Is there value in the sustainable supply chain? A systematic literature review

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Abstract

Aiming to identify the aspects that characterizes the value generated in the sustainable chain of supplies through a systematic review, it was identified 31 articles that discuss the chain value from the perspective of the sustainable chain of supplies. The analysis was divided into two dimensions, how the concept of value are used and value generation practices in the chain. The perspective of the predominant value chain in the analyzed literature is the relational value, through integration and cooperation. The main identified practices were the lifecycle analysis, governance and cooperation, planning and application of capabilities in the chain.

Keywords Value chain; sustainable supply chain; relational value; product life cycle.

Contextualization

The concept of the supplies chain emerged from the organizations and it has yet to find it's concept in the literature. Burgess, Singh and Koroglu's (2006) research highlights four main categories for the concept, as an activity, as a process, as a system and others. The most used definition in the literature is from Mentzer at al. (2011), "as a group of three or more entities (organizations or individuals) directly involved in the flow of products upstream and downstream, services, finances and/or information from each client (and return)".

With the rising interest in the supply chain, new concepts arise. According to Ahi & Searcy (2013), to manage these activities, focusing on the internal and interorganizational coordination is necessary, generating as the main results, the creation of value, improvement in the efficiency and overall performance in the chain. The supply chain management aims to improve the performance in long term, creating more value not only to the company, but also to the whole network of supplies, including the final client (Gencer, 2016; Mentzer et al, 2001).

Nowadays, environmental and social concerns are also being incorporated in the supply chain, this fact happens by contemplating the whole product processing, since the raw material until the final consumer (Ahi & Searcy, 2013). This integration allows the development of more sustainable products and processes (Seuring & Muller, 2008). Companies that implement sustainability in their chain of supply with practices orientated to the creation of value improve their performance (Sharfman et al., 2009).

Various studies about the traditional and the sustainable chain of supplies' management incorporate in its definition the value generation (Kleindorfer; Singhal & Wassenhove, 2005; Ketchen; Hult, 2007; Sharfman et al., 2009; Carter; Rogers & Choi, 2015; Gencer, 2016; Seuring & Muller, 2008; Reuter et al, 2010), with this, the research aims to identify the aspects that characterizes the generated value in the sustainable chain of supplies and to analyze how these aspects interact with the performances of the organizations, within the literature, through a systematic review.

One of the main studies support the idea of the value chain, because the value generation of the organization exceeds the bounds of the company, involving suppliers and consumers, creating, then, a value system (Porter, 2001). The perspective of differentiation of the chain members distinguish between the main support activities in a value chain structure (Lambert & Cooper, 2000).

The value chain management is worried about reducing the sources of uncertainty through cooperation between the chain members, by reducing these uncertainties the general environment gets better and the total costs are reduced (Mcguffog, 1996).

The management of the value or the supply chain usually centralizes its efforts in maximizing the opportunities of adding value, parallel to reducing costs (Ketchen & Hult, 2007). There are numerous perspectives under the comprehension of value, Lyndgreen and Wynstra (2005) point out that it is possible to create two different types of value, one of the product and the other of the relationship. Walters and Lancaster (2000) understand the value to the consumer as a set of benefits and utilities of a product or a service. Complementing the idea, to Woodruff (1997) the product value or the perception and client interpretation are evaluated by the result of the ease-of-use expectation and the purpose of use. The relational value differs from the value created for the consumer, for not depending exclusively on the offered product or service, but for taking into consideration factors such as reputation, localization, and also the cost of supplier replacement (Lindgreen & Wynstra, 2005).

Methodology

To identify the aspects that characterize the generated value in the sustainable supply chain and to analyze how these aspects interact with the organizations' performances it was developed a systematic review of the literature articles in the field of Sustainable Supply Chain (SSCM) through content analysis.

The systematic review of literature differs from a more narrative one for having a methodological focus, which reflects a detailed description of the steps taken to select, examine and analyze the literature, allowing a reproduction and enhance transparency (Carter & Easton, 2011; Tranfield, Denyer & Smart, 2003). The collect of information from previous published researches (Wiesmann et al., 2017) to subsequently select and critically evaluate the object of study, helps defining the barriers of what should be included or not in the analysis sample (Webster & Watson, 2002).

For compiling the paper sample, a literature search was carried out, based on the pair of keywords "value chain" and "sustainable supply chain or green supply chain". The keyword research was made in big databases and library services: Web of science (21) e Scopus (46). To increase the precision and relevance of the research, selection filters were used for academic magazines articles, in English and until 2017, it was identified in this phase 15 (Web science) and 27 (Scopus) articles. After deleting the duplicated articles, 31 articles that discuss the value in the sustainable chain of supplies were analyzed.

For the analysis, it was adopted the model used by Seuring e Gold (2012) that suggest a descriptive evaluation of the literature through a content analysis based in previously developed analytic categories, these categories are derived from the selected articles

themselves, forming a interactive process of construction of the categories, test and review.

