

BIBLIOMETRIC TRENDS IN OPERATIONS MANAGEMENT: INDUSTRY 5.0 PERSPECTIVE

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Abstract: In the dynamic landscape of Industry 5.0, the intersection of cutting-edge technologies and operational excellence is shaping the future of operations management. New industrial trends bring unprecedented convergence of the physical and digital realms, where smart technologies, smart automation, and data-driven insights are propelling operational efficiency to new heights. As a consequence, the fulfilment of specific customer demands is to be achieved through the utilization of mass-produced items, while strategic decisions should be optimized within adaptable business and engineering workflows. Concurrently, efforts should be directed towards enhancing resource productivity and efficiency. With a particular focus on Industry 5.0, the purpose of this study is to give a bibliographic review that thoroughly identifies the primary researchers and contributors in the field of operations management. For other academics who are curious in the latest advancements in the subject, the research findings ought to be an invaluable resource. It also creates opportunities for deeper operations management-related research.

Key Words: operations management, industry 4.0, industry 5.0, bibliometric analysis

1. INTRODUCTION

In the ever-evolving landscape of industrial operations, the emergence of Industry 5.0 marks a transformative era, redefining the way organizations conceive, execute, and optimize their processes. As we delve into the heart of this new industrial revolution, a critical lens on operations management becomes imperative, as it is the cornerstone that connects the technological advancements of Industry 5.0 with organizational success [1]. Industry 5.0 represents the culmination of technological progress, characterized by the seamless integration of physical and digital realms. At its core lies the concept of hyper-connectivity, where smart technologies, the Internet of Things (IoT), artificial intelligence (AI), and cyber-physical systems converge to create an interconnected ecosystem. This connectivity extends beyond machines to encompass the entire value chain, fostering collaboration, transparency, and real-time data exchange. Industry 5.0 marks a paradigm shift by seamlessly blending the physical and digital domains within industrial processes. Unlike its predecessors, where automation primarily focused on enhancing efficiency, Industry 5.0 transcends these boundaries. The physical and digital realms are no longer distinct entities; instead, they coalesce to form a unified environment where the lines between the physical and digital aspects of operations blur [2].

The unification of smart technologies, IoT, AI, and cyber-physical systems is a basis of Industry 5.0. Smart technologies include sensors, actuators, and other intelligent devices that can collect and transmit data. IoT plays a pivotal role by connecting these devices and enabling them to communicate and share information. AI, with its ability to analyse vast datasets and make intelligent decisions, further amplifies the capabilities of these interconnected systems. Cyber-physical systems bridge the gap between the physical and digital worlds, creating a symbiotic relationship that enhances overall operational efficiency [3].

The result is the creation of an interconnected ecosystem where machines, processes, and humans collaborate impeccably. This interconnectedness extends far beyond individual machines and workstations; it encompasses the entire value chain. From suppliers to manufacturers, distributors, and customers, the entire ecosystem is linked in real-time. This connectivity not only streamlines operations but also facilitates a holistic understanding of the entire production and supply chain, enabling organizations to make data-driven decisions and respond promptly to dynamic market demands. Hyper-connectivity in Industry 5.0 leads to a cultural shift within organizations. Collaboration becomes more than a buzzword; it becomes the essence of operations. Teams and departments are no longer isolated silos but integral parts of a collaborative network. Transparency is inherent, as data is shared across the value chain, providing stakeholders with real-time insights into every aspect of operations. The exchange of data in real-time becomes a catalyst for agility, allowing organizations to adapt swiftly to changing circumstances, optimize processes, and enhance overall performance [4].

A comprehensive bibliometric analysis of the main research streams and important contributors in the field of operations management will be provided by this study. The research findings may prove to be a valuable resource for other scholars who are eager to gain further insight into the latest developments in the field. Moreover, it generates prospects for further research about operations management.

2. MATERIALS AND METHODS

Because of its well-established reputation for housing scholarly journals and research papers of the highest quality, the Scopus database was used to gather scientific research pertinent to the subject at hand. The following keywords were used in order to compile relevant research in the field: “Operations Management”, “Industry 4.0”, “Industry 5.0”. The general information about the data used for the analysis are given in Table 1.

Table 1 – General information about the data

Timespan	2014:2023
Sources	140
Documents	255
Average citations per doc	27.04
Authors	726
Articles	128
Books	20
Conference papers	107

Database retrieval and organisation were accomplished with the help of the Biblioshiny software from the RStudio cloud. Biblioshiny provides information on the most productive countries, institutions, authors, research fields, and journals. It also provides information on keywords, impact factors, h-indexes, total citations, and more. It is suggested to use this open-source programme to carry out thorough science mapping analyses [5].

