

## Understanding how Artificial Intelligence Affects Leadership: Exploring Opportunities and Challenges through Bibliometrics



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**ABSTRACT:** The aim of the article is to identify opportunities and challenges in the specialized literature regarding the impact of artificial intelligence on leadership. The work is based on a bibliometric analysis of papers published on the Scopus platform in 2019-2023 and was conducted starting from an advanced search using the keywords „artificial intelligence”, „AI”, „leader”, „digital” and „leadership”. We started from the research question: What is the situation regarding the specialized literature on how artificial intelligence affects leadership? To answer this question, we proposed the following objectives: identifying the number of publications regarding the impact of artificial intelligence on leadership, determining the evolution of the number of publications, establishing the most common types of published works, highlighting bibliometric maps with the opportunities and challenges regarding the effects of AI on leadership.

The bibliometric analysis served as a rigorous and objective method to understand how artificial intelligence affects leadership. This analysis was conducted in December 2023, using Microsoft Excel for graphical representations and the VOSviewer for visualizing the connections between the representative keywords of the selected articles.

The main findings refer to the fact that the article sheds light on the opportunities and challenges arising from the integration of AI into management practices, thus providing valuable insights for the development of relevant strategies and policies in organizational contexts.

**KEYWORDS:** artificial intelligence, leadership, digital leadership, opportunities, challenges, bibliometric analysis

### I. INTRODUCTION

The widespread integration of artificial intelligence (AI) across diverse sectors, encompassing education, global digital development, healthcare, and leadership, offers substantial opportunities for advancement and efficiency (Cheng & Wang, 2023).

This paper is based on the bibliometric analysis regarding artificial intelligence affects leadership. The title of this article is "Understanding how artificial intelligence affects leadership: exploring opportunities and challenges through bibliometrics" and the purpose of the research is to understand the artificial intelligence impact on leadership.

We started from the research question: What is the situation regarding the specialized literature on how artificial intelligence affects leadership?

A comprehensive strategy was proposed to address the research question regarding the state of specialized literature on the impact of artificial intelligence on leadership. The initial step involves quantifying the number of publications specifically dedicated to the intersection of artificial intelligence and leadership. This counting process serves as a foundation for a comprehensive overview of the research landscape through quantitative analysis, aiding in understanding the evolution of scholarly interest in this area over time.

The second goal entails delving into the temporal aspect of this research area, moving beyond simple quantification. The examination of how the number of publications has evolved during the specified timeframe aids in identifying trends, changes, and pivotal moments in the impact of artificial intelligence on leadership. This longitudinal analysis provides essential insights into the dynamically changing nature of this topic.

The third aim involves categorizing and examining the diverse published works contributing to this paper to obtain a more nuanced perspective. The attempt is made to ascertain whether research on this subject predominantly appears in scholarly publications, essays, conference papers, or other communication channels. This analysis illuminates the broad spectrum of perspectives and approaches utilized in the industry.

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Visualizing keyword relationships among relevant publications uncovers thematic connections and clusters in the academic debate. This is achieved through network analysis, helping identify main ideas, current subjects, and interdisciplinary intersections that shape discussions on artificial intelligence's impact on leadership.

Additionally, a qualitative analysis was conducted involving the examination of 20 relevant articles to identify opportunities and challenges arising from artificial intelligence in relation to leadership. Subsequently, bibliometric maps were highlighted to illustrate the opportunities and challenges regarding the effects of AI on leadership.

## II. LITERATURE REVIEW

The integration of artificial intelligence (AI) across various sectors, including education, global digital development, healthcare, and leadership, presents substantial opportunities for advancement, efficiency, and transformative impact. A careful examination of the challenges and obstacles is crucial for successful implementation.

In the realm of education, AI offers opportunities for improved learning and efficiency, challenges such as conceptual ambiguity, barriers, ethical concerns, digital leadership gaps, and slow adoption need to be addressed for successful implementation (Cheng & Wang, 2023).

