South East European Journal of Economics and Business
Volume 20 (2) 2025, 68-84
DOI: 10.2478/jeb-2025-0019

ARTIFICIAL INTELLIGENCE AND DIGITAL LEADERSHIP: MAPPING RESEARCH TRENDS AND THEMATIC PATTERNS

Enis Mulolli, Xhavit Islami

Abstract

Digital transformation has accelerated the integration of artificial intelligence (AI) into organizational processes, reshaping leadership practices across industries. Therefore, this study utilizes bibliometric analysis to examine the evolving landscape of artificial intelligence in leadership research. This study conducts a bibliometric analysis of 60 articles retrieved from the Dimensions.ai database (2019–2025), utilizing the Bibliometrix package in RStudio. The study provides essential insights by examining publishing trends, prominent authors and sources, thematic developments, and collaboration networks, and trending topics within AI and leadership.*

The findings illustrate that the publishing trends revealed a significant and rapid growth in research output over the years. Moreover, the analysis of prominent authors and sources highlights the most influential works that have had a substantial impact on the field. Thematic mapping identifies six significant research clusters, with "AI, leadership, and digital transformation" serving as a motor theme. Collaboration networks uncover limited but growing international collaboration, with the United States and China exhibiting the most robust partnerships. Furthermore, trending keywords such as "artificial intelligence," "leadership," and "digital transformation" indicate ongoing research interest and signal directions for future research. This study not only maps the existing knowledge structure but also offers valuable insights that can inspire future research directions regarding the evolving role of leadership in the age of artificial intelligence.

Keywords: *Artificial intelligence; Leadership; Digital transformation; Bibliometric analysis; Dimensions.ai*

JEL code: *L20, M12, M15, O33*

Enis Mulolli, PhD
Management Department
Faculty of Economics, AAB College
St. "Elez Berisha", No. 56, 10000 Prishtinë
Republic of Kosovo

Xhavit Islami, PhD (Corresponding author)
Assistant Professor
Management Department
Faculty of Economics
AAB College
St. "Elez Berisha", No. 56, 10000 Prishtinë
Republic of Kosovo
E-mail: xhavit.islami@aab-edu.net
ORCID: 0000-0002-6653-4166

1. INTRODUCTION

Digital transformation, driven by digital technologies, has revolutionized all industries and companies (Bresciani et al. 2021) and is a crucial priority for businesses in this century (İnel 2019). This digital transformation has changed the nature of work in ways that were unimaginable even a decade ago (Barley et al. 2017), enhancing business processes by improving customer experience, optimizing operations, or

creating new business models (Fitzgerald et al. 2014; Kraus et al. 2021), while also putting tremendous pressure on employees to innovate through the use of information technology (Pilav-Velić et al. 2021). Digital transformation should be included into the existing business perspectives, as this topic addresses much more than just technological shifts (Bouncken et al. 2021). As a result of digital transformation, a variety of technological tools and processes, including artificial intelligence, machine learning, blockchain, and data analytics, have become essential for businesses that aspire to thrive in a dynamic and increasingly competitive environment (Chowdhury et al. 2023). Therefore, as firms transition into digital work environments, digital leadership has become significant in enabling successful digital transformation (Ghavifekr and Pei 2023). The majority of companies are currently in the process of assessing and strategizing the implementation of digital leadership (DL) as a leadership strategy that is designed to facilitate the development of digitally enabled business models by altering the behavior of leaders, organizational structures, and employee management (Oberer and Erkollar 2018). Furthermore, artificial intelligence is redefining leadership by enhancing key functions such as planning, decision-making, organizing, leading, and controlling, fostering a symbiotic partnership that transforms managerial practices and drives organizational success (Islami and Mulolli 2024). According to Haenlein and Kaplan (2019), AI can assist leaders in formulating more objective and well-informed decisions, but in order to harness this potential in strategic decisions within the firms, the leaders play a crucial role in its implementation and use (Ruokonen and Ritala 2024). AI technologies are increasingly essential in strategic contexts, gaining attention due to their demonstrated potential, as highlighted in reports from leading consultancies and technology firms (Islami, Mulolli, and Mustafa 2025).

In recent years, there has been a notable surge in interest in the intersection of artificial intelligence and leadership studies. For instance, Peifer et al. (2022) study, highlights that leaders and leadership are crucial for implementing and using AI successfully. Another study, concluded that the integration of artificial intelligence into leadership practices will change how leaders operate. By offering data-driven insights and real-time analysis, AI has the potential to change decision-making by relieving executives of routine responsibilities and allowing them to concentrate on strategic thinking and innovation (Madanchian et al. 2024). Also, Wagner (2020) stated that the advancement of AI technologies brings about a paradigm shift in how leaders conceptualize, strategize, and carry out their duties inside organizations. Furthermore, Bevilacqua et al. (2025) investigated the intersection of artificial intelligence and top managerial leadership using bibliometric and content analysis. Their findings offer a framework for successfully integrating AI into business strategy. Another study by Rademaker et al. (2023) through conceptual analysis reveals that effective leadership is critical in reducing technostress and cultivating a healthy digital work environment. Therefore, this study aims to review the literature on artificial intelligence and leadership in the digital era, investigating the thematic progression, collaboration patterns, identifying emergent topics, and potential avenues for future research in this area. By carefully gathering and analyzing relevant data from the dimensions.ai database, we address several research questions:

RQ1: What are the research trends in the literature addressing the relationship between artificial intelligence and leadership in terms of contributing authors, publication sources, and countries?

RQ2: What are the main thematic areas and conceptual structures explored in the literature on artificial intelligence and leadership?

RQ3: What are the patterns and dynamics of collaboration among authors and countries in the field of artificial intelligence and leadership?

RQ4: What are the emerging research trends and potential future directions in the field of artificial intelligence and leadership?

In response to addressing our research questions, this study employs bibliometric analysis, a quantitative approach that employs statistical methods to analyze large volumes of scientific data.

This methodology enables us to identify influential authors, journals and countries, thereby offering critical insights into the development of the field of AI and leadership. Moreover, it facilitates the identification of thematic patterns, the analysis of keyword networks and collaboration dynamics, and the detection of trending topics within AI and leadership research.

This paper organizes its subsequent sections as follows: Section 2 highlights the definitions for the main concepts. Section 3 discusses the chosen methodology in the form of criteria, terms, and software, as well as the data sources. Section 4 presents the results and analysis. Section 5 addresses the discussion and future research opportunities. Section 6 presents the conclusions and limitations of the study.

2. CONCEPTUAL DEFINITIONS OF AI AND DIGITAL LEADERSHIP

2.1. Artificial intelligence

Artificial intelligence has emerged as one of the most essential technologies in many organizations, growing to be an intrinsic part of our society (Lu et al. 2024). The term "artificial intelligence" originated in the mid-1950s when American computer scientist and AI pioneer John McCarthy employed the word in a grant proposal for a conference (Zerfass et al. 2020). Artificial intelligence is the term used to describe systems that are capable of imitating human intelligence with minimal human intervention (Haenlein and Kaplan 2019). Due to its multifunctionality, AI enables its application across diverse domains performing diverse tasks, ranging from image recognition to autonomous decision-making. As the technology advances, it is becoming increasingly apparent that AI will eventually replace a significant number of the functions presently performed by humans, potentially in a broader scope than we can currently imagine (Mumali 2022). In order to succinctly illustrate the evolution of AI over time, Table 1 provides a list of several key definitions of AI within their historical contexts.