3. RESULTS AND DISCUSSION

This section presents the main bibliometric analysis related to the operations management in the new industrial era.

Figure 1 provides information about the top ten sources where the articles dealing with the topic of operations management from the perspective of Industry 5.0 are published. It can be seen that International Journal of Production Research and International Journal of Production Economics have the highest number of articles published.

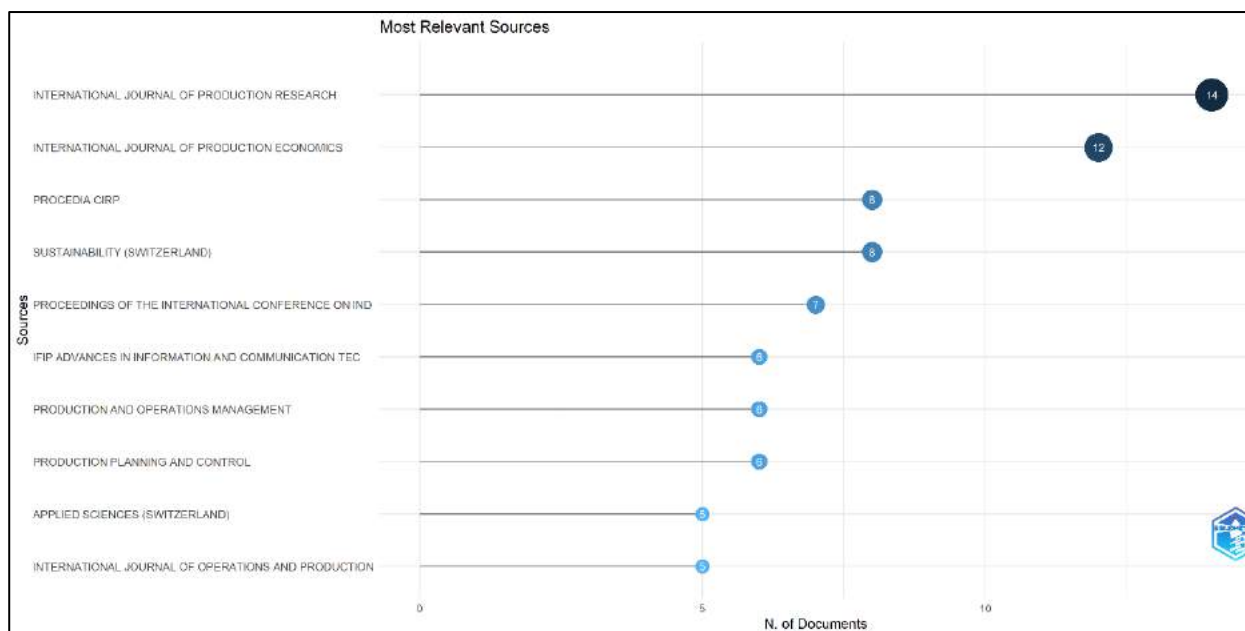


Figure 1. Most relevant sources

Figure 2 should inform the audience about the countries of the authors that are working on the topics concerning operations management in the new industrial era. The highest number of articles are published from authors who are coming from Brazil, Italy, China, India, United Kingdom and Germany.

