

Creating a sustainable supply chain: the strategic foundation

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Supply chains are responsible for more than 50 per cent of an organisation's environmental footprint. As a result, organisations are increasingly seeking to create sustainable supply chains to improve their performance, which is a challenging task. Our research found that supply chain managers identify cost, complexity, resistance to making changes to processes, a lack of detailed knowledge, information and superficial leadership commitment to sustainability and to supply chain collaboration as the key barriers.

Despite these challenges, organisations have been very successful in achieving supply chain sustainability. Siemens, a global technology provider, used its supplier sustainability programme to reduce both its emissions and waste by 18 per cent and achieved 90 per cent recycling of materials ([Siemens, 2017](#)). Bombardier, an aircraft and vehicle manufacturer, used its design for environment programme to reduce energy consumption by 1.4 per cent, total greenhouse gas emissions and water consumption by 5 per cent and hazardous waste by 10.7 per cent, while increasing revenues by 2.5 per cent ([Bombardier, 2017](#)). Interface, the world's largest manufacturer of commercial carpet squares used its new industrial model and life cycle assessment method to reduce energy consumption by 40 per cent, material usage by 12 per cent and greenhouse gas emission by 25 per cent while increasing revenues by 11 per cent ([Interface, 2017](#)).

These companies are leaders in sustainability, but how can other organisations achieve these types of results? Engaging the many and varied organisations making up a supply chain requires an integrating and adaptive strategy. Government regulations and contracts can provide an incentive for sustainability, but do not have the flexibility necessary to create the alignment or organisations needed to achieve high-performance sustainability in the supply chain. To do this, a sustainability-oriented strategy is needed. A strategy for supply chain sustainability requires the organisation to have shared beliefs about the importance of environmental and social sustainability, economic efficiency and accountability, mechanisms for control and coordination and sustainability objectives. How this is achieved, however, is quite different from the normal strategy process because both sustainability performance and the supply chain resources are located outside the organisation. This leads to the important question – “What are the key elements of a supply chain sustainability strategy and why is it different?”

To identify the key elements that a supply chain sustainability strategy would comprise, we surveyed 3,800 supply chain professionals and also developed case studies on supply chain sustainability strategies at Siemens, Bombardier and Interface. This research confirmed what we proposed earlier; a strategy can be the foundation of supply chain sustainability. It also determined that a relationship-focussed strategy will have a greatest impact on sustainability performance in the supply chain. In addition, a supply chain

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sustainability strategy was found to be effective in motivating sustainability innovation in the supply chain. Another important feature of the strategy was that it supported employee engagement in sustainability efforts in the supply chain.

We found that an effective strategy required a personal commitment from senior management to reducing the company's environmental impact. It also required supply chain members to be involved in the sustainability initiatives of the organisation and in planning for increasing sustainability in the supply chain. Finally, the strategy needed to develop the technical capabilities of all staff for initiatives in the supply chain. Some of the important differences to normal strategies included the development of externally focussed action plans, much larger contributions from suppliers to initiatives and planning and the development of skills for activities located outside the organisation. The supply chain sustainability activities of Siemens, Bombardier and Interface confirm the importance of the four components of a supply chain sustainability strategy, as we discuss below.

Developing leadership commitment to sustainability

The research determined that a personal leadership commitment to supply chain sustainability was required to support the magnitude of change required and development of competencies necessary to increase the performance of the supply chain. This finding is logical, as leadership plays a critical role in shaping a firm's values, orientation and directions and, as such, has a significant influence on both performance and the types of performance achieved (Eccles *et al.*, 2012). Change processes are also facilitated by leaders performing the role of project champions, as they can most effectively respond to barriers. One of the greatest barriers encountered in implementing supply chain sustainability strategies is the difficulty of changing the traditional perspective of the supply chain as simply a supplier to viewing it as a network of partners sharing a common plan. Leadership support of the strategy also allows it to be integrated into the business strategy, as well as the operations, systems and management practices. It is important to connect the supply chain sustainability strategy with these areas, as they provide a connection to the organisation's strongest competencies. Leadership support also legitimises the sustainability goals as valid organisational targets (Epstein *et al.*, 2010; Wolf, 2011).

Traditional leaders may only support sustainability initiatives which offer proven returns on investment. Leadership in this strategy goes beyond responding to incentives, standards or regulations. It is focussed on large-scale strategies implemented over longer time horizons. To implement large-scale sustainability strategies in the supply chain, leaders will have to engage supply chain stakeholders, identify and address supply chain-located obstacles and introduce new knowledge and ideas that reflect the characteristics of the whole supply chain. This may also require a structured approach to organising the knowledge and expertise within the organisation, such as the use of design thinking. The research determined that appropriate information systems were helpful in ensuring both the exchange of actionable information and establishing communication standards suitable for the sustainability-adding activities of the supply chain.

Accessing the required level of expertise for sustainability also requires cross-functional and cross-departmental collaboration and consideration of the value chain, life cycle costs, technologies, customer issues and employee contributions. The research confirmed that departmental silos are a barrier to this level of cooperation. The most common practice in the participating organisations was to focus on collaboration between pairs of departments, such as sales and marketing or logistics and operations and with members of the supply chain. Achieving this level of cooperation requires strategic leadership.

