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SPECIAL TOPIC FORUM ON SUSTAINABLE SUPPLY CHAIN MANAGEMENT: INTRODUCTION AND REFLECTIONS ON THE ROLE OF PURCHASING MANAGEMENT*

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This paper introduces a special topic forum on "Sustainable Supply Chain Management." Before introducing the papers included in the forum, the authors provide thoughts on the direction and future of sustainability research, particularly in the context of purchasing and supply chain management. The underlying premise that structures our discussion is straightforward: a company is no more sustainable than its supply chain. As such the purchasing function becomes central in a company's sustainability effort. In doing so, we reflect on the relationship between purchasing management and sustainable development by drawing from Kraljic's seminal article on how "Purchasing Must Become Supply Management."

Keywords: *sustainability; purchasing strategy; supplier relationships*

INTRODUCTION

Many large manufacturing and service organizations have adopted environmental management systems and devoted resources to assure fair and equitable treatment of their employees around the world. Due in part to pressure from various stakeholder groups, many of these organizations have also recognized the importance for their suppliers to implement similar environmental and social practices (Sharma and Henriques 2005). Suppliers that are sensitive to environmental and social issues in their operations can provide the buying organization with an increased efficiency, a reduced likelihood of supply disruption and safeguards to the organization's image. Therefore, it is not surprising that the business research community has been active on the topic of sustainable development in supply chains over the recent years (Jayaraman, Klassen and Linton 2007; Carter and Rogers 2008; Seuring, Sarkis, Muller and Rao 2008).

Sustainable development and supply chain management are two concepts that, independently, have generated a lot of research over the last decade but remain widely defined (Chen and Paulraj 2004; Sharma and Henriques 2005); that became particularly clear during the editorial process as submitted manuscripts varied greatly in terms of scope and definitions. Such a diversity was predictable as the topic of sustainability in the supply chain took a number of labels in the literature including *green supply chain* (Bowen, Cousins, Lamming and Faruk 2001; Vachon and Klassen 2006), *socially responsible purchasing* (Carter and Jennings 2002; Carter 2004) or *closed-loop supply chain* (Seitz and Peattie 2004; Guide and Van Wassenhove 2009) just to name a few.

Another important outcome of the editorial process is the realization that a company is no more sustainable than its supply chain — that is, a company is no more sustainable than the suppliers that are selected and retained by the company. This assertion became the primary premise underlying this paper. A direct implication of that premise is that boundary-spanning functions such as purchasing are central to a company's sustainable

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development efforts. Interestingly, the *Journal of Supply Chain Management* finds its roots in purchasing research. Hence, this paper provides an opportunity to reflect on the relationship between purchasing management and sustainable development. Concentrating on purchasing allows us to clearly delineate the domain of reflection for this paper while contributing to the discussion of the linkages between sustainable development and supply chain management.

Building on the framework provided by the seminal work of Kraljic (1983), this paper focuses on the strategic integration of sustainable development into purchasing management. In subsequent sections, we revisit Kraljic's article on how "Purchasing Must Become Supply Management," and link to sustainable development using the notion of competitive priorities (i.e., cost, quality, delivery, flexibility and innovation) (Ward, Mccreery, Ritzman and Sharma 1998; Krause, Pagell and Curkovic 2001; Rosenzweig and Roth 2004). Next, by introducing the notion of sustainability as a competitive priority, the role of the purchasing function in sustainable supply chain management is discussed. Questions that can serve as the basis for future research are also presented. Finally, we introduce the papers in the special topic forum, and close with concluding remarks.

BACK TO THE FUTURE: WHEN PURCHASING BECAME SUPPLY MANAGEMENT

It is worthwhile to remember that purchasing has received attention in formal, published books and articles as far back as the early-mid 1800s. Already in these early days, purchasing was recognized as the function that reaches outside the boundaries of the firm to acquire goods and services in support of the operations function (Leenders and Fearon 2008). Throughout the years, the purchasing function has demonstrated its stabilizing role by adjusting its strategy to contextual changes such as shortages, price volatility and consumer demand swings (Leenders and Fearon 2008). However, it took essentially a century to appreciate the strategic value of the purchasing function beyond its "cost center" status (Ellram and Carr 1994). Around that time, the trade literature also took notice of the purchasing function's new prominence within companies (see, for example, the article entitled "Purchasing's New Muscle" published in *Fortune* magazine by Tully 1995). During the past two decades, purchasing was incorporated into the term supply chain management, which not only considers immediate suppliers, but also subsuppliers (e.g., second and third tiers suppliers) and the entities downstream from the firm that facilitate the transport of products and services to markets.

