ensure that construction companies are committed

to green compliance, the objective of this study is to identify the factors that are significant for enabling green purchasing implementation in the construction sector.

2. Literature Review

2.1 Green Purchasing Adoption

The term "green purchasing" refers to incorporating environmental considerations into all aspects of the purchase process, from product and process design to the disposal of the product (Yang et al., 2022). A purchasing process is green when the consumer attempts to improve the environmental efficiency of the product purchased and the suppliers that provide it (Kanapathy et al., 2016). Companies and organisations that choose green purchasing approaches and practices will substantially improve the environmental performance of their company marketing power, staff level of environmental awareness, public image and reputation, and energy and resources conservation achievements (Ho et al., 2010). The majority of the literature comes from developed-country perspectives and experiences; however, relatively a few studies have looked into green purchasing in emerging economies (ElTayeb et al., 2010). The literature has often addressed the factors that motivate companies to engage in proactive green purchasing in manufacturing industries; nonetheless, the results have been inconsistent and diverse. Nevertheless, green purchasing is still relatively new in developing nations, with little empirical data available due to firms failing to adopt the concept effectively (Yee et al., 2021). Thus, this study will identify the factors that motivate companies in the construction industry.

2.2 Key Indicators of Green Purchasing

Government Regulation

According to Carter & Carter (1998), the regulatory sector comprises government agencies and stakeholders such as consumer and lobbying groups that influence government and regulatory authorities. Many studies have described that higher regulatory pressures tend to enhance the implementation of green purchasing (Famiyeh et al., 2018; Malviya & Kant, 2017; Yook et al., 2018). No regulation or policy in Malaysia specifies the companies to conduct green purchasing activities. Nonetheless, in Malaysia and other countries, regulatory bodies set regulations to prohibit the use and pollution and facilitate recycled material use in the products of harmful or toxic materials (ElTayeb et al., 2010). Apart from that, the study conducted by (Wong et al., 2016) revealed that the experts in the construction industry interviewed indicated that the government should take a proactive role in pushing green purchasing adoption.

Stakeholder Pressure

Stakeholders are any group or individual who can influence or achieve an organisation's objectives, particularly those critical to the corporation's survival and success (Freeman, 1984). The stakeholder explained in this study are the external stakeholder in a construction company, comprising a client, consultant, competitor, advocacy group, societies and media. Stakeholders' active involvement is an essential means to implement green purchasing effectively. In order to improve environmental performance, coordination with internal and external stakeholders is crucial (Foo et al., 2019). This view is supported by (Wong et al., 2016), who write that there must be a shared understanding and commitment between stakeholders on green purchasing. Sarkis et al. (2010) pointed out that environmental cooperation with stakeholders is significant.

Top Management Support

Effective environmental practices require top management's awareness, priorities, and support (Björklund, 2011; Yook et al., 2018). Headquarters or top management may establish a policy for green purchasing and guidelines for subsidiaries that are either followed or partially rejected by subsidiaries (Hsu et al., 2014). Previous evidence suggests that other influencing factors that contribute to green purchasing adoption are dedicated resources, expertise in sustainability to facilitate green purchasing & decision making provided by top management (Wong et al., 2016; Yen & Yen, 2012).

Corporate Factor

A variety of organisational factors also affect a corporation's green purchasing practices. The success of green purchasing in a company depends largely on how the purchasing function is organised (Zhu & Geng, 2006). In order to achieve this, it involves changing the attitudes of large companies who are trying to build and establish a much closer relationship with their suppliers, provide support, advice and guidance, and share their knowledge and expertise (Rao, 2002). According to ElTayeb et al. (2010), the belief in green initiatives

should be motivated by external impositions and opportunities and a firm's sense of responsibility to the business in which it operates.

Material Supplier

The environmental collaboration between companies and suppliers significantly impacts their green purchasing adoption. Yen & Yen (2012) suggested that a company's green purchasing adoption can be increased by working with the supplier to reduce the environmental impact. The supplier also must conform to particular legislation, social norms, and standards, such as the ISO 14001 and the EMS (Miemczyk et al., 2012). In committing with the supplier, there must be a high level of trust between the company and suppliers (Yook et al., 2018) since they provide sustainable products and services (Björklund, 2011).

Subcontractor Relationship

Subcontractor relationships with the main contractor are becoming increasingly crucial for successful supply chains. Companies need to engage subcontractors in enhancing the environmental efficiency of the entire supply chain and thus tackle the environmental impact of the purchasing process (Ramakrishnan et al., 2015). Kanapathy et al. (2016) found that most respondents exchange information and provide subcontractors with training and education in development strategies. Working collaboratively to minimise the environmental impact of their operations and achieve environmental goals will also improve the buy-in of green purchasing (Yen & Yen, 2012).