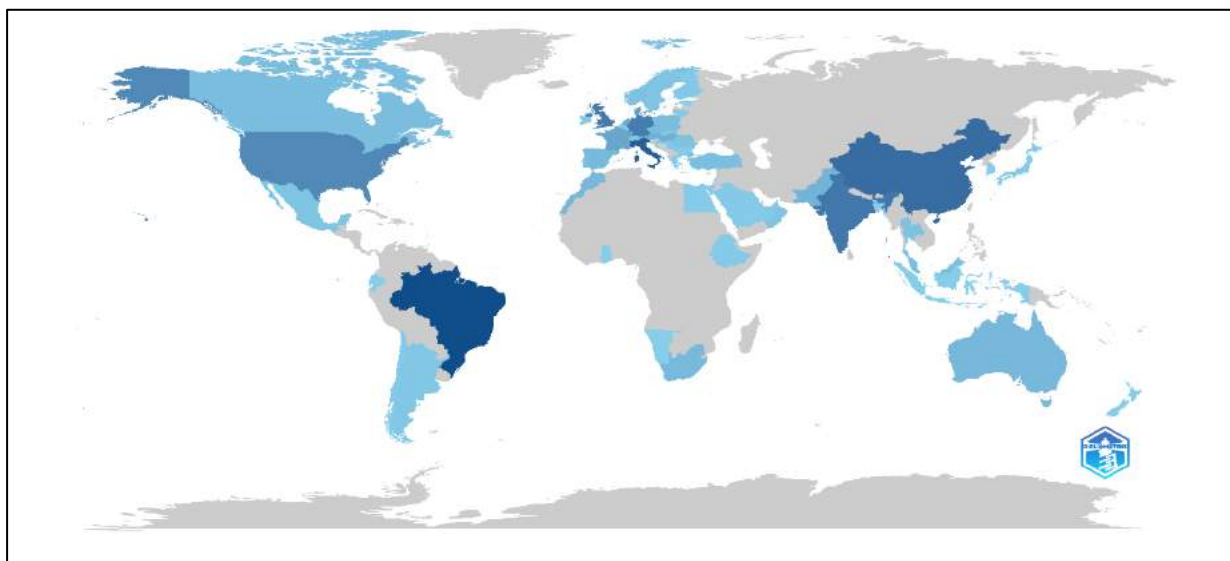


Figure 2. Country scientific production

The most effective approach for understanding the conceptual framework of research on a specific topic is co-word analysis. A similar process is used to identify the most frequently recurring words and phrases in the paper's title and keyword list (Figure 3). Co-word analysis shows that "Industry 4.0", "Operation(s) Management", "Decision Making", "Information Management", and "Manufacture" are the most often used keywords in the paper titles and abstracts.

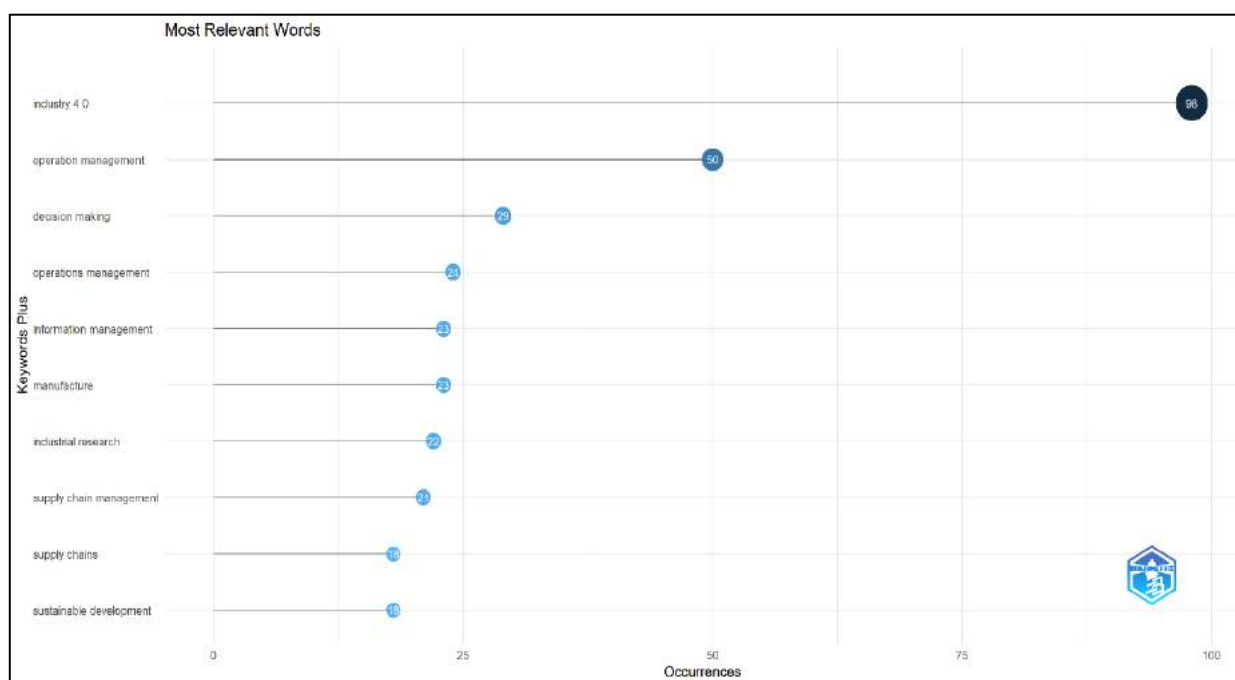


Figure 3 Most relevant keywords

Finally, thematic map which shows basic themes (i.e. Industry 4.0/5.0, Operations management, Decision making, and Human recourse management), niche themes (i.e. Operations, Resilience, and Adaption), motor themes (i.e. Visibility, Production management, Synchronization, Information management, Manufacture, and Supply chains), and emerging or declining themes (i.e. Behavioural operations, Performance, Warehouses, Sustainability, Innovation, and Literature review) is presented in Figure 4.

