



A REVIEW OF KEY DIMENSIONS FOR DESIGNING ENVIRONMENT-DRIVEN COLLABORATION PRACTICES WITH EXTERNAL BUSINESS PARTNERS

Stewart, Raphaëlle (1); Boks, Casper (2); Bey, Niki (1)

1: Technical University of Denmark, Denmark; 2: Norwegian University of Science and Technology, Norway

Abstract

Environmental sustainability challenges are of growing interest in the business world and collaboration with external business partners is considered a key means to tackle them. Nevertheless, collaborating with external business partners to develop and deliver greener products and services is not straightforward for companies, and recommendations from academia, as well as industry practices remain scarce. Guidance is needed for designing collaboration practices and their implementation when developing and delivering greener products and services. Pursuing this aim, the present paper reviews environmental management literature fields and extracts indications regarding practices of such collaboration with external business partners. We outline three key dimensions affecting collaboration practices and their implementation and consolidate them in a framework. We suggest that tailored implementation approaches should be based on the clarification of the company's objective for collaboration, the company's organizational profile for collaboration and the company's value network context. As a final point, we derive needs for further research.

Keywords: Collaborative design, Sustainability, Ecodesign, Green supply chain management, Green innovation

Contact:

Raphaëlle Stewart
Technical University of Denmark
Department of Management Engineering
Denmark
rste@dtu.dk

Please cite this paper as:
Surnames, Initials: *Title of paper*. In: Proceedings of the 21st International Conference on Engineering Design (ICED17),
Vol. 5: Design for X, Design to X, Vancouver, Canada, 21.-25.08.2017.

1 INTRODUCTION

An increasing number of companies have recognized the importance of sustainability issues for their business and seek to develop their own sustainability strategies (Epstein and Buhovac, 2010). In a business context, sustainability has no unique definition and has been shown to have multiple interpretations (Lankoski, 2016). Here we take the stand to primarily focus on environmental aspects since social, societal and philanthropic aspects of sustainability are, due to their inclusivity and challenging quantification, less precisely defined which makes the study of their implementation in a business context less tangible (Lankoski, 2016). Collaboration with external business partners has been broadly emphasized as a means to tackle environmental sustainability challenges and there is a general call in the environmental management literature for increasing collaboration across business partners to address environmental issues (Ageron et al., 2012; Brockhaus et al., 2013; Dangelico, 2015; Dekoninck et al., 2016; Kim et al., 2016; De Marchi, 2010; McAloone et al., 2010; Pereira and Vence, 2012; Petruzzelli et al., 2011; Sheldrick and Rahimifard, 2013). This standpoint is notably influenced by life cycle thinking which highlights that environmental impacts should be considered all along the life cycle of products and services (Dangelico et al., 2013; Paulraj, 2011; UNEP/SETAC, 2009). In many sectors, environmental impacts in the supply chain represent a high share of the total environmental impacts of products (GreenBiz and Trucost, 2015). On the other hand, collaboration to address environmental challenges is promoted to deal with their complexity by pooling competencies and resources (De Marchi, 2010). Collaboration is also present in the international community's agenda with the Sustainable Development Goals (SDGs) which recommend companies to engage in partnerships (UN Global Compact et al., 2015). Business leaders outline that teaming up is key for tackling sustainability issues and there is a trend towards partnerships with other organizations in the way companies address their environmental issues (Sadovnikova and Pujari, 2016).

On the other hand, the business community is currently experiencing a development of environment-driven approaches which require that companies act together in order to reach higher environmental performance, e.g. green supply chain initiatives such as management of environmental targets on a value chain level (Science Based Targets, 2016); green business model innovation such as circular economy strategies (Lewandowski, 2016). Regardless of these considerations, implementing collaboration practices with external business partners on green issues is challenging, as it is shown in recent literature with various references to inter-organizational challenges experienced by companies, in the context of e.g. green product development, green supply chain management and green business model changes (Stewart et al., 2016). Furthermore, it is often stated that collaboration levels remain low in practice (Brockhaus et al., 2013; Holt and Ghobadian, 2009; McAloone et al., 2010).

In the present paper, we focus on environment-driven collaboration practices with the potential to help companies develop and deliver "greener" products and services, i.e. to achieve higher environmental performance of products and services. This topic is covered in a variety of literature fields from which insights are combined in this paper as they all are expected to contribute to further understanding and supporting companies' collaboration practices. Using this approach we seek to contribute to the general call in business sustainability literature to provide support for companies in their implementation efforts of environmental approaches (Domingo et al., 2015; Engert and Baumgartner, 2016; Pigosso et al., 2013). More specifically in the context of interactions with external business partners, several scholars outlined a need for more guidance to select initiatives, identify business partners and develop capabilities, considering that companies have limited resources (Van Bommel, 2011; Bowen et al., 2001; Dekoninck et al., 2016; Masoumik et al., 2015). Consequently, we aim to grasp different dimensions affecting collaboration practices and implementation, formalize our findings in a framework and derive needs for further research in the area.