Sustainability leadership at Interface

Ray Anderson, the sustainability leader at Interface, started them on their journey to supply chain sustainability. He encouraged Interface to adopt new thinking and a new approach to its strategy. He set a goal of zero environmental impact by 2020 and encouraged his employees to be involved in his passion. Anderson involved sustainability expert Paul Hawken, chair of The Natural Step, a non-profit, non-governmental organisation founded in Sweden in 1989. Anderson established a task force to guide the development of the supply chain sustainability strategy and also redesigned Interface's business practices to be compatible with the supply chain strategy and goals.

Supplier involvement in the organisation's sustainability initiatives

The next part of a sustainability strategy identified in the research was the process of involving the supply chain members in the organisation's initiatives. This aspect requires supply chain member relationship management, affects all aspects of the supply chain operations and can have a dramatic impact on supply chain performance (Flynn *et al.*, 2010). Effective relationships facilitate the exchange of information and the visibility of project status (Prajogo and Olhager, 2012). Involving supply chain members in the organisation's sustainability initiatives also requires openness to engaging other organisations in internal processes and information transfer. The openness can be generated by leadership engagement activities. Information transfer, however, requires effective communication (Rowlinson and Cheung, 2011). The research determined that effective communication enabled boundary-spanning network capabilities to be included, resulting in the exchange of expertise and ideas and improved supply chain sustainability outcomes. The diversity of knowledge across the supply chain was particularly effective in improving sustainability initiative designs and innovation, as well as outcomes. Finally, establishing good communication and involving supply chain members in the organisation's initiatives helped synchronise sustainability initiatives throughout the supply chain.

Involving Bombardier's suppliers in sustainability initiatives

Bombardier identified its supply chain as a key focus for sustainability improvement. They initiated their engagement with the supply chain by sharing their values. They also reported on the environmental impact of all their products to their supply chain members through their Environmental Product Declaration Report, which created the foundation for involving their suppliers in their initiatives. This proved to be very effective and the input of one supplier, Cascades, enabled them to produce a new line of innovative eco-responsible products.

Involving Interface's suppliers in sustainability initiatives

Interface began involving its supply chain partners in its sustainability initiatives by providing training to supply chain members in partnership with a major US university. Interface then held supply chain member summits to introduce them to the company's mission, business strategies, sustainability objectives and use of life cycle assessment. Supplier involvement with Interface's sustainability initiatives proved to be very effective, as their sustainability performance demonstrates.

Supplier involvement in planning for increasing sustainability in the supply chain

Supplier involvement in sustainability planning increases engagement within the supply chain. In the same way that involving employees in decision-making improves their participation in information sharing (Cantor *et al.*, 2012), involvement in supply chain

sustainability planning creates a culture of mutual responsibility. The research determined that supply chain member involvement in planning was necessary to:

- commit supply chain owned resources to the plan;
- synchronise other supply chain member initiatives with the plan; and
- disseminate the plan across the supply chain.

The benefits of supplier participation in sustainability planning consequently include access to greater resources, facilitated dissemination of the strategic plan and consideration of all critical environmental factors.

Siemens and its suppliers

Suppliers played a critical role in planning for Siemens' sustainability-oriented value chain. Because of this important role, Siemens expected suppliers to demonstrate their commitment to the company's code of conduct by becoming ISO 14001 (environmental management) certified. Siemens also encouraged suppliers to ensure that the second-tier suppliers adhered to Siemens' code of conduct. This created the foundation for informed input into the supply chain sustainability planning from suppliers and establishing a common language for the development of the plan.

Building technical skill

The research determined that a supply chain sustainability strategy with the characteristics described in the previous sections requires a high degree of capability from both the organisation and supply chain members. In addition to the need to develop a strategy for a complex network, the context for a sustainability strategy may be rapidly evolving and competitive. The planning component of a sustainability strategy therefore requires participants with high levels of technical competency in order to determine how the resources available will have the greatest impact on sustainability performance. The technical competencies associated with supply chain strategy planning include problem-solving, decision-making, IT and knowledge (Gammelgaard and Larson, 2001; Ngai *et al.*, 2011). These competencies also support the incorporation of innovation in the strategy. Finally, technical competency increases the effectiveness and reduces the time associated with the implementation of the supply chain sustainability (Silviu and Schipper, 2014).

Siemens sustainability training for supply chains members

Siemens conducted supplier sustainability workshops in various countries to help build their suppliers' sustainability capabilities. The company used a wide variety of IT systems to assist suppliers with assessing, optimising and reporting on the environmental impacts of their operations and products. These included environment-related process control systems, product environmental impact modelling and optimisation and environmental impact audits.

