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## A holistic perspective on sustainable procurement implementation

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# **A HOLISTIC PERSPECTIVE ON SUSTAINABLE PROCUREMENT IMPLEMENTATION**

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## **ABSTRACT**

The capability and capacity to implement a sustainable approach to procurement is increasingly becoming an order qualifier in product related globalised businesses. This research aims to identify key factors influencing successful supply network wide implementation of a sustainable approach to procurement. Building on a systems thinking approach, the study develops a conceptual model for sustainable procurement implementation. The drivers and barriers to sustainable procurement are identified based on a literature review and secondary data collected on 85 global firms' sustainability practices. The research identifies corporate environmental awareness and the commitment of top management as the key drivers for implementing sustainable procurement practices within supply network. The conceptual model identifies three broad categories of drivers along with barriers for the potential adaptation.

## **INTRODUCTION**

The growth of the world economy due to the globalization of trade, is commonly seen to have caused a substantial increase in Co2 emission. This so called '*greenhouse gas effect*' is a major contributor to global warming and climate change. Faced with these environmental challenges practitioners and researchers are looking to integrate sustainability in their business activities (Walker et al., 2008; Sarkis et al., 2011). This growing interest in sustainable business practice is evident in the increase in the number of published articles on sustainable supply chain management (Walker et al., 2012). Yet to-date this growing body of work on sustainable business practices follows a Western or developed economy view of what are good practices for sustainability; with wide variations in sustainable practices being observed in less developed areas (Steurer and Konrad, 2009) across the globe. Research is needed on the factors affecting the adoption of environmental procurement to spread good practices globally (Tian et al., 2014).

Extant research has identified drivers and barriers to incorporating environmental concerns within a business, but most of that analysis has been undertaken at the level of the supply-chain or network level rather than drilling down to focus just on the procurement function itself. Sustainable procurement is currently seen as strategic function (Weele, 2014) but extant research either reports either at the level of a specific country or specific organisation, limiting generalizability. Therefore, further investigation into factors affecting the implementation for sustainable procurement is essential to extend best practices globally. The aim of this research is to identify the key factors influencing the successful implementation of sustainable procurement. The objective of the research is to develop a conceptual model for sustainable procurement implementation based on the identification of key factors driving sustainability within a procurement function.

The paper is organised as follows. The next section reviews the literature for drivers and barriers for sustainable procurement practices. The research methodology briefly presents the method used for data collection and analysis. The following section presents findings including the conceptual framework generated as part of this study. By applying the

principle of systems thinking, the relationship of different variables is presented through causal loop diagramming. The paper closes with conclusions, limitations and areas for future research.

## LITERATURE REVIEW

### Sustainable Supply Chain Management

Growing environmental and social problems have raised the awareness of sustainability among firms as well as government (Govindan et al., 2014). Initiatives by Governments such as ISO14001 certification and establishing the environmental regulation/legislation is evident in some parts of the world (Zhu and Sarkis, 2004). The Government's actions could be one of the important triggers to encouraging the implementation of environmental management (Tian et al., 2014). Another trigger comes from stakeholder groups, since they strongly influence the corporate strategies of the firm (Vachon and Klassen, 2008). Sustainable Supply Chain Management (SSCM) emerges as an organisational approach to instil environmental awareness in the traditional supply chain management (Sarkis et al., 2011). The scope of SSCM varies from sustainable procurement to environmental conscious customer (Zhu and Sarkis, 2004). Earlier, Srivastava (2007) scrutinised the SSCM literature and argued that the scope of SSCM encompasses from product design processes through the end customers, as well as end-of-life product management. The boundary of SSCM is rather wide and in order to achieve the successful implementation, the focus needs to be on the strategic functions (such as procurement, manufacturing) of supply chain management.