2 METHOD AND MATERIAL

Four literature fields were explored for indications on collaboration between business partners in the perspective of developing and delivering greener products or services. These are Green Product Development, hereafter called GPD (including Eco-design, Design for Environment), Green Innovation, hereafter called GI (including Environmental Innovation, and Green Product Innovation), Green Supply Chain Management, hereafter called GSCM (including Green Purchasing), and Green Business Model Innovation, hereafter called GBM (including Green Business Model Change). Along with the

undertaken explorative approach, literature searches were conducted in the database Scopus which allows for easy keyword string searches. Figure 1 sums up the literature review strategy, including the three keyword blocks used to build the search strings. For the review, we selected journal and conference papers which elaborate on the elements shaping companies' collaboration practices in a green context. Performance assessment of collaboration practices was excluded. Further references were added based on reference lists of papers featuring in the selection, and papers which the authors had identified earlier. Figure 2 shows the distribution of papers reviewed per literature field. We describe in the paper the three dimensions of gained insights (see Figure 1, right hand-side).

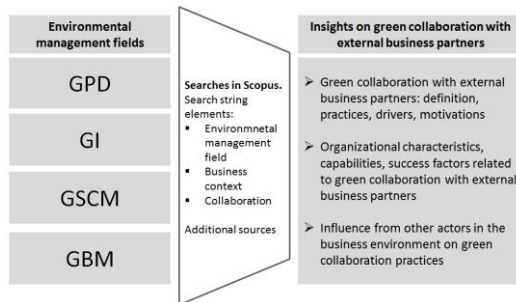


Figure 1. Literature review strategy

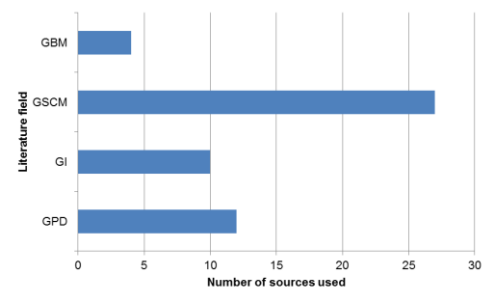


Figure 2. Sources per literature field

3 RESULTS AND DISCUSSION

Overall, the pool of selected papers is dominated by GSCM literature which gives much emphasis to collaboration across business partners in value chains in terms of motivations, practices and internal and external factors influencing collaboration. GPD literature contains limited references to the importance of collaboration with external business partners and very few references on the factors influencing collaboration. GI literature touches upon the topic of collaboration with external business partners to a more detailed extent, with more precise indications on motivations, practices and influencing factors. GBM is almost absent, which limits its contribution to the present analysis.

3.1 On unearthing the diversity of collaboration practices and objectives

In a business context, collaboration is a broad concept with no unique definition (Barratt, 2004; Gmelin and Seuring, 2014). Collaboration is sometimes mentioned as an important practice without further detail on what it entails (Hallstedt et al., 2013; Rosen and Kishawy, 2012). In the GPD context, Gmelin and Seuring (2014) compile different elements suggested by scholars to define collaboration and report that it typically implies sharing information, having harmonized goals, sharing resources, creating knowledge, and having common procedures. In the GSCM context, Brockhaus et al. (2013) distinguish between collaborative and mandated approaches by defining the former as a “higher level concept” in which several companies team up on the long term to improve their sustainability performance through joint initiatives. Gold et al. (2010) outline that collaboration differs from monitoring since it aims at strong engagement and proactivity from both parts and implies an “inter-organizational exchange process”. Collaboration is about “mutual problem solving” while monitoring is about “inspection and risk minimization”(Vachon and Klassen, 2006). Vachon and Klassen (2008) define environmental collaboration as “the direct involvement of an organization with its suppliers and customers in planning jointly for environmental management and environmental solutions”.

In practice, collaboration to address green challenges of products and services may be undertaken with various actors, e.g. suppliers, customers, service providers, recyclers, companies in other business areas, within the company's own enterprise group, with NGOs and environmental groups, with knowledge institutions, etc. (Bocken et al., 2014; Dangelico, 2015; Yarahmadi and Higgins, 2012). In the SDG compass (UN Global Compact et al., 2015), three major types of partnerships are reported: value chain partnerships in which suppliers and buyers work together; sector initiatives in which industry leaders work together; and multi-stakeholder partnerships involving different types of organizations. Collaboration with external business partners can materialize in a multitude of different practices as broadly reviewed in literature, e.g. green fair which consists in organizing open days to build a closer relationship with business partners; training of business partners; shared environmental savings in which

financial incentives are designed for both parts to foster sustainability performance (Youn et al., 2012; Young and Kielkiewicz-Young, 2001); peer partnerships in which companies within the same industry develop common guidelines to improve offering standards from an environmental perspective (Young and Kielkiewicz-Young, 2001); co-design of products and services; environmental tools and data sharing; joint work to reduce impacts of equipment; take-back initiatives (Yarahmadi and Higgins, 2012); shared value creation workshops (McAloone et al., 2010); common environmental goals setting; joint decisions for improvement actions (Vachon and Klassen, 2008); creation of knowledge networks, exploitation of the local knowledge base and creation of local innovation clusters (Dangelico, 2015). All in all, green collaboration may be seen as a joint action between several proactively engaged business partners, specifically focused on environmental challenges. Yet, the form of collaboration and partners engaged may vary from one case to the other.