2.2. Digital Leadership

The initial leadership concepts emerged in the 19th century. According to the Great Man theory, leadership qualities are inherent and can only be transmitted genetically from one generation to the next (Lee 2011). Today, leadership has a crucial role in the organization's leading process (Islami and Mulolli 2020). However, leadership remains a complex, ever-changing dynamic concept that continues to defy a universally accepted definition, requiring ongoing research (Nixon et al. 2012). With the rise of digital communication, the concept of *e-leadership* emerged. The term "e-leadership" came to refer to leaders who conduct many of their leadership processes via electronic channels and have a worldwide reach (Zaccaro and Bader 2003). However, rapid digital transformation has broadened this concept beyond electronic mediation to include a broader spectrum of digital tools and strategies. This evolution has paved the way for the emergence of *digital leadership*. According to Larjovuori et al. (2016), digital leadership is defined as "the leader's ability to create a clear and meaningful vision for the digitalization process and the capability to execute strategies to actualize it. Digital leadership is a term that serves as an umbrella term for a variety of leadership styles, including technology leadership,

Table 1. Artificial intelligence definitions

Author/s (year)	Definition
McCarthy (1956)	Define Artificial intelligence as "the science and engineering of making intelligent machines.
Rich (1983)	Artificial intelligence concentrates on creating computer systems that can perform tasks that require human intelligence.
Simmons and Chappell (1988, p.14)	"The term artificial intelligence denotes behavior of a machine which, if a human behaves in the same way, is considered intelligent."
Haenlein and Kaplan (2019, p.5).	Artificial intelligence is defined as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation."
Abbass (2021, p.95)	"Artificial Intelligence is social and cognitive phenomena that enable a machine to socially integrate with a society to perform competitive tasks requiring cognitive processes and communicate with other entities in society by exchanging messages with high information content and shorter representations."
Sheikh et al. (2023)	AI is defined as a technology that enables machines to imitate various complex human skills
Gil de Zúñiga et al. (2024)	AI refers to the ability of non-human machines or artificial entities to do tasks, solve problems, communicate, interact, and behave logically in the same way that biological humans do.

Source: First author

Table 2. Definitions of Digital Leadership

Author/s (year)	Definition
Avolio et al. (2000, p.617)	"E-leadership is defined as a social influence process mediated by AIT to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations".
El Sawy et al. (2016, p. 141)	Define digital leadership as "doing the right things for the strategic success of digitalisation of the enterprise and its business ecosystem".
Zhong (2017)	Digital leadership entails leading and inspiring digital transformation, fostering and sustaining a digital learning culture, enhancing professional development through technology, as well as providing and maintaining a digital organization.
Eberl and Drews (2021, p. 4)	"Digital leadership is a complex construct aiming for a customer-centered, digitally enabled, leading-edge business model by (1) transforming the role, skills, and style of the digital leader, (2) realizing a digital organization, including governance, vision, values, structure, culture, and decision processes, and (3) adjusting people management, virtual teams, knowledge, and communication and collaboration on the individual level".

Source: First author

virtual leadership, e-leadership, and leadership 4.0, all of which are used interchangeably in the literature (Karakose et al. 2022). Table 2 provides a list of several key definitions of digital leadership.

3. METHODOLOGY

This study employs a bibliometric analysis to investigate the research questions advanced in the introduction. Bibliometric analysis is a highly effective instrument that can be employed for complex scientific mapping, analyzing the relationship between different factors, exploring the emerging and niche themes providing future directions, collaboration among countries and authors, and identifying intellectual structures (Khan et al. 2021). Figure1 illustrates the rigorous article selection process using the PRISMA method (Page et al. 2021), to enhance the reproducibility and transparency of the research. The data for this analysis were extracted on 9 March 2025, from the Dimensions.ai database. The search query was formulated as follows: ("Artificial intelligence" and "Leadership"); we limited our search to the last 10 years (2015–2025*). The Dimensions.ai database was selected because it includes a wide range of information, such as details about awarded grants, clinical trials, patents, policy documents, altimetric data, and regular publication and citation data (Herzog et al. 2020). Moreover, Singh et al. (2021) highlighted that Dimensions.ai has the most exhaustive journal coverage compared to its competitors, indexing 82.22% more unique journals than Web of Science and 48.17% more than Scopus, while still covering almost all journals indexed on the two platforms.

In this study, bibliometric analysis is employed to (1) identify descriptives and trends in reporting among authors, sources and countries; (2) identify thematic patterns and keyword networks; (3) analyze the collaborations among authors and countries; and (4) identify the trend topics, on the research topic of AI and leadership. The Bibliometrix R package within RStudio (Aria and Cuccurullo 2017) was used to conduct the bibliometric analysis of 60 articles obtained through gathering data, cleansing, and screening. Bibliometrix R package was selected for its open-source environment and comprehensive suite of bibliometric techniques (Aria and Cuccurullo 2017).