### Challenges for sustainable procurement practices

#### Drivers

The major influencing drivers for promoting sustainability practice could be grouped under two categories as internal and external (Walker et al., 2008). We follow similar classification approach to review drivers and barriers to the sustainable procurement practices. Different sectors adopt sustainable procurement practices, however the internal

List of drivers	References
<b>Internal</b>	
Top management commitment	Drumwright (1994); Carter et al. (1998); Wycherley (1999); Walker et al. (2012)
Cost reduction	Handfield et al. (1997); Carter et al. (1998); Carter and Dresner (2001); Zhu et al. (2005); Large and Gimenez Thomsen (2011); Walker et al. (2012)
Improving firm performance	Carter et al. (2000); Rao and Holt (2005); Nidumolu et al. (2009)
Skillful policy entrepreneurs	Cousins et al. (2004); Giunipero et al. (2012); McMurray et al. (2014);
<b>External</b>	
Gaining competitive advantage	Carter and Jennings (2004); Rao and Holt (2005); Lawson et al. (2009); Giunipero et al. (2012); McMurray et al. (2014)
Legislative and regulatory compliance	Min and Galle (2001); Handfield et al. (2002); Carter and Jennings (2004); Zhu et al. (2005); Walker et al. (2008)
Potential for receiving publicity	Carter and Jennings (2004); Cousins et al. (2008); Walker et al. (2008); Appolloni et al. (2014)
Pressure by customers and investors	Giunipero et al. (2012); Genovese et al. (2013)
Public pressure	Handfield et al. (2002); Zhu et al. (2005); Cousins et al. (2008); Giunipero et al. (2012)

Table 1: Drivers for sustainable procurement practices

driving efforts are much similar. It is identified that personal commitment of top-management is positively related with an introduction of environmental policy (Walker and Brammer, 2009). Top management support is essential for driving the environmental program, as it requires strong resource support for the deployment (Carter and Jennings, 2004; Vachon, 2007). Skill of policy entrepreneur, in other words the middle management significantly contribute to the organizations achievement (McMurray et al., 2014; Giunipero et al., 2012). Other organisational factors influencing sustainable procurement implementation can be associated with leadership, policy, organisation strategy and finance (McMurray et al., 2014). Another important internal driving force is a desire to gain cost reduction advantages (Large and Gimenez, 2011; Walker et al., 2012).

One of the important external driving forces is a compliance with the international environmental standard and regulations, such as ISO14001, WEEE and RoHS (Zhu et al., 2005). Government pressure appears to be associated with the management decisions related to the adoption of the green procurement practice (Carter and Jennings, 2004; Walker et al., 2008). It has an argument that the compliance with regulation/legislation may not positively reflect on organization’s environmental procurement performance. However, with the government regulation acquiescence, firms gain benefits from governmental incentives in some countries. For example, UK promoted the environmental program by provide a premium tariff and tax benefits for suppliers or manufacturer who invest or innovate the use of renewable energy and minimise resources consumption (European commission, 2012; UK Environmental Law Association, 2014).

Key motivator and facilitator for environmental responsible business is customer pressure (Carter and Jennings, 2004). The end-customer’s demand for green design and manufacturing can be seen as a ‘reactive driver’ of sustainable procurement (Giunipero et al., 2012). Offering sustainable products is a ‘proactive action’ which can possibly lead in gaining a competitive advantage in the market (Giunipero et al., 2012). Enhancing financial performance, improving working conditions and better labour standards for health and safety positively strengthens firm’s ability to compete against competitors (McMurray et al., 2014). On the contrary, if firms do not consider environmental procurement practices, it may face public resistance improving their performance or a reputation (Appolloni et al., 2014). The public movement towards greater environmental responsibility appears to be one of other key external drivers escalating firm’s pressure on the adoption of environmental practice (Zhu et al., 2005; Giunipero et al., 2012). All the identified internal and external barriers are presented in Table 1.

List of barriers	References
Costs	Wycherley (1999); Roa and Holt (2005); Beske et al. (2008); Large and Gimenez Thomsen (2011); Giunipero et al. (2012)
Industrial specific barriers	Chen (2005); Zhu and Sarkis (2006)
Inexperienced in the practice	Min and Galle (2001); Carter and Jennings (2004); Bowen et al. (2011)
Poor supplier commitment	Cousins et al. (2004); Walker et al. (2008); Sarkis et al. (2011); Giunipero et al. (2012); Hollos et al. (2012)
Techonological investment	Carter and Jennings (2004); Vachon (2007); Genovese et al. (2013)
Unclear standards	Chen (2005); Zhu and Sarkis (2007); Min and Galle (2001); Sarkis and Dhavale (2015); Walker and Brammer (2009)