Shelepov's (2022) article provides a comprehensive analysis of the objectives and strategies of various countries regarding leadership in artificial intelligence and digital technologies. The author highlights the opportunities and challenges Russia faces in actively engaging in global digital development. The importance of international collaboration in various areas, such as digital infrastructure, cybersecurity, digital platform regulation, data governance, and artificial intelligence, is emphasized. The article suggests that an active approach and collaboration within international organizations could strengthen Russia's position in the global digital arena.

The implementation of digital transformation in the South African manufacturing sector presents significant opportunities for economic stimulus, job creation, and overall economic uplift during periods of recession. However, it also comes with challenges, ranging from navigating digital confusion to overcoming cultural resistance to change and addressing imbalances in recruiting IT specialists. Effective and adaptive leadership is crucial for maximizing the benefits and overcoming challenges within this essential digital transformation for sustainable economic development (Gaffley & Pesler, 2021).

The healthcare sector stands to benefit significantly from AI, as highlighted by Cousins et al. (2023). The integration of AI in digital pathology and healthcare leadership during the COVID-19 pandemic offers opportunities for improved diagnostics, crisis management, and decision-making. However, challenges such as regulatory complexities, data security, and ethical concerns necessitate careful consideration and strategic measures.

Navigating the implementation of clinical AI requires a delicate balance. While opportunities exist in fostering collaboration, innovation, and usability focus, challenges such as abandonment risks, interoperability issues, and public hesitancy need thoughtful consideration. Overcoming distrust, ensuring legal clarity, and adapting to the impact on healthcare culture are vital for successful implementation. Striking this balance is key to realizing the potential benefits of clinical AI in improving healthcare practices. (Hogg et al., 2023)

Bohacek and Farid (2022) highlights the potential of AI in protecting leaders from deep fake threats, offering a promising identity-based approach. However, challenges such as data acquisition, privacy considerations, and the evolving nature of deep fakes underscore the complex landscape of AI in countering misinformation and ensuring ethical deployment.

Salisbury et al. (2023) explore the role of digital fellowships, such as the Topol Digital Fellowship and the Fellowship in Clinical AI, in preparing healthcare leaders for the accelerated adoption of digital technologies in the wake of the COVID-19 pandemic. The opportunities highlighted include leadership development, interdisciplinary collaboration, and innovation, contributing to staff retention and addressing the digital skills gap. Challenges include measuring impact, scalability, and evolving curricula.

Overall, the article emphasizes the need for increased collaboration among universities, industry, and professional bodies to integrate lessons from these fellowships into healthcare education.

Benchea and Ilie (2023) show significant opportunities for leaders in the digital age, emphasizing the importance of digital literacy, data mastery and agile leadership. Their article recognizes the need for leaders to diversify their knowledge and skills. However, challenges such as resistance to change, skill gaps, and the potential disruption of professions underscore the complexities leaders face in navigating the digital landscape. Striking a balance between traditional and digital leadership skills becomes a critical factor for success in this transformative era.

In summary, while AI presents immense opportunities, addressing challenges such as ethical concerns, regulatory complexities, and cultural shifts is imperative for successful integration across various sectors. The future of AI depends on a thoughtful and balanced approach that maximizes benefits while mitigating potential risks.

