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# **A systematic literature review of the role of networks in supply chain sustainability performance**

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**Title**

A systematic literature review of the role of networks in supply chain sustainability performance

**Summary**

This developmental paper outlines some initial findings from dominant scholarly discourses in supply chain sustainability from a network perspective. It achieves this by selecting 54 articles included in the systematic review of the literature. It draws on the evidence from the reviewed articles and found that network properties (i.e. relational properties and structural properties) contribute to the supply chain sustainability. Propositions and a conceptual framework are then established on the basis of the preliminary analysis. It offers insight for potential research to further analyse the role of networks connecting supply chain actors in implementing sustainability.

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1603

## **Comments on how this paper will be developed prior to discussion at the conference**

This developmental paper reports some initial findings from the preliminary analysis of the scholarly studies. It will be then developed by further adjusting the thematic analysis and finalising the propositions and the novel conceptual framework from the current identity research.

## **Introduction**

Supply chain sustainability is the management of environment, social and economic impacts throughout the life cycles of products and services. Given the ever-increasing numbers of actors involved in the design, production, delivery of products and services, firms more and more engage and invest in developing and maintaining relationships with external upstream and downstream actors to achieve supply chain sustainability goals. Whilst the role of supply chain collaboration in general and the specific aspects of supply chain relationships in driving supply chain sustainability has been extensively studied in the literature (e.g., Chen et al., 2017; Gunasekaran et al., 2015; Vachon and Klassen, 2008), the focus has been on the dyadic perspective giving little attention to the broader network in which firms are embedded.

Most recently, a growing pool of research has begun to highlight the importance of adopting a network lens in supply chain management in general (e.g., Kim et al., 2011; Borgatti and Li, 2009) and in explaining and investigating supply chain sustainability in particular (e.g., Tate et al., 2013). For instance, Hartmann and Moeller (2014) suggest that although a focal firm has little control over its suppliers' unsustainable behaviour when the suppliers are beyond the first-tier, consumers still attribute responsibility to the focal firm. Thus, it is stated that the achievement of sustainability requires the engagement of actors from multiple tiers where often conflicting sustainability ambitions, objectives, and capabilities prevail (Villena and Gioia, 2018). Focusing on the patterns of connectivity in supply chain networks, recent research also suggests that firms are more likely to adopt environmental standards or comply with the ethical codes of conduct in the process of sourcing and production when they are embedded in highly dense supply networks (i.e. they receive more monitoring from multiple actors) (Beckman et al., 2009; Vurro et al., 2009).

Whilst the notion of network is a common underpinning theme, connecting these findings, the scholarly literature lacks a synthesis of major findings and a reflection of the current development of this area. Specifically, a more systematic, theoretical articulation of how different properties of networks connecting firms in supply chains reinforce the sustainability performance of embedded firms and network is still absent. Thus, the purpose of this paper is to systematically review and assess the status of research on supply chain sustainability from a network perspective and provides an organising lens for future scholarship in this area.

## **Design/methodology/approach**

Using an evidence-based approach, a systematic review (SR) of 54 articles from 17 peer-reviewed international journals associated with the network view of supply chain sustainability in the time span between Year 2003 and Year 2018 is conducted. The research follows the five steps for SR as suggested by Denyer and Tranfield's (2009): question formulation, locating studies, study selection/evaluation, analysis/synthesis and reporting/using results. The literature search was executed in EBSCO, Scopus, ABI/INFORM databases by allowing combination of keywords reflecting the core phenomena of interest (i.e., supply chain, sustainability and network).

The investigation incorporates a descriptive and thematic analysis to identify patterns that synthesise constructs and their relationships. The descriptive analysis briefly describes the feature of data information, including 6 sections: 1) journal and rankings, 2) geographical distribution, 3) nature of studies and methodology, 4) sector and industry type, 5) underpinning

theories, 6) Supply chain sustainability performance: Units of analysis, definitions and conceptualisations. Having conducted the descriptive analysis, a thematic approach was adopted, interpreting main aspects of the research topic (Braun and Clarke, 2006). The thematic analysis consists of 4 sections: 1) network-level collaboration, 2) network governance mechanisms, 3) structural properties of networks, 4) and the interactive effects of structural properties and governance mechanisms on supply chain sustainability.