Table 2: Barriers for sustainable procurement implementation

**Barriers**

One of the major barriers to implementing a sustainable approach to procurement is higher cost. Investment cost is complex, as it demands collaboration from all the related internal and external stakeholders. Regulation is another major driver toward the environmental efforts. Interestingly it could be both a driver as well as a barrier for implementation

success (Zhu and Sarkis, 2007). The lack of clear standards and direction from government regarding regulation/policy on sustainability can also significantly delay the program. To reach the goal of implementing sustainable procurement, companies in general start tracking their own carbon footprint. Where both buyers and suppliers are unwilling to share or exchange footprint information- a major barrier remains. Another crucial barrier emphasized by several studies is a lack of the right technology (Walker et al., 2008; Sarkis et al., 2011). Table 2 shows additional barriers along with the associated references identified through the literature review.

## RESEARCH METHODOLOGY

The exploratory study attempts to bring research insights by combing literature survey with secondary data on sustainability practices. A Systems Thinking (ST) approach is adopted in the study to capture a holistic picture of the problem. The ST approach helps in understanding the complex interdependencies between variables necessary for robust decision-making. The method helps in understanding the structure and behaviour of a system as a whole (Hoejmose and Adrien-Kirby, 2012). One of the key benefits of ST is its ability to effectively break down the problem for the holistic view (Sillitto, 2014). Systems thinking is a useful approach for preliminary observation and analysis, before applying system dynamics modelling to capture precise reflection of a real system (Sterman, 2001).

Secondary data on 83 firms was collected for the study in the form of annual reports. Parts of these reports discuss the sustainability practices and policies adopted by the individual firm. For example, Amazon’s annual report presents actions such as reducing packaging waste, green building and so forth for eco-friendly business (Amazon.com Inc., 2015). In the sample, the majority of firms are engaging with sustainable procurement. The number of academic papers published within the field of sustainable procurement has been growing since 2005, and is increasing year on year (Appolloni et al., 2014). The sustainable procurement content of the sample of company report data supports this trend; there is a steady increase in the number of publications during 2008-2010, with a steep rise from 2011 onward. It is evident that there is rising interest both in academia and industry.

## SYSTEMS THINKING

Causal loop diagram (CLD) is used as a tool for developing systems thinking. Using a CLD tool, the researchers’ plotted all the drivers and barriers to understand their inter-dependence. Figure 1 shows the CLD for sustainable procurement implementation. The feedback loops represent the effects (+/-) on each other. Through the analysis it was evident that three variables strongly influence sustainable procurement implementation; corporate environmental awareness policy, policy entrepreneur and green procurement strategy variables were strongly influencing different internal as well as external drivers.

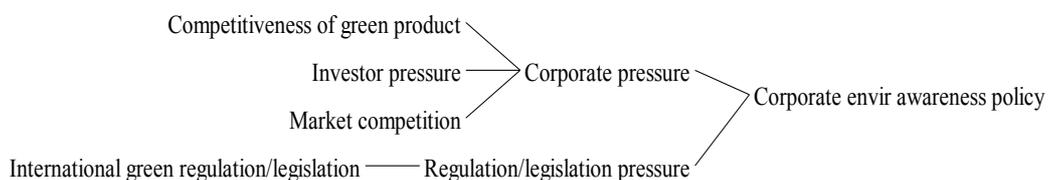


Figure 2: Example of causal loop tree diagram

Corporate environmental awareness policy is the key factor derived from the CLD. This factor is triggered by regulatory compliance and pressure from the outside company such as from customers, investors and society. The second driver is policy entrepreneur or middle management level, seeing the role and responsible of a policy entrepreneur would support the achievement in the implementation. The final key driver is green procurement strategy; this strategy is motivated by the decision making from executive management and regulation requirement in standard material specification. Figure 2 shows the relationship map between influencing variables. An iterative process of creating similar causal loop tree diagrams supported the development of the conceptual model.



## FINDINGS AND CONCLUSIONS

Based on a review of the academic literature and analysis of firm generated data, the research identifies the drivers and barriers affecting the implementation of green environmental practices. Additional drivers were identified from the secondary data. Target setting, training on environmental awareness, green product design, product life cycle assessment and Audit/Supplier evaluation are identified through the study.