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## III. METHODOLOGY

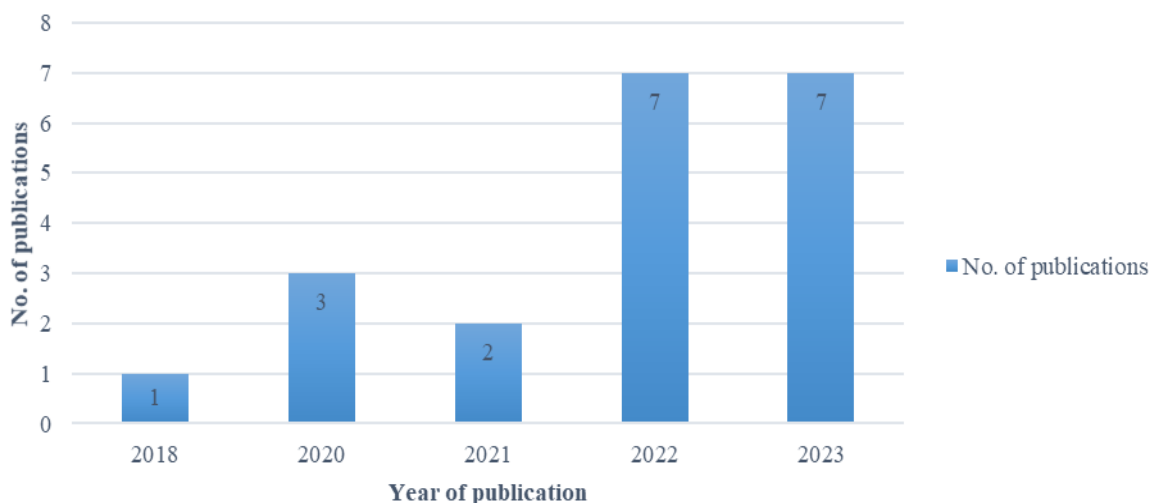
The article is based on a bibliometric analysis of papers published on the Scopus platform in last years, during 2019-2023. An advanced search was used, based on the keywords identified in title, abstract and keywords, only for open access papers: (TITLE-ABS-KEY (artificial AND intelligence) OR TITLE-ABS-KEY (ai) AND TITLE-ABS-KEY (leader) AND TITLE-ABS-KEY (digital) AND TITLE-ABS-KEY (leadership)) AND (LIMIT-TO (OA, "all")). Following this advanced search, 20 relevant papers were obtained.

Firstly, a quantitative research approach was employed to analyze the works generated by the advanced search. The evolution of the number of publications was graphically represented, the most common types of published. The bibliometric analysis served as a rigorous and objective method to understand how artificial intelligence affects leadership. This analysis was conducted in December 2023, using Microsoft Excel for graphical representations and the VOSviewer for visualizing the connections between the representative keywords of the selected articles.

Subsequently, to enhance the analysis, a qualitative research phase was conducted, involving the examination of the content of 20 relevant works. This qualitative analysis aimed to identify opportunities and challenges arising from artificial intelligence in relation to leadership. VOSviewer was used to create various clusters and connections among the opportunities and challenges recognized in the analyzed scientific works.

## IV. RESULTS

Here are the results of this analysis, with the comments considered necessary and useful in understanding the essence of this paper.



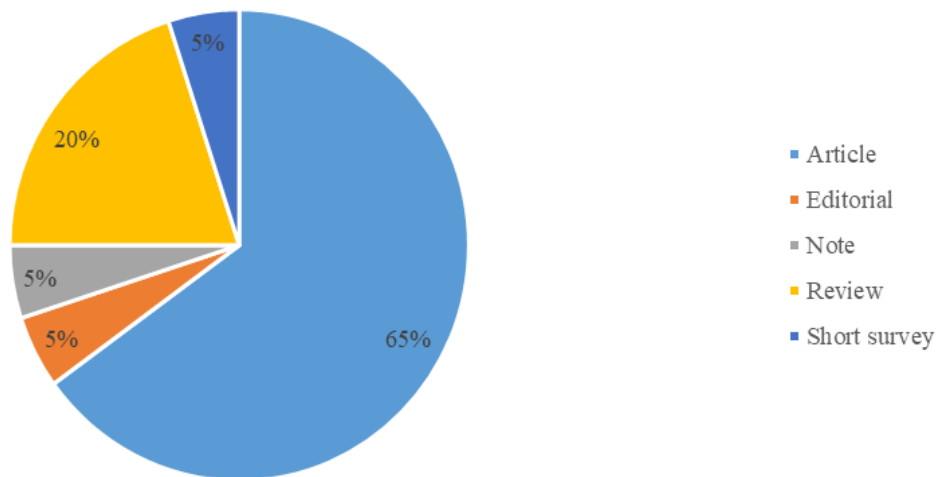
**Figure 1. No. of publications evolution**  
Source: Own processing in Microsoft Excel

This figure illustrates the yearly evolution of publications related to AI and leadership from 2018 to 2023. The trend is visually represented, showing changes in the volume of publications over these years.

