



Preface: artificial intelligence in operations management

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The recent and exponential growth of adopters of digital technologies, thanks to the information and communications technologies (ICTs) advances, have been changing the field of operations management (OM) drastically (Li, 2020; Queiroz & Fosso Wamba, 2021). In this perspective, although artificial intelligence (AI) has already been discussed for decades (Fosso Wamba et al., 2021), only in recent years, supported by the unprecedented advances in computer processing power, internet diffusion, and social networks sites, it has gained popularization as never before seen.

In this outlook, the organizations started a run to mindset shift to incorporate AI techniques into their operations (Belhadi et al., 2021). Thus, it can be seen that AI has been used successfully in many operations contexts (Fosso Wamba & Queiroz, 2021; Queiroz & Fosso Wamba, 2021; Yang et al., 2021). For instance, AI has been employed in different fields such as healthcare operations, humanitarian supply chains, inventory management, and transportation activities.

In that context, the main objective of this special issue is to unlock the potential of AI applications in OM fields. After competitive review rounds, 28 papers were selected for this special issue. The papers provide insightful and most exemplary applications of AI and related technologies in many OM and associated fields. Thus, to provide a good visualization of the papers, Table 1 points out the main information. Therefore, it can be seen that the papers explore diverse OM contexts by employing different AI tools and approaches and other cutting-edge technologies.

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Table 1 Main information of the accepted papers for the special issue

Paper title	Authors	Main AI tool/approach	Main context
Transforming business using digital innovations: the application of AI, blockchain, cloud and data analytics	Akter, Michael, Uddin, McCarthy & Rahman	Machine learning and deep learning	Digital business transformation
Service provider portfolio selection for project management using a BP neural network	Bai, Zheng, Wang & Liu	Back Propagation (BP) neural networks	Service provider selection
A cognitive analytics management framework to select input and output variables for data envelopment analysis modeling of performance efficiency of banks using random forest and entropy of information	Bou-Hamad, Anouze & Osman	Data envelopment analysis (DEA)	Bank performance efficiency evaluation
Going beyond intent to adopt Blockchain: an analytics approach to understand board member and financial health characteristics	Farnoush, Gupta, Dolarsara, Paradise & Rao	Clustering models	Blockchain adoption and firms financial performance
Increasing flexibility and productivity in Industry 4.0 production networks with autonomous mobile robots and smart intralogistics	Fragapane, Ivanov, Peron, Sgarbossa & Strandhagen	Autonomous mobile robots (AMR)	Manufacturing flexibility
Social media and sensemaking patterns in new product development: demystifying the customer sentiment	Giannakis, Dubey, Yan, Spanaki & Papadopoulos	Fuzzy logic	New product development
Understanding artificial intelligence adoption in operations management: insights from the review of academic literature and social media discussions	Grover, Kar & Dwivedi	AI (Review)	Social media and OM

Table 1 (continued)

Paper title	Authors	Main AI tool/approach	Main context
Artificial intelligence for decision support systems in the field of operations research: review and future scope of research	Gupta, Modgil, Bhattacharyya & Bose	AI (Review)	Decision support systems and OR
Artificial intelligence in healthcare operations to enhance treatment outcomes: a framework to predict lung cancer prognosis	Johnson, Albizri & Simsek	Particle swarm optimization	Healthcare operations
Assets management on electrical grid using Faster-RCNN	Kala, Kre, Gnassou, Kala, Akpablin & Coulibaly	Faster Region proposal Convolutional Neural Networks (Faster-RCNN)	Electricity distribution lines
Early box office prediction in China's film market based on a stacking fusion model	Liao, Peng, Shi, Shi & Yu	Stacking model	Box office prediction in films market
The detection and location estimation of disasters using Twitter and the identification of Non-Governmental Organisations using crowdsourcing	Loynes, Ouenniche & De Smedt	Linear support vector classifier and density-based spatial clustering of applications with noise	Humanitarian disasters detection
Impact of artificial intelligence investment on firm value	Lui, Lee & Ngai	AI (Event study)	The role of AI investments on the value of the firms
A bi-objective hierarchical program scheduling problem and its solution based on NSGA-III	Peng, lin, Zhang & Chen	NSGA-III	Program scheduling problem
Artificial intelligence-based inventory management: a Monte Carlo tree search approach	Preil & Krapp	Monte Carlo tree search heuristic	Inventory management
A novel advanced grey incidence analysis for investigating the level of resilience in supply chains	Rajesh	New decision support model based on grey incidence analysis	Supply chains resilience
Disruptive technologies in agricultural operations: a systematic review of AI-driven AgriTech research	Spanaki, Sivarajah, Fakhimi, Despoudi & Irani	AI (review)	Agricultural technology with AI

Table 1 (continued)

