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Bibliometric Analysis of a Digital Leadership Concept According to Visual Mapping Technique



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Abstract

The concept of digital leadership has become popular as leadership approaches have shifted from the traditional dimension to digitalisation, which is necessary in the current era. Therefore, leaders need to adapt to change in today's conditions, where technological advances are rapidly occurring. This study aims to determine the developmental stages of the concept of digital leadership in the literature, provide a comprehensive and holistic perspective on the field by conducting a bibliometric analysis of publications, and offer a guide for future studies. For this purpose, 587 publications were identified from the Scopus database between 2016 and 2025, after which data cleaning was performed, and 405 English publications in the fields of 'Business, Management and Accounting' and 'Social Sciences' were taken into consideration. The data obtained were analysed with the Vosviewer program and the R Studio program, which is integrated into the R program. Because of the analysis, the highest number of publications was made in 2024 (n=168). Additionally, the country with the highest number of citations was Indonesia (n=339), the average number of citations per publication was 10.71, and the journal with the highest number of publications on the subject was Sustainability (n=12).

Keywords

Digital Leadership · E-leadership · Digital Transformation · Vosviewer · R Studio

Jel Codes

M10, M12, M15



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Bibliometric Analysis of a Digital Leadership Concept According to Visual Mapping Technique

The phenomenon of leadership in ancient civilisations has played an important role in shaping the course of human history. From a historical perspective, the emergence of leadership is associated with hierarchical structures and dominant authority figures. The framework of leadership theories can be seen as evolving from behavioural theory to contemporary concepts, including transformational leadership approaches (Shahzad, 2024). The shift in leadership paradigms caused by digitalisation has made digital leadership an increasingly important phenomenon in both theoretical discourse and practical application (Bach, 2024). Digital leaders are characterised as individuals who have pioneering concepts about the digital world, demonstrate the ability to inspire employees in a digital context, establish sustainable communication with their employees even in digital interactions and develop effective digital strategies, (Sağbaş & Erdoğan, 2022). The concept of digital leadership offers a multi-faceted perspective on how to foster innovation and facilitate digital transformation in organisations. This concept encompasses the development of dynamic digital capabilities required for effective implementation of digital transformation. These capabilities include detection, capture, and transformation. They allow leaders to develop strategies based on technological trends, boost organisational agility, and redesign internal structures, thereby ensuring digital success (Albannai et al., 2024). Digital leadership practices are effective in transforming organisational culture and creating an innovative and collaborative cultural structure (Bala, 2024; Subiyanto et al., 2024). Digital leadership is a critical component used across a variety of industries, enabling organisations to adapt and thrive in an ever-evolving digital environment (Kok Ming & Mansor, 2024). Laukka et al. (2022) stated that technology can be used in the education sector for integration into administrative processes, improve educational outcomes, and promote innovation. Rangavittal (2024) stated that digital leadership and e-leadership practices in the health sector, especially in digital health services, benefit clinicians and patients and improve service quality. Competent digital leaders use advanced data analytics and artificial intelligence to develop medicines and optimise processes, thereby reducing the time to market. Pasalong et al. (2024). The study stated that digital leadership significantly improves the performance of the industrial sector and supports activities to increase productivity within organisations. In the context of digital transformation, digital leadership has become an important concept for organisations (Espina-Romero et al., 2023).

Existing literature on digital leadership has been examined in various contexts, but it is frequently restricted to conceptual definitions or is fragmented due to the emphasis on specific sectors within applied studies. This situation points to a lack of studies that include a systematic and comprehensive analysis of the development of digital leadership over time, its thematic evolution, and global academic interest. Although recent analyses such as Aydın et al. (2024) point to the growth dynamics of the field, comprehensive analyses that contribute to the theoretical construction of digital leadership and evaluate research clusters in a thematic context are still limited.

In this context, the primary objective of the present study is to methodically reveal the thematic evolution of the concept by examining the academic accumulation on digital leadership through publications between 2016 and 2025. Furthermore, this study aims to address the structural gap in the literature in this context. The study aims to contribute both academically and practically by analysing not only the numerical trends but also the themes that shape the theoretical framework of digital leadership. In this respect, this study

aims to deepen knowledge production in the field with a more holistic approach by contributing to the theoretical infrastructure of the concept of digital leadership.

Theoretical Background

Technological progress and industrial change significantly alter socioeconomic dynamics and thereby affect organisations that act as key players. In particular, this interaction is taking place in a way that fundamentally changes cultural practices and the relationships of organisations with their stakeholders, rather than solely focusing on the digitalisation of business processes and the integration of technological developments into business life (Sürücü et al., 2022).