Expected Business Benefit

It is usually well known that the main goals of business organisations are to maximise profits and financial returns. Each aspect of their choice is assessed according to the criteria of cost-benefit. Still, most businesses find environmental venture and associated costs to be moderate. They do not see environmental investments as expensive activities and expect improvements in performance and cost savings from recycling, reuse and environmental programmes (Yen & Yen, 2012). This innovation could lead to collateral advantages such as better quality, reliability, or supply costs (González-Benito et al., 2016). Figure 1 depicts the study's framework based on the literature review.

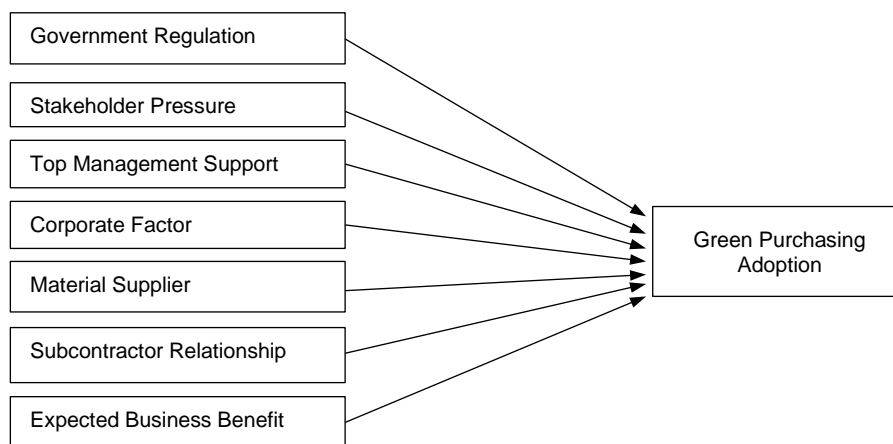


Figure 1. Conceptual Framework

3. Research Methodology

3.1 Instrumentation

Data is obtained through developed questionnaires from primary sources of data. The questionnaire in this study was adapted from previous research papers (Eltayeb & Zailani, 2010; Hsu et al., 2014; Wong et al., 2016; Yen & Yen, 2012; Yook et al., 2018). The questions were chosen based on the constructs used in this study. The questionnaire has also been amended to assure that it may be adapted and applied to the current purchasing environment in Malaysia.

3.2 Data Collection

A pilot study was conducted for this study. The questionnaire survey respondents were Contractor G7 (the limit of tender/value of work has no limit) registered with the Construction Industry Development Board (CIDB).

The study concentrated on G7 contractor companies as the companies will likely adopt the ISO14001, an international standard for environmental management. It is a must to have this standard system implemented on a construction site, where it serves as a guide to engaging in good environmental and sustainable practices (CIDB, 2015). A pre-test was undertaken with ten academics and two practitioners who hold senior positions in G7 contractor companies for content validity. Then, a pilot test of 132 items was used to evaluate their content validity, construct validity, and reliability. The questionnaire, which included a five-point Likert scale ranging from (1) 'Strongly Disagree' to (5) 'Strongly Agree', was administered to 50 respondents. A total of 33 questionnaires were received. The pilot study's findings will serve as a benchmark for the next phase, which will involve the distribution of improved questionnaires to construction companies throughout Malaysia.

4. Results

The findings are based on a pilot study conducted because no government regulations or policies in Malaysia mandate companies to engage in green purchasing activities. The pilot study was conducted in Peninsular Malaysia with a simple random sampling method. Two analyses have been taken at this point: descriptive analysis and reliability test. The IBM SPSS 27 software was used to analyse all the data acquired in sections A and B.

4.1 Descriptive Analysis

The objective of descriptive analysis is to explore and summarise the data distribution. The unit of analysis in this study is the organisation or the firm. Table 1 displays the demographic background of the respondent. The significant responses were received from the state of Selangor (41.9%), indicating the highest number of G7 registered contractors. Most of the firm's primary business operations are building firms (51.5%). The majority of the firms are local contractors (78.8%), with employees ranging from 50 to 249 (48.5%). Companies that practice green purchasing (48.5%) balance with those that do not (51.5%).