A parallel can be made between the evolution of the purchasing function over the last two decades and the issue of sustainable development in supply chains. Going back to the main premise that a company is no more sustainable than its supply chain leads to the conclusion that supply chain management is insufficient; instead, *sustainable* supply chain management must become the norm. Such a conclusion encourages further reflection as to whether what is currently taking place is somewhat akin to the transformation from purchasing to supply management, which started over 25 years ago. In order to guide and further develop that reflection, Kraljic's (1983) seminal paper published in *Harvard Business Review*, entitled "Purchasing Must Become Supply Management," serves as a starting point.[1]

Kraljic's Model

Kraljic's primary objective was to encourage and enable purchasing managers to think strategically about the purchases they were making, and to critically evaluate their purchases in light of the risks and uncertainties in their respective markets. These risks and uncertainties include: (i) changes in the number of viable suppliers; (ii) changes in the nature of supplier relationships; (iii) technological developments; and (iv) changes in the availability of items because of political instabilities, natural disasters and other factors that are comprised in supply risk.

Kraljic recommended that purchases be classified into four categories, namely strategic, bottleneck, leverage and noncritical items. Each of these categories necessitates a distinct purchasing strategy. *Strategic items* are few in number and require a strategy that depends on the power-dependence relationship with the supplier. In situations where the buying firm was dominant, Kraljic recommended that the firm exploit the situation so as to minimize costs and minimize its supply risk. In cases where the supplier held dominant power, the company should be defensive and look for substitute materials or suppliers. All of these tactics were based on Kraljic's recommended fundamental objective of "exploit[ing] the company's full buying and bargaining power" (p. 116) while maintaining flexibility in purchasing arrangements so as to ensure the availability of critical supply items at competitive prices. Kraljic recommended "key performance criteria" for each of his four categories of commodities: strategic — long-term availability; bottleneck — cost management and reliable short-term sourcing; leverage — cost and materials flow management; and non-critical items — functional efficiency.

After 25 years, Kraljic's paper still receives a significant amount of recognition in the purchasing and supply chain literature. While a few authors have attempted to refine or test Kraljic's work (Olsen and Ellram 1997; Gelderman and Van Weele 2003), the increasing number of citations indicates that Kraljic's paper continues to receive recognition. However, with the relatively new

[1]While many readers of *JSCM* are familiar with Kraljic's paper, for those who are not we provide a brief synopsis in the next section.

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focus on "sustainability" — by consumers, companies, managers and various other stakeholders, all to differing degrees — we question whether Kraljic's fundamental objective of "exploit[ing] the company's full buying and bargaining power" (p. 116) so as to achieve low cost, low risk and adequate availability of purchasing inputs represents a holistic picture of purchasing strategies available to purchasing managers who are striving to build sustainable supply chains.

As with Kraljic's original argument, where purchasing managers were encouraged and enabled to think strategically about the impact of the purchases they were making, a similar transformation is needed to actively incorporate sustainability related aspects. To do so, in the next section we raise questions about the applicability of Kraljic's fundamental objective of exploiting the company's full bargaining power to achieve sustainability-focused purchasing, revisit the notion of competitive priorities for purchasing and provide suggestions for purchasing and supply chain managers who are seeking to increase their focus on sustainability.

PUTTING "SUSTAINABLE DEVELOPMENT" IN PURCHASING MANAGEMENT

How can sustainable development be integrated to purchasing management? An avenue to answer this question resides in the concept of competitive priorities. Hayes and Wheelwright (1984) developed the concept of "competitive priorities," defining them as strategic preferences a company adopts as it strives to compete in a particular market. To summarize, competitive priorities are selected to support a company's overall strategy that is typically geared toward fulfilling market requirements and creating customer value. Traditionally, four competitive priorities are recognized: quality, cost, delivery and flexibility (Ward et al. 1998; Rosenzweig and Roth 2004). Krause et al. (2001) provided a similar notion of competitive priorities for the purchasing function, but added innovation as an additional priority. They used supplier selection and retention as a surrogate for purchasing's competitive priorities.