3.1. Search criteria and screening of documents

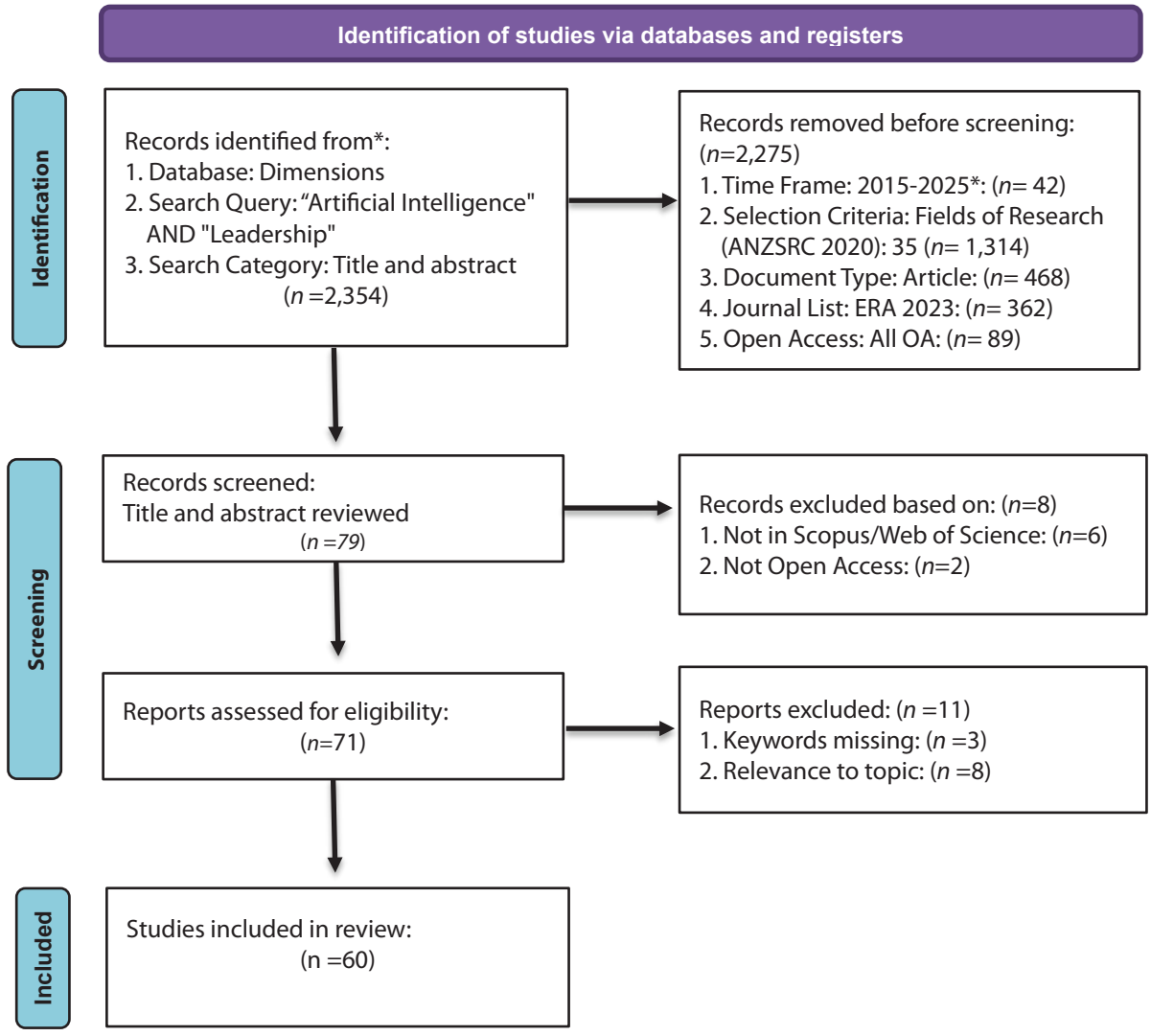
The selection criteria and screening process is illustrated in Figure 1. First an initial search was conducted in the Dimensions database using the query *"Artificial Intelligence"* and *"Leadership"* in the title and abstract fields. This search resulted in 2,354 titles using the query terms.

Second in the pre-Screening phase 2,275 records were excluded based on predefined criteria: time frame was 2015-2025* (n = 42 excluded); publications had to be classified within a relevant field of study according to the Australian and New Zealand Standard

Research Classification (ANZSRC) 2020 codes, in our case the code was 35 which included publication from Commerce, Management, Tourism and Services (*n* = 1,314 excluded); the classification of document types was restricted solely to articles (*n* = 468 excluded), as other source types, including books, book chapters, and conference papers, were excluded from consideration due to their lack of adherence to the rigorous review process typically applied to conceptual, empirical, and review articles published in journals (Bretas and Alon 2021); we have limited the scope of the journal quality types to ERA 2023 (Excellence in Research for Australia), which includes only articles published in journals that are recognized as reputable and high-quality by the ERA framework (*n* = 362 excluded); and the study included only all open access (OA) articles (n = 89 excluded) based on the "UNESCO Recommendation on Open Science" (UNESCO 2022).

Third after filtering, 79 articles remained for detailed screening based on their titles and abstracts. In this step, articles were screened if they were written in English, and if they were not indexed in *Scopus/Web of Science* (*n* = 6 excluded) or did not meet OA requirements (*n* = 2 excluded), leaving 71 articles for full eligibility assessment. Fourth, 71 eligible articles were reviewed in full to determine their final suitability for inclusion in the study. During this phase 11 article were removed due to missing keywords (*n* = 3) and insufficient focus on AI and Leadership (*n* = 8). Finally, a total of 60 articles met all criteria and were included in the final review. Following the final screening, we did not receive any publications prior to 2019; thus, the data given pertains to the years 2019-2025*.

Figure 1. PRISMA flow chart.



Source: PRISMA 2020 statement (Page et al., 2021)

4. RESULTS AND ANALYSIS

4.1. Descriptives and publication trends

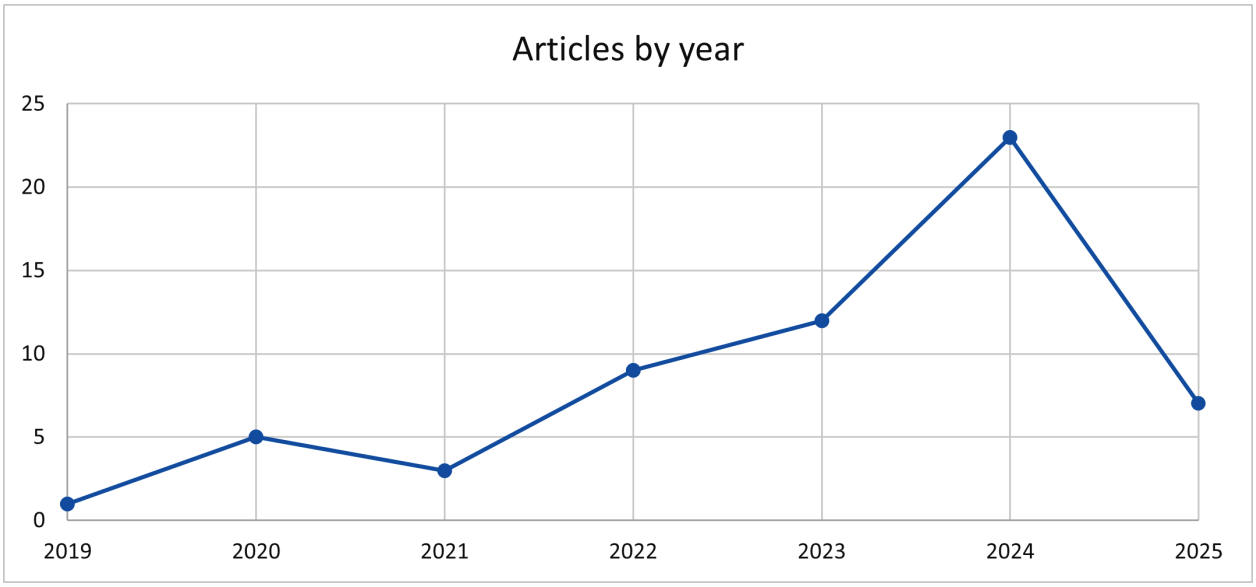
Table 3 presents an overview of the bibliometric data examined in this study. The dataset consists of 60 publications authored by 210 individuals and published during a six-year span, from 2019 to 2025*, across 38 different sources. Figure 2 presents the general trend of publications between 2019 and 2025*. We can observe that the annual publication of articles showed a consistent upward trend over the period under study, without the months of 2025. Figure 2 shows an annual growth rate of publications stands at 38.31%, demonstrating a rapid increase in field of research over the years.

Table 3. Main information of Bibliograpic data.

