
Guest editorial: The 6th world conference on production and operations management

1. Introduction

In the last years, scholars and practitioners in Production and Operations Management (P&OM) have addressed the profound transformation in the field driven by digitalization, the need of organizational agility, sustainability imperatives and globalization, which are reshaping traditional paradigms and influencing operations (Alexander *et al.*, 2022; Kumar *et al.*, 2023), particularly in supply chain management (Mithas *et al.*, 2022), thereby embracing new avenues for competitive success (Arcidiacono *et al.*, 2023). This explains why the 6th World Conference on Production and Operations Management (August 23-25, 2022), online at Kindai University, Osaka-Japan. <https://jomsa.org/worldpom/> was dedicated to the theme: “P&OM and Strategy in the Era of Technological Revolution”.

Twelve articles were pre-selected by the Conference Program Committee for this IJOPM’s SI based on the reviewers’ assessment of the authors’ abstracts and the authors’ preferences for applying to the 6th World P&OM Conference’s Special Issues, as specified in the full paper submission. These articles faced double-blind peer review conducted by collaborating academic experts of IJOPM. Four articles have ultimately passed through a rigorous review process that has significantly enhanced the initially submitted proposals, ultimately meeting the journal’s criteria for novelty, rigor and academic quality.

This editorial contains our reflections on the topic of technological revolution and its conceptualization around three key elements: people, new technologies and the environment. It first develops some reflections on these three elements in the current context and then summarizes the principal contributions of the four selected articles. The editorial concludes with a discussion of the main findings of selected papers and the main directions for future research.

2. The era of technological revolution: new technologies, people and environment

The papers presented at 6th World Conference on P&OM contributing to this special issue navigate the complexity of the modern digital landscape in a context of increasing competition from multiple factors that interact and define a complex and uncertain context. The adoption of technological and organizational innovations constitutes a key element for organizations to perform adequately and sustainably in this setting (Sharma *et al.*, 2022).

New digital technologies play a key role in the current technological revolution (Mithas *et al.*, 2022). Emerging technologies such as artificial intelligence, blockchain or the Internet of Things (Industry 4.0 and 5.0) have the potential to revolutionize industries and redefine the nature of work, supporting a wide range of decision-makings and changes to respond to market developments and customer demands with efficiency (Oliveira-Dias *et al.*, 2022). Understanding their implications requires not only technical expertise but also a holistic perspective that considers their social, economic and environmental impacts (Felsberger *et al.*, 2022).

On the other hand, people are at the heart of technological innovations (Cimini *et al.*, 2022). While new technologies have the potential to revolutionize industries, their development and application are fundamentally reliant on human experience and expertise. Hence, any dialogue concerning the technological revolution should recognize and integrate the diverse range of human backgrounds, abilities and experience, and also potential negative impacts of



technological revolution on the society (Dieste *et al.*, 2023). Day after day technological advancements continue, so there is a growing need for new tasks and skills to be integrated into job roles, leading to increased job complexity, often stemming from the interdependencies of various tasks (Adrianto *et al.*, 2023). This phenomenon underscores the critical role of human labor, particularly blue-collar workers and middle managers, that becomes indispensable in operations. Their involvement is key for translating technological innovations into tangible organizational outcomes (Thürer *et al.*, 2020).

Finally, the growing environmental concerns underscore the imperative to address the ecological impacts of technological progress (Pham *et al.*, 2020). The proliferation of digital technologies has precipitated significant environmental challenges, including the management of e-waste, energy consumption and carbon emissions (Agrawal *et al.*, 2022). The use of both traditional and novel technologies has emerged as an effective strategy not only for saving resources but also to preserve the environment and promote sustainability (Berrone *et al.*, 2013). In the field of OM, the complex interdependencies and collaborations within global supply chains, involving different actors located in diverse, sometimes distant and dynamic environments, pose formidable challenges in crafting competitive value propositions (Xu *et al.*, 2020; Govindan *et al.*, 2021).

