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# Rethinking business models for sustainability-oriented innovation: implementing collaborative logistics in manufacturing SMEs

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## 1. Objectives

The attention of industrial firms toward environmental sustainability has grown in the past decade (Perotti *et al.*, 2012) and has pushed firms towards the implementation of sustainability-oriented innovations, such as collaborative logistics (CL) practices, being logistics one of the main sources of air pollution (Mesjasz, 2016). In this perspective, companies are feeling the need to adopt innovative models to both improve their logistics performances from a sustainable perspective and guarantee competitive advantages in the global context.

The interest in such approaches in the industrial context is associated with high-complexity levels in terms of implementation, since such a transition towards CL requires a rethinking and reconfiguration of existing business models, along their main value dimensions (Oskam *et al.*, 2018) of value proposition, value delivery, value creation, value networking, and value appropriation (Cortimiglia *et al.*, 2016).

Such level of complexity in sustainability-oriented innovation, and particularly in sustainable logistics transition, is further enhanced for Small and Medium-sized Enterprises (SMEs) (Woschke *et al.*, 2017), in the light of their scarcity of resources, limited change management knowledge, and risk-aversion.

The present study aims to explore if and how SMEs face the transition towards CL processes and the impact on their business models (BM), by addressing the following research question: *How does transitioning towards CL impact the five dimensions of BM and linkages among them?*

In line with the explorative nature of the RQ, we adopt a qualitative approach (Yin, 2003), based on a single case study methodology (Halinen and Törnroos, 2005). The case study selected is IRON, an Italian manufacturing SME in the mechanical processing sector, which has implemented an internal project aimed at supporting sustainability-oriented innovation processes. Data collection relies on focus groups (Powel and Single, 1996) and participating observation. The resulting empirical data has been analyzed along the processual dimension of the project and codified using the five BM dimensions identified (Cortimiglia *et al.*, 2016).

## **2. Literature review**

Logistics concerns the movement of goods, services, and information from the point of origin to the point of consumption, with the aim of meeting customer needs and creating value, and plays a crucial role in enhancing the success and competitiveness of firms (Ojha and Gokhale, 2009). Companies have realized that logistics decisions have a significant impact on costs, customer service levels, market penetration, and profits (Ballou, 1997).

CL has emerged as an innovative approach resulting from the transition from logistics management to sustainable Supply Chain Management (SCM), based on the concept of collaboration, as it involves sharing activities and resources among multiple independent companies to improve overall logistics efficiency (Stock and Boyer, 2009). CL holds the

potential to achieve economic, environmental, and social sustainability as well as to meet the growing demand for sustainable business practices (Ferrel *et al.*, 2020) on the one hand; on the other hand, it enables companies to lower operating costs, to enhance efficiency, and to improve customer satisfaction (Osório *et al.*, 2013).

Collaboration in logistics is becoming a strategic tool for SMEs; however, they face challenges in finding suitable partners for collaboration due to their limited resources, capabilities, and access to information (Zaridis *et al.*, 2021; Vlachos and Gutnik, 2016). Furthermore, innovative and sustainable-oriented ideas, as CL, require rethinking the processes leading to the company's value creation, in terms of resources needed, costs to be borne, and new partnerships to be established; thus, pushing towards changes in the companies' BMs. A successful rethinking of the BM's dimensions and a paradigm change in the way firms create and deliver value are key leverages for integrating innovation and sustainability into organizations (Geissfoerfer *et al.*, 2018; Pieroni *et al.*, 2019).

BM is "a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network" (Shafer *et al.*, 2005: 204), whose main dimensions are that of value proposition (offering), delivery (customer segments, relationships, and distribution channels), creation (key activities and resources), networking (partners), and appropriation (revenue streams and cost structure) (Cortimiglia *et al.*, 2016).

Encompassing sustainability and innovation elements in the company's BM requires a "loosening" of the boundaries of the focal firm and a consideration of the larger network, as well as for interdependence and interaction among the elements of the BM to embrace a shift towards an embedded system view (Breuer *et al.*, 2018). The adoption of a BM perspective can help in providing guidance for identifying which of the five main BM dimensions require being rethought of, reconfigured, or adjusted in interaction with the network of suppliers and customers to face environmentally complex challenges.

### **3. Method**

This research applies an ongoing qualitative processual case study methodology (Yin, 2003; Halinen and Törnroos, 2005) in line with previous studies on the interrelation between BM and sustainable innovations (Acciarini *et al.*, 2022). The empirical setting under investigation is an Italian manufacturing SME active in the mechanical processing

sector, IRON<sup>1</sup>, that has been chosen for its recent effort in implementing an internal project aimed at supporting sustainability-oriented innovation processes and because of its commitment to redefining actors, activities, and resources to be employed for CL. The focus of the analysis is thus a project implemented within IRON, named COSI (Customer-oriented Sustainable Innovation).

Data collection is based on an 18-hours focus group (Powel and Single, 1996) with the CEO and 7 employees, and on participating observation conducted by one of the authors. Using different sources of data helps triangulate information from multiple sources to confirm results emerging within the single case study (Woodside and Wilson, 2003).

Data is analyzed following a systematic combining approach (Dubois and Gadde, 2002) and coding is based on the processual dimension of the COSI project with a focus on the three main topics covered, that is: Supply Chain Management approach for sustainability-oriented innovation; implications and challenges of CL; sustainability-driven customer segmentation, and on the five conceptual dimensions of the BM framework, as depicted in Cortimiglia *et al.* (2016).