Description	Results
Timespan	2019:2025
Sources	38
Documents	60
Annual Growth Rate %	38.31
Document Average Age	1.95
Average citations per doc	37.97
Document contents	
Keywords Plus (ID)	272
Author's Keywords (DE)	272
Authors	
Authors	210
Authors of single-authored docs	4
Authors collaboration	
Single-authored docs	4
Co-Authors per Doc	3.58
International co-authorships %	28.33
Document types	
Article	60

Source: Authors' elaboration using Biblioshiny package in R

Figure 2. Annual scientific production (2019-2025*).



Source: Authors' elaboration using Biblioshiny package in R

4.2. Analysis of authors, sources and country collaborations

This section analyzes the authors, publication sources, and countries contributing to AI and leadership research. Table 4 highlights the ten most relevant articles in the field, ranked by their total global citations (TGCs). The article by Huang and Rust (2021) is the most cited publication, with a total of 597 citations, published in the *Journal of Service Research*, indicating its significant impact in the field.

In the topic sources, Table 5 illustrates the most influential journals, based on the number of publications, citations, and h-index. The highest publisher was owned by MDPI with 4 in total. The journal *Sustainability* leads the ranking with 11 publications, a total of 196 citations, and the highest h-index (6), indicating its strong contribution to the discourse in this domain. In contrast, the *Journal of Service Research*, despite contributing only 1 article, has garnered 597 citations, indicating a highly impactful study on the field.

Table 6 and Figure 3 show the corresponding author's countries in the context of the research theme. Australia leads the field of study with six articles, five of which are related to the source country and one to multiple country publications, followed by China with five articles, which has more multi-country publications (MCP=4), indicating a greater emphasis on international collaboration.

Table 4. Top 10 authors of most relevant articles (sorted by citations)

Rank	Author and Year	Journal	TGC
1	Huang and Rust (2021)	Journal of Service Research	597
2	Chatterjee et al. (2021)	Technological Forecasting and Social Change	359
3	Larson and DeChurch (2020)	The Leadership Quarterly	206
4	Dubey et al. (2021)	International Journal of Production Research	156
5	Lundvall and Rikap (2022)	Research Policy	107
6	Zerfass et al. (2020)	Journal of Communication Management	93
7	Dey et al. (2024)	International Journal of Production Research	71
8	Lee et al. (2020)	European Journal of Marketing	65
9	Quaquebeke and Gerpott (2023)	Journal of Leadership & Organizational Studies	61
10	Henderikx and Stoffers (2022)	Sustainability	55

Source: Authors' elaboration using Biblioshiny package in R

Table 5. Most influential sources/journals

Rank	Journals	Publications	H-Index	Total citations	Publisher
1	Sustainability	11	6	196	MDPI
2	Administrative Sciences	4	2	50	MDPI
3	Heliyon	3	2	81	Elsevier
4	Journal of Global Information Management	3	2	40	IGI Global
5	International Journal of Production Research	2	1	227	Taylor & Francis
6	Applied Sciences	2	1	1	MDPI
7	Asia Pacific Management Review	2	1	9	Elsevier
8	Journal of Organizational and End User Computing	2	1	3	IGI Global
9	Systems	2	1	5	MDPI
10	Journal of Service Research	1	1	597	SAGE

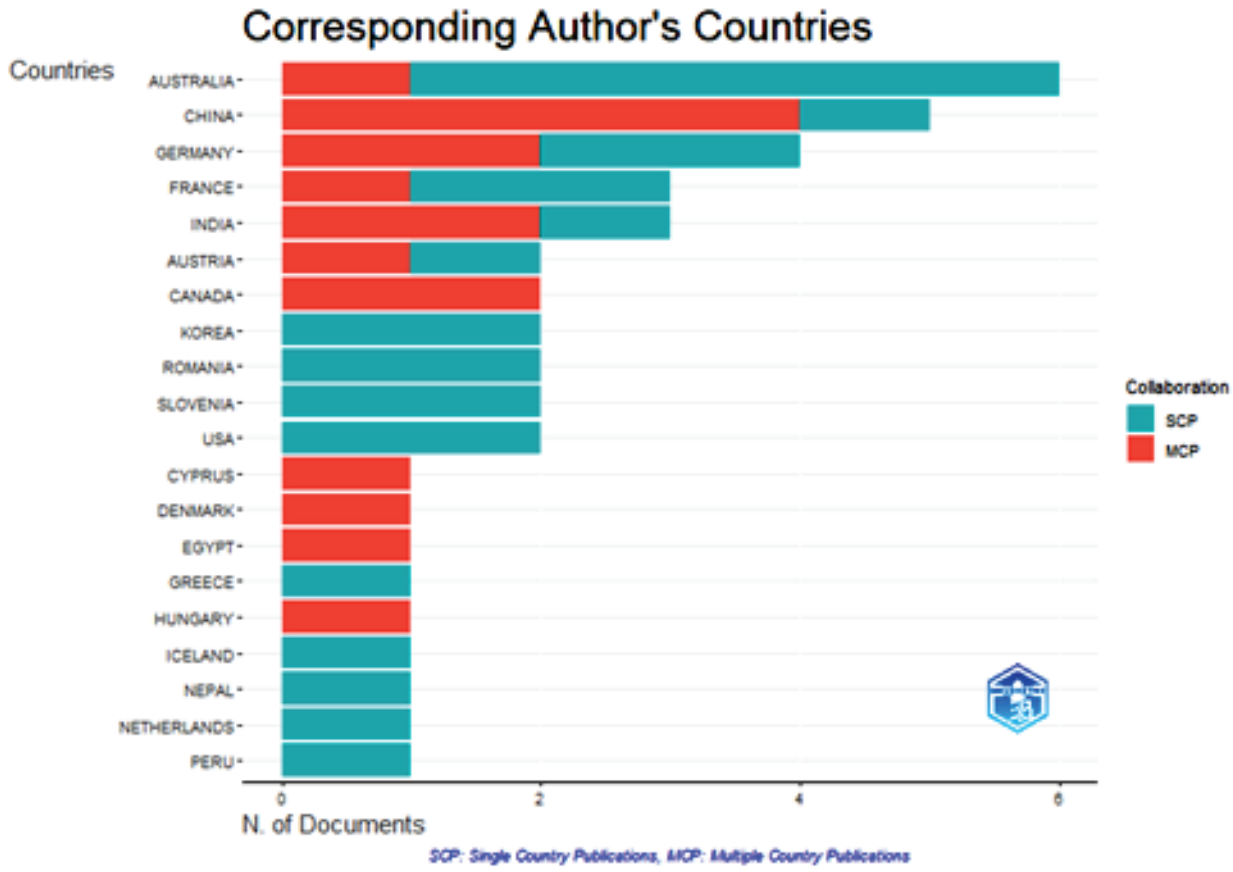
Source: Authors' elaboration using Biblioshiny package in R

Table 6. Most productive corresponding author countries

Rank	Contry	Articles	Articles %	SCP	MCP
1	Australia	6	10	5	1
2	China	5	8.3	1	4
3	Germany	4	6.7	2	2
4	France	3	5	2	1
5	India	3	5	1	2
6	Austria	2	3.3	1	1
7	Canada	2	3.3	0	2
8	Korea	2	3.3	2	0
9	Romania	2	3.3	2	0
10	Slovenia	2	3.3	2	0