The alignment of functional competitive priorities with the overall corporate strategy is key for business performance (Vickery, Droge and Markland 1993; Gonzalez-Benito 2007). If companies are increasingly including sustainable development in their strategy (Hart 1995; Bansal 2005; Sharma and Henriques 2005), should sustainable development become a competitive priority for the various functions of the company? The literature and anecdotal evidence suggest that, indeed, sustainable development should be added to the set of competitive priorities (de Burgos Jinemez and Lorente 2001). We propose that sustainability and its components represent an addition to the traditional set of competitive priorities for purchasing. Thus, quality, cost, delivery, flexibility, innovation and sustainability must be addressed by each company to varying degrees — depending on how it is striving to compete — and that these competitive priorities are manifested, in part, through the purchasing function's supplier selection and retention decisions.

The challenge with the addition of sustainability is that while quality, cost, delivery, flexibility and innovation are largely evident in a supplier's product or service, the components of sustainability are more difficult to detect and/or ensure. Furthermore, the delineation between the traditional competitive priorities and sustainable development is not always clear. For instance, a Fortune 100 firm vice-president recently asked a simple question during a presentation: Is sustainability a new euphemism for cost-cutting efforts? Also, while Kraljic's matrix has provided value to managers, students and researchers because of its intuitive appeal, his approach seems to emphasize the minimization of cost and risk — this dual emphasis may be suboptimal when sustainability is an important competitive priority. Such apparent and conflictual gaps trigger the following questions:

- Will a company that has a reputation for having a world-class supply chain, also rank high in terms of having a sustainable supply chain?
- If a company's top management includes sustainability as one of its competitive priorities, would purchasing and supply chain managers find Kraljic's commodity portfolio approach useful to move toward that goal?
- Consequently, is Kraljic's primary focus on a supply strategy being primarily dependent on (i) the strategic importance of the purchased inputs (in terms of profit impact and supply risk), and (ii) the complexity of the supply market holistic enough to adequately incorporate sustainability in supply decisions?

PURCHASING MUST BECOME SUSTAINABLE SUPPLY MANAGEMENT

The most popular definition of sustainable development was presented by the Bruntland Commission as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Economic and Development 1987). Nowadays, environmental stewardship and social equity are recognized as major pillars of sustainable development (Vachon and Mao 2008) along with economic performance. Environmental stewardship includes the preservation of natural resources, waste minimization and reduced emissions. Societal equity is concerned with poverty, injustice and human rights — from an operations management perspective employees' health and safety is considered within this dimension of sustainability. The economic performance dimension assures that the economic needs of the company, workers and other stakeholders are met. Other authors have proposed additional dimensions to sustainable

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development such as social institutions (Spangenberg 2002) and cultural diversity (Werbach 2009). While social institutions are not under the control of corporations, cultural diversity is a new reality in today's multicultural societies and international supply networks. Cultural diversity addresses the call for companies to value diversity and protect the earth's various cultures, especially those in which companies do business. Given these dimensions of sustainability, we believe that many companies have made progress in terms of environmental and economic issues — while significant progress is generally lacking in societal and cultural issues.

Based on our primary premise that companies are only as sustainable as the suppliers that compose their supply chains, several questions are not readily addressed by Kraljic's work. Suppliers are selected and retained or eliminated from a company's supply base by various managers within the firm, including purchasing managers, design engineers, buyers and teams that can include representatives from all parts of the firm. If sustainable development becomes a strategic priority for the firm, and supplier selection decisions are being made to reflect that priority, Kraljic's work — if used by these managers — needs to be critically reassessed, adapted or perhaps replaced. For instance, does the proactive use of minority-owned suppliers, a socially related issue, fit within Kraljic's framework? Also, if a supplier is otherwise selectable given Kraljic's recommendations, how does the presence of an alternate supplier that is identical, except for the fact that it uses a higher percentage of recyclables as inputs at a higher cost or higher level of supply risk, fit within the decision?

Regardless of what one thinks of the suitability of Kraljic's framework for today's purchasing professionals, we propose that to achieve sustainable supply management, purchasing managers who use such a framework must, at minimum, amend it to include sustainability as a "key performance criterion" — in all four quadrants of the matrix — for strategic, leverage, bottleneck and noncritical items alike. If one also agrees that purchasing strategy is evident in the characteristics of the suppliers it chooses to purchase from, sustainability becomes a competitive priority on par with quality, cost, delivery, flexibility and innovation.