The data indicates a growing interest in the intersection of AI and leadership, with a noticeable increase in publications, especially from 2021 onwards. This uptrend suggests that the academic and professional communities are increasingly recognizing the importance and impact of AI on leadership practices and theories.

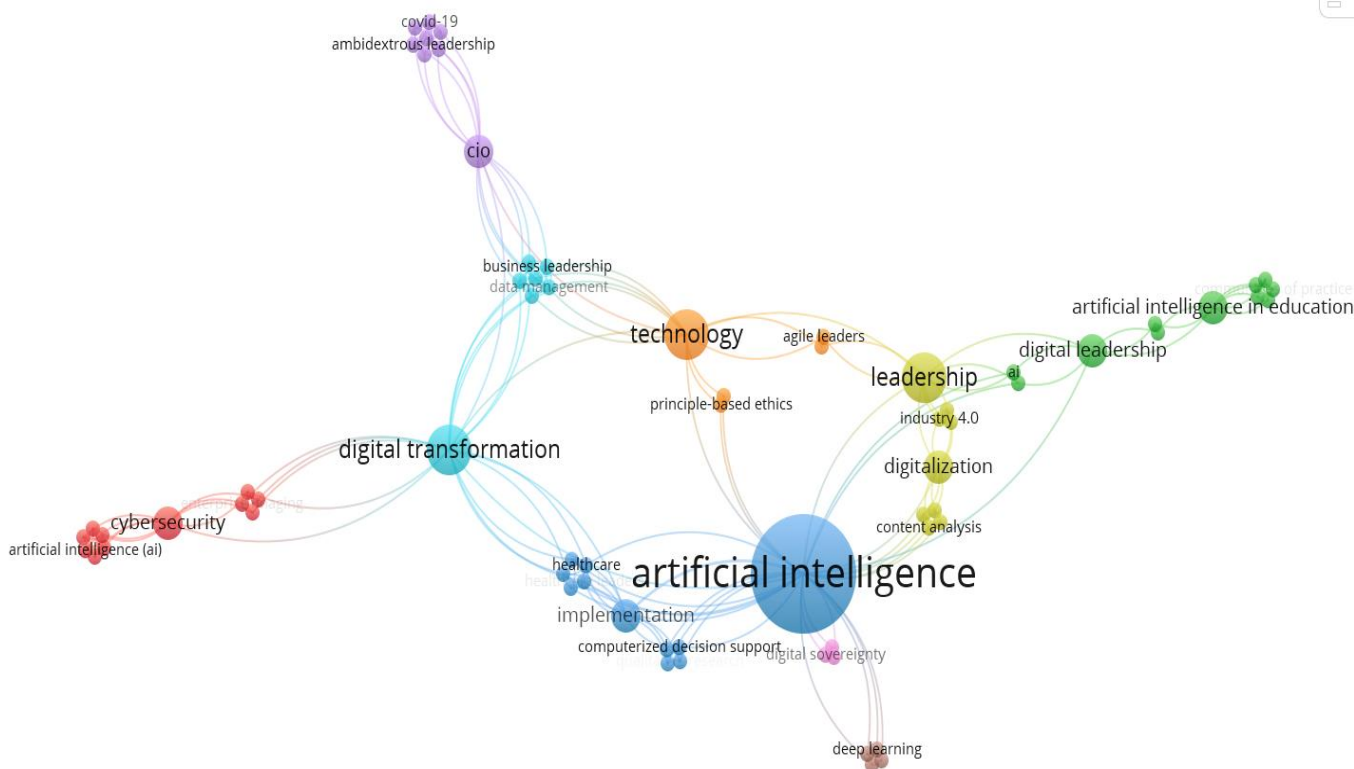
The initial slow growth, followed by a rapid increase, indicates technological advancements, greater availability of data, and a wider acknowledgment of AI's potential in enhancing leadership effectiveness and decision-making processes.