Beyond what collaboration entails when environment-related, what forms it can take and who with, it is also interesting to explore the objectives for collaboration in literature, i.e. the underlying motives pushing the company towards undertaking a collaborative initiative. The objective is more detailed than the drive for collaboration which is often expressed in terms of institutional pressures or internal pulls (Agi, 2015; Van Bommel, 2011; Holt and Ghobadian, 2009) but without details on what companies aim at collaborating for. Yarahmadi and Higgins (2012) distinguish two main types of motivation for companies to collaborate on green challenges, namely compliance-based and competency-based. Compliance-based partnerships aim at complying with institutional rules and norms, i.e. pressures exerted by the company's stakeholders. Competency-based partnerships aim at expanding the pool of resources accessible to the company. On a more granulated level, Yarahmadi and Higgins (2012) list out a set of motivations for collaboration. These include access to new form of expertise, ideas, technological and R&D resources (Johansson, 2002; Lee and Kim, 2011; Pippel, 2015; Young and Kielkiewicz-Young, 2001); access to information; obtain legitimacy from stakeholders; address environmental risk in supply chain; modify industry standards towards increased environmental performance (Young and Kielkiewicz-Young, 2001); avoid competitive disadvantage (Yarahmadi and Higgins, 2012). Sadovnika & Pujari (2016) contend that companies may engage in partnerships with external business partners to elevate their corporate environmental profiles, i.e. environment-related corporate perception. Brockhaus et al. (2013) outline that for some companies the main motivation to engage business partners in environmental work is unearthing cost savings. The life-cycle perspective on products and services brings the focus on environmental hotspots and may lead companies to consider undertaking collaboration with external business partners in order to reach these hotspots and better monitor them (Dangelico et al., 2013; Nakano and Hirao, 2011). In the GI and GBM fields, collaboration with external business partners is driven by the need to implement systemic and radical changes (Asswad et al., 2016; Bocken et al., 2014; De Marchi, 2010; Verghese and Lewis, 2007; Winkler, 2011). For other companies, environment-driven collaboration with partners may be a concrete source of business, e.g. Tetra Pak collaborates with companies to whom it sells processing equipment to help them reduce their environmental impacts (Tetra Pak, 2016); Novozymes collaborates with companies to whom it sells enzymatic solutions, to help the latter reduce their environmental impacts (Novozymes, 2014). Gold et al. (2010) argue that inter-firm collaboration may be pursued in itself to gain a competitive advantage, i.e. rare and difficult to imitate competency.

The above development intends to emphasize the great diversity in possible objectives of companies engaging in collaborative activities with external business partners. Yarahmadi and Higgins (2012) suggest that the type of partners to engage through collaboration should be chosen depending on the type of motivation. We further propose that the objective for collaboration may more generally influence the collaboration practices and their implementation.

3.2 On the characteristics influencing the collaborative profile of companies

All literature fields contain indications of organizational characteristics, capabilities, enablers and success factors affecting or likely to affect the ability of firms to collaborate with external business partners. However, the GSCM literature provides most of the factors hereafter mentioned and the latter may not be systematically specific to the collaborative approach of GSCM. In the GSCM context, scholars outline the importance of understanding internal factors to explore what can be undertaken by specific companies (Agi, 2015; Van Bommel, 2011; Bowen et al., 2001). These factors can be grouped in four categories: management, knowledge & learning, work practices and external orientation.

The first category “management” includes all elements defining to what extent the company management prioritizes interactions with external business partners to address environmental issues, i.e. strategies and top management commitment (Agi, 2015; Yen and Yen, 2012), strategic perspective on purchasing (Paulraj, 2011), financial resources (Gandhi et al., 2015), monitoring, reward and appraisal systems (Agi, 2015). An overall innovative and entrepreneurial attitude at the company with specific focus on combining business and societal values was found to help companies in their proactive sustainable supply chain management practices (Paulraj, 2011). The second category, “knowledge & learning”, emphasizes the importance for the company to have an advanced understanding of its environmental issues (Bowen et al., 2001), to possess high technical expertise within the company (Bowen et al., 2001) and provide training (Agi, 2015), to be able to exchange and integrate knowledge with external partners (Agi, 2015), to have a strong focus on knowledge management and sharing (Agi, 2015), and to be able to learn and adapt (Van Bommel, 2011). The third category, “work practices” includes all characteristics addressing how the company works. Cross functional communication, learning and work are emphasized as key aspects for facilitating GSCM practices (Agi, 2015; Bowen et al., 2001; Young and Kielkiewicz-Young, 2001). Using detailed procedures is also pointed out (Agi, 2015). Van Bommel (2011) highlights the importance of giving autonomy to the teams as well as the possibility for experimenting. The fourth and last category, “external orientation”, focuses on describing the extent to which the company is integrated with its external business environment. Some aspects are actually at the frontier between the third and fourth categories: work practices integrated with the external business environment. Alblas et al. (2013) outline the need for new ways to communicate and collaborate across the value chain to enhance green product development. Exchange of information is a key success factor of collaborative supply chain approaches (Gavronski et al., 2011; Ramanathan et al., 2014). Cooperative information systems and interoperability standards are emphasized as means to increase communication in the value chain (Agi, 2015; Van Bommel, 2011; Gmelin and Seuring, 2014) and working in cross company teams (Agi, 2015) is a way to further integrate external business partners in project work at the company. The company reputation plays a role in its collaboration possibilities (Agi, 2015; Van Bommel, 2011). The characteristics of relationships between the company and its business partners, e.g. long-term (Agi, 2015), trustworthy (Agi, 2015; Van Bommel, 2011; Cheng et al., 2008), collaborative or partnership-oriented (Bowen et al., 2001; Dekoninck et al., 2016), close relationship (Dekoninck et al., 2016), with information transparency (Van Bommel, 2011) are influencing factors. Growing a network of players (Dangelico, 2015) and the pre-existence of joint initiatives can foster further collaborations (Van Bommel, 2011). Asswad et al (2016) recommend using an open innovation platform to collaborate with multiple stakeholders and overcome the challenges of implementing sustainable business models.