This situation, which has accelerated, especially after the COVID-19 pandemic, has made it necessary for companies to participate in digitisation activities (Hussein et al., 2024; Faraj et al., 2021). The emergence of digital technologies, exemplified by innovations such as artificial intelligence, cloud computing, 5G, machine learning and big data, has significantly reshaped the understanding of organisational management by promoting change in an environment of economic and industrial uncertainty (Cortellazzo et al., 2019; Mollah et al., 2024; Peng, 2022). The emergence of digital technologies and versatile applications has brought about a significant change in leadership paradigms and led to the concept of digital leadership (Schwarz Müller et al., 2018). Consequently, digital leadership is regarded as a potent instrument for managers to motivate their employees to pursue innovation and excellence (Alsetoohy et al., 2022). Digital leadership is defined as the alignment of leadership skills with digital competencies to increase organisational performance (Wasono & Furinto, 2018). According to another definition, digital leadership is the process of formulating a specific vision within the context of digitalisation and subsequently activating suitable strategies to achieve this vision. It also involves the strategic allocation of human resources towards the realisation of predefined objectives (Karafakioglu & Afacan Findikli, 2024). Digital leadership approaches facilitate the dissolution of hierarchical structures and organisational boundaries through enhanced connectivity and information exchange. Consequently, leadership function has become imperative for comprehending the significance of digitalisation in employee engagement, talent retention and talent management (Cortellazzo et al., 2019). A number of studies have been conducted on the subject of digital leadership and its association with digital innovation (Mollah et al., 2024), organisational commitment (Braojos et al., 2024), work engagement (Li et al., 2024), performance (Amran et al., 2024; Büyükbeşe & Doğan, 2022; Chatterjee et al., 2021; Oğan & Wolff, 2022; Örücü & Hasırcı, 2024; Senadjki et al., 2024; Surahman & Legowo, 2024), organisational agility (Karafakioglu & Afacan Findikli, 2024), innovative work behaviours (Abbas et al., 2024; Ahmed et al., 2024; Zia et al., 2024). It was determined that they were studied in conjunction with their subjects. Moreover, bibliometric studies in the domain of digital leadership yield significant insights on prevailing trends and thematic research clusters in this field. A number of studies have been conducted on the subject of digital leadership. (Aydın et al., 2024; Espina-Romero et al., 2023; Prawestri vd., 2024; Alshidi & Binti Ahmad Rashid, 2024; Ming et al., 2023; Tigre et al., 2023; Wider et al., 2023).

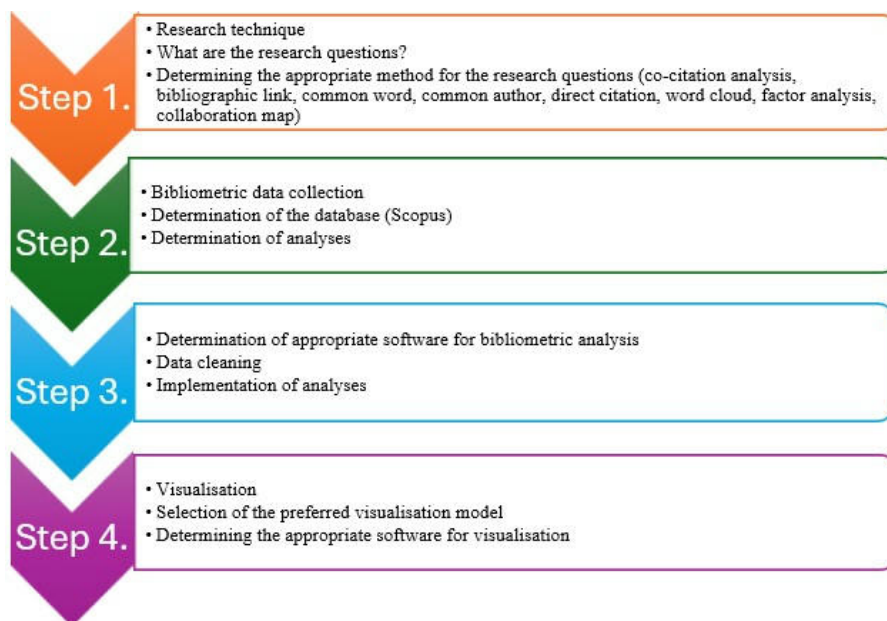
Prawestri et al., (2024). It identifies the United Kingdom (UK) and the United States of America (USA) as leading contributors to research on digital leadership and suggests that future research opportunities exist in areas such as: leadership, digital leadership, innovation, digital technology, e-learning, digitalisation and industry 4.0, which highlights seven clusters in the network visualisation. Aydın et al., (2024). The findings revealed that the annual growth rate in the field of digital leadership was 15.09%, while the average number of citations per article in performance analysis was 21.48. Espina-Romero et al. (2023) observed that the leading countries in the field of digital leadership according to the number of citations are the USA, Germany,