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**Figure 2. No. of publication by document type distribution**  
**Source:** Own processing in Microsoft Excel

This figure categorizes the publications by document type, such as articles, editorials, reviews, short surveys, etc. The majority of the publications are articles, which suggests that the bulk of the research on AI and leadership is being conducted in-depth and is peer-reviewed. This underscores the academic rigor applied to exploring the topic. The presence of editorials and reviews indicates a dialog within the academic community about the implications, challenges, and future directions of AI in leadership. Short surveys might provide insights into specific aspects or trends within this research area.



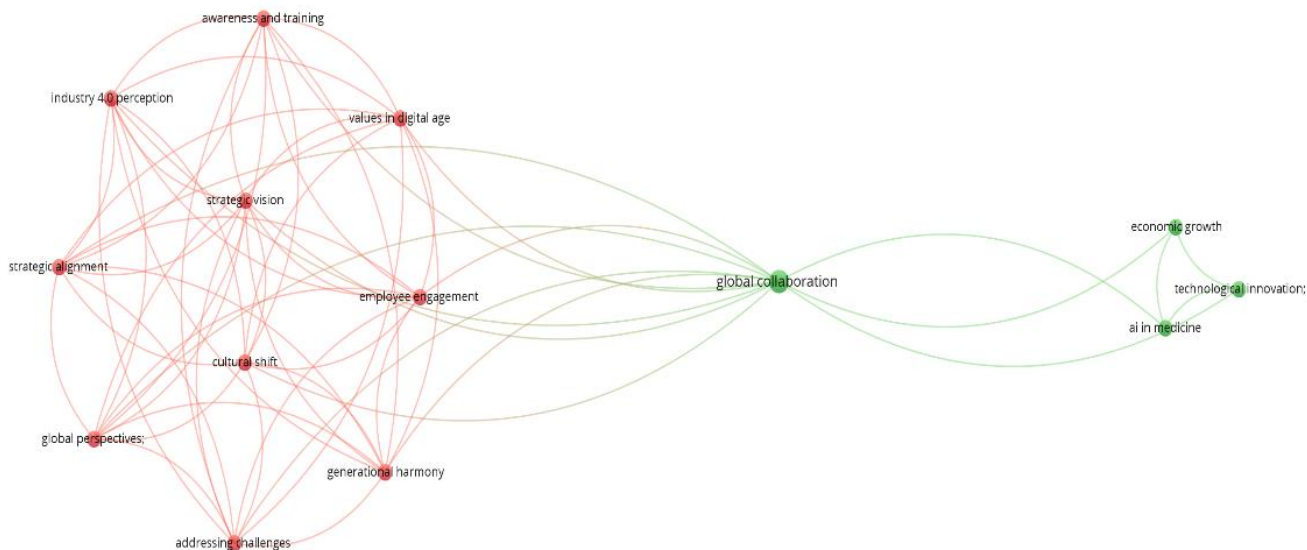
**Figure 3. Keywords bibliometric map**  
**Source:** Own processing in VOSviewer

This figure presents a bibliometric map of keywords related to AI and leadership, showing how various terms are interconnected.

The bibliometric map highlights the central themes and concepts in the research on AI and leadership. Keywords that are closely linked represent areas of concentrated research or concepts that are frequently explored together. This visualization aids in

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understanding the focal points of current research, including technological aspects, leadership theories, ethical considerations, and implementation challenges. The density and proximity of keywords indicates the maturity of research areas or emerging trends.