- For *strategic* items, including sustainability as a key performance criterion may mean additional emphasis on innovation to ensure that supply chain partners emphasize sustainability during new product development. In particular, buying organizations should consider collaborating and cross-fertilizing their know-how with suppliers of strategic items in order to minimize the environmental and social impacts of new products. It also means that if they have not already done so, supplier partners should be encouraged to adopt sustainability as one of their own competitive priorities. If they refuse, perhaps the supplier selection and retention decision should be revisited.
- For *leverage* items — packaging suppliers, for example — sustainable priorities mean greater emphasis on the use of recyclables and material reduction — both emphasize the environmental dimension of sustainability and, ultimately, a reduction of costs. For buying firms, the idea here would be to share across the supply network best practices in regards to the material intensity reduction associated with logistical flows and finished products. Also, sourcing of raw materials for these items may require suppliers to closely examine their own supply chains to adopt the various dimensions of sustainability.
- For *bottleneck* items, the push for sustainability would seem more problematic because the buying firm is already in a dependent situation, and is in no position to pressure a supplier to operate sustainably. In this situation, buying organizations should try to develop or promote industry-wide standards and norms that are conducive for sustainability (e.g., hospitals pooling their power to have responsible waste management service companies' processes and equipment certified). Generally, however, Kraljic's focus on cost and risk minimization seems to run counter to the idea of sustainability for bottleneck items.
- For *noncritical* items — such as office supplies — supplier selection and retention decisions may have to be revisited. For these items, the decision may not be overly difficult because of the adequate number of suppliers available. In this case, a requirement by buying organizations for a third-party certification of suppliers' operations and practices would be warranted.

Overall, each of these commodity categories will need to be revisited by companies that are serious about achieving significant results in raising sustainability as a competitive priority. This necessity reflects the fact that sustainable development is not unidimensional as managerial actions should be adapted to the context or, in the case of purchasing, to the type of input supplied. Further, Kraljic's umbrella imperatives to minimize risk and cost may have to be attenuated to achieve sustainability objectives. For example, more risk may be incurred over the short term as a company reduces the number of suppliers it considers selectable and retainable because of sustainability objectives. Further, additional costs may also be incurred if suppliers that have better sustainability performance also charge higher unit prices as a result of their own higher costs.

Some companies will, and have, unilaterally adopted sustainability as part of their business strategy, while other companies may be coerced to do so by customers, suppliers and/or legislation. Some companies may choose to focus on only the environmental and economic dimensions of sustainability, while others will also include the social and/or cultural dimensions. What seems clear is that for those companies that do include sustainability as part of the corporate and competitive

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strategy, sustainability as a key performance criterion should be present in all four quadrants of Kraljic's matrix. In that sense, sustainability may not help to differentiate among the characteristics of different categories of commodities that are purchased. However, the actions required by companies to achieve sustainability goals within these commodity categories may differ, as we have suggested above.

Perhaps, like quality in the 1990s, sustainability will become an order qualifier when placing orders with suppliers. Until that occurs, purchasing managers will have to proactively revisit their supplier selection decisions in order to elevate sustainability. We also wonder if supply chain managers will need to be more transparent in their activities, so as to provide verification of their efforts to achieve sustainability in their supply chains. Quality, cost, delivery, flexibility and innovation are often evident in a product. The degree to which sustainability considerations are present in a product or service may be more difficult for customers to detect. Thus, companies that are proactive in sustainability may find it beneficial to communicate their sustainability-related supply chain activities to their own customers.

One of our goals in this paper was to encourage our fellow researchers to consider how sustainability goals within companies are affecting purchasing and supply chain managers in terms of setting strategies for the purchase of their inputs, and in managing the relationships and performance of their suppliers. We hope that the preceding discussion incites further theoretical insights and more empirical investigations into the role of sustainability and its effect on purchasing and supply chain strategy. The subsequent section introduces the papers in this special topic forum.

INTRODUCING THE PAPERS IN THIS SPECIAL TOPIC FORUM

The call for papers for this special topic forum tried to circumscribe the topics in two ways. First, it encouraged submissions that integrated social, environmental and economic performance. Hence, the call for papers aimed at submissions that would use the triple-bottom line mindset for corporate sustainable development (Elkington 1998; Bansal 2005). From a supply chain standpoint, the suggested topics were mainly associated with issues pertaining to the management of the supply network (e.g., monitoring supplier performance, managing global supply networks, applying the triple bottom line to the sourcing decision and so on).