#### **4. Results/Findings**

IRON is a small Italian company specialized in realizing metal-based products and offering related services, such as laser cut, banding, and wending. The company is located in the rural area of the Marche region in Italy and operates in a very traditional context, where innovation in terms of sustainability is difficult to access. However, the firm pays particular attention to innovation and is recently making the first efforts to achieve more sustainable business practices along its supply chain. Indeed, in 2022 the company implemented the COSI project aimed at supporting sustainable-driven innovation for customers in terms of CL. The project consisted of three days of meetings between the IRON Team and two Professors from a local University with knowledge of sustainability issues. Meetings were divided into three days.

Day one was focused on the SCM approach for sustainable-oriented collaborations. It identified some criticalities for the company, among which: organizational resistances, high perceived risk about suppliers' opportunistic behaviours, and lack of a structured approach.

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<sup>1</sup> The name of the company, of the projects and of stakeholders has been anonymized to ensure confidentiality.

Day two was dedicated to CL implementation and its challenges. Participants highlighted the limited value networking opportunities in IRON's geographical context and the limited competences of its employees on how to manage CL.

Day three dealt with sustainability-driven customer segmentation. What emerged is that IRON does not have the proper knowledge to develop a proper customer segmentation analysis.

CL is a sustainable effort involving only a small portion of the productive process, which is transportation. Therefore, it could be a first, affordable effort for SMEs to gradually try to become more sustainable. However, the IRON case reveals how even a delimited green transition as CL entails challenges and calls for adaptations in the overall BM and its dimensions.

The most stressed dimension in CL is value delivery, which is the main focus of the entire process - as CL implies a consistent revision of the adopted distribution channel, introducing new ones and achieving market segmentation to identify the set of customers interested to receive sustainable services (Brotspies and Weinstein, 2019). Value networking and value creation are also objects of change, as a faltering business network tremendously limited the opportunities for the SME in achieving CL (Velter *et al.*, 2020), and CL requires an internal reorganization, the development of sustainability-related knowledge, the achievement of a strategic vision related to sustainable performances, the increase and reorganization in logistics activities, and the activation of a control system to monitor internal performances through codified information, respectively. Value proposition and value appropriation are part of the transition, even though minor changes are required to determine the type of green offering to offer and to build an appropriate cost structure and revenue model related to green transportation services.

Notwithstanding different changes at the level of the various BM dimensions, all of them are involved in a net of links and interrelations, for which issues emerging at the level of one dimension have direct impacts on other dimensions and vice versa. Table 1 depicts the interrelations among the elements.

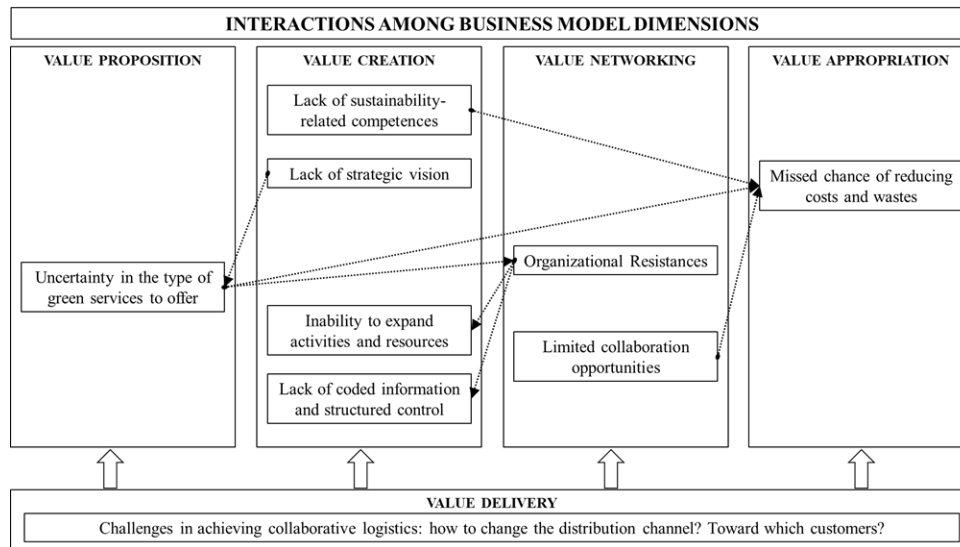


Figure 1 – Interactions among business model dimensions in the IRON case

## 5. Value & Implications

To analyse companies' transition towards CL and how this shift redesigns its BM, this study highlights the importance of rethinking the BM for integrating innovation and sustainability-connected aspects.

Understanding the interrelation among BM dimensions is crucial for comprehending the complexity of sustainable approaches for SMEs. The interaction among dimensions creates a “domino effect”, where challenges in one dimension lead to challenges in others, increasing complexity. In this context, a cohesive strategic vision and developing specific competences are crucial.

The analysis reveals key points. First, integrating sustainability and innovation into the BM requires clear business vision and mission focused on green and sustainable practices. Second, the adoption of sustainable logistics is facilitated by establishing a partner network that enables innovation and sustainability throughout the supply chain. Third, customer segmentation plays a strategic role in identifying stakeholders interested in sustainable services.

Overcoming the limitations of SMEs, such as small size and resource constraints (Zaridis *et al.*, 2021), requires acquiring internal skills and knowledge. Investing this

knowledge across all BM dimensions is essential for creating a sustainable corporate vision. Additionally, SMEs benefit from strong leadership to overcome organizational resistance and cultural aversion, and drive the transformation toward a more innovative and sustainable BM.

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