In the broader GSCM context, several studies have sought to identify relationships between different factors and shown that some drive others, e.g. Agi (2015) showed that top management commitment, relationships with supply chain partners and good management practices are leading factors supporting companies’ GSCM practices; Bowen (2001) revealed that a proactive corporate environmental attitude and a strategic purchasing and supply management approach help companies build GSCM capabilities. Yet, there is a need for better understanding how the given set of capabilities at a company will influence collaboration practices and implementation to fulfil the company’s objectives.

3.3 On the importance of taking “the others” into account

The value chain organization and power distribution are referred to as important factors shaping what companies are able or willing to do. On the one hand, dealing with value chains dispersed around the globe and composed of a highly complex network of actors will require adapted mechanisms that are likely very different from simpler value chain structures or from situations in which the ambition can be met by dealing with direct suppliers (Goldbach et al., 2003). Size and bargaining power as a supplier or buyer matter to what certain companies may expect from others in the value chain (Alblas et al., 2014; Pimenta and Ball, 2015; Verhulst, 2012; Young and Kielkiewicz-Young, 2001) and a given company may thus highly depend on its business partners when it comes to reaching environmental targets (Verhulst, 2012). It is also important to take into account industry characteristics such as field cohesion defined as the “intensity and density of formal and informal network ties between constituents in an organizational field”. High field cohesion leads to shared understanding of topics by companies and tendency to mimicking (Bansal and Roth, 2000). In high field cohesion contexts, companies are highly dependent on each other’s and have more difficulty to challenge the accepted norms or status quo

(Bansal and Roth, 2000). Thus, if the norm is conservatism regarding environmental topics, single companies' environmental practices may remain quite poor (Bansal and Roth, 2000). On the other hand, close connection with environmentally aware and highly demanding players is a strong motivator for companies to apply practices that will guarantee maintaining a good relationship (Bansal and Roth, 2000). Thus, field cohesion and environmental dynamics in the industry may play a role in collaboration practices between external business partners.

Van Bommel (2010) points out that to understand a company's approach towards GSCM, its external drivers and ability to cooperate must be put in the perspective with the cooperative power of the supply network. Factors influencing the latter are e.g. trust, joint programs, and cooperative information systems throughout the supply network (Van Bommel, 2011). In this sense, low cooperative power of the supply network might lead a company towards rather defensive GSCM approaches with little space for collaboration between business partners (Van Bommel, 2011). Further, adoption of environment-related cooperation by external business partners greatly depends on how the latter will interpret and react to cooperation proposals. Their response depends on their own environmental context, attitude and capabilities, their relationship with the company and their perception of the cooperation proposal. For example, Lee (2008) shows that the willingness of SMEs to take part in GSCM practices suggested by a buyer depends on their readiness for GSCM, in terms of capabilities, resources and attitudes. Other scholars noted the influence of business partners' understanding of sustainability (Morali and Searcy, 2013) and their awareness for green issues (DeKoninck et al., 2016). Delmas and Montiel (2009) reveal that the uptake of green initiative among suppliers under a buyer's push depends on characteristics of the supplier-buyer relationship. Highly specialized assets suppliers and new entrant suppliers are more likely to buy-in (Delmas and Montiel, 2009). Further, in the group of preferred suppliers, implementation is more likely to occur, which can be explained by the fact that buyers have more contact with these key suppliers and dedicate more resources for training them (Delmas and Montiel, 2009). Targeted external business partners may feel threatened by green initiatives promoted by their buyers and fear a hidden agenda of cost reduction (Brockhaus et al., 2013) or exposure of poor environmental performance (Walker and Jones, 2012).

In the reviewed literature the focus is mainly on managing value network actors to be engaged in collaboration approaches. Interestingly, the GBM literature opens up the discussion about other value network actors, and specifically powerful actors with high invested interests in the current business models. In the compendium of business model change cases provided by Henriksen et al. (2012), several cases mention resistance stemming from powerful actors which have interest in the current business set up, e.g. a strong connection between the chemical industry and the cleaning industry, providing barriers for newcomers to the market to propose new greener products to be used by the cleaning industry. This brings the discussion on collaboration with external business partners to another level in which not only the motivation and capability of both parts influence the initiatives, but the influence of other value network actors is also to be considered. The GBM literature, and especially on the uptake of circular business models, also emphasizes possible resistance from powerful value network actors with high invested interest in today's business models (CIRAIG, 2015). Consequently, there is a need to take into account the influence of all relevant value network actors when designing collaboration practices and their implementation.

3.4 Consolidation framework and discussion

We consolidate our findings in the framework displayed in Figure 3 and highlight interactions which are interesting to explore. As we have emphasized in the previous sections, there is a need to clarify how the objective(s) pursued by the company, its organizational profile for collaboration, and its value network context influence its collaboration practices and implementation, including who to collaborate with, in what form and with what support (a). The other way round, it is interesting to explore interactions across dimensions, i.e. the extent to which the set of capabilities and the value network context influence each other (b); the extent to which the set of capabilities and the objective for collaboration influence each other (c); and the extent to which the value network context and the objective for collaboration influence each other (d). It would also be relevant to explore to what extent and how companies may develop their collaborative profile, and manage their value network.