### **Preliminary findings**

The paper distinguishes two prevailing network properties in driving sustainability in supply chains. The two properties: relational (i.e., the collaborative arrangements among network members as well as the governance mechanisms supporting and sustaining interactions among participating actors to enhance the likelihood of achieving sustainability goals) and structural (i.e., the architecture or patterns of supply chain relationships) are conjectured to affect both the environmental and social aspects of sustainability.

The network relational properties consist of different collaborative arrangements across multiple supply chain tiers as well as network-level norms and standards enabled by both formal and informal mechanisms. Collaboration for sustainability (more than two actors) provides a broader view of the interconnected relations of the whole network. Extant studies (e.g., Svensson et al., 2018; Roehrich et al., 2017) have identified that network-level collaboration promotes the dissemination and adoption of sustainability practices. For instance, actors embedded in the multi-tier supply chains seek to share the information and knowledge through collaborative activities (e.g., co-product development, ideas and designs sharing) (e.g., T.R. Lee et al., 2011). To support and sustain the collaboration among the participating actors, some scholars recognized that formalisation of sustainable supply chain management activities can be realized through a set of criteria/standards, corporate codes of conduct and contracts (Lu et al., 2018; Meqdadi et al., 2017). For instance, environmental criteria/standards could be seen as an important way to communicate focal firm's green practices to their multi-tier suppliers and create visibility across the whole network (Roehrich et al., 2017). At the same time, a few authors also state that formal control cannot avoid the issues of opportunistic behaviour, social forms of control (i.e., trust, power, relationships, etc.) may lead to a quicker information and knowledge sharing in supply network (Lu et al., 2018). For instance, actors tends to orchestrate different levels of resources to learn sustainability-related knowledge and implement sustainability practices through a long-term and trusting relationship (Gong et al., 2018).

The structural properties involve both firms' unique network positions such as centrality and brokerage role as well as whole network-level connectivity patterns such as density and complexity. For instance, Vurro et al. (2009) and Beckman et al. (2009) identified that network density and node-level centrality of the focal organisation are likely determinants of central actor's responsiveness to sustainability implementation (i.e., CSR efforts); Wilhelm et al. (2014) and Meinschmidt et al. (2018) suggested that supply chain complexity determine the buying firm's sustainability performance (i.e. perceived sustainability risk, extending sustainability to lower-tier suppliers); Saunders et al. (2017) discussed that exchange brokers (e.g., brokers could be government, coliation, industry action group, etc.) in supply network help bridge the structural holes and enhance the focal firm's sustainability performance (i.e. focal firm have access to the resources and knowledge of the sustainability initiatives from members of other network clusters).

Additionally, the review of literature suggests an interactive effect of structural and relational properties on sustainability outcomes. One study from Tachizawa and Wong (2015) highlighted that supply network structural properties (i.e., centrality, density and complexity)

moderated the interactions between environmental performance and relational properties (i.e., governance mechanisms) at supply network level.

### Conclusions

This study is the first attempt towards synthesizing dominant scholarly discourses on supply chain sustainability from a network perspective and provides an evaluation of the scientific status of the field. By synthesising the current conceptual and empirical literature, this review provides an original and better understanding of the phenomenon. Specifically, we have developed theory in the form of propositions that link various relational and structural supply network properties and sustainability outcomes of network and embedded firms in terms of different unit of analysis:

- **P1.** Network-level collaboration positively affect sustainability performance at firm, dyad, and network levels in supply chains.
- **P2.** Governance mechanisms, involving formal, informal, and plural forms, affect supply chain sustainability performance at a focal firm level, dyad, and network levels.
- **P3.** Supply network structural properties, e.g. network density, node-centrality, network complexity, structural hole, affect the sustainability performance at focal firm level.
- **P4.** Supply network structural properties, e.g. network density, node-centrality, and network complexity, are likely to moderate the effect between governance mechanisms and sustainability performance at network level.

