Artificial Intelligence in Management: A Literature Review using Tree of Science*

Inteligencia Artificial en la Administración: una revisión de la literatura utilizando Tree of Science

Recibido: marzo 23 de 2023 - Evaluado: abril 30 de 2023 - Aceptado: junio 10 de 2023

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Para citar este artículo / To cite this Article
Joaquin Alexis-Tahta, "Artificial Intelligence in Management: A Literature Review using Tree of Science" Revista de Ingenierías Interfaces, vol. 6, no.1, pp.1-12, 2023.

Abstract

Artificial Intelligence (AI) and the possibilities for the future that it brings us, can reduce daily tasks and allow us to pursue different activities in management. Though AI has been studied and researched to this day, this article shows us the real possibilities of AI in the present and the future in management. The main papers were identified using the methodology of Tree of Science from a Scopus search. The study concludes by showing the outlook on the future of AI and it is practical and important to know this for improving the management performance in firms. Gaining more knowledge on AI could be beneficial as human error, competency, and more could be eliminated which would further improve the field.

Keywords: Artificial Intelligence, Management, Review, Tree of Science, Machine Learning, Deep Learning, Big Data, Supply Chain Management, Human Resources, Scientometrics.

Resumen

La Inteligencia Artificial (IA) y las posibilidades de futuro que nos depara, pueden reducir las tareas diarias y permitirnos desarrollar diferentes actividades en la Administración. Aunque la IA ha sido estudiada e investigada hasta el día de hoy, este artículo nos muestra las posibilidades reales de la IA en el presente y el futuro en la Administración. Los principales artículos se identificaron mediante la metodología Tree of Science a partir de una búsqueda en Scopus.

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*Artículo inédito: "Artificial Intelligence in Management: A Literature Review using Tree of Science".

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El estudio concluye mostrando las perspectivas sobre el futuro de la IA y es práctico e importante conocer esto para mejorar el desempeño de la gestión en las empresas. Obtener más conocimiento sobre IA podría ser beneficioso ya que se podrían eliminar el error humano, la competencia y más, lo que mejoraría aún más el campo de administración.

Palabras clave: Inteligencia Artificial, Administración, Revisión, Tree of Science, Aprendizaje de maquinaria, Aprendizaje profundo, Administración de cadenas de abastecimiento, Recursos humanos, Cienciometría.

1. Introducción

Artificial Intelligence (AI) is important in management as it can reduce uncertainty and can improve efficiency [1]. Uncertainty in management is unwanted, as time is valuable and the accuracy and precision of a decision can be beneficial or detrimental. Human error is a way of uncertainty, humans cannot process information nearly as fast as computers, and human decisions are based on emotion, feelings, and knowledge while a computer makes decisions based on information and based on facts [2]. Using AI in management makes decisions on what they know, and they base their decisions on pure facts. They can see the probabilities and they can predict the best outcomes. More efficient processes are better and can allow the use of resources which can be beneficial to management. Therefore, AI has the potential to make processes more effective by recording data and by analyzing current processes, something that humans in our current stage would not be as effective in doing. AI can overall promote better use of time in the workplace and a possibility to improve output.

Unlike this, there have been few real deep articles on this topic that show the importance of AI in management. Jarrahi [3] studied how AI affects supply chain management, but his focus went more in-depth on how AI can help humans and how they can be complementary. Fisch & Block [4] wrote an article about how AI can help improve the accuracy and efficiency of natural disaster management and monitoring. This article successfully talked about efficiency, accuracy, and uncertainty regarding AI but was mostly focused on how it could affect Natural disaster Management and not really on the improvements that management can get as a whole. This is why the article was done with the purpose of filling the gaps and unifying the information regarding improvements that AI can have in management.

To fulfill the objective, we used Scopus to find information related to “Artificial Intelligence” and “Management”. From here we loaded our results into Tree of Science and classified all of the articles as the classic parts of the tree: Roots, Trunk, and Leaves. This method of using the tree allows us to visualize the themes and the main points regarding these topics from a wider but more in-depth scale.

Given the information above, our question for this paper was how can AI impact management. To figure out this, a study was made to track and map how AI applies and helps management in many different fields. For this, we tracked the articles from the last 10 years and revised them in depth. This allowed us to track and establish multiple major ways that AI was impacting and helping management. Detailed and further analysis showed a

gap in information, or a common link for the learning of such material, which is the major investigation necessary for the future and development of AI in management. We tracked Human Resources, Supply Chain, and Big Data all as potential places where AI makes a big difference in management.

This article continues with the methodology, which is the process of identifying the main articles and information explained in detail. Then it shows the chronological contributions with the different perspectives identified from the information. Finally, it concludes with how AI is being implemented in Management at the current time and also how AI can grow, and the future of its development in management.

