The Rôle of Digital Technologies in the Développent of Résilient and Satinable Supply-Chains

Paulo Alexandre Pereira
Full-time Phd student at Iscte Business School
Business Research Unit (BRU-IUL)
Iscte - Instituto Universitário de Lisboa
Lisboa, Portugal
Researcher at INESC TEC
Porto, Portugal
pafpa@iscte.pt; paulo.a.pereira@inesctec.pt

Ana Lúcia Martins
Associate Professor in Operations Management at Iscte Business School
Integrated Researcher at Business Research Unit (BRU-IUL)
Iscte - Instituto Universitário de Lisboa
Lisboa, Portugal

Ricardo Augusto Zimmermann
Senior researcher at INESC TEC
Porto, Portugal

Abstract

Supply Chain Management (SCM) cannot distance itself from seeking both sustainability and resilience to deal with consecutive change. To achieve this objective, SCM has seen the adoption of digital technologies as a decisive tool to face challenges, such as the COVID-19 pandemic and the war in Ukraine. These disruptions guide SC managers to search for new opportunities and strategies that impact them in the short and long term.

The terms "supply chain sustainability" and "supply chain resilience" have been well explored in literature as independent terms, but there is a lack of studies on their combination, especially in the digital field. This paper aims to explore the extant literature focused on the adoption of digital technologies that contribute to the development of sustainable and resilient SCs, recurring to a systematic literature review. The objective is to identify the trade-offs and the synergies that characterize the relationship between technological-enabled practices for sustainability and resilience.

The database used was Scopus and the formulated query resulted from de author's discussion including words related to supply chain, sustainability, resilience, and digital technologies. Only articles published in journals and in English were considered, and there was no restriction regarding the date of publication.

The first search presented a total of 136 articles (March 2023). The selection was performed in two stages: (1) reading the abstracts and keywords of all papers; (2) full reading of the papers selected in the first stage. After the first analysis (step 1), we selected 63 articles. After step 2, 42 papers that address the relationship between digital technologies and sustainability and resilience were kept.

The results showed an increase in the production of papers approaching the themes, possibly (at least in part) due to the COVID-19 pandemic and the pressure that competition provokes on the stakeholders.

The technologies majorly identified are related to Blockchain, Additive Manufacturing, Big Data, and the Internet of Things as means to achieve SCs with higher levels of resilience and sustainability, being also identified papers that approach the terms "industry 4.0" and "industry 5.0". The main fields where papers have been conducted are food supply chain, agriculture, and automotive industries because of the traceability capabilities of most technologies.

These findings lead to the conclusion that these technologies are the ones with the potential to change organizations and research is focusing on the initial links of SC.

According to the quantitative analysis, 2022 was the year when more articles were published in the journals Operations Management Research, Annals of Operations Research, and Production Planning and Control as the ones that published more. Most papers focused on the utilization of one technology and do not identify a specific theory. We conclude that there is crescent interest in this topic and a lack of theoretical support.

This study contributes to increasing the body of knowledge related to digital technologies in SCs that simultaneously contributes to achieving resilience and sustainability in those SCs. The findings resulting from this systematic literature review help consolidate the theme for future research.

Keywords
Sustainability, resilience, digital technologies

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Biographies

Paulo A. Pereira works at INESC TEC and is a full-time Ph.D. student in Management with a specialization in Operations Management, Logistics, and Supply Chain Management at Iscte Business School. He has a bachelor's degree in Industrial Management and Logistics and a master's in Management, where his thesis focuses on the application of Blockchain Technology to Supply Chain Management. He also has experience as an invited professor in this field. His topics of interest are related to the application of digital technologies to Supply Chain, Industry 4.0, operations and logistics management, and also sustainability and resilience in the supply chain. He has participated in different conferences, though the years such as Euroma 2022.

Ana L. Martins is an Associate Professor at Iscte – Instituto Universitário de Lisboa, Lisbon, Portugal, and an integrated researcher at BRU-Iscte (Business Research Unit). She holds a PhD in Management, with a specialization in Operations Management and Technology, and an MSc in Management, with a specialization in Strategy. She currently serves as Iscte Business School Vice-dean for Teaching and Innovation. She also serves as director of the Master in Humanitarian Action, and in the past served as director of the bachelor's degree in Industrial Management and Logistics. Ana teaches Operations Management, Logistics Management, Service Operations Management, and Supply Chain Management. Ana authored close to 100 scientific articles. Her current main research topics are operations management in humanitarian settings, logistics management, supply chain management, and lean management in the services area, mainly in judicial and healthcare systems.

Ricardo Zimmermann is a senior researcher at the Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), Portugal. His qualification includes a Ph.D. in Industrial Engineering and Management by the University of Aveiro, a Master in Management by the University of Aveiro, a Master in Business Administration by SENAI (National Service of Industrial Learning), Brazil and a BS in Management by the Federal University of Santa Catarina (UFSC), Brazil. His main research interest is the role of digital technologies on the development of sustainable and resilient supply chains. Ricardo has management experience in companies in Portugal and Brazil.