and China. The authors identified nine industry sectors related to digital leadership. Alshidi & Binti Ahmad Rashid, (2024). The study conducted a period-based analysis, concluding that in the first period, the theme of technology management emerged as a primary focus; in the second period, the themes of virtual teams and technology became predominant; and in the third period, the themes of COVID-19, virtual reality, and digital technologies became the primary focus of research in this field. Tigre et al. (2023). They concluded that there has been a 243% increase in digital leadership in the last 10 years and stated that the growth is expected to continue as the field has not yet reached saturation. Studies on digital leadership have been increasing since 2002. Germany is the most productive country, with 12 (7.74%) published documents. Wider et al., (2023). The identification of four primary clusters for research in the domain of digital leadership emphasises the growing importance of this research area in various disciplines, as well as the necessity for a more integrated perspective on the research landscape.

Methodology

A literature review is a method used to evaluate the literature, in order to fill existing gaps (Tranfield et al., 2003). The objective of this method is to identify qualitative and quantitative variables associated with a particular field with statistical procedures known as bibliometric analyses (Rey-Martí et al., 2016). Bibliometric analysis methods are used to accomplish objectives such as performance analysis and science mapping. Performance analysis is employed to evaluate the publication performance of individuals or institutions, while science mapping aims to reveal the framework of a field (Zupic & Čater, 2015). Bibliometric analysis is a method that uses quantitative data to facilitate a scientific mapping of data, encompassing elements such as citation analysis, performance analysis, co-occurrence, keywords, and co-citation (Beloskar et al., 2024).

Figure 1
A Bibliometric Analysis Process



Source: Kodalak & Akman, 2023

In this study, to demonstrate the bibliometric analysis process shown in Figure 1, a search was carried out by typing "Digital Leadership" in the Scopus database. Some restrictions were applied during this process. In this context, English-language studies in the fields of 'Business, Management and Accounting'

and ‘Social Sciences’ between 2016 and 2025 were evaluated, and the number of publications, which was initially 587, was reduced to 405. In addition, data cleaning was performed. Then, the data downloaded from the Scopus database as CSV files, were analysed using the Biblioshiny and VOSviewer programs with the RStudio program integrated into the R programming environment.

During the research, answers to the following questions were sought:

- Who are the most cited authors on the concept of ‘Digital Leadership’ in the Scopus database?
- What are the most relevant references regarding the concept of ‘Digital Leadership’ in the Scopus database?
- How is the distribution of articles related to the concept of ‘Digital Leadership’ in the Scopus database between 2016 and 2025, according to years?
- Which countries had the highest number of citations for the concept of ‘Digital Leadership’ in the Scopus database?

Findings

In this section, the analyses conducted on the data obtained about the concept of “Digital Leadership” are given.