2. Materiales y Métodos

Scopus was used to identify the relevant papers. We used the words "artificial intelligence" and "management" in titles from 2013. We obtained 150 documents that were uploaded to the ToS platform [5] to identify the papers in roots, trunks, and branches. ToS has been applied in fields like psychology [6], [7], management [8]–[11], marketing [12]–[14], entrepreneurship [15], [16], education [17], [18], health [17], [18], engineering [7], [19] and in biology sciences [20]–[22]. ToS is a popular research tool in Colombia [23].

3. Resultados

Root

The first study in the roots makes mention of AI and how it can adapt to its own data and achieve specific goals using machine learning. It also offers a perspective on the possibilities for the future of AI [24]. On the other hand, Tambe et al. [25] challenged the idea of a gap between the possibilities and the realities of the use of AI in management. The article recognizes multiple challenges with the Use of data science in Human resources (HR) and the probable use and taking of decisions from small data sets. The article, however, proves helpful in giving practical responses and ideas to combat these challenges. Continuing on, Duan et al. [26] showed the challenges of using AI-based systems in decision-making. He explains the hardships and issues of replacing human decision-making with AI, most specifically in the AI-Human interaction and Integration. In contrast, Jarrahi [3] writes about the similarities and the possibilities of complementary work by Humans and by AI. It addresses AI's reach and its limits and how Humans can complement AI to remove uncertainty from decision-making. Dwivedi et al. [27] talk about AI development and how it is growing at an insane pace, as the article offers insight into future developments for society in general. Also, Frey & Osborne [28] studied how there is a huge risk for Jobs in the USA that can be susceptible to AI and computerization. The article states that around 47% of Jobs are susceptible to this, and it examines the realm of possibilities and the negative relationship that AI and humans can have. Finally, the article talks about how AI is different for many different topics. The article informs the reader

about AI in its evolutionary stages and the different types of AI (Analytical AI, Humanized AI, and Human Inspired AI) [29].

Trunk

The first study in the trunk refers to an examination of AI in Human Resource Management (HRM) and its impact on gender equality [30]. Also, Qamar et al. [31] presented a review of AI-HRM and proposed a framework to help the transition to AI, and Chowdhury et al. [32] highlighted soft skills like leadership to implement AI in HRM. Otherwise, Toorajipour et al. [33] studied the scientific research on AI in Supply Chain Management (SCM) identifying the different techniques through a literature review. Thus, AI has been implemented in management in HRM and SCM.

Branch 1

Arias-Pérez & Cepeda-Cardona [34] studied the relationship between turbulent environments and AI, they showed that robots influence the ability to act during changes. Leoni et al. [35] empirically analyzed the mediating relationship of Knowledge Management (KM) between AI and SCM in firm performance. This study demonstrated the importance of implementing AI in organizations. Kumar et al. [36] studied the impact of AI in small firms, they suggested that small firms with an AI focus are more productive and innovative. Also, Wong et al. [37] identified that small firms that used AI in their SCM are more likely to succeed in turbulent environments. However, AI implementations are not far away from ethical issues, therefore Stahl [38] proposed a framework to generate innovative implementations using AI with ethical concerns. Also, AI implementations and maintenance are complex tasks and need other actors to have important results [39]. Therefore, Bencsik [40] proposed an innovation model to support firms that want to use AI in knowledge management (KM) and, therefore, it is important to establish future directions of AI in Management [27], [41].

Branch 2

Naz et al. [42] studied AI and its impact on property management, especially after the pandemic when managers needed to control risks and disruptions. The article focuses on the role of AI in real estate operations and its possibilities for the future. On the other hand, an article by Bento et al. [43] acknowledges the potential and the limitations of AI in project management by doing a systematic literature review. Continuing on, Mithas et al. [44] wrote about the history of AI and how its affected operations management throughout history. Then it proposes a SACE (sense, analyze, collaborate, and execute) Framework to find and classify emerging technologies in terms of their functions, which then can be compared and integrated into operation management. However, The article by Aljawder et al. [45] talks about the waste management problems in developed countries and how AI and

computer systems might be the solution. The article identifies trends, gaps, and opportunities for AI applications and integration in SCM(supply chain management). The study traces the history of AI research in SCM, mainly focusing on developing new solutions for concurrent and possible future supply chain problems. Analytical AI approaches to SCM that minimize overall costs can only go so far [46]. Continuing, Toorajipour et al [33] also talk about the gaps in SCM, like The lack of implementation of AI in SCM in some fields, the current fields with AI implementation, and the future for AI implementation in the Subfields of SCM. That is why Preil & Krapp [47] Developed the MCT (Monte Carlo Tree Search) AI as a better and more accurate AI for Supply chain inventory management that takes into account real-time data.