Since there are many different approaches to the comprehension of value in the chain, to organize this article analysis, the article was divided into two sections: the first one addressing the concepts of value used by the articles and the second one, that was categorized by the applicability of value in the supply chain, that is, how the value is effectively generated.

Results

Bibliometric resume of the articles

This section aims to show the research scenario about value chain in sustainable supply chains, its evolution and representativeness. The research revealed 31 scientific articles, one being editorial. The first article to address the value of the chain in sustainable chains was in 2006 (3), in 2017, seven articles were made about this theme, showing a growth. However, these indexes show a low representativeness in the thematic, and it may characterize the absence of perception of value in sustainable chains.

The areas of research are Engineer, operations, the environment, business, technology and other topics of social sciences, being Engineer the one with bigger reference: 12 articles in this area. The countries that publish about this theme are: Italy, Swiss, Netherlands, Germany, it stands out the absence of the United States, since according to Fahimnia et al. (2015) it is the country that publishes the most about sustainable supply chain. The most published journals are the International Journal of Production Economics (IF=3,493) and the Journal of Cleaner Production (IF=5,715). As for the method, the articles prioritize the use of case studies (17) and literature review (7), the others are surveys and mathematical modelling.

Categories of Analysis

The descriptive evaluation of literature through a content analysis was built in two parts, the first aiming to describe how the chain of value is proposed in the articles and concepts used for value. In the second part of this section, practices will be described, focusing on the purpose of the research that identifies and analyzes the aspects that characterize the generated value in the sustainable supply chain.

Concepts of value

The climate change, global warming and scarcity of resources are forcing an improvement of the organizational processes, economic and technological standards (Gopalakrishnan et al, 2012). Regulatory, competitive and stakeholders' requirements emphasizes the sustainability for value creation (Stindt, 2017).

The perspective of the most predominant value chain in the analyzed literature is the relational value, through integration and cooperation between several actors. The classic value chain orientation for consumers is extended, adding benefits to other stakeholders, as well as environmental implications of the product or the process.

The classic orientation of customer value creation is based on the idea of that consumer perceptions and behaviors for "sustainable" products are key elements for the value chain (Couto et al, 2016; Thomas-Francois, Von Massow & Joppe, 2017). The decision to invest in sustainable alternatives in the chain is going to change between the actors, the interaction between governance model (Vurro, Russo, Perrini, 2009), Cooperation (Bhardwaj, 2016), community involvement (Ortiz-Martinez, Moragues-Faus, 2015) e

transparency (Bonfanti & Bordignon, 2017) play a crucial role for sustainability and will enable the generation of value in the chain.

The linear value chain model composed of process, transport and production use modules, approaches product value. The highlight is on the integration of the environmental thinking in the value chain, being its concept extended for the environmental value of the chain or eco-friendly value (Savino, Manzini & Mazza, 2013; Kannegiesser & Gunther, 2013; Keivanpour; Kadi & Mascle, 2015) or development of a circular product (Franco, 2017).

Globalization increased the understanding of unique companies (Pahl & Vob, 2013), generated a new vision on the border and corporate responsibility, as well as the relation with public resources. More recent approaches are of global value chains, focusing on vertical dimensions of the chain and material and financial flows and non-material flows (Bostrom et al, 2015) and creation of sustainable global product chains (Vermeulen, 2010). Characterized by a greater complexity, but also associated with the increase in levels of value-added activities (Acquaye et al 2016; Jorgensen & Knudsen, 2006) different governance structures and power asymmetry in global value chain (Van Lakerveld & Van Tulder, 2017).

Practices in generating value

With the increasing number of misconduct scandals, borders expansion and stakeholder pressures, drive the need for stakeholder management toward sustainability practices (Vurro, Russo & Perrini, 2009). The categories observed in literature contemplated three perspectives of value generation in the chain, first to evaluate and to measure value in the chain, the second to understand the importance of the governance and cooperation, and finally the real application of the sustainability in the chain for value generation.

The performance evaluation of sustainable supply chains is a challenge, either because of the absence of methods, chains complexities or existence of multiple measures that characterize the performance (Acquaye et al 2016), several tools have proved to be useful as standards and platforms (Teuscher, Grüninger, & Ferdinand, 2006) . The focus on the evaluation was divided into two perspectives: a general one and another for the evaluation of the product or life cycle.

The point of view of the risks management (Teuscher, Grüninger, & Ferdinand, 2006) and strategy and the evaluation of performance of the value chain, with financial (Zokaeï & Manikas, 2014) and non-financial measures, allows the growth and maintenance of the companies ahead of current trends in environmental protection. The evaluation could be by the rate of cost variation and performance in the multiple layers of value chain (Tsai, 2009), considering the importance of observing the integration of sustainability and ecological concepts in a SCM over an economic point of view (Savino; Manzini & Mazza, 2013) in formulation process and integrating the competitive and corporative strategies (Gracia & Quezada, 2016).