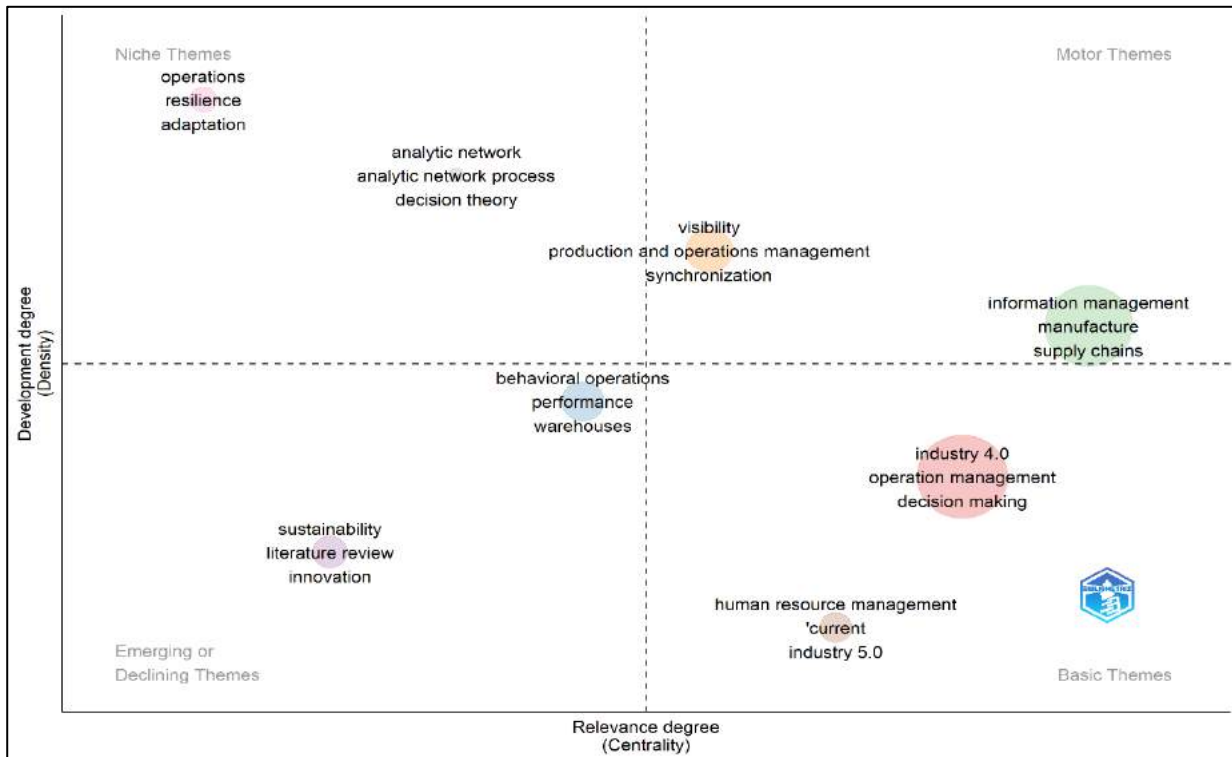


Figure 4 Thematic map

4. CONCLUSION

The purpose of this article was to discuss the relationship between operations management and the new industrial era, also known as Industry 4.0/5.0, which should be considered a disruptive force that is changing the nature of industry. The future of operations management is being shaped by the convergence of cutting-edge technology and operational excellence, as the manufacturing sector adopts the principles of Industry 4.0/5.0.

The authors attempted to thoroughly characterize and present the primary sources and streams of research in the field of operations management in the new industrial realm through the use of bibliometric analysis. Presenting the common and fundamental knowledge that should help other scholars curious about the latest advancements in the subject was the main goal.

The analysis's foundation is the Scopus database, which is regarded as a reliable resource for scholarly articles and publications of the highest calibre. Nonetheless, other databases may be examined in order to find pertinent publications within the subject. In order to conduct a more thorough and in-depth analysis, the authors suggest that future research take into account additional databases, such as Web of Science or others.

5. LITERATURE

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