

Editorial: Sustainable supply chain management (SSCM): challenges in the XXI century

Taking an interest in the sustainable supply chain at the start of the 21st century means looking at the main factors that influence it today: technology, demand, culture, taking the human factor into account and sustainable sourcing strategies. This is what this special issue, dedicated to the sustainability of the supply chain in the 21st century, sets out to explore.

Different fields and industrial sectors, particularly the agricultural and service sectors, were studied through intervention research, literature reviews and case studies. The seven articles presented address the key issues of sustainable supply chains.

In summary, there are several lessons to be learned from these investigations. They have demonstrated the positive influence of *technology* and *culture* on the sustainability of the supply chain, the need to include *immaterial and emotional elements*, the importance of *consumer knowledge* coupled with the *information system* to consolidate sustainability, the *role of consumers* at the end of the chain in the implementation of a supply chain that is both resilient, transparent and sustainable, the need to overcome the barriers to the implementation of Industry 5.0 (I5.0), to achieve resilience and sustainability in the supply chain. Also, in setting up a *circular ecosystem*, there is a need for a central player, whether social, private or public, to support the efforts of local communities. Last but not least, it outlines that a sourcing strategy promotes *supplier diversity* (SD) and reduces social and economic inequalities. We understand that the sustainable supply chain is a multifactorial and interdisciplinary topic. This explains the variety of questions and research areas proposed in this special issue.

In their article entitled “Circular supply chains and Industry 4.0: An analysis of interfaces in Brazilian foodtechs”, Tiago Hennemann Hilario da Silva and Simone Sehnem aim to identify the interfaces between Industry 4.0 technologies and circular supply chains in food techs, through key stakeholders in the sector. The research was conducted in Brazilian food tech. Sixteen circular supply chain practices were identified, along with the enumeration of three different Industry 4.0 technologies already implemented in the food tech, verifying adherence to stakeholder theory issues. The results indicate that Industry 4.0 technologies generate efficiency in food tech circular supply chains, although they are still in their early stages. Resource circularity creates value for food tech when supported by Industry 4.0 technologies and stakeholder engagement, conditions that are crucial for resource circularity. The study also highlights the need for support from the public sector, including regulatory issues and tax exemptions for investment in new Industry 4.0 technologies.



In the article “Industry 5.0 and sustainable supply chain: A DEMATEL approach” by Seema Laddha and Anguja Agraw, the authors argue that adopting I5.0 in supply chain sustainability promises to revolutionise how businesses operate. However, numerous barriers hinder the successful implementation of I5.0 technologies. Technological barriers include the lack of standardised protocols and interoperability, hindering seamless integration and communication among diverse systems and technologies. Insufficient IT infrastructure and limited connectivity pose challenges in capturing and leveraging real-time data for enhancing supply chain sustainability. In addition, increased connectivity and data sharing bring about cybersecurity risks and data privacy concerns, impacting trust and impeding I5.0 adoption. Organisational barriers arise from resistance to change and inadequate digital readiness among employees and stakeholders. Economic barriers emerge from the high costs associated with I5.0 adoption, including investments in technology infrastructure, software and workforce training. Uncertainty regarding the return on investment and the lack of clear business cases and success stories can deter organisations from embracing I5.0 technologies. By overcoming these obstacles, organisations can leverage the potential of I5.0 to drive operational efficiency, enhance collaboration and create resilient and sustainable supply chains.

In sequence, the article “Managing circular ecosystems in imperfect contexts: The case of extractive fishing in the Brazilian Amazon region” by Adriana De Mello, Neuzai Marreiros Barbosa, Pedro Hellmeister and Antonio Braz aims to answer the question of how to structure a circular ecosystem for extractive fishing in the Amazon. It explores possibilities for implementing a circular ecosystem management model in an imperfect market with low technological support and limited public assistance. The aim is to propose recommendations for developing a circular ecosystem for extractive fishing, bearing in mind the imperfect context of the reality of the extractive fishery in the state of Amazonas, where there is low technological availability, high informality and little support from public authorities. It was possible to observe the importance of an orchestrating agent – such as an association or even a public authority – for establishing and developing a circular ecosystem for extractive fishing in the region. The article contributes to the management practice of structuring circular ecosystems, which can be considered a basis for drawing up public policies to benefit local communities.