**Figure 4. Opportunities regarding the effects of AI on leadership bibliometric map**  
Source: Own processing in VOSviewer

This figure depicts a bibliometric map specifically focusing on the opportunities presented by AI in the context of leadership.

The map outlines the positive impacts and potential benefits of integrating AI into leadership practices. It likely highlights areas such as decision support, predictive analytics, personalized leadership, efficiency improvements, and strategic planning enhancements. The visualization of these opportunities helps identify where AI can complement or augment human leadership capabilities, indicating potential areas for innovation and development.



**Figure 5. Challenges regarding the effects of AI on leadership bibliometric map**  
Source: Own processing in VOSviewer

This figure illustrates the challenges and concerns associated with the application of AI in leadership through a bibliometric map.

This map is crucial for understanding the hurdles and ethical considerations that come with integrating AI into leadership. Challenges might include data privacy, algorithmic bias, ethical use, leadership displacement and the need for new skill sets. By mapping these challenges, the figure provides a comprehensive view of the obstacles that need to be addressed to harness AI's full potential in leadership effectively and responsibly.

As a summary of these 5 figures, they collectively offer a nuanced view of the evolving landscape of AI in leadership, highlighting both the promising opportunities and the significant challenges that need to be navigated.

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## CONCLUSIONS

Based on the data and insights derived from the article "Understanding How Artificial Intelligence Affects Leadership," we can draw comprehensive conclusions that encapsulate the multifaceted impact of AI on leadership. The bibliometric analysis spanning publications from 2019 to 2023 displays a burgeoning interest in how AI technologies intersect with leadership practices, theories, and challenges.

Expanding interest and research volume: the upward trajectory in the volume of publications highlights an expanding academic and professional curiosity. This trend underscores the recognition of AI's potential to revolutionize leadership across various sectors, including healthcare, education, finance, and technology. The increase in research output, particularly after 2021, signals an acknowledgment of pivotal advancements in AI technologies and their applicability in enhancing leadership effectiveness, strategic decision-making, and organizational efficiency.

Diverse publication landscape: The dominance of articles as the primary document type in the field indicates a robust foundation of in-depth, peer-reviewed research. This comprehensive exploration is complemented by editorials and reviews, which facilitate an ongoing discourse about AI's evolving role in leadership, ensuring a dynamic exchange of ideas, innovations, and critiques within the academic and professional communities.

Central themes and interconnectedness: The bibliometric maps, especially those depicting keywords and thematic focuses, elucidate the core areas of interest and research within the AI-leadership nexus. These maps reveal the complexity and breadth of the topic, highlighting not only technological aspects and applications but also ethical considerations, leadership theories adaptation, and the challenges of AI integration. The interconnectedness of terms and themes emphasizes the interdisciplinary nature of the research, requiring a blend of technical, ethical, and leadership acumen.

Opportunities and challenges: The analysis distinctly categorizes the opportunities and challenges brought forth by AI in leadership contexts. Opportunities include leveraging AI for enhanced decision-making, efficiency, personalization in leadership styles, and strategic foresight. Conversely, the challenges map accentuates critical areas needing attention, such as ethical dilemmas, data privacy concerns, the risk of algorithmic bias, and the imperative for new leadership competencies in an AI-driven era.

Conclusive insights: The article presents a nuanced perspective on AI's role in redefining leadership. While AI offers transformative potential to elevate and innovate leadership practices, it concurrently presents significant challenges that necessitate vigilant ethical considerations, continuous learning, and adaptive leadership strategies. The growing body of research and discourse around AI and leadership not only enriches our understanding but also paves the way for developing frameworks and policies that harness AI's benefits responsibly and inclusively.

In summary, the integration of AI into leadership practices is an evolving journey marked by tremendous opportunities for innovation and efficiency, balanced by the imperative to address ethical, technical, and adaptive challenges. The ongoing research and dialogue in this domain are vital for shaping a future where AI and leadership coalesce to foster sustainable, ethical, and effective organizational landscapes.

## ACKNOWLEDGMENT

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

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