In the present paper, we are interested in collaboration practices of companies with external business partners targeted at developing and delivering greener products and services. However, we did not limit our review to collaboration practices directly linked to product or service development. Instead we also

consider innovation, research & development, purchasing, marketing, communication and regulation as key business functions where external collaboration may contribute to develop and deliver greener products and services. Depending on the objective for collaboration, different business functions may be involved in the collaboration practice and implementation and influence the latter.

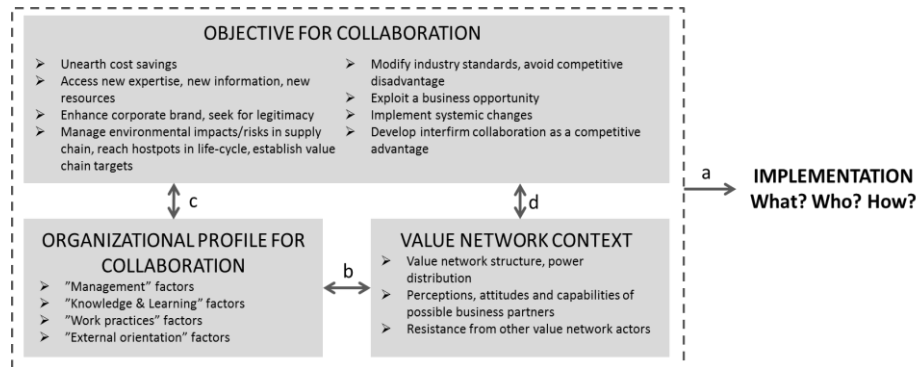


Figure 3. Consolidation framework describing the reviewed dimensions of environment-driven collaboration practices - with interactions (a-d) to be further explored

In the above development, we have argued in favour of taking into account the objective of the company as well as its internal and external context to design collaboration practices and implementation to make best use of the company's resources in the perspective of achieving its objective. Yet, similar considerations seem reasonable in any context of collaboration with external business partners. Such observation encourages exploring to what extent the general management literature on collaboration across business partners could be applied to environment-driven collaboration practices, and to what extent it could bring answers to the research directions previously outlined. Nevertheless, one shall wonder whether there are specificities when it comes to implementing environment-driven collaboration practices. To our knowledge, no study has directly explored the differences between green collaboration and generic collaboration with external business partners in terms of practice and implementation. The environmental management literature contains indications on how generic management processes may differ when it comes to taking a green perspective. For instance, Souto and Rodriguez (2015) have found that typical barriers in general innovation contexts at companies, e.g. lack of qualified staff, limited information on technology and markets, difficulty in finding cooperation partners for innovation, markets dominated by established firms and uncertain demand for innovative goods and services, are similar but perceived with higher intensity by companies when it comes to environmental innovation, with the greatest difference found for the difficulty in finding cooperation partners for innovation. Verhulst (2012) explored the differences between a generic organizational change and a sustainable design organizational change in companies; and found that the main differences are related to the complexity of the sustainability concept which has several consequences. First, it makes it difficult to articulate the added value justifying the change towards sustainable design; second it brings about new thorny trade-offs across criteria in product development; and third it is difficult to follow-up on performance, design communication strategies and in-depth training programs (Verhulst, 2012). There is a need to specifically explore what differentiates green collaboration from generic collaboration with external business partners; and whether increased barriers and specific complexity are also relevant issues to address. We can expect that challenges will vary greatly from one collaboration objective to another. Collaboration practices mainly targeted towards cost savings are supposedly closer to generic collaboration across the value chain, than co-design of greener products with external business partners. When revealing the diversity of objectives for green collaboration, it becomes apparent that effective environmental improvements will not be one key objective for all green collaboration approaches with external business partners. It was revealed that the life cycle perspective of environmental impacts and the need for cooperating across value chains to tackle environmental hotspots is only one motivation type among others for green collaboration practices and coexists with compliance-based approaches and cost reductions-led approaches. It would be interesting to explore further how "green" green collaboration practices are. In other words, it seems relevant to investigate to what extent and how companies investigate and measure whether green collaboration initiatives lead to developing and delivering products and services with environmental benefits. On the other hand, it would be interesting to reflect on the role of environmental indicators in supporting different types of collaboration objectives

and under what form they would have their best chance to feed the decision-making process and fit into collaboration monitoring approaches.

4 CONCLUSION

The aim of this paper was to emphasize key dimensions shaping environment-driven collaboration practices with external business partners by exploring different environmental management literature fields. We suggest that implementation approaches should be based on clarifying the following dimension triad: the company's objective(s) for collaboration, the organizational profile for collaboration and the company's value network context. Moreover, we recommend further research on (i) investigating how a given triad can be taken into account when designing collaboration practices and implementation and (ii) exploring to what extent a company can manage its organizational profile and value network context to achieve a given objective. There is also a need for exploring how generic and green collaboration practices differ and what is the specific role of environmental management literature in supporting collaboration practices; and for investigating the actual environmental relevance of green collaboration considering the diversity of companies' objectives.