The call for papers generated 18 submissions.[2] After a rigorous review process, two papers, one invited and one regular submission, have passed through the process and are presented in this special topic forum.[3]

The first paper, entitled "Looking Forward, Pushing Back and Peering Sideways: Analyzing the Sustainability of Industrial Symbiosis" (Bansal and McKnight 2009), presents a conceptual framework centered on the notion of industrial symbiosis (IS). It is a thought-provoking paper that explores how IS might fundamentally integrate sustainability in a richer, broader definition of supply chain management. In essence, IS requires expanding relationships between firms to include the reuse, recycle and reprocessing of intermediates and byproducts. Building on a case from the Sarnia-Lambton region (Ontario, Canada), the authors suggest that the flows of process wastes — either from other or to other firms — create an expanded interconnected network of new "suppliers" and "customers" with concerns about cost, quality and reliability. As a result, all partners in a complex network based on IS must become more resilient, i.e., able to adjust to unexpected change.

The second paper ("Food for Thought: Social versus Environmental Sustainability Practices and Performance Outcomes") takes on the challenging task of exploring simultaneously all three elements of sustainability — social, environmental and economic — and succeeds in an admirable fashion (Pullman, Maloni and Carter 2009). Using the data from a survey of the U.S. food and beverage industry, the authors test a path model linking social and environmental practices to a set of performance metrics (including environmental, quality and cost). Their results add empirical weight to the notion that managing the interrelated aspects of sustainability is both complex and competitively rewarding, partly because direct, immediate performance gains might be difficult to recognize. Specifically, the authors found that social practices are linked to quality performance but not environmental performance. They also note that environmental performance has only an indirect effect on cost performance as it was mediated by quality performance.

CONCLUDING REMARKS

In concluding this paper, we would like to emphasize two of our previous points. First, we referred earlier in the paper to a vice president of a Fortune 100 firm, who asked whether sustainability was a new euphemism for today's cost-cutting efforts. We hope not! However, it could support cost as a competitive priority, similar to the way a set of local suppliers can increase supply chain resilience — by reducing the likelihood of late shipments — and support delivery and/or flexibility as a priority. Furthermore, it is clear that while some sustainability efforts will increase costs in the short run, many will yield

[2]In retrospect, we would like to express our apologies to the several authors who queried about the possibility of sending in their manuscripts after the deadline: we had to decline several requests.

[3]We are grateful to the reviewers who have completed the manuscript evaluation in a timely and professional manner. Their names appear in the Appendix.

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long-term reductions in cost — especially if cost is measured from the perspective of earth-to-earth product life cycle considerations.

Second, we believe that companies that emphasize sustainability as a competitive priority will benefit by documenting and communicating their supply chain management efforts to their customers and the markets in which they compete. As we noted earlier, while quality, cost, delivery and innovation may be readily evident in many companies' products, the components of sustainability may be more difficult to detect. Thus, supply chain management practitioners may have to be more proactive about communicating the efforts they are making to ensure their supply chains are sustainable.

We hope the papers in this special topic forum on sustainable supply chain management incite further work in this area.

REFERENCES

Bansal, P. "Evolving Sustainably: A Longitudinal Study of Corporate Sustainable Development," *Strategic Management Journal*, (26:3), 2005, pp. 197-218.

Bansal, P. and B. McKnight. "Looking Forward Pushing Back and Peering Sideways: Analyzing the Sustainability of Industrial Symbiosis," *Journal of Supply Chain Management*, (45:4), 2009, pp. 25-36.

Bowen, F.E., P.D. Cousins, R.C. Lamming and A.C. Faruk. "The Role of Supply Management Capabilities in Green Supply," *Production and Operations Management*, (10:2), 2001, pp. 174-189.

Carter, C.R. "Purchasing and Social Responsibility: A Replication and Extension," *Journal of Supply Chain Management*, (40:4), 2004, pp. 4-16.

Carter, C.R. and M.M. Jennings. "Logistics Social Responsibility: An Integrative Framework," *Journal of Business Logistics*, (23:1), 2002, pp. 145-180.

Carter, C.R. and D.S. Rogers. "A Framework of Sustainable Supply Chain Management: Moving toward New Theory," *International Journal of Physical Distribution and Logistics Management*, (38:5), 2008, pp. 360-387.

Chen, I.J. and A. Paulraj. "Towards a Theory of Supply Chain Management: The Constructs and Measurements," *Journal of Operations Management*, (22:2), 2004, pp. 119-150.

de Burgos Jinemez, J. and J.J.C. Lorente. "Environmental Performance as an Operations Objective," *International Journal of Operations and Production Management*, (21:12), 2001, pp. 1553-1572.

Elkington, J. *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, New Society Publishers, Gabriola Island, BC, Canada, 1998.

Ellram, L.M. and A.S. Carr. "Strategic Purchasing: A History and Review of the Literature," *International Journal of Purchasing and Materials Management*, (30:2), 1994, pp. 10-19.