3. Substantive contributions of the selected papers

The papers included in this special issue serve as examples of scholarly inquiry into various dimensions of P&OM in the context of the technological revolution:

Technological advancements and data analytics: In the era of big data, the ability to extract actionable insights from vast textual datasets has emerged as a critical challenge for P&OM researchers. Odacioglu *et al.* (2024) paper titled “Big textual data research for operations management: topic modelling with grounded theory” introduces a methodological innovation that integrates machine learning techniques with grounded theory to glean actionable insights from voluminous textual data. Drawing on the principles of constructivist grounded theory, the authors offer an example of application of their methodological innovation, by employing topic modeling to analyze textual data sourced from a professional project management website. The authors propose a methodology that leverages big textual data and machine learning techniques to extract insights and inform decision-making in operations management. Through a meticulous four-step coding process, they demonstrate how this approach enables systematic exploration and interpretation of management phenomena, thereby enriching the theoretical foundations of P&OM research. As a result, this paper shows the synergistic potential of technological advancements and traditional research paradigms in advancing the frontiers of P&OM knowledge. This study’s primary contribution lies in its examination of how organizations, amidst the technological revolution, are contending with large volumes of textual data. The application of advanced analytical methods can contribute to value creation (Chen *et al.*, 2022), and presents a promising pathway for generating new knowledge and fostering innovation.

Organizational agility and adaptability: In today’s hypercompetitive business environment, organizational agility has emerged as a key determinant of success. Central to the concept of agility is the notion of ambidexterity, which refers to the ability of organizations to balance exploration and exploitation activities. Stei *et al.*’s (2024) paper titled, “Leveraging organizational knowledge to develop agility and improve performance: the role of ambidexterity”, investigates the relationship between ambidexterity, organizational agility and performance. As organizations navigate rapid technological changes and disruptive market forces, the ability to balance exploration and exploitation becomes essential for adapting to changing circumstances and maintaining competitiveness. Elaborating further on existing measurement models, the authors propose a comprehensive framework that incorporates the concept of tension inherent in ambidexterity. Through empirical analysis, they demonstrate that a balanced approach to exploration and exploitation fosters

entrepreneurial and adaptive agility, thereby enhancing firm performance. Moreover, they highlight the moderating role of environmental competitiveness in shaping the impact of ambidexterity on agility, providing valuable insights for practitioners seeking to enhance organizational resilience in dynamic market environments.

Innovative management practices and collaboration: The successful implementation of training programs is critical for building a skilled and adaptable workforce, particularly in the context of globalized manufacturing operations. [Nishiwaki and Oe \(2024\)](#), in their paper titled “Cooperative management of an initial training program: case study of a Czech production site of a Japanese globalized manufacturing firm”, present an in-depth case study of the “Dojo” training program implemented at a production site in the Czech Republic. Drawing on insights from management innovation theory, the authors analyze the collaborative processes involved in standardizing training procedures and skills development. Through interviews, archival data analysis and financial data examination, they elucidate the mechanisms through which the Dojo program facilitates knowledge transfer and fosters trustful relationships between the subsidiary and the parent company. By offering theoretical insights into management innovation at the subsidiary level, this study contributes to the literature on human resource management and operations management, highlighting the importance of collaborative management practices in driving organizational performance. These practices play a catalytic role in facilitating knowledge transfer, skill standardization and organizational performance improvement. Overall, this study highlights the importance of organizational innovation, collaboration and training in driving success amidst technological revolution.

Sustainability and socio-ecological dynamics: Supply chains are complex socio-ecological systems characterized by interdependencies across multiple levels of analysis. [Madonna et al.'s \(2024\)](#) paper, entitled “Panarchy theory: myth or reality? Empirical evidence of the socio-ecological nature of supply chains”, applies the lens of panarchy theory to examine the dynamic interactions between the planetary, political-economic and supply chain levels. By conceptualizing supply chains as adaptive systems embedded in larger socio-ecological contexts, the authors explore the impact of climate change risk exposure and mitigation efforts on supply chain dynamics. Drawing on empirical evidence from the Carbon Disclosure Project’s Supply Chain Program, they reveal how focal firms and first-tier suppliers navigate cross-level linkages to improve their carbon performance and gain legitimacy in the face of environmental challenges. This study contributes to the literature on sustainable supply chain management by highlighting the mechanisms through which panarchy theory can inform strategic decision-making and facilitate adaptive responses to complex socio-ecological dynamics.

4. Future avenues for research and practice

Building upon the foundations laid by the papers presented in this special issue, several promising avenues for future P&OM research and practice emerge.