Source: Authors' elaboration using Biblioshiny package in R

Figure 3. Country of the corresponding author

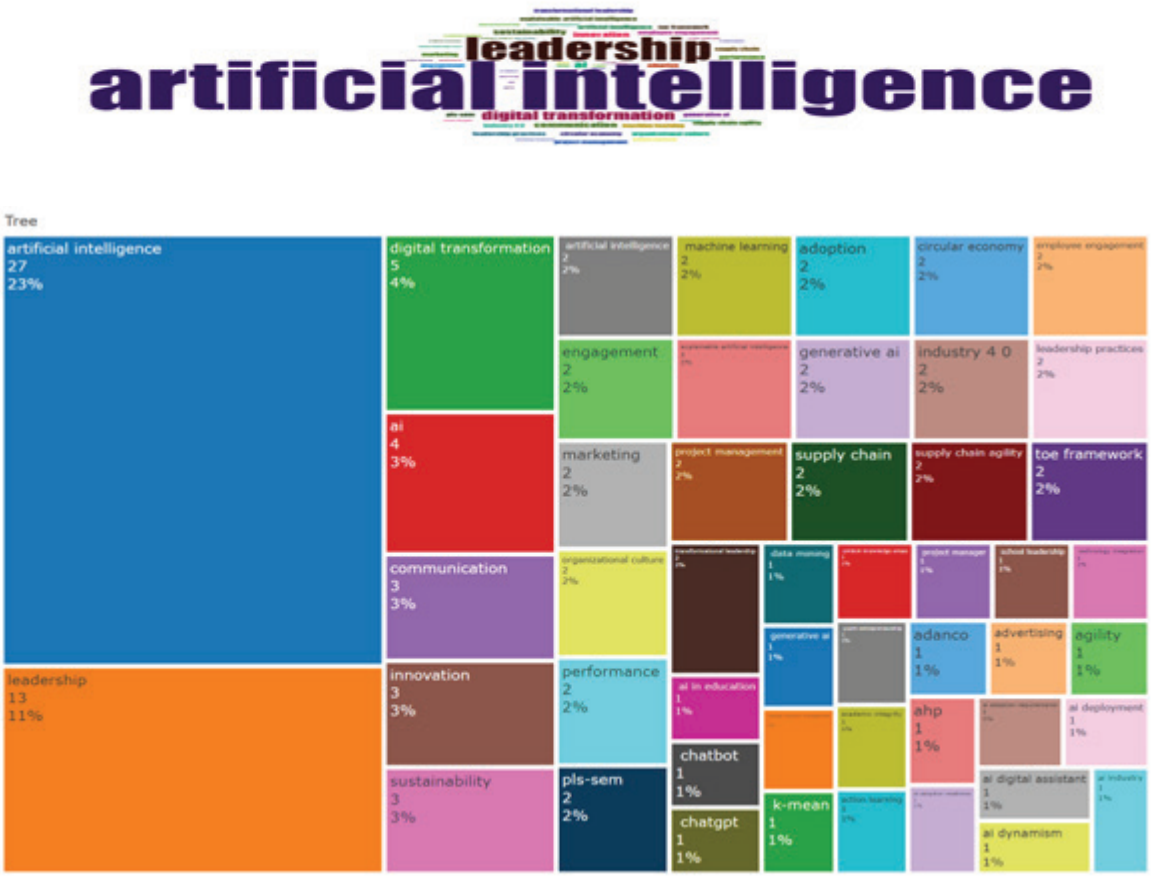


Source: Authors' elaboration using Biblioshiny package in R

4.3. Analysis of Thematic Patterns and Keyword Networks

Keyword Analysis - of authors is an essential method for comprehending and identifying the research focus and priorities within a specific research field (Song et al. 2019). Figure 4 illustrates the most frequently used keywords across the analyzed documents. *Artificial intelligence* emerges as the dominant keyword, appearing 27 times, highlighting its central role in the research. It is followed by *leadership*, mentioned 13 times, and *digital transformation*, which appears 5 times.

Figure 4. Word cloud and Word tree of keywords



Source: Authors' elaboration using Biblioshiny package in R

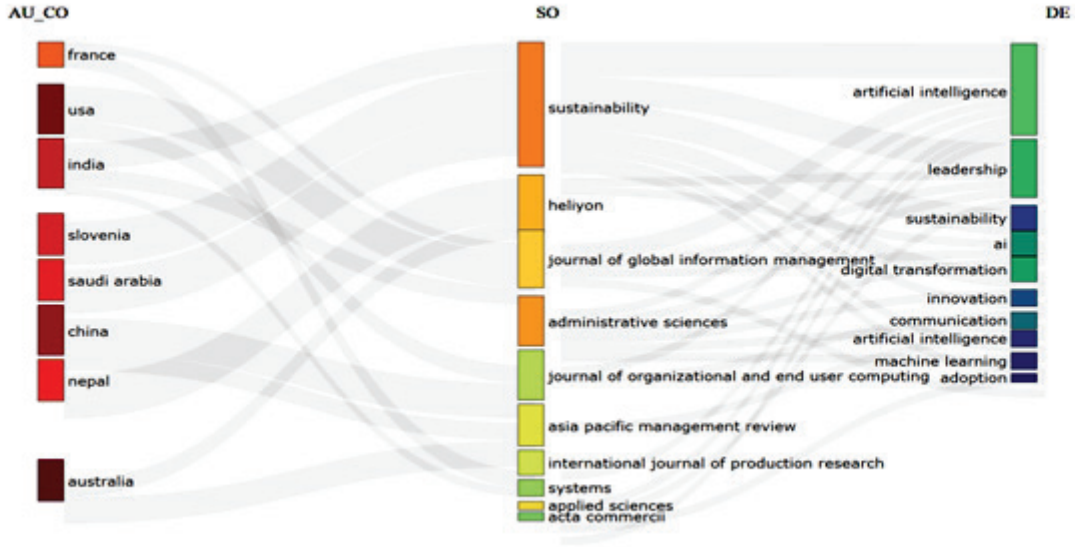
Sankey diagram - also known as a three-field plot, effectively visualizes the flow of values between interconnected sets. In Figure 5, a three-field plot illustrates the interconnections between countries, journals, and keywords in bibliometric analysis. The analysis shows that authors from India have published in three different journals, reflecting a broader distribution of publication sources compared to other countries, which predominantly used only two. *Sustainability* was the most preferred journal among authors from India, Slovenia, and Saudi Arabia. The most frequently used keywords include "artificial intelligence," "leadership," "sustainability" "AI," and "digital transformation." Overall, these bibliometric findings underscore the expanding research focus on AI and leadership studies, while also highlighting key contributors in terms of countries, journals, and authors. Such insights are valuable for identifying dominant trends and shaping future research directions (Kraus, Bouncken, and Yela Aránega 2024).