Table 1: Companies Profile

Variables	Categories	Frequency	Percentage %
Location of Companies (State)	Johor	3	9.1
	Kedah	1	3.0
	Negeri Sembilan	1	3.0
	Perak	2	6.1
	Perlis	1	3.0
	Pulau Pinang	3	9.1
	Selangor	13	39.4
	Wilayah Persekutuan (Kuala Lumpur)	9	27.3
Type of Company	Local Contractor	26	78.8
	Local Contractor with International Operation	3	9.1
	Foreign Contractor	1	3.0
	Joint Venture Contractor	3	9.1
Number of employees in company	1 - 9	2	6.1
	10 - 49	6	18.2
	50 - 249	16	48.4
	250 and above	9	27.3
Main Business	Building	17	51.5
	Civil Engineering (Infrastructure)	11	33.3
	Electrical Engineering	1	3.0
	Mechanical Works (Plumbing, HVAC etc)	4	12.2
Green purchasing practices	Yes	16	48.5
	No	17	51.5

4.2 Reliability Analysis

The reliability test was conducted for eight indicators, including the dependant variable. Cronbach's alpha reliability coefficient was used to determine the internal reliability of the scales. Cronbach's alpha reliability coefficient ranges typically between 0 and 1. The greater the internal consistency of the scale items, the closer the Cronbach Alpha coefficient approaches the value of 1.0. The value of 0.80 is commonly used as a guideline to indicate an acceptable level of internal reliability (Bryman & Bell, 2011). Table 3 shows that all of the scale indicators scored 0.861 or higher. The values show that the constituent scales of the measure were

strong and internally consistent. This result is consistent with findings from (Ramakrishnan et al., 2015) on government regulation and stakeholder pressure, (González-Benito et al., 2016) on top management support, (Mohamad & Koilpillai, 2020) on corporate factors, (Rahim et al., 2018; Yen & Yen, 2012) on the material supplier, (González-Benito et al., 2016) on subcontractor relationship and (ElTayeb et al., 2010) on expected business benefit.

Table 3: Reliability test for each group of scales.

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
Government Regulation	0.861	0.859	10
Stakeholder Pressure	0.921	0.924	14
Top Management Support	0.982	0.982	13
Corporate Factor	0.953	0.954	10
Material Supplier	0.970	0.971	20
Subcontractor Relationship	0.941	0.950	12
Expected Business Benefit	0.970	0.971	18
Green Purchasing Adoption	0.961	0.962	14

5. Conclusion

According to the pilot study's findings, these seven factors are reliable to test and use in the second phase of the data distribution to Malaysian construction companies. The findings demonstrated that Malaysian contractor companies are proactive in their organisational strategies, relying on internal and external pressure to adopt environmental management practices. Based on the findings, the most crucial factor is top management support with 0.982. Top management in the contractor companies is senior managers who might have the green attitudes to commit to green purchasing adoption. Hence, top management commitment is the main factor in the company's success in implementing green purchasing practices. The other higher significant factors are material suppliers and expected business benefits. Since suppliers are the providers of green materials and services, this implementation significantly influences operational efficiency and substantially impacts their green purchasing adoption.

Furthermore, the significant influence of expected business benefits on green purchasing shows that the sampled companies prioritise profit when selecting whether to pursue green purchasing initiatives. Even though green materials and services are higher in cost, companies that anticipate a business benefit from these activities will be motivated to adopt this practice. This research will improve people's knowledge and understanding of the green purchasing concept. The study focused on the green purchasing contractor's viewpoint. Future research may examine the supplier's experience to give new insights on determinants and barriers to companies adhering to green practices.

References

- Björklund, M., 2011, influence from the business environment on environmental purchasing - Drivers and hinders of purchasing green transportation services, *Journal of Purchasing and Supply Management*, 17(1), 11–22.
- Bryman, A., & Bell, E., 2011, *Business research methods 3rd Edition*. In *Business Research Method*, Oxford, UK.
- Carter, C. R., & Carter, J. R., 1998, Interorganizational Determinants of Environmental Purchasing: Initial Evidence from the Consumer Products Industries, *Decision Sciences*, 29(3), 659–681.
- CIDB, 2015, *Construction Industry Transformation Programme (CITP) 2016-2020*, In *Construction Industry Development Board Malaysia (CIDB)*, Kuala Lumpur, Malaysia
- Economic Planning Unit, 2015, *Eleventh Malaysia Plan 2016-2020*, In *Rancangan Malaysia Kesebelas (Eleventh Malaysia Plan) : 2016-2020*, Prime Minister Department, Putrajaya, Malaysia.
- ElTayeb, T. K., Zailani, S., & Jayaraman, K., 2010, The examination on the drivers for green purchasing adoption among EMS 14001 certified companies in Malaysia, *Journal of Manufacturing Technology Management*, 21(2), 206–225.
- Energy Commission, 2014, *Malaysia Energy Statistic 2014*, *Statewide Agricultural Land Use Baseline 2014*.
- Famiyeh, S., Kwarteng, A., Asante-Darko, D., & Dadzie, S. A., 2018, Green supply chain management initiatives and operational competitive performance, *Benchmarking*, 25(2), 607–631.