REFERENCES

- Ageron, B., Gunasekaran, A. and Spalanzani, A. (2012), "Sustainable supply management: An empirical study", *International Journal of Production Economics*, Vol. 140, pp. 168–182. <http://dx.doi.org/10.1016/j.ijpe.2011.04.007>
- Agi, M. (2015), "Analysis of the influence of organisational and inter-organisational factors on the implementation of Green Supply Chain Management practices", *International Conference on Industrial Engineering and Systems Management, IEEE IESM 2015*, pp. 803–812. <http://dx.doi.org/0.1109/IESM.2015.7380249>
- Alblas, A.A., Peters, K. and Wortmann, J.C. (2014), "Fuzzy sustainability incentives in new product development", *International Journal of Operations and Production Management*, Vol. 34 No. 4, pp. 513–545. <http://dx.doi.org/10.1108/IJOPM-06-2012-0222>
- Asswad, J., Hake, G. and Gómez, J.M. (2016), "Overcoming the Barriers of Sustainable Business Model Innovation by Integrating Open Innovation", *19th International Conference on Business Information Systems, BIS 2016*, pp. 302–314. http://dx.doi.org/10.1007/978-3-319-39426-8_24
- Bansal, P. and Roth, K. (2000), "Why companies go green: A model of ecological responsiveness", *Academy of Management Journal*, Vol. 43 No. 4, pp. 717–736.
- Barratt, M. (2004), "Understanding the meaning of collaboration in the supply chain", *Supply Chain Management: An International Journal*, Vol. 9 No. 1, pp. 30–42. <http://dx.doi.org/10.1108/13598540410517566>
- Bocken, N.M.P., Short, S.W., Rana, P. and Evans, S. (2014), "A literature and practice review to develop sustainable business model archetypes", *Journal of Cleaner Production*, Vol. 65, pp. 42–56. <http://dx.doi.org/10.1016/j.jclepro.2013.11.039>
- Van Bommel, H.W.M. (2011), "A conceptual framework for analyzing sustainability strategies in industrial supply networks from an innovation perspective", *Journal of Cleaner Production*, Vol. 19, pp. 895–904. <http://doi.org/10.1016/j.jclepro.2010.12.015>
- Bowen, F.E., Cousins, P., Lamming, R. and Faruk, A. (2001), "The role of supply management capabilities in green supply", *Production and Operations Management*, Vol. 10 No. 2, pp. 174–189. <http://dx.doi.org/10.1111/j.1937-5956.2001.tb00077.x>
- Brockhaus, S., Kersten, W. and Knemeyer, A.M. (2013), "Where do we go from here? Progressing sustainability implementation efforts across supply chains", *Journal of Business Logistics*, Vol. 34 No. 2, pp. 167–182. <http://dx.doi.org/10.1111/jbl.12017>
- Cheng, J.H., Yeh, C.H. and Tu, C.W. (2008), "Trust and knowledge sharing in green supply chains", *Supply Chain Management*, Vol. 13 No. 4, pp. 283–295. <http://dx.doi.org/10.1108/13598540810882170>
- CIRAIG. (2015), *Circular Economy: A Critical Literature Review of Concepts*, Montreal.
- Dangelico, R.M. (2015), "Green Product Innovation: Where we are and Where we are Going", *Business Strategy and the Environment*, <https://doi.org/10.1002/bse.1886>
- Dangelico, R.M., Pontrandolfo, P. and Pujari, D. (2013), "Developing sustainable new products in the textile and upholstered furniture industries: Role of external integrative capabilities", *Journal of Product Innovation Management*, Vol. 30 No. 4, pp. 642–658. <http://dx.doi.org/10.1111/jpim.12013>
- Dekoninck, E.A., Domingo, L., O'hare, J.A., Pigosso, D.C.A., Reyes, T. and Troussier, N. (2016), "Defining the challenges for ecodesign implementation in companies: development and consolidation of a framework", *Journal of Cleaner Production*, Vol. 135, pp. 410–425. <http://dx.doi.org/10.1016/j.jclepro.2016.06.045>