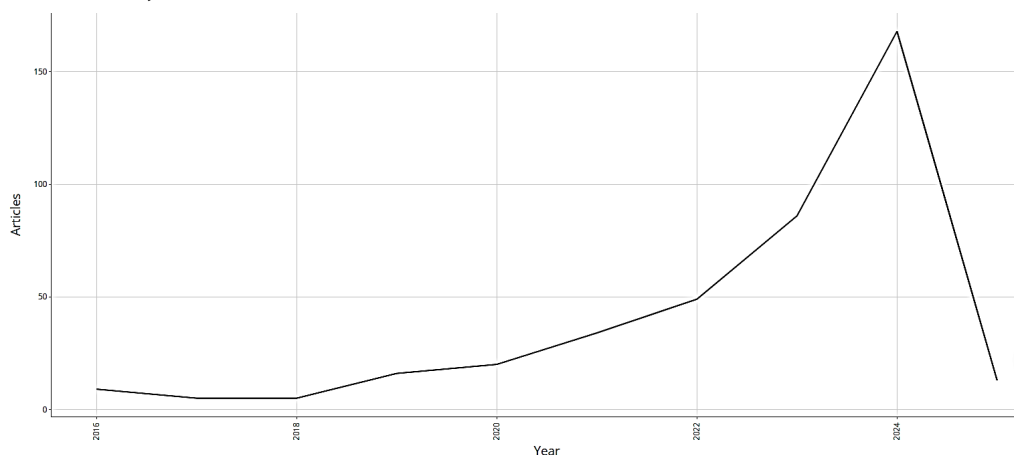
Table 1

General Information on the Concept of Digital Leadership

Main Information	
Timespan	2016-2025
Sources	277
Documents	405
Annual Growth Rate %	4.17
Average age of documents	2.41
Average Citations Per Doc	10.71
Document Contents	
Keywords Plus (ID)	606
Authors’ Keywords (DE)	1040
Authors	
Authors	1089
Authors of single-authored docs	57
Authors Collaboration	
Co-Authors per Doc	3.15
International co-authorships %	27.65
Document Types	
Article	252
Book	11
Book Chapter	65
Conference Paper	45
Other	32

A bibliometric analysis of 405 academic studies published in the Scopus database between 2016 and 2025 reveals growing academic interest in digital leadership. The annual growth rate of publications was 4.17%, the average number of citations was 10.71, and the average number of authors per document was 3.15. These findings indicate that studies are both effective and collaborative. While the international collaboration rate of 27.65% suggests that the issue of digital leadership is being addressed on a global scale, the diversity of author keywords ($n=1040$) indicates that the issue is being studied from multiple perspectives. When analysed by type of publication, academic articles constitute the largest share (62.22%), followed by book chapters (16.05%) and conference proceedings (11.11%). With an average document age of 2.41 years, the literature shows that the topic of digital leadership remains current. These data provide important insights into how leadership has evolved in the academic world during the digital transformation era.

Figure 2
Annual Scientific Production

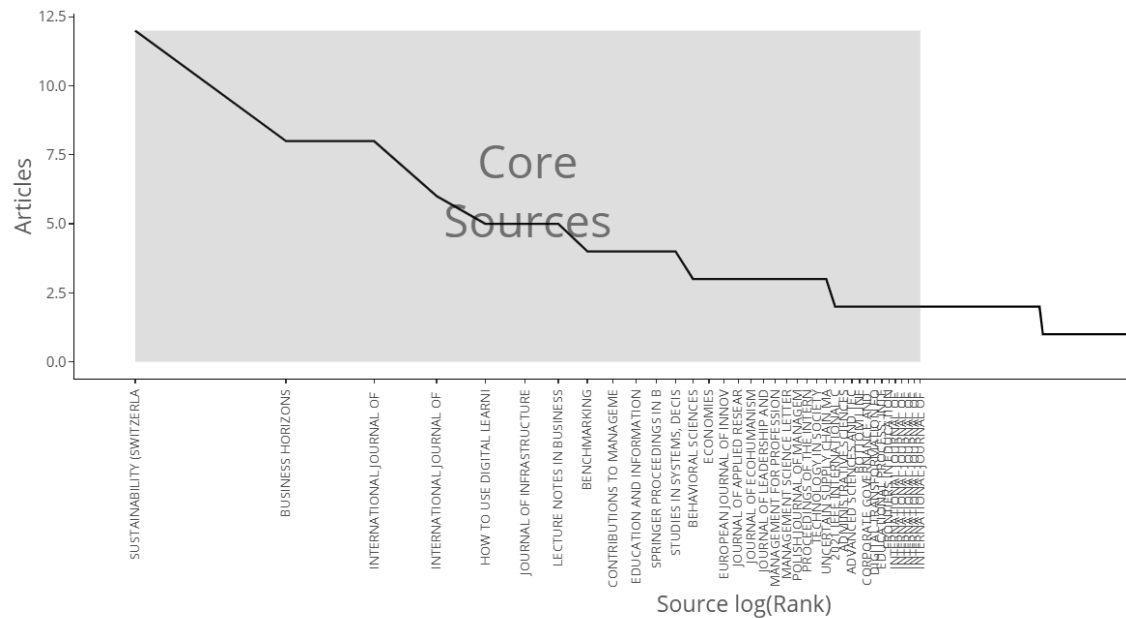


When the last 10 years of scientific publication productions related to the concept of 'Digital Leadership' are examined in [Figure 1](#), it is determined that the first years evaluated were 2016 ($n = 9$), 2017 ($n = 5$), 2019 ($n = 16$), 2021 ($n = 34$), and 2024 ($n = 168$), and interest in the subject has constantly increased over the years and has become a popular topic.