Gelderman, C.J. and A.J. Van Weele. "Handling Measurement Issues and Strategic Direction in Kraljic's Portfolio Model," *Journal of Purchasing and Supply Management*, (9:5–6), 2003, pp. 207-216.

Gonzalez-Benito, J. "A Theory of Purchasing's Contribution to Business Performance," *Journal of Operations Management*, (25), 2007, pp. 901-917.

Guide, V.D.R. and L.N. Van Wassenhove. "The Evolution of Closed-Loop Supply Chain Research," *Operations Research*, (57:1), 2009, pp. 10-18.

Hart, S.L. "A Natural-Resource-Based View of the Firm," *Academy of Management Review*, (20:4), 1995, pp. 986-1014.

Hayes, R.H. and S.C. Wheelwright. *Restoring Our Competitive Edge: Competing Through Manufacturing*, Wiley, New York, 1984.

Jayaraman, V., R.D. Klassen and J.D. Linton. "Supply Chain Management in a Sustainable Environment," *Journal of Operations Management*, (25:3), 2007, pp. 1071-1074.

Kraljic, P. "Purchasing Must Become Supply Management," *Harvard Business Review*, (61:5), 1983, pp. 109-117.

Krause, D.R., M. Pagell and S. Curkovic. "Toward a Measure of Competitive Priorities for Purchasing," *Journal of Operations Management*, (19:4), 2001, pp. 497-512.

Leenders, M.R. and H.E. Fearon. "Developing Purchasing's Foundation," *Journal of Supply Chain Management*, (44:2), 2008, pp. 17-27.

Olsen, R.F. and L.M. Ellram. "A Portfolio Approach to Supplier Relationship," *Industrial Marketing Management*, (26:2), 1997, pp. 101-113.

Pullman, M.E., M.J. Maloni and C.R. Carter. "Food for Thought: Social versus Environmental Sustainability Practices and Performance Outcomes," *Journal of Supply Chain Management*, (45:4), 2009, pp. 38-54.

Rosenzweig, E.D. and A.V. Roth. "Towards a Theory of Competitive Progression: Evidence from High-Tech Manufacturing," *Production and Operations Management*, (13:4), 2004, pp. 354-368.

Seitz, M.A. and K. Peattie. "Meeting the Closed-Loop Challenge: The Case of Remanufacturing," *California Management Review*, (46:2), 2004, pp. 74-89.

Seuring, S., J. Sarkis, M. Muller and P. Rao. "Sustainability and Supply Chain Management — An Introduction to the Special Issue," *Journal of Cleaner Production*, (16:14), 2008, pp. 1545-1551.

Sharma, S. and I. Henriques. "Stakeholder Influences on Sustainability Practices in the Canadian Forest Products Industry," *Strategic Management Journal*, (26:2), 2005, pp. 159-180.

Spangenberg, J.H. "Institutional Sustainability Indicators: An Analysis of the Institutions in Agenda 21 and a Draft Set of Indicators for Monitoring their Effectivity," *Sustainable Development*, (10:2), 2002, pp. 103-115.

Tully, S."Purchasing's New Muscle," *Fortune* Vol. 131, 1995

Vachon, S. and R.D. Klassen. "Extending Green Practices across the Supply Chain: The Impact of Upstream and Downstream Integration," *International Journal of*

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Operations and Production Management, (26:7), 2006, pp. 795-821.

Vachon, S. and Z. Mao. "Linking Supply Chain Strength to Sustainable Development: A Country-Level Analysis," *Journal of Cleaner Production*, (16:15), 2008, pp. 1552-1560.

Vickery, S.K., C. Droge and R.E. Markland. "Production Competence and Business Strategy: Do They Affect Business Performance?," *Decision Sciences*, (24:2), 1993, pp. 435-455.

Ward, P.T., J.K. McCreery, L.P. Ritzman and D. Sharma. "Competitive Priorities in Operations Management," *Decision Sciences*, (29:4), 1998, pp. 1035-1046.

Werbach, A. *Strategy for Sustainability: A Business Manifesto*, Harvard Business Press, Boston, MA, 2009.

World Commission on Environment and Development. *Our Common Future*, Oxford University Press, New York, 1987.

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APPENDIX

List of Reviewers

Many thanks for the diligent work and fast response of the reviewers.
Tonya Boone, College of Williams & Mary
Injazz Chen, Cleveland State University
Jack Crumbly, Jackson State University
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