- Delmas, M. and Montiel, I. (2009), "Greening the supply chain: When is customer pressure effective?", *Journal of Economics and Management Strategy*, Vol. 18 No. 1, pp. 171–201. <http://dx.doi.org/10.1111/j.1530-9134.2009.00211.x>
- Domingo, L., Buckingham, M., Dekoninck, E. and Cornwell, H. (2015), "The importance of understanding the business context when planning eco-design activities", *Journal of Industrial and Production Engineering*, Vol. 32 No. 1, pp. 3–11. <http://dx.doi.org/10.1080/21681015.2014.1000398>
- Engert, S. and Baumgartner, R.J. (2016), "Corporate sustainability strategy - Bridging the gap between formulation and implementation", *Journal of Cleaner Production*, Vol. 113, pp. 822–834. <http://dx.doi.org/10.1016/j.jclepro.2015.11.094>
- Epstein, M.J. and Buhovac, A.R. (2010), "Solving the sustainability implementation challenge", *Organizational Dynamics*, Vol. 39, pp. 306–315. <http://dx.doi.org/10.1016/j.orgdyn.2010.07.003>
- Gandhi, S., Mangla, S.K., Kumar, P. and Kumar, D. (2015), Evaluating Factors in Implementation of Successful Green Supply Chain Management Using DEMATEL: A Case Study, *International Strategic Management Review*, Vol. 3. <https://doi.org/10.1016/j.ism.2015.05.001>
- Gavronski, I., Klassen, R.D., Vachon, S. and Nascimento, L.F.M. do. (2011), "A resource-based view of green supply management", *Transportation Research Part E*, Vol. 47, pp. 872–885. <http://dx.doi.org/10.1016/j.tre.2011.05.018>
- Gmelin, H. and Seuring, S. (2014), "Determinants of a sustainable new product development", *Journal of Cleaner Production*, Vol. 69, pp. 1–9. <http://dx.doi.org/10.1016/j.jclepro.2014.01.053>
- Gold, S., Seuring, S. and Beske, P. (2010), "Sustainable supply chain management and inter-organization resources: a literature review", *Corporate Social Responsibility & Environmental Management*, Vol. 17, pp. 230–245. <http://dx.doi.org/10.1002/csr.207>
- Goldbach, M., Seuring, S. and Back, S. (2003), "Co-ordinating sustainable cotton chains for the mass market", *Greener Management International*, Vol. 43, pp. 65–79. <https://doi.org/10.9774/GLEAF.3062.2003.au.00008>
- GreenBiz and Trucost (2015), *State of Green Business 2015*.
- Hallstedt, S.I., Thompson, A.W. and Lindahl, P. (2013), "Key elements for implementing a strategic sustainability perspective in the product innovation process", *Journal of Cleaner Production*, Vol. 51, pp. 277–288. <http://dx.doi.org/10.1016/j.jclepro.2013.01.043>
- Henriksen, K., Bjerre, M., Damgaard Grann, E., Lindhal, M., Suortti, T., Fridriksson, K., Mühlbradt, T., et al. (2012), *Green Business Model Innovation : Business Case Study Compendium*, Nordic Innovation, Oslo.
- Holt, D. and Ghobadian, A. (2009), "An empirical study of green supply chain management practices amongst UK manufacturers", *Journal of Manufacturing Technology Management*, Vol. 20 No. 7, pp. 933–956. <http://dx.doi.org/10.1108/17410380910984212>
- Johansson, G. (2002), "Success factors for integration of ecodesign in product development: A review of state of the art", *Environmental Management and Health*, Vol. 13 No. 1, pp. 98–107. <http://dx.doi.org/10.1108/09566160210417868>
- Kim, M.G., Woo, C., Rho, J.J. and Chung, Y. (2016), "Environmental capabilities of suppliers for green supply chain management in construction projects: A Case Study in Korea", *Sustainability*, Vol. 8 No. 82, pp. 1–17. <http://dx.doi.org/10.3390/su8010082>
- Lankoski, L. (2016), "Alternative conceptions of sustainability in a business context", *Journal of Cleaner Production*, Vol. 139, pp. 847–857. <http://dx.doi.org/10.1016/j.jclepro.2016.08.087>
- Lee, K.-H. and Kim, J.-W. (2011), "Integrating Suppliers into Green Product Innovation Development: an Empirical Case Study in the Semiconductor Industry", *Business Strategy and the Environment*, Vol. 20, pp. 527–538. <http://dx.doi.org/10.1002/bse.714>
- Lewandowski, M. (2016), "Designing the business models for circular economy-towards the conceptual framework", *Sustainability*, Vol. 8 No. 43. <https://doi.org/10.3390/su8010043>
- De Marchi, V. (2010), *Cooperation toward Environmental Innovation : An Empirical Investigation*.
- Masoumik, S.M., Abdul-Rashid, S.H., Olugu, E.U. and Ghazilla, R.A.R. (2015), "A strategic approach to develop green supply chains", *Procedia CIRP*, Vol. 26, pp. 670–676. <http://dx.doi.org/10.1016/j.procir.2014.07.091>
- McAloone, T.C., Mougard, K., Restrepo, J. and Knudsen, S. (2010), "Eco-Innovation in the Value Chain", 11th International Design Conference (Design 2010), pp. 855–864.
- Morali, O. and Searcy, C. (2013), "A Review of Sustainable Supply Chain Management Practices in Canada", *Journal of Business Ethics*, Vol. 117, pp. 635–658. <http://dx.doi.org/10.1007/s10551-012-1539-4>
- Nakano, K. and Hirao, M. (2011), "Collaborative activity with business partners for improvement of product environmental performance using LCA", *Journal of Cleaner Production*, Vol. 19, pp. 1189–1197. <http://dx.doi.org/10.1016/j.jclepro.2011.03.007>
- Novozymes. (2014), *The Novozymes Report 2014*.
- Paulraj, A. (2011), "Understanding the Relationships Between Internal Resources and Capabilities, Sustainable Supply Management and Organizational Sustainability", *Journal of Supply Chain Management*, Vol. 47 No. 1, pp. 19–37. <http://dx.doi.org/10.1111/j.1745-493X.2010.03212.x>