The research has drawn out the key factors that potentially influence adoption of sustainable procurement practices. A conceptual model of the drivers for sustainable procurement has been developed (Figure 3). This study suggests three main drivers affect implementation, namely corporate environmental policy, policy entrepreneur and sustainable procurement strategy. The length of an arrow represents the power of each driver and the area that it influences. For example, policy entrepreneur is influencing the sustainable procurement strategy while at the same time both factors are under the force of corporate environmental policy driving the integrated environmental practice within the purchasing function. However, in order to achieve the objective, the companies cannot overlook the barriers that cause delays and ineffective implementation (identified above as cost, regulation and supplier commitment).

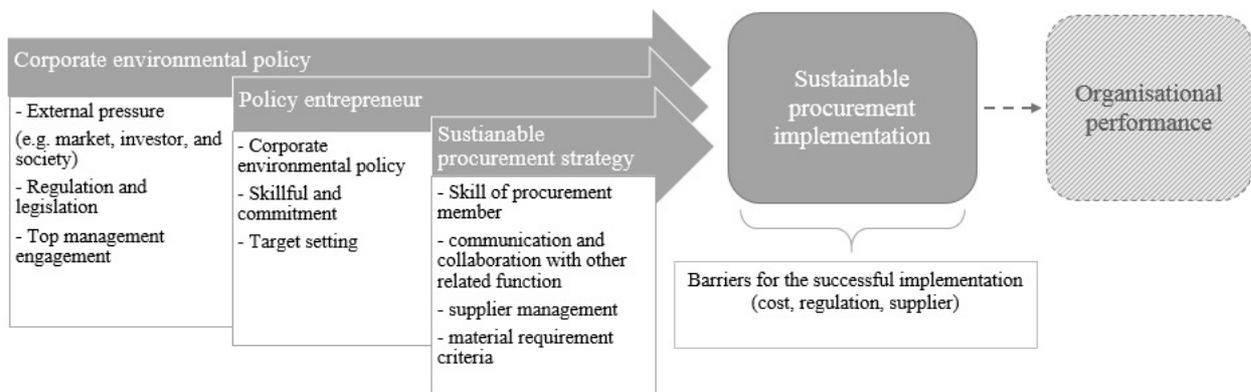


Figure 3: A conceptual model for improving the sustainable procurement practice

The research analysed secondary data from 83 leading supply-chain organisations to identify the factors that support implementing sustainable procurement. The research successfully provides a holistic and systematic approach to implementing sustainable procurement across supply networks. A systems thinking approach extracted the key activities as well as contributing to addressing the limitations of current models. This combination of systems thinking and secondary data analysis contributes to the holistic capture of the structure of the entire sustainable procurement system. Nevertheless, the research has some limitations in terms of the data and methodology. Even though the information came from the reliable sources, organizations may not publish up-to-date or detailed information. The Causal loop diagram developed in this study assumes that there are no time delays between causal links. In addition, the CLDs did not provide the researchers' with concrete results, but does represent the provisional system structure of the relationship between variables. The study provides exploratory perspective on social, environmental and economic issues within the procurement function. The next stage of the research will utilize the information to develop a stock and flow diagram for a simulation study. This study also strongly suggests that unsuccessful sustainability implementation creates a negative feedback for the firm, impacting its brand reputation and image; and reinforcing the need to understand implementation. The research is expected to support practitioners in understanding the barriers, challenges and opportunities in sustainable procurement.