In “Supplier diversity journey: An empirical investigation”, Priscila Miguel and Andrea Lago da Silva propose to investigate how purchasing organisations implement SD initiatives over time. The research suggests that the SD journey encompasses three different but interrelated stages: structuring, operation and adaptation, before being fully implemented. Moreover, findings provide evidence that SD implementation in Brazil is highly influenced by the lack of a consistent knowledge base and the lack of legitimate intermediary organisations. By using a temporal approach to understand how different practitioners managed practices suggested by the literature over time, this study contributes to understanding the path to an effective SD implementation and how intra and inter-organizational context influences this activity. The research demonstrates how organisations can promote diversity and reduce social and economic inequalities by buying from diverse suppliers. The study’s originality is to show that different buying organisations implemented and managed the known practices and dealt with the challenges when trying to adopt SD.

Considering “The role of cultural factors in green supply chain management practices: A conceptual framework and an empirical investigation”, Sadia Iddik contributes to the debate on the impact of organisational culture and national culture on green supply chain management (GSCM) adoption by empirically testing the developed framework, and

ultimately pave the way towards potential areas for future research. Using survey data from a sample of Moroccan manufacturing firms, the research results indicate that the national culture does not influence the GSCM implementation and that adhocracy culture, clan culture and hierarchical culture positively impact the implementation of GSCM initiatives. Furthermore, the firm's size exerts significant control over the adoption of GSCM initiatives. The article represents a starting point for understanding how environmental sustainability and culture are interlinked.

On the other hand, in "Going forward and beyond: On the track of a practice turn in supply chain sustainability studies", Raphaël Lissillour and Minelle Silva propose to explore new theories. Their conceptual paper is based on theoretical arguments to elaborate on how the practice can, in turn, arise in the sustainability of the supply chain (SSC) field. For the authors, there is a need to include immaterial, emotional and intangible elements to comprehend SSC practice better. This can support managers in better understanding their practices by recognising explicit activities and mainly by reflecting on hidden elements that affect performance. The originality of their research is to show how practice theories are powerful to support scholars and practitioners in moving away from an extremely economic focus to embrace sustainability practice genuinely. In doing so, the practice turn appears to be an essential phase for SSC field maturity.

In "Voting with the wallet: A principal-agent framework for the analysis of sustainable consumption decisions", Bruno Varella Miranda, Guilherme Fowler A. Monteiro, Gustavo Oliveira, and Vinicius Picanco Rodrigues investigate the idea that consumers who make environmentally and socially responsible choices are equivalent to voters in an election delegating a task to an agent. Their paper relies on the principles of agency theory to shed light on fundamental challenges that affect the ability to transform supply chains. The research unravels two puzzles linked to decision delegation within sustainable supply chains. It shows that (i) as firms adopt sustainable production systems, their ability to convey relevant information that convinces consumers to enter into a delegation relationship diminishes, and (ii) once a delegation relationship is established, complementarity within the dimensions of the contract is more important than the mere provision of economic incentives. The findings of this paper offer insights that can inspire empirical research on sustainable production and consumption patterns. Sustainability will only be achieved if people are able to fully understand what explains the gaps between our ambitions and reality. The article contributes to improving our understanding of these gaps.

In our comprehension, these articles suggest relevant avenues for future research, for which we thank all the authors. They have done a great deal of work in revising their articles and refining their thoughts. Finally, we would like to warmly thank the 20 anonymous reviewers for their careful reading, which helped to improve the quality of the articles, and also the *RAUSP Management Journal* Editor-in-Chief., Prof Dr Flavio Hourneaux Junior, Universidade de São Paulo (FEA-USP), as Prof Dr Maria Sylvia Macchione Saes, Universidade de São Paulo (FEA-USP), for their incentive and confidence in the preparation of this special issue on sustainable supply chain management and challenges in the 21st century.

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Economics, Business and Accounting/FEA-USP) in organising the Track 3: Sustainable Supply Chain Management & Circular Economy.

Editorial

We hope this Special Issue will enable you to pursue and enrich your reflections to move towards sustainable models.

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