Involving your Suppliers in Eco-Design

G.EN.ESI Education Centre

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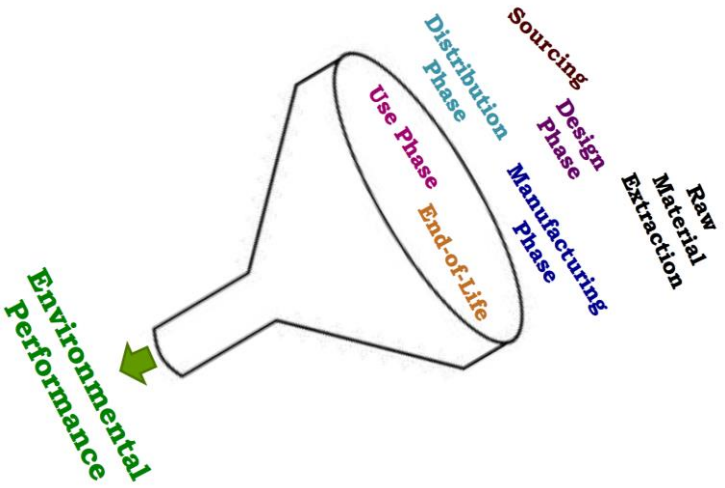
Introduction

As organisations are experiencing increased social and regulatory demands to behave in an environmentally conscious manner, environmental impact is fast becoming a factor to be considered on par with cost, functionality and value during the product development process. Some organisations are enhancing their competitiveness by improving their environmental performance through the mitigation of the environmental impact of their production and service activities (Bacallan, 2000). However, others view these new requirements as mandates or burdens that slow development while ramping up cost, detracting from the main business of the company. As a result, environmental aspects are often considered as an afterthought, resulting in delays and added costs when changes are made following the late addition of environmental requirements into the development process (Handfield *et al.*, 2001). With its roots in concurrent engineering, three dimensional concurrent engineering (3DCE) holds great promise for integrating environmental considerations into the product development process. 3DCE is the notion that the simultaneous design of product, process and supply chain, through links between internal functions and participation with external partners, leads to improved operating performance (Fine, 1998). Although relatively new in practice, as companies begin to embrace it, 3DCE appears to be a vehicle for demonstrating that eco-design efforts can support both traditional and environmental product development goals (Ellram *et al.*, 2008).

Your Product's Environmental Performance



As the environmental performance of a product is the amalgamation of its environmental impact through all the stages of its lifecycle, from the extraction of raw materials to its end of life, it is dependent on the totality of the supply chain in both upstream and downstream directions throughout its lifecycle. During the product development process, it is necessary to have as much information as possible pertaining to the environmental performance of the various supply chain partners and the products and services they provide.

Supplier Involvement in Environmental New Product Development

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Through time, and as companies sought to attain sustainable growth through the rapid introduction of new products, the product development process – an inherently collaborative activity between internal groups (such as engineering, marketing, manufacturing, sales and service) – increased in complexity due to the addition of external partners (such as subcontractors, customers, technology suppliers and co-development partners). This decrease in vertical integration, combined with increasing globalisation and outsourcing, resulted in the growth of supply chain management (SCM) which places great emphasis on the management of relationships within the supply chain, viewing the supply chain as more than just a logistic network comprising of interrelated companies built around delivering a specific product or service to the customer (Saeed *et al.*, 2005). Through cooperation and information sharing, SCM coordinates different parties within the network and establishes business partnerships with the aim of achieving overall and long-term benefits for all involved parties.

Due to the important role that the supply chain plays in the environmental performance of your product, it is important to incorporate them in your environmental new product development process through active SCM. On the one hand, there is the notion of collaboration advantage, defined as " *a significant leg up in a global economy due to a firm's well developed ability to create and sustain fruitful collaborations*" (Kanter, 1994), which is associated with the product development chain; while on the other, there is the resource-based theory view that one source of differential performance between companies is the way in which they organise exchange activity (Conner and Prahalad, 1996), which is related to the supply chain.

Supply Chain Information Sharing

One way of incorporating your suppliers into your product development process, for the benefit of environmental performance of your products is through increased supply chain information sharing. Information sharing can be applied to almost all core domains of corporate operational activities. Ranging from customer chains where information can aid in the formulation of customer experience strategies, to exchanges within the development chain where information is shared within product design and product lifecycle management activities and supply chain information exchanges that lead to greater visibility and responsiveness (Yu *et al.*, 2001). Typically, information sharing within the supply chain is associated with maximising responsiveness and efficiency while minimising cost, with the relationships formed handled by the procurement and/or logistics department; meanwhile, information sharing within the product development chain is allied with the acquisition of resources and capabilities to improve product offerings, with the collaborative relationships formed more likely to have a research and development focus. The amalgamation of the two forms of information sharing results in advantages gained through the unified use of the formed relationships, enriching the depth and quality of information shared via both design and supply chains. With particular focus on design chains and collaborative design, utilising supply chain information sharing relationships and methods within the product development process offer a means of non-invasively integrating the supply base into the environmental product development process.