Thematic map - the thematic analysis develops themes using author's keywords and represent the most relevant issues in the field. The purpose of creating a thematic map is to comprehend the present status and analyses the future direction of research advancement in the topic (García-Lillo et al. 2023). The cluster size in the themed map indicates the frequency of occurrence. Figure 6 illustrates the thematic map, encompassing six research themes covering the entire dataset of artificial intelligence and leadership studies between 2019 and 2025*. Themes are classified into four categories: Niche themes, Motor themes, Emerging or Declining themes, and Basic themes, according to their density and centrality. The thematic map is delineated as follows:

Two clusters classified as niche themes: "communication, leadership practices, performance" and "machine learning, transformational leadership". One cluster for the motor theme: "artificial intelligence, leadership, and digital transformation". These clusters

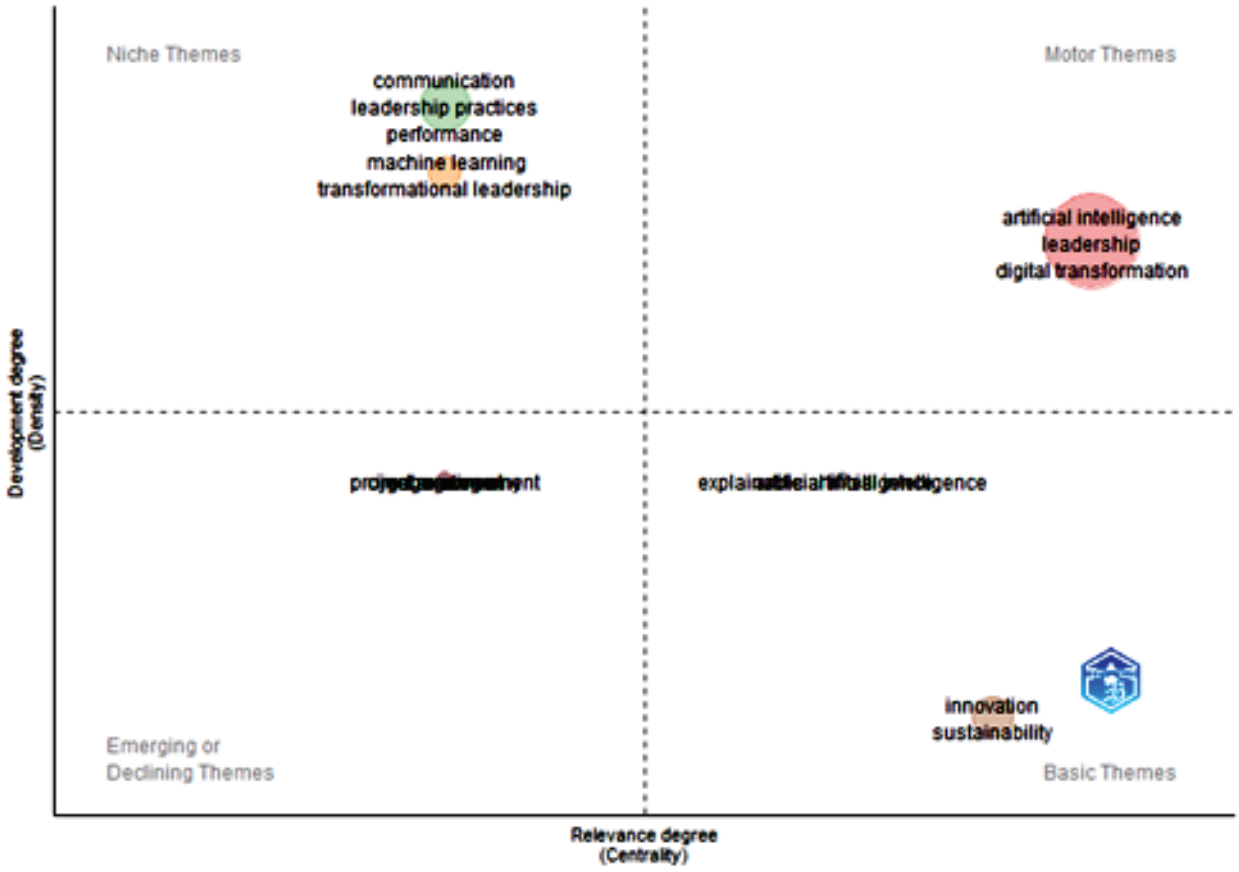
represented the foundation of contemporary study in this field. There are two clusters of basic themes: "explainable artificial intelligence" and "innovation, sustainability". One cluster is classified as emerging or declining themes: "project management".

Figure 5. A three-field plot illustrating the network among countries (left), journals (middle), and keywords (right).



Source: Authors' elaboration using Biblioshiny package in R

Figure 6. Thematic map by author keywords



Source: Authors' elaboration using Biblioshiny package in R

4.4. Analysis of Collaborations among Authors and Countries

The collaborative networks of co-authors were grouped in the 13 distinct research clusters, as identified in Figure 7. Cluster 1 (red) includes four co-authors from India and Saudi Arabia (Chatterjee S, Baabdullah AM, Chaudhuri R, and Chaudhuri S). Cluster 2 (pale blue) with three co-authors from Australia, (Heravi A, Rehan A, and Thorpe D). Cluster 3 (green) includes two co-authors from Morocco and France (Abadie A and Chowdhury S). Cluster 4 (violet) represents three co-authors from Slovenia (Abina A, Batkovič T, and Cestnik B). Cluster 5 (orange) includes three co-authors from Turkiye (Abositta A, Adedokun MW, and Berberoğlu A). Cluster 6 (brown) with three co-authors from Jordan and United Arab Emirates (Abualfalayeh G, Al-Qudah S, and Al Qudah MA). Cluster 7 (pink) includes four co-authors from Egypt and Saudi Arabia (Agina MF, Ahmad N, Ahmed M, and Asiri A). Cluster 8 (gray) with two co-authors from Malaysia (Ahmad Amri Zainal Adnan and Arsalan Mujahid Ghouri). Cluster 9 (turquoise) represents three co-authors from Saudi Arabia (Almuteri SD, Ashi AK, and Bogari KJ). Finally, cluster 10 (peach) groups three co-authors from Colombia (Arrubla-Hoyos W, Cama-Pinto A, and Cama-Pinto D).