Technological integration and innovation: Results of this special issue suggest that future research could explore the integration of emerging digital technologies into P&OM practices, with a focus on harnessing their transformative potential to enhance operational efficiency, transparency and agility. For instance, as demonstrated by [Odacioglu et al.'s \(2024\)](#) paper by applying topic-modeling analysis, practitioners can make informed decisions based on insights derived from processing textual data. This suggests that practitioners can actively participate in the research process, providing expert opinions to enhance the effectiveness of decision-making processes for their operations and projects (e.g. integrating topic modeling with grounded theory and providing a framework for collaborative research with practitioners and different stakeholders). Future studies can also apply the proposed methodology to diverse P&OM domains such as supply chain management, operations strategy and quality management to contribute to P&OM theory and gain insights from different data sources. Future research should focus on how the use of digital tools supports decision-making in P&OM at different levels of

management (top managers, middle managers, groups), and how decisions-making process can be based on facts, real information or perceptions of different stakeholders.

Sustainability and circular economy: There is a burgeoning need for research on sustainable P&OM practices and the transition towards a circular economy paradigm (Batista *et al.*, 2023). In this line, Madonna *et al.* (2023) show the complex interactions within supply chain actors and with external factors, suggesting the need of deeper analysis of specific linkages within supply chains, considering bidirectional linkages among different levels. The dynamics of these interactions make imperative the use of longitudinal data in order to detect the direction and causalities between supply chain actors' initiatives and the external environment. Additionally, studying interaction and mediation effects between different levels of the supply chain and testing them through multi-level regression analysis could provide valuable insights. In particular, from a practical perspective, we think that today an area which deserves an in-depth investigation to accelerate the widespread of circular economy practices regards the dynamics between the political level and supply chain collaboration in the circular economy field. In many sectors and countries, regulations lack on waste management at the end of a product life or on refurbishing of a product to put it back to the market or on producing secondary raw materials with a certified quality (Singh *et al.*, 2017). It is often difficult to discern to what extent new regulations are driven by governments or guided by leading companies in the field, as their actions synergically intersect.

Resilience and agility: In the new era of technological revolution, P&OM faces increasing complexity in processes and operations, characterized by high market volatility, uncertainty and risk of disruptions in global supply chains (Koh *et al.*, 2019; Wieland *et al.*, 2023). In this context, by enhancing organizational resilience, and cultivating a culture of adaptive learning, organizations can navigate disruptions and thrive amidst uncertainty (Belhadi *et al.*, 2024). With this regard, this special issue offers interesting avenues for future research. First, ambidexterity enables organizations to simultaneously exploit existing processes and capabilities while exploring new methods and technologies, allowing to strike a balance between efficiency and innovation in P&OM. Ambidexterity can be explored regarding artificial intelligence (AI). Future research can study if algorithms can be designed with ambidextrous characteristics, balancing between exploiting existing data and knowledge to improve performance and exploring new data sources and techniques to enhance capabilities and adaptability. Similarly, balancing between exploiting existing knowledge and exploring new data and techniques, AI can adapt to changing circumstances and improve their performance iteratively. More research is needed in this area.

Human-centric approaches: Lastly, future research could pivot towards human-centric approaches to P&OM regarding new technologies and environmental-social issues. In this sense, future research should emphasize on topics such as employee empowerment, well-being, diversity and inclusion, and nurturing a culture of continuous learning and adaptation. In this vein, contributions of this special issue suggest that future research could focus on identifying specific training interventions that enhance employees' ability to adapt to changing circumstances and contribute to organizational agility. In addition, the case study of the "Dojo" program suggests that future research could delve into the effectiveness of collaborative approaches in standardizing training procedures and fostering trustful relationships between different levels of the organization. Here, a promising line of research is also the identification of factors, both organizational and individual, that influence employees' engagement in training programs. In addition, in multi-plant and global contexts, as stated by Nishiwaki and Oe (2023), a further area which deserves further research regards how adapting or to what extent standardizing training procedures, in production sites which differ significantly for level of complexity of production technologies.

In summary, this special issue stands as evidence of the vitality and importance of OM research in responding to the imperatives of the technological revolution. Through the adoption of interdisciplinary methodologies, theoretical frameworks and collaborative initiatives, scholars and practitioners have the opportunity to leverage the transformative

capacity of OM to facilitate sustainable value generation and societal impact in an era of unprecedented technological changes and huge social challenges.

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Further reading

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