


Chapter 1

Supply Chain Performance in the Industry 4.0 Context: Knowledge Mapping and Analysis

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ABSTRACT

The research aims to explore the topic of supply chain performance in the Industry 4.0 context, based on knowledge mapping. Thus, qualitative and quantitative approaches are combined in a documentary study that uses 354 articles published on Web of Science as a cornerstone. Methods like co-authorship analysis, co-citation analysis, clusters density analysis, and content analysis are employed, and the results bring forward the fact that (1) almost a quarter of the scientific publications regarding supply chain performance in the Industry 4.0 context are concentrated in five high-ranked journals; (2) the most cited articles provide a systematic and content-centric review of the literature, and set the framework for the empirical analysis; (3) the theoretical background of the analyzed articles have their roots in the resource-based theory; and (4) the future research requires establishing a link between supply chain management, Industry 4.0, and sustainable development at the micro, meso, and macro levels.

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INTRODUCTION

Within the digitalization framework, Industry 4.0 is capturing the attention of both practitioners and academics due to its influence on various areas like, supply chain management, operation management, sustainable development, and information technologies. It is characterized by technological innovations such as Machine to Machine communications, Internet of Things, Internet of Everything, Cyber-Physical Systems, artificial intelligence and Big Data Analytics (Brettel, Friederichsen, Keller, & Rosenberg, 2014), and it requires a change at the level of the business models and supply chains (Schmidt, Möhring, Härting, Reichstein, Neumaier, & Jozinovic, 2015).

Against the backdrop of a highly digitalized world where customers' opinions are spread among continents in a few milliseconds and the market is no longer disputed among companies but among supply chains networks, the business models focus on multi-level communication and collaboration. However, this approach brings forward several challenges since its success depends on stakeholders; alignment in terms of values, objectives, and processes.

First of all, in order for the multi-level collaborative supply chain networks to be successful, the supply chain members must share a common set of values and principles and they must trust one another. This fosters knowledge sharing among members and as emphasized by Leon, Rodriguez-Rodriguez, Gomez-Gasquet, and Mula (2020), it has a strong impact on business process improvement.

Secondly, enterprise interoperability has to be ensured in order for the Industry 4.0 to act as an opportunity and not a threat. Thus, the supply chain networks can take advantage of the technological innovations, ensuring compatibility of data exchange formats, interface architecture, and IT infrastructure among the members of the supply chain network (Khisro & Sundberg, 2020).

Last but not least, a particular attention should be given to supply chain performance since this is able to emphasize the efficiency of collaboration within the multi-level supply chain network. For more than three decades, hundreds of studies analyzed the concept of supply chain performance (Bhagwat & Sharma, 2009; Gunasekaran & Ngai, 2004; Neely, 2005), but the change of perspective required by Industry 4.0 is still open to debate. As Fatorachian and Kazemi (2021, p.64) state, "there is little insight on how performance benefits can be realised throughout the Industry 4.0 enabled supply chain". The studies developed so far either concentrate on highlighting how Industry 4.0 could foster supply chain interoperability (Cisneros-Cabrera et al., 2021; Sony & Naik, 2019) or they focus on measuring the performance at the focal firm level (Dubey et al., 2020; Hald & Mouritsen, 2018; Jha, Sharma, Kumar, & Verma, 2022). Despite the fact that both approaches provide valuable insights, they neglect that "at the supply chain level, Industry 4.0 can allow for a holistic approach towards supply chain management and lead to performance improvements through enabling extensive integration and connectivity" (Fatorachian & Kazemi, 2021, p.65).

Against this backdrop, the current chapter aims to explore the topic of supply chain performance in the Industry 4.0 context, based on knowledge mapping. Therefore, an exhaustive analysis and mapping of the existing knowledge of this topic is carried out, in such a way that it helps researchers and practitioners to understand and delve into the essential aspects that may give rise to future work.

Following this introduction, the paper consists of three more sections. The next section describes the research methodology followed in this work and sheds light on the knowledge mapping processes. Then, the perspectives from which the topic of supply chain performance in a digitalized economy is addressed are revealed. Special emphasis has been placed on descriptive statistics and knowledge map-

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