Supply Chain Information Sharing During Environmental New Product Development

With environmental new product development (ENPD) practices such as eco-design and environmentally responsible manufacturing (ERM) requiring the co-operation of the entire supply chain (Puraji et al., 2003), the importance of the early consideration of supply chain aspects increases drastically. Through early supply chain involvement, specific information pertaining to the product's supply chain and characteristics of components and materials from the supply base is available during the design phase. It is this availability of information that can allow for various environmental assessments to be carried out, which are as accurate as possible as they will be based on supply chain specific

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information. Additionally, the effects of making alterations to the product's supply chain can be seen in real time as the product is being designed. The availability of this information allows for certain environmental considerations and assessments to be made during the product's development and not after product design has been completed. An example of how information sharing can aid ENPD is as follows: a member of the supply chain provides information regarding a component, including weight of component, geographical location of the production plant and transport used to ship it. When the designer selects this component during the design process, they can get access to information regarding the transport scenario associated with the part. This information be used as part of calculations such as the environmental impact (S-LCA) and cost (S-LCC), giving the designer real time environmental feedback regarding the product being designed based on the use of different components from different suppliers.

Impact of Eco-Information Characteristics on Information Sharing

Supply chain information sharing is the driving force behind involving your suppliers in your environmental product development process. One associated challenge is that of asymmetric information. It is important to understand that scenarios exist where various members of the supply chain have differing states of information relating to cost, resources, performance status and market conditions. As a result, to fully realise the potential within supply chain information sharing for eco-design benefits, it is important that work is carried out continuously to fill in existing gaps in order to avoid misunderstandings, opportunism and sub-optimal decision- making.

Your request for information that is not usually exchanged may result in incomplete information, as not all suppliers will have the all the required information pertaining to the products and services that they provide. As an example, a component manufacturer would likely be able to supply information regarding the materials and manufacturing processes related to aspects of the component that they have designed in-house; however, without requesting it from their own suppliers they would not be able to provide the same information for parts that they buy in. It is expected that with time, as the supply chain becomes more familiar with extra information requests, its completeness will increase. Information suppliers will be required to make the necessary investments at their end in order to attain any missing eco-information relating to the products and services they supply; however, as the world becomes more environmentally conscious, it is not presumptuous to say that these will be investments that companies have to make in order to remain competitive. The magnitude of challenges presented by this type of information sharing is such that the presence of a "champion", whose role is to guide the process along and ensure that communication channels are in place should conflict or challenges arise, would be paramount and very likely the key to its success.

Supply Chain Mapping

However before one can accurately share information with the supply chain and utilise it for the benefit of the NPD process, it is essential to have precise knowledge pertaining to the supply base and its architecture. Through the use of supply chain mapping, companies can have an accurate picture of the supply chain of their products, in both up and downstream directions. Supply chain mapping refers to outlining the structure of your supply chain. Not only does this aid in the attainment of product information from the supply chain but it also allows for greater supplier chain visibility and helps companies understand any risks inherent in their supply chains. Companies will be able to acquire information pertaining to not just first tier suppliers but potentially second and third tier suppliers too. This understanding of risk and visibility will also allow companies during the make-or-buy decision. When determining the supply chain architecture of a product and whether to make or buy certain components, it is important to understand the impact choices made have on value chain migration, defined as "*the shifting of value creating forces in a products supply chain*", and any associated risks.

Conclusion

To fully realise eco-design objectives, it is important to incorporate your supply chain in your development process. This requires the bridging of the gap between SCM and product development. One way of involving your supply chain is based on encouraging supply information sharing and using that information during the product development process. Through supply chain mapping, you can gain a picture of what your chain looks like and it will help you better understand what role various suppliers and supplied products play in the environmental performance of your product.

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Further Reading

While information on involving your supply chain in eco-design may be limited, the following resource for collaborating with your suppliers during new product development is very valuable and worth exploring:

- The Institute for Supplier Collaboration – www.suppliercollaboration.org
  A wide range of information on various ways you can collaborate with your suppliers, not just limited to new product development collaboration.

Alternatively, if you wish to speak to someone directly about involving your suppliers in your eco-design initiatives please email info@genesi_fp7.eu

References

Bacallan, J., 2000. Greening the Supply Chain. *Business and Environment,* 6.

Conner, K. & Prahalad, C.K., 1996. A Resource-Based Theory View of the Firm: Knowledge vs Opportunism. *Organisational Science,* 7.

Ellram, L., Tate, W. & Carter, C., 2008. Applying 3DCE to Environmentally Responsible Manufacturing Practices. *Journal of Cleaner Energy,* 16**,** 1620-1631.

Fine, C.H., 1998. *Clockspeed: Winning Industry Control in the Age of Temporary Advantage.* Massachusetts, United States: Perseus Books.

Handfield, R., Melnyk, S., Calantone, R. & Curkovic, S., 2001. Integrating Environmental Concerns into the Design Process: The Gap between Theory and Practice. *IEEE Transactions on Engineering Management,* 48**,** 189-208.

Kanter, R.M., 1994. Collaborative Advantage. *Harvard Business Review,* 72**.**

Puraji, D., Wright, G., Peattie, K. 2003. Green and Competitive: Influences on Environmental New Product Development. Journal of Business Research, 56, 657–671

Saeed, K., Malhotra, M. & Grover, V., 2005. Examining the Impact of Interorganisational Systems on Process Efficiency and Sourcing Leverag in Buyer-Supper Dyads. *Decision Sciences,* 36.

Yu, Z., Yan, H. & Cheng, T.C., 2001. Benefits of Information Sharing with Supply Chain Partnerships. *Industrial Management and Data Systems,* 101

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