## REFERENCES

- Appolloni, A., Sun, H., Jia, F. and Li, X. (2014) 'Green Procurement in the private sector: A state of the art review between 1996 and 2013', *Journal of Cleaner Production*, vol. 85, pp. 122–133.
- Carter, C. R. and Jennings, M. M. (2004) 'The role of purchasing in corporate social responsibility: a structural equation analysis', *Journal of Business Logistics*, vol. 25, no. 1, pp. 145–186.
- European commission (2012) Legal sources on renewable energy: Netherlands [Online], Renewable energy. Available from: <http://www.res-legal.eu/en/search-by-country/netherlands/> (Accessed 17 June 2016).
- Giunipero, L. C., Hooker, R. E. and Denslow, D. (2012) 'Purchasing and supply management sustainability: Drivers and barriers', *Journal of Purchasing and Supply Management*, vol. 18, no. 4, pp. 258–269.
- Govindan, K., Kaliyan, M., Kannan, D. and Haq, A. N. (2014) 'Barriers analysis for green supply chain management implementation in Indian industries using analytic hierarchy process', *International Journal of Production Economics*, vol. 147, pp. 555–568.
- Hoejmose, S. U. and Adrien-Kirby, A. J. (2012) 'Socially and environmentally responsible procurement: A literature review and future research agenda of a managerial issue in the 21st century', *Journal of Purchasing and Supply Management*, vol. 18, no. 4, pp. 232–242.
- Large, R. O. and Gimenez Thomsen, C. (2011) 'Drivers of green supply management performance: Evidence from Germany', *Journal of Purchasing and Supply Management*, vol. 17, no. 3, pp. 176–184.
- McMurray, A. J., Islam, M. M., Siwar, C. and Fien, J. (2014) 'Sustainable procurement in Malaysian organisations: Practices, barriers and opportunities', *Journal of Purchasing and Supply Management*, vol. 20, no. 3, pp. 195–207.
- Sarkis, J., Zhu, Q. and Lai, K.-h. (2011) 'An organisational theoretic review of green supply chain management literature', *International Journal of Production Economics*, vol. 130, no. 1, pp. 1–15.
- Sillitto, H. (2014), *Architecting systems: Concepts, principles and practice*, London, College Publications.
- Srivastava, S. K. (2007) 'Green supply-chain management: A state-of-the-art literature review', *International Journal of Management Reviews*, vol. 9, no. 1, pp. 53–80.
- Steurer, R. and Konrad, A. (2009). Business–society relations in Central-Eastern and Western Europe: How those who lead in sustainability reporting bridge the gap in corporate (social) responsibility. *Scandinavian Journal of Management* Vol. 25 No. 1, pp23-36.
- Tian, Y., Govindan, K. and Zhu, Q. (2014) 'A system dynamics model based on evolutionary game theory for green supply chain management diffusion among Chinese manufacturers', *Journal of Cleaner Production*, vol. 80, pp. 96–105.
- UK Environmental Law Association (2014) Increased levels of greenhouse gases [Online]. Available from: <http://www.environmentlaw.org.uk/rte.asp?id=191> (Accessed 17 June 2016).
- Vachon, S. (2007) 'Green supply chain practices and the selection of environmental technologies', *International Journal of Production Research*, vol. 45, no. 18, pp. 4357–4379.
- Vachon, S. and Klassen, R. D. (2008) 'Environmental management and manufacturing performance: The role of collaboration in the supply chain', *International Journal of Production Economics*, vol. 111, no. 2, pp. 299–315.
- Walker, H. and Brammer, S. (2009) 'Sustainable procurement in the United Kingdom public sector', *Supply Chain Management: An International Journal*, vol. 14, no. 2, pp. 128–137.
- Walker, H., Di Sisto, L. and McBain, D. (2008) 'Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors', *Journal of Purchasing and Supply Management*, vol. 14, no. 1, pp. 69–85.

Walker, H., Miemczyk, J., Johnsen, T. and Spencer, R. (2012) 'Sustainable procurement: Past, present and future', *Journal of Purchasing and Supply Management*, vol. 18, no. 4, pp. 201–206.

Weele, A. (2014), *Purchasing and supply chain management: Analysis, strategy, planning and practice*, 6th edition, United Kingdom, CENGAGE learning.

Zhu, Q. and Sarkis, J. (2004) 'Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises', *Journal of Operations Management*, vol. 22, no. 3, pp. 265–289.

Zhu, Q., Sarkis, J. and Geng, Y. (2005) 'Green supply chain management in China: Pressures, practices and performance', *International Journal of Operations and Production Management*, vol. 25, no. 5, pp. 449–468.

Zhu, Q. and Sarkis, J. (2007) 'The moderating effects of institutional pressures on emergent green supply chain practices and performance', *International Journal of Production Research*, vol. 45, 18-19, pp. 4333–4355.

*Note:* Additional references shown in Table 1 and 2 are not included in this list due to page restrictions.