According to the 4 propositions and preliminary findings, the conceptual framework is established in Figure 1 below:

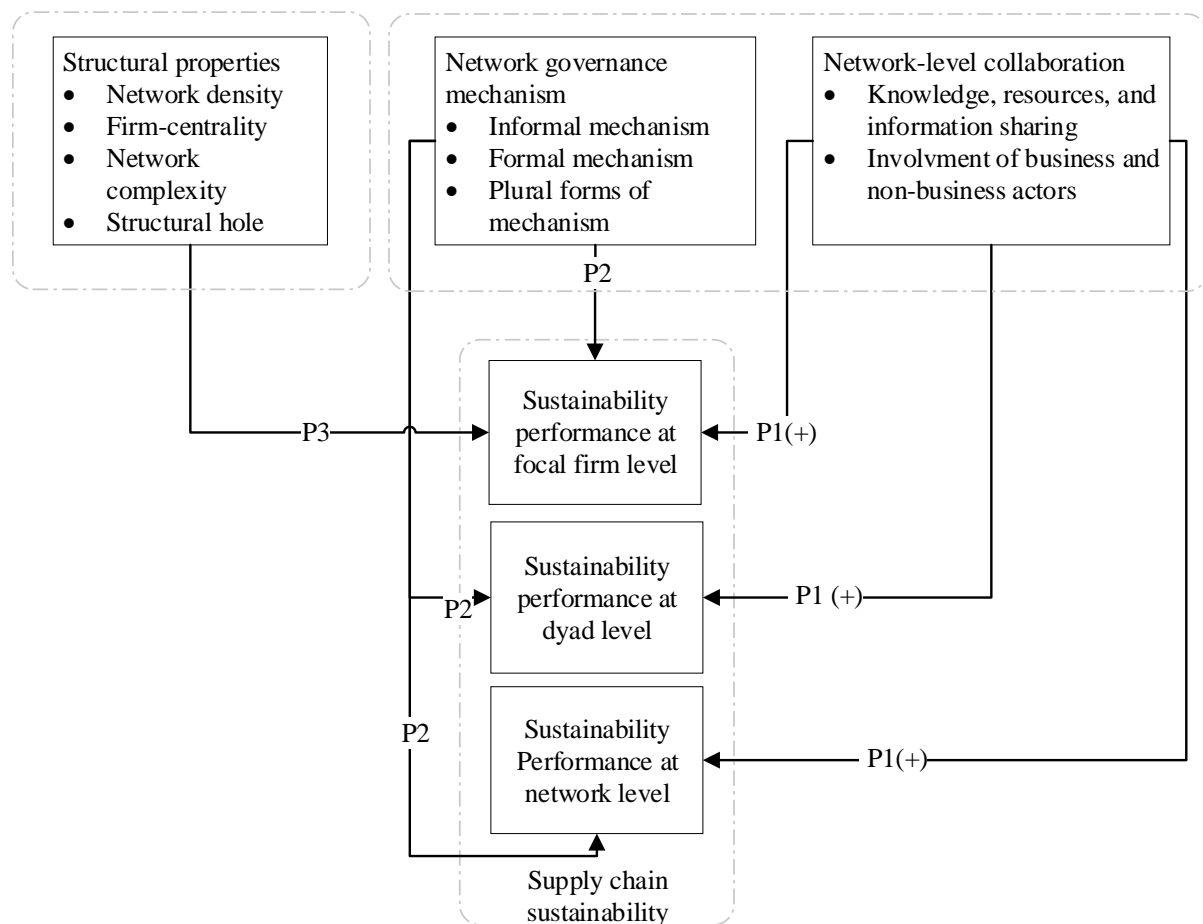


Figure 1 Conceptual framework

Further, we suggest 4 research topics that deserve further attention: 1) structural investigation of supply network on sustainability performance, 2) creation of network relational strength (an index) for sustainability in conjunction with structural properties, 3) sustainability measurements from a network view, and 4) a distinction between social and environment dimensions of sustainability in identifying network determinants. This study also helps practitioners understand the role of the underlying networks connecting actors in supply chains in implementing sustainability.

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