Paper title	Authors	Main AI tool/approach	Main context
Appraisals of harms and injustice trigger an eerie feeling that decreases trust in artificial intelligence systems	Sullivan, de Bourmont & Dunaway	Artificial agents	Trust in artificial agents
Swarm intelligence-based hyper-heuristic for the vehicle routing problem with prioritized customers	Tarhini, Danach & Harfouche	Swarm intelligence	Vehicle routing problem
Real estate price estimation in French cities using geocoding and machine learning	Tchuente & Nyawa	Machine learning	Price estimation in the real estate field
A multi-objective supplier selection framework based on user-preferences	Toffano, Garraffa, Lin, Prestwich, Simonis & Wilson	Multi-objective optimization	Supplier selection
Adoption and use of AI tools: a research agenda grounded in UTAUT	Venkatesh	AI (conceptual)	Research agenda about AI tools adoption and use
Managing pharmaceuticals delivery service using a hybrid particle swarm intelligence approach	Wu, Li, Chu, Amoasi & Liu	Hybrid particle swarm intelligence	Vehicle routing problem
A CS-AdaBoost-BP model for product quality inspection	Wu, Zhou, Xu & Lou	Back propagation (BP) neural networks	Product quality inspection
Impact of artificial intelligence adoption on online returns policies	Yang, Ji & Tan	AI adoption	Online return policies and operations
Green efficiency performance analysis of the logistics industry in China: based on a kind of machine learning methods	Yao, Cheng, Zhou & Song	Machine learning	Green efficiency performance in logistics operations
A comparative analysis of machine learning techniques and fuzzy analytic hierarchy process to determine the tacit knowledge criteria	Yazici, Beyca, Gurcan, Zaim, Delen & Zaim	Machine learning and fuzzy analytic hierarchy process	Knowledge criteria and effects on firm performance

Table 1 (continued)

Paper title	Authors	Main AI tool/approach	Main context
Blockchain-based intelligent contract for factoring business in supply chains	Zheng, Zhang & Gauthier	Practical Byzantine Fault-Tolerant (pBFT) algorithm	Factoring business in supply chains operations

1 Final thoughts and directions to contemporary world challenges

In this special issue, the selected papers shed more light on AI usage from different OM perspectives and related fields. As final remarks, we would like to provide some particular directions and avenues that need more reflection and efforts by scholars and practitioners interested in exploring AI techniques/applications to address some huge events that affect the OM globally.

- *AI applications in operations and supply chains container demand*: due to the COVID-19 crisis and other disruptive events like the blockage in the Suez Canal, these two events combined with minor crises considerably affected world trade.
- *AI applications to minimize the shortages and delays in OM*: the COVID-19 crisis disrupted important supply chains such as the semiconductor chip, food, labour shortages, etc.
- *AI applications to empower and make tangible the environmental, social, and corporate governance (ESG) strategies*: the pressure for organizations and their networks for more clean and transparent operations can be supported by AI.
- *AI integrated into smart cities to improve the OM and social good*: despite the advances in smart city understanding and actions, there is a huge gap in integrating AI and OM to improve social good.
- *AI applications to minimize the impacts in OM during disruptive events*: although the potential of AI applications in OM, it is unclear how OM can benefit from AI applications in the face of crises before they occur. Also, it is crucial to explore how AI can contribute to re-establishing OM during and after highly disruptive events.

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References

- Belhadi, A., Mani, V., Kamble, S. S., Khan, S. A. R., & Verma, S. (2021). Artificial intelligence-driven innovation for enhancing supply chain resilience and performance under the effect of supply chain dynamism: An empirical investigation. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-021-03956-x>
- Fosso Wamba, S., Bawack, R. E., Guthrie, C., Queiroz, M. M., & Carillo, K. D. A. (2021). Are we preparing for a good AI society? A bibliometric review and research agenda. *Technological Forecasting and Social Change*, 164, 1–27. <https://doi.org/10.1016/j.techfore.2020.120482>

- Fosso Wamba, S., & Queiroz, M. M. (2021). Responsible Artificial Intelligence as a Secret Ingredient for Digital Health: Bibliometric Analysis, Insights, and Research Directions. *Information Systems Frontiers*. <https://doi.org/10.1007/s10796-021-10142-8>
- Li, F. (2020). Leading digital transformation: three emerging approaches for managing the transition. *International Journal of Operations & Production Management*. <https://doi.org/10.1108/IJOPM-04-2020-0202>
- Queiroz, M. M., & Fosso Wamba, S. (2021). A structured literature review on the interplay between emerging technologies and COVID-19—insights and directions to operations fields. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-021-04107-y>
- Yang, C., Feng, Y., & Whinston, A. (2021). Dynamic pricing and information disclosure for fresh produce: An artificial intelligence approach. *Production and Operations Management*. <https://doi.org/10.1111/poms.13525>

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