Discussion

The literature identifies some interesting parallels to these findings in other domains. For example, the need for leadership in supply chain sustainability strategy is consistent with innovation theory, which indicates that architectural (system changing) innovations such as supply chain sustainability strategies require senior leadership support to legitimise the associated structural and system changes (Eccles *et al.*, 2012). The need for supplier involvement in organisational sustainability initiatives and planning sustainability initiatives for the supply chain has parallels in network theory and social capital theory. Both theories

indicate that it is necessary to establish strong ties (relationships that allow the exchange of valuable information and agreements). In the case of supply chain sustainability strategy, strong ties with key supply chain members are needed to implement change and access key capabilities and resources in the supply chain (Hearnshaw and Wilson, 2013; Krause *et al.*, 2007; Pathak *et al.*, 2007). Organisations must convert weak ties with suppliers into strong ties through relationship development and information exchange before they can be involved in strategy development.

The involvement of suppliers in strategy planning and the required technical capability are both examples of building the capability to assess and mobilise resources. This action has parallels with constructs of the resource-based view, in which the ability to mobilise strategic resources improves performance (Barney, 2012; Wu *et al.*, 2006). Many of the strategic resources involved in the sustainability strategy are distributed throughout the supply chain, which is different from the conventional resource-based view, which assumes that resources are under the direct control of the organisation. The employee involvement legitimisation effect of strategic leadership in supply chain strategy implementation, on the other hand, is a strategic orientation process. It involves legitimising and prioritising the sustainability strategy initiatives throughout the organisation. Supply chain-orientation theory suggests that performance in supply chain initiatives is increased when departments in the organisation act in coordination and support this approach (Patel *et al.*, 2013).

The mechanisms for the four dimensions of supply chain sustainability strategy indicated by innovation, network and strategic theory confirm that there is a strong logic behind their role in sustainability strategy. They suggest that this strategy will meet both the functional requirements of creating the mechanisms for supply chain sustainability improvement and introduce a performance improvement orientation to the strategy. As sustainability initiatives are strongly associated with economic performance improvement (Green *et al.*, 2012), it is likely that this orientation will improve the economic performance of the supply chain members as well.

Conclusion

This paper demonstrates that a supply chain sustainability strategy has unique characteristics which are not normally present in a standard business or operations level strategy. These include developing a common language for sustainability with suppliers, as well as the involvement of suppliers in internal sustainability initiatives and planning for the use of resources located externally to the organisation to achieve greater sustainability performance in the supply chain. By comparison, operations strategy involves the use of internal capabilities such as technology management to achieve organisational objectives.

This article also demonstrates that the four components of a supply chain sustainability strategy (leadership for sustainability, supply chain member involvement in company initiatives, supply chain sustainability strategic planning and developing technical competency) are interrelated. For example, as leadership commitment legitimises and encourages the engagement of staff members in sustainability initiatives and in engagement with the supply chain, the communication and relationships with supply chain members will be developed. This will increase the likelihood of supply chain members becoming involved in the organisation's sustainability initiatives and strategy planning for the entire supply chain. Increased technical competency will provide more mechanisms and a shared language for communication of sustainability initiatives within the organisation and the supply chain. This will create a clearer language for sustainability leadership, as well as improve communication throughout the supply chain in relation to sustainability, facilitating the integration of supply chain members in planning. More involvement of supply chain members in organisational sustainability initiatives and planning will create the demand for more technological competency, as well as increasing the effect of leadership.

The strategy and the mechanisms described in this paper can be used to develop a supply chain sustainability strategy. At the practice level, there would be two stages. The first stage requires an assessment of the current status of the organisation in relation to each of the four components of the strategy. The following questions need to be considered: To what extent are our leaders visibly committed to sustainability? To what extent are suppliers involved in our current sustainability initiatives? Would suppliers be prepared to be involved in the development of an initiative? Does the current communication with supply chain members support such an initiative? Do our employees and supply chain members have sufficient technical competence to develop a sustainability strategy?

The second stage involves using the four parts of the strategy framework as a planning tool. Each part can be developed to build the strategy, beginning with a senior staff member taking on the leadership role, followed by engaging supplier involvement in organisational sustainability initiatives, then moving to developing technical capability in the organisation and supply chain through training and instruction programmes and finishing with supplier involvement in the development of the strategy using resource mapping and industry strategy tools such as “agile”. The technical capability and sustainability strategy development are likely to require input from external suppliers, both for coordinating integrated activities and developing technical capability, using approaches such as ISO 14001 certification.

This paper has several limitations, which also provide some exciting future research opportunities. The research is based on a survey and three case studies, which provide important examples that explain some of the mechanisms through which parts of the supply chain sustainability strategy operate. An extensive case study-based project may uncover more mechanisms for the development of the four parts of supply chain sustainability strategy. Future research could also incorporate perspectives from different countries where the local context may result in identifying different mechanisms for parts of the supply chain strategy (the selected firms were based in Canada, the USA and Germany). Four propositions could also be developed from the four parts of the supply chain strategy framework for testing against supply chain strategy sustainability performance.

While the data used for this paper considered the effect of a range of different variables on supply chain sustainability performance, we identified the four parts of the supply chain strategy after the data analysis. An examination of these parts as constructs for sustainability performance could provide further information in regard to their relative contribution to sustainability performance. The propositions could then be tested using quantitative techniques in developed countries, as well as in emerging economies such as India and China.

Keywords:
Sustainability,
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Bombardier,
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Further reading

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