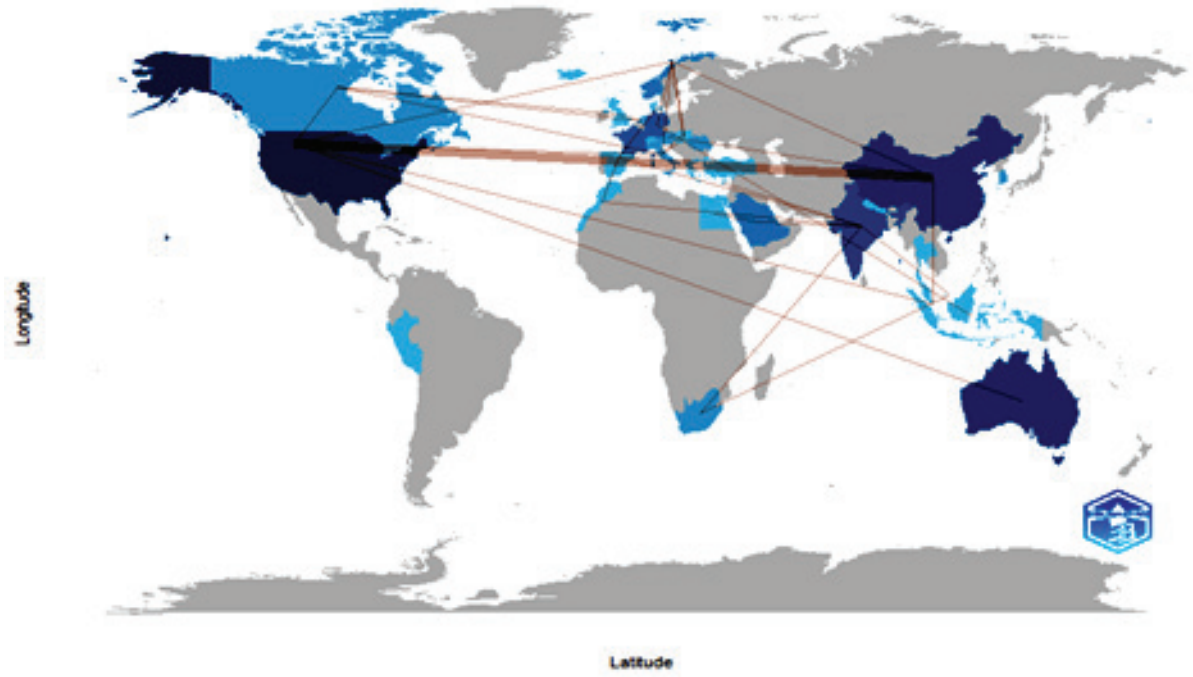
A total of ten interactive teams consisting of 30 scholars from 12 distinct countries were identified inside the productive co-authorship network. Six of these teams were nationally homogeneous, originating from: Australia (cluster 2), Slovenia (cluster 4), Turkiye (cluster 5), Malaysia (cluster 8), Saudi Arabia (cluster 9), and Colombia (cluster 10). The remaining four were multinational teams, featuring collaborations between co-authors from: cluster 1 (India & Saudi Arabia), cluster 3 (Morocco & France), cluster 6 (Jordan & United Arab Emirates), and cluster 7 (Egypt & Saudi Arabia).

Figure 8 illustrates the collaborative network among countries in artificial intelligence and leadership research. The thick line shows high frequency of collaboration among countries. The analysis reveals that the USA and China have the highest no. of collaborations, with 4 joint studies, representing the strongest and most frequent collaboration in the dataset. However, the research landscape is extremely fragmented, with limited sustained international engagement, as evidenced by the fact that all other country pairs only exhibit a single collaboration. Notably, countries such as India, Norway, and Italy appear in multiple one-time collaborations, suggesting sporadic rather than deep-rooted partnerships. The sparse and uneven nature of these collaborations' points to a highlighting the necessity for more robust and organized international networks to enhance the global comprehension of AI's impact on leadership practices across many contexts.

Figure 7. Author Collaboration Network

Source: Authors' elaboration using Biblioshiny package in R

Figure 8. Countries Collaboration

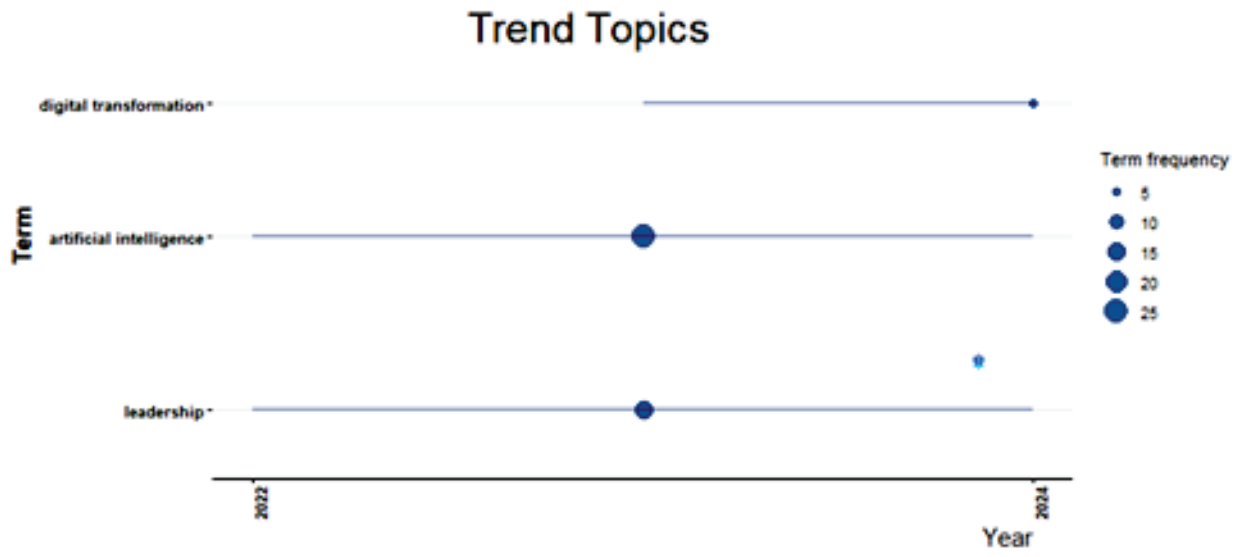


Source: Authors' elaboration using Biblioshiny package in R

4.5. Trend Topics

Figure 9 highlights the trending topics within the field, revealing that "artificial intelligence," "leadership," and "digital transformation" are emerging as critical areas of focus in AI-Leadership research. Significantly, "artificial intelligence" exhibited the highest term frequency with 27 occurrences in 2023, reflecting robust and ongoing research engagement. The term "leadership" was mentioned 13 times in 2023, while "digital transformation" was referenced 5 times in 2024. These trends suggest that future research could fruitfully explore the intersections of these topics, particularly as they continue to gain prominence in the literature.

Figure 9. Trending topic in AI – Leadership



Source: Authors' elaboration using Biblioshiny package in R

5. DISCUSSION AND FUTURE RESEARCH OPPORTUNITIES

The bibliometric analysis has illuminated the trends, patterns, and impact of artificial intelligence on leadership research. The findings provide a comprehensive overview of research retrieved from the Dimensions.ai database covering the period from 2019 to 2025*. The main objective of this research was to investigate thematic progression, collaboration patterns, identify emergent topics, and potential avenues for future research in this area.

To understand the research landscape and identify patterns and trends, four research questions were formulated. These questions were addressed through bibliometric analysis using the specialized Bibliometrix tool in RStudio. In order to answer the RQ1, focused on identifying the research trends in terms of contributing authors, publication sources, and countries. The research on the relationship between artificial intelligence and leadership has shown notable growth from 2019 to 2025*, as illustrated in Figure 2. The analysis demonstrated a distinct upward trajectory in the number of publications, peaking at 23 publications in 2024, reflecting a rising academic interest in this interdisciplinary area. This expansion shows a rising acknowledgment of AI's revolutionary power in strategies for leadership. In terms of impactful contributions, Table 4 presents the top ten most relevant articles based on total global citations (TGCs). The study by Huang and Rust (2021), published in the Journal of Service Research, stands out as the most cited work with 597 citations, indicating its significant impact in the field. Table 5 lists the ten most influential journals in terms of publication sources. Sustainability, published by MDPI, emerges as the leading journal in this domain, with 11 publications, 196 citations, and the highest h-index (6), highlighting its significant contribution to research on AI and leadership. Geographically, Table 6 show the top 10 corresponding author's countries in the context of the research theme. Australia ranks first, contributing six publications, five of which are single-country publications and one of which is a multi-country publication. China follows with five publications and is significantly more involved in international collaboration, as evidenced by its higher number of multi-country publications (MCP = 4). This suggests growing global interest and cooperation in this research area.