A strategy to lead CS sustainability would require an understanding of the environmental impact of the product throughout its life cycle (Deng & Wang, 2006) that goes since the suppliers to the disposal of obsolete products (Adhitya, Halim & Srinivasan, 2011) or amplied to the take-back and reprocessing (Chari, Diallo & Venkatadri, 2014; Franco, 2017).

Global warming, climate changes and resources scarcity are trends for the development and implementation of sustainable production and distribution systems, being the focus of the performance evaluation of the predominant chain in the environmental dimension (Gopalakrishnan et al, 2012; Kannegiesser & Gunther, 2013; Couto et al, 2016). From this perspective, the evaluation of the product life cycle, such as

chain planning strategies, remanufacturing, including product design, material sourcing and selection, manufacture processes, final product delivery to the consumers, as well as end-of-life management product after its lifespan significantly influence the performance of the organization (Adhitya, Halim & Srinivasan, 2011; Pahl & Vob, 2014).

There is also a proposal to evaluate the value chain with SSCM practices focused on the global chain, once that, among countries the attempts to perform environmental sustainability are measured in terms of the level of analysis from a value chain hierarchy perspective (Acquaye et al, 2016), also explored the opportunities of large buyers to inspire and assist their small suppliers (Jorgensen & Knudsen, 2006).

Practices of collaborative planning for procurement and traditional governance models by suppliers are significantly related to cost effectiveness (Yan, Chien & Yang, 2016). The pressures of society on the environmental and social effects of the activities in the chain as a whole of the organizations, distancing themselves of the cost priority model to the search for sustainable business model, governance models or self-governance (Vermeulen, 2015) have been incorporated into the value chain, expanding the model of collaboration and dynamic integration of the interests of the partners involved in the management of the entire chain (Vurro, Russo & Perrini, 2009; Rizzi et al, 2014; Berning & Venter, 2015; Bostrom et al, 2015). In this way, understanding governance and decision-making processes goes beyond interaction with suppliers (Bhardwaj, 2016), but also with community involvement in the development of value chains, reinforcing interaction with and between producers in order to sustain their activity over time in comparison (Ortiz-Miranda, Moragues-Faus, 2015). This interaction with several actors broadens the notion of accountability and transparency (Bonfanti & Bordignon, 2017).

Finally, more recent articles such as Stindt (2017) with a more practical approach, highlights concepts that enable the real implementation of the sustainable supply chain and provide evaluation methods along the value chain. And Machado et al (2017) with the integration of capabilities into value generation. Or the co-creation of value through valuable relationships and intangible resources (Thomas-François, Von Massow & Joppe, 2017) or through the development and adoption of clean technologies along the supply chain (Costantini et al, 2017).

Final Considerations

The objective of the study is to identify the aspects that characterize the value generated in the sustainable supply chain and to analyze how these aspects interact with the performance of the organizations, within the literature, through a systematic review.

The present study observed that the most predominant chain of value perspective in the analyzed literature is the relational value, through integration and cooperation between several actors. The classic value chain orientation for consumers is extended, adding benefits to other stakeholders, as well as environmental implications of the product or the process.

The literature in sustainable supply chain value is still quite recent, this may be in accordance with Pagell and Shevchenko (2014) that the current knowledge is not enough to create truly sustainable supply chains. Thus, we must recognize a "persistent gap" between the diffusion of the sustainability discourse and its practical application (Ashby et al., 2012).

The applicability of the value in the supply chain had highlighted three types of value generation, the first of chain evaluation with Life Cycle Analysis (LCA) practices and the development of environmentally sustainable products. Another category was of governance and cooperation in the chain, generating value. And more recent articles

discuss the actual implementation of SSCM in value generation, by means of planning and Capabilities.

From the point of view of the supply chain, companies are increasingly involved with strategies that enable the creation of sustainable, environmentally focused supply chains. Similarly, social issues have become increasingly important to have proven its positive impact on supply chain performance (Golicic & Smith, 2013). The focus on the environmental dimension is also seen in other articles as Seuring and Muller (2008) and Ashby et al, (2012), fact that neglects the social dimension still in the perspective of sustainable supply chain management. Another justification for this is the fact that the area of research in management and business is not representative, since most of the studies identified in the search are from the engineering area, which refers to a more technical approach to environmental issues.

Another important aspect observed in the research is the importance of the cooperation and governance in the chain, pointed in the literature as a mechanism of value appropriation. Governance goes beyond the cooperation and requires proactive involvement among the participants in the chain (Pietrobelli & Rabellotti, 2006). Governance models make it possible to reduce transaction costs and favor other sources of competitive advantage (Dyer & Singh, 1998).

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