- Pereira, Á. and Vence, X. (2012), “Key business factors for eco-innovation: An overview of recent firm-level empirical studies”, *Cuadernos de Gestion*, Vol. 12, pp. 73–103. <http://dx.doi.org/10.5295/cdg.110308ap>
- Petruzzelli, A.M., Dangelico, R.M., Rotolo, D. and Albino, V. (2011), “Organizational factors and technological features in the development of green innovations: Evidence from patent analysis”, *Innovation: Management, Policy and Practice*, Vol. 13 No. 3. <https://doi.org/10.5172/impp.2011.13.3.291>
- Pigosso, D.C.A., Rozenfeld, H. and McAloone, T.C. (2013), “Ecodesign maturity model: a management framework to support ecodesign implementation into manufacturing companies”, *Journal of Cleaner Production*, Vol. 59, pp. 160–173. <http://dx.doi.org/10.1016/j.jclepro.2013.06.040>
- Pimenta, H.C.D. and Ball, P.D. (2015), “Analysis of Environmental Sustainability Practices Across Upstream Supply Chain Management”, *Procedia CIRP*, Vol. 26, pp. 677–682. <http://dx.doi.org/10.1016/j.procir.2014.07.036>
- Pippel, G. (2015), “R&D Collaboration for Environmental Innovation”, *International Journal of Innovation Management*, Vol. 19 No. 1. <https://doi.org/10.1142/S1363919615500048>
- Ramanathan, U., Bentley, Y. and Pang, G. (2014), “The role of collaboration in the UK green supply chains: An exploratory study of the perspectives of suppliers, logistics and retailers”, *Journal of Cleaner Production*, Vol. 70, pp. 231–241. <http://dx.doi.org/10.1016/j.jclepro.2014.02.026>
- Rosen, M.A. and Kishawy, H.A. (2012), “Sustainable manufacturing and design: Concepts, practices and needs”, *Sustainability*, Vol. 4, pp. 154–174. <http://dx.doi.org/10.3390/su4020154>
- Sadovnikova, A. and Pujari, A. (2016), “The effect of green partnerships on firm value”, *Journal of the Academy of Marketing Science*, pp. 1–17. <http://dx.doi.org/10.1007/s11747-016-0490-9>
- Science Based Targets. (2016), *Science Based Targets : the Call To Action*.
- Sheldrick, L. and Rahimifard, S. (2013), “Evolution in Ecodesign and Sustainable Design Methodologies”, in: Nee A., Song B., Ong SK. (eds) *Re-engineering Manufacturing for Sustainability*. Springer, Singapore, pp. 35–40. http://dx.doi.org/10.1007/978-981-4451-48-2_6
- Souto, J.E. and Rodriguez, A. (2015), “The problems of environmentally involved firms: innovation obstacles and essential issues in the achievement of environmental innovation”, *Journal of Cleaner Production*, Vol. 101, pp. 49–58. <http://dx.doi.org/10.1016/j.jclepro.2015.04.017>
- Stewart, R., Bey, N. and Boks, C. (2016), “Exploration of the Barriers to Implementing Different Types of Sustainability Approaches”, *Procedia CIRP*, Vol. 48, pp. 22–27. <http://dx.doi.org/10.1016/j.procir.2016.04.063>
- Tetra Pak. (2016), *Sustainability Update 2015*.
- UN Global Compact, GRI and WBCSD. (2015), *SDG Compass. The Guide for Business Action on the SDGs*.
- UNEP/SETAC. (2009), *Life Cycle Management: How Business Uses It to Decrease Footprint, Create Opportunities and Make Value Chains More Sustainable*, Winifred Power, Ireland.
- Vachon, S. and Klassen, R.D. (2006), “Extending Green Practices across the Supply Chain: The Impact of Upstream and Downstream Integration”, *International Journal of Operations & Production Management*, Vol. 26 No. 7, <http://dx.doi.org/10.1016/j.ijpe.2006.11.030>
- 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, pp. 299–315. <http://dx.doi.org/10.1108/01443570610672248>
- Vergheze, K. and Lewis, H. (2007), “Environmental innovation in industrial packaging: a supply chain approach”, *International Journal of Production Research*, Vol. 45 No. 18–19, pp. 4381–4401. <http://dx.doi.org/10.1080/00207540701450211>
- Verhulst, E. (2012), *The human side of sustainable design implementation from the perspective of change management*, University of Antwerp.
- Walker, H. and Jones, N. (2012), “Sustainable supply chain management across the UK private sector”, *Supply Chain Management: An International Journal*, Vol. 17 No. 1, pp. 15–28. <http://dx.doi.org/10.1108/13598541211212177>
- Winkler, H. (2011), “Closed-loop production systems-A sustainable supply chain approach”, *CIRP Journal of Manufacturing Science and Technology*, Vol. 4, pp. 243–246. <http://dx.doi.org/10.1016/j.cirpj.2011.05.001>
- Yarahmadi, M. and Higgins, P.G. (2012), “Motivations towards environmental innovation”, *European Journal of Innovation Management*, Vol. 15 No. 4, pp. 400–420. <http://dx.doi.org/10.1108/14601061211272358>
- Yen, Y.X. and Yen, S.Y. (2012), “Top-management’s role in adopting green purchasing standards in high-tech industrial firms”, *Journal of Business Research*, Vol. 65, pp. 951–959. <http://dx.doi.org/10.1016/j.jbusres.2011.05.002>
- Youn, S., Yang, M.G. (Mark) and Roh, J.J. (2012), “Extending the efficient and responsive supply chains framework to the green context”, *Benchmarking: An International Journal*, Vol. 19 No. 4-5, pp. 463–480. <http://dx.doi.org/10.1108/14635771211257954>
- Young, A. and Kielkiewicz-Young, A. (2001), “Sustainable Supply Network Management”, *Corporate Environmental Strategy*, Vol. 8 No. 3, pp. 260–268. [http://dx.doi.org/10.1016/S1066-7938\(01\)00122-1](http://dx.doi.org/10.1016/S1066-7938(01)00122-1)