RQ2, delved into the main thematic areas and conceptual structures explored in the literature. The keyword analysis illustrates in Figure 4 identifies three dominant keywords: artificial intelligence (27 mentions), leadership (13 mentions), and digital transformation (5 mentions). These form also the motor theme cluster, as illustrated in the thematic map in Figure 6, emphasizing the core of current research, suggesting that the intersection of these areas forms the the basis for recent scholarly exploration. For additional insights, a Sankey diagram in bibliometric analysis is employed to map the connections among countries, journals, and keywords in the three-field plot in Figure 5. The analysis demonstrates that authors from India have published in three distinct journals more frequently than authors from any other country. Additionally, the Sustainability journal is the preferred venue for authors from India, Slovenia, and Saudi Arabia. Consistently, frequently used keywords across countries and journals include artificial intelligence, leadership, sustainability, AI, and digital transformation, which correlate the findings from the keyword frequency analysis. Overall, these bibliometric findings underscore the expanding research focus on AI and leadership studies.

To address RQ3, which investigated the collaboration patterns and dynamics among authors and countries in artificial intelligence and leadership, the bibliometric analysis employed co-authorship and country-level collaboration network analyses. Co-authorship network analysis in Figure 7 reveals 10 interactive teams consisting of 30 scholars from 12 distinct countries. Six teams were nationally based, reflecting a preference for domestic collaboration in Australia, Slovenia, Turkiye, Malaysia, Saudi Arabia, and Colombia. The remaining four teams engaged in international collaboration, with partnerships between India and Saudi Arabia, Morocco and France, Jordan and the UAE, and Egypt and Saudi Arabia, indicating preliminary steps towards international partnerships. The collaborative network among countries shown in Figure 8 reveals that the USA and China are the predominant partners, with four joint publications. However, most other collaborations occurred only once, indicating a fragmented landscape with limited long-term international engagement. Countries such as India, Norway, and Italy are involved in various one-time collaborations, pointing to sporadic rather than systematic partnerships. This fragmented and inconsistent collaboration points to a significant research gap (e.g. see, Bevilacqua et al. 2025; Zárate-Torres et al. 2025), emphasizing the necessity of more organized and robust international network partnerships to enhance the global comprehension of the impact of AI on leadership in a variety of contexts.

Regarding RQ4, which aimed to uncover rising research trends and potential future directions in the field of artificial intelligence and leadership, the analysis of trending topics illustrated in Figure 9 provides

valuable insights. The analysis of trending topics clearly indicates that "artificial intelligence," "leadership," and "digital transformation" are becoming increasingly significant focal points within the AI-Leadership research domain. These identified trends strongly suggest several potential avenues for future research. Considering the pivotal role of AI, future research may investigate particular AI applications within leadership frameworks, including AI-enhanced decision support systems, performance management tools, and AI-driven talent development platforms. On the other hand, digital transformation indicates a growing acknowledgment that the integration of AI into leadership is not an isolated occurrence, but rather a critical element of broader organizational digital transformation initiatives. Future research may explore the impact of AI-driven digital transformation on organizational structures, processes, and cultures, and how leadership must adapt to manage these changes effectively.

6. CONCLUSION AND LIMITATIONS

A bibliometric analysis of 60 articles retrieved from the Dimensions.ai database is conducted in this study, utilizing the Bibliometrix package in RStudio. It effectively maps the intellectual landscape of research on artificial intelligence and leadership from 2019 to 2025*, which is consistent with our fundamental objective to examine the most recent academic research in the field. The study provides essential insights into the current state of the field by examining publishing trends, prominent authors and sources, thematic developments, and collaboration networks, while also emphasizing potential avenues for future research in this dynamic and quickly expanding domain. Based on the descriptive analysis of publishing trends, there has been a significant and rapid increase in research output and a growing academic interest in the intersection of artificial intelligence and leadership. Moreover, the examination of prominent authors and sources demonstrates that the most pertinent articles emphasize the foundational works that have had a substantial impact on the field, while the examination of the top publication sources emphasizes the importance of key journals, in this case, Sustainability. Although Australia now leads in the volume of publications among corresponding author countries, China exhibits a stronger propensity for international collaboration. Furthermore, in the thematic developments, according to the keyword analysis, the dominant keywords were artificial intelligence, leadership, and digital transformation, which were also identified as motor themes on the thematic map. This cluster represents the core foundation of contemporary study in this field. On other hand three-field plot analysis highlighted India's diverse publication strategy. Collaboration analysis among authors and countries reveals primarily nationally homogeneous clusters with limited international partnerships. Despite strong ties between the USA and China, overall international engagement remains fragmented and sporadic, emphasizing the need for more coherent international research networks. Finally, the analysis of trending topics confirms the increasing prominence of "artificial intelligence," "leadership," and "digital transformation" within the literature. These trends indicate that future research will probably focus on how these relationships between these concepts are connected, especially looking at how AI-driven digital transformation is changing the basic elements of leadership theory and practice. In summary this bibliometric study offers a comprehensive examination of the research landscape at the intersection of AI and leadership. As AI evolves and its impact on businesses grows, further scholarly research in these suggested areas will be crucial for developing a comprehensive understanding of the evolving role of leadership in the age of artificial intelligence.

6.1. Limitations

This section outlines the limitations of the study. First, the scope of the available literature within the selected time frame (2015–2025*) and the use of the Dimensions.ai database constrain the review. Based on the selection criteria, no relevant papers were located before to 2019, and the data extraction date (March 9, 2025) implies that not all publications from 2025 are fully incorporated. Consequently, relevant studies published outside this period or in other databases may have been excluded, potentially creating gaps in the findings. Also, the exclusion of articles published after March 2025, given the rapid pace of research in this area, these articles could introduce new and relevant contributions to the literature.

Second limitation is that the research exclusively considers studies published in English, potentially excluding valuable research in other languages. Additionally, the analysis was limited to open-access publications, which may have excluded significant studies restricted by pay walls or other restrictions, which limits the comprehensiveness of the review. Furthermore, the study is confined to three main disciplinary areas: commerce, management, tourism and services, and journal quality was limited to those listed in ERA 2023. This disciplinary and journal quality focus

may exclude significant insights from other areas that overlap with AI and leadership.

Lastly, given the rapid advancement of AI technology, the literature reviewed may not fully represent the most recent developments or upcoming trends. As a result, certain findings may rapidly become outdated quickly as new AI applications and Leadership implications emerge.

Despite these limitations, this study aims to spark further scholarly discussion and encourage future research in this dynamic and increasingly important area of research. Acknowledging these limitations, future studies may expand upon this research to deliver a more comprehensive and nuanced examination of artificial intelligence in leadership.

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