Fosso Wamba et al. [48] highlighted the possibilities for the collaboration of AI in OSCM (Operations and Supply Chain Management) by highlighting some companies that already use AI and some pragmatic and innovative Ideas on how the implementation could work. Continuing on, Alheeti and Aldaiyat [49] talk about construction safety and management. The article proposes a new labor safety management program, with online AI monitoring the management will provide a safer environment and help construction management. All in all, it is important to note the Future of AI in SCM and how the interests have shifted from implementing AI from that time to using machine learning and data science. Improving AI and Identifying certain areas of Value that are a possibility for more AI applications are the real focus for SCM to come [50].

Branch 3

AI has influenced the innovation process of companies during the last years but AI is a more multifaceted tool for managers who want to implement innovation processes [51], [52]; for example, AI permits to analyze illegal practices in HRM [53] or for the creation of new products [54]. Moreover, areas like cost management [55], innovation [56], SCH [57], and strategic management [58] will be highly affected. Another important area to be impacted by AI is marketing. Marketing strategies have evolved during the last years starting from traditional marketing (for example, television) and changing to Online Social Network (OSN) sites; however, and due to data accessibility, AI has increased the performance of this area [59]. Blockchain is another topic related to AI in management, cryptocurrency is changing the rules of transactions between companies and clients [60]. Therefore, Di Vaio et al. [61] proposed guidelines that can help practitioners who want to implement AI Management strategies.

Conclusiones

It is important to learn about Artificial intelligence and its effects on the supply chain and supply chain management as it allows us to optimize and make humans able to focus on other tasks. Even though supply chain management and AI have been fairly studied, The article's purpose is to the potential and the current levels of AI in the subfields of SCM.

Also, it is important to learn how we can improve AI and make its processes more efficient, as that can also improve human processes and allow humans to do more tasks. As artificial intelligence is studied regularly, these ideas have still not been studied in-depth. The results show that AI should not be created to replace humans, but instead to augment human contributions. These augmentations can help humans improve the efficiency of everyday tasks.

It is important to study AI in communications as it could change the field completely. The article addresses a research gap, as this topic has not been studied very much. Because of that, the article's purpose was to bridge that gap and a quantitive study of AI in communications. The results showed that there was a limited amount of understanding of technology and AI in communications.

Monitoring and Managing natural disasters is very important as lives are at stake. Artificial intelligence can help make this more effective and make handling these situations better. The article addresses realistic disaster models (NDM) as an essential topic but no real research has been conducted on it yet. That is why the article shows a study on how AI can be effective and can be applied in different natural disaster models. The results from the study showed some innovations and recommendations to develop better models and therefore better NDM prevention. It is practical to study NDMs, as AI seems like a perfect way to combat natural disasters and prevent the most loss of life.

It is important to learn about Supply chain risk management (SCRM), as it is an idea that tries to prevent, mitigate, or assess current or incoming unexpected conditions in the supply chain. SCRM is mostly a quick and important decision and it is fitting for Artificial intelligence to be used. Supply chain problems relevant to SCRM are now using AI and AI enhancements. An investigation was conducted into SCRM and how the AI methodology used, responded to specific tasks. Finally, a study was done to suggest directions for the future of SCRM and AI.

The future of operations, management, and (SCM) may change dramatically, with newfound technology and innovations from artificial intelligence (AI) as in this digital era, AI is vital for different elements of operations and management. AI is proven to be a step in a new direction for all Management and operations in the future. The objective is to show the results of a study done on AI and how it affects operations and management. This study explores the usability of AI utilization within an organization. The study also provides guidelines for management and future optimizations and overall improvements to the field.

Digitization in Human Resource Management has resulted in Artificial Intelligence becoming increasingly important in human resources Information Systems. “Best practice analysis, discipline management, employee training, and development systems” [62] have been greatly impacted by Artificial intelligence. This paper gives insight into human resources and its parts that should receive more attention. The study identifies possibilities in research to give future Human resources a better understanding and better direction.

Crowdfunding uses videos to present and promote their entrepreneurial venture to potential investors. Self-presentation and selling techniques are positively associated with success

and a greater rate of crowdfunding. The results of the article show that AI can benefit video analysis. This shows the intel companies can gain and the improvements that companies can gain from the analysis of videos using AI.

This paper highlights the role of artificial intelligence (AI) in leveraging data from digital transformation initiatives. The need for combining data management and AI is very present as AI can be more sure and can help a company's business ventures. The use of AI applications allows companies to turn data into valuable knowledge and intelligence.

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