- Foo, M. Y., Kanapathy, K., Zailani, S., & Shaharudin, M. R., 2019, Green purchasing capabilities, practices and institutional pressure, *Management of Environmental Quality: An International Journal*, 30(5), 1171–1189.
- Freeman, R. E., 1984, Strategic management, A stakeholder approach, In *Journal of International Marketing*, Pitman/Ballinger: Boston, USA.
- González-Benito, J., Lannelongue, G., Ferreira, L. M., & Gonzalez-Zapatero, C., 2016, The effect of green purchasing on purchasing performance: the moderating role played by long-term relationships and strategic integration, *Journal of Business and Industrial Marketing*, 31(12), 312–324.
- GTMP, 2017, Green Technology Master Plan (GTMP), Ministry of Energy, Green Technology and Water (KeTTHA), Putrajaya, Malaysia.
- Ho, L. W. P., Dickinson, N. M., & Chan, G. Y. S., 2010, Green procurement in the asian public sector and the Hong Kong private sector, *Natural Resources Forum*, 34(1), 24–38.
- Hsu, P. F., Hu, P. J. H., Wei, C. P., & Huang, J. W., 2014, Green Purchasing by MNC Subsidiaries: The Role of Local Tailoring in the Presence of Institutional Duality, *Decision Sciences*, 45(4), 647–682.
- IEA-GSR, 2017, Towards a zero-emission, efficient, and resilient buildings and construction sector, *Global Status Report 2017*, In *Global Status Report*, United Nations Environment Programme.
- Kanapathy, K., Yee, G. W., Zailani, S., & Aghapour, A. H., 2016, An intra-regional comparison on RoHS practices for green purchasing management among electrical and electronics SMEs in Southeast Asia, *International Journal of Procurement Management*, 9(3), 249–271.
- Malviya, R. K., & Kant, R., 2017, Modeling the enablers of green supply chain management, *Benchmarking: An International Journal*, 24(2), 536–568.
- Miernczyk, J., Johnsen, T. E., & Macquet, M., 2012, Sustainable purchasing and supply management: A structured literature review of definitions and measures at the dyad, chain and network levels, *Supply Chain Management: An International Journal*, 17(5), 478–496.
- Mohamad, M. N., & Koilpillai, C. S. S., 2020, Effect of corporate sustainable development on green purchasing: Insights from ISO 14001 certified manufacturing companies in Malaysia, *International Journal of Integrated Supply Management*, 13(2–3), 234–251.
- Rahim, A. A., Janipha, N. A. I., & Ismail, F., 2018, awareness of green purchasing amongst construction organisations, *Chemical Engineering Transactions*, 63, 325–330.
- Ramakrishnan, P., Haron, H., & Goh, Y. N., 2015, Factors influencing green purchasing adoption for small and medium enterprises (SMEs) in Malaysia, *International Journal of Business and Society*, 16(1), 39–56.
- Rao, P., 2002, Greening the supply chain: A new initiative in South East Asia, *International Journal of Operations and Production Management*, 22(6), 632–655.
- Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B., 2010, Stakeholder pressure and the adoption of environmental practices: The mediating effect of training, *Journal of Operations Management*, 28(2), 163–176.
- UNEP, 2017, The Emissions Gap Report 2017 - A UN Environment Synthesis Report, In *United Nations Environment Programme (UNEP)*.
- Wong, J. K. W., Chan, J. K. S., & Wadu, M. J., 2016, Facilitating effective green procurement in construction projects: An empirical study of the enablers, *Journal of Cleaner Production*, 135(1), 859–871.
- Yang, J., Wang, Y., Gu, Q., & Xie, H., 2022, The antecedents and consequences of green purchasing: an empirical investigation, *Benchmarking*, 29(1), 1–21.
- Yee, F. M., Shaharudin, M. R., Ma, G., Mohamad Zailani, S. H., Kanapathy, K., Foo, M. Y., Shaharudin, M. R., Ma, G., Mohamad Zailani, S. H., & Kanapathy, K., 2021, Green purchasing capabilities and practices towards firm's triple bottom line in Malaysia, *Journal of Cleaner Production*, 307, Article number 127268.
- Yen, Y. X., & Yen, S. Y., 2012, Top-management's role in adopting green purchasing standards in high-tech industrial firms, *Journal of Business Research*, 65(7), 951–959.
- Yook, K. H., Choi, J. H., & Suresh, N. C., 2018, Linking green purchasing capabilities to environmental and economic performance: The moderating role of firm size, *Journal of Purchasing and Supply Management*, 24(4), 326–337.
- Zhu, Q., & Geng, Y., 2006, Green purchasing in Chinese large and medium-sized state-owned enterprises, In *Greening the Supply Chain (Issue Hutchison, 173–187)*.