The graph covering the years 2016–2025 shows significant fluctuations in scientific publication production during this period. Although production volume was low and stable from 2016 to 2018, it increased in 2019 and continued rising steadily until 2024. This increase can be attributed to the maturation of the research group, the expansion of academic capacity and the increase in external funding. In 2024, the number of publications increased dramatically, reaching a production volume of approximately ($n=168$) papers. This spike is thought to be the result of factors such as the completion of extensive projects, systematic reviews, and the publication of several delayed papers. However, the sharp decline in the number of publications observed in 2025 may be due to incomplete data for that year. Therefore, data from after 2025 are critical for ensuring the sustainability of scientific productivity. An analysis of publications from the mentioned period reveals that topics such as digital citizenship emerged in 2016 (McGillivray et al., 2016). In 2017, e-leadership and digital collaboration emerged (Antoni & Syrek, 2017). By 2019, renewed interest emerged in digital transformation and digital citizenship (Dimitriadis, 2019; Mihardjo et al., 2019). The 2021 pandemic significantly impacted the concepts of digital leadership and competence (Claassen et al., 2021; De La Calle et al., 2021; Fischer et al., 2021). By 2023, digital trust, innovation, and business intelligence had become central themes (Mo et al., 2023; Raed et al., 2023). In 2024, the focus shifted to innovative business behaviour and

knowledge sharing (Ahmed et al., 2024; Yahya et al., 2024). In 2025, digital adoption and employee motivation will be key areas of interest (Binsar et al., 2025; Palmucci et al., 2025). This study examined the evolution of these topics. Considering the increase in the number of articles over the years, we conclude that digital leadership is an interesting concept.

Figure 3
Bradford's law

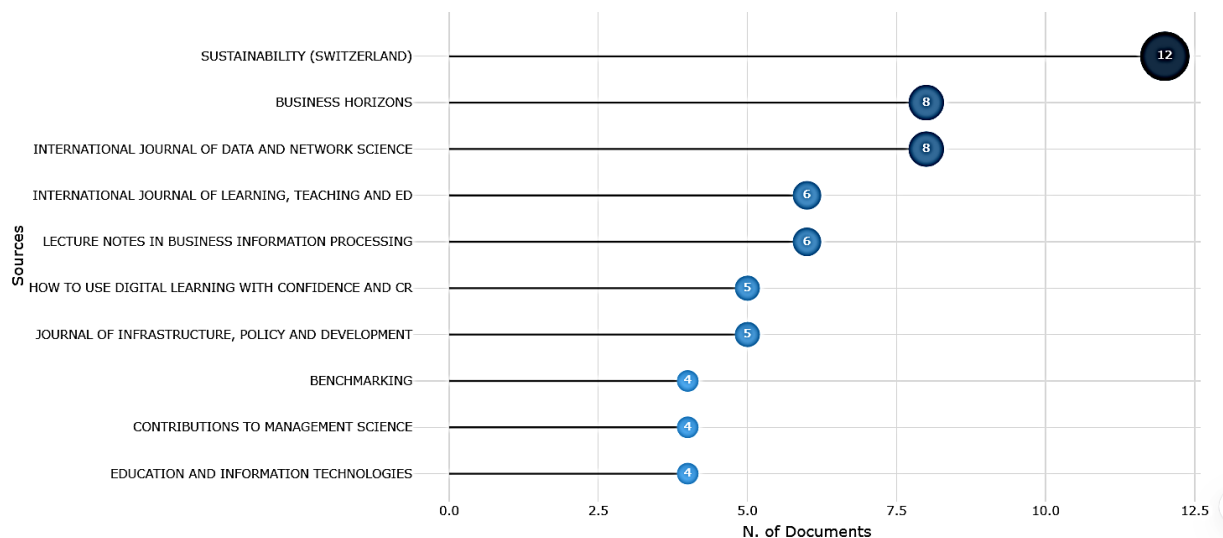


Bradford's law describes a bibliometric approach that characterises the distribution of scientific articles among various journals within a given academic discipline, specifically clarifying the phenomenon of diminishing effectiveness and scatter. This law makes it possible to determine the most appropriate journals for a subject. Accordingly, it is assumed that journals are categorised into three groups. The first group should consist of core journals with 33% of production and high productivity. The second group is expected to consist of large journals that will account for 33% of the publication output and have lower productivity. The last group is expected to contribute less although it includes a much larger number of journals (Alves, 2019). It was determined that the core journals related to the concept of digital leadership included *Sustainability*, *Business Horizons*, *International Journal of Data and Network Science*, *Lecture Notes in Business Information Processing*, *International Journal of Learning, Teaching and Educational Research*, *"How to Use Digital Learning with Confidence and Creativity: A Practical Introduction,"* *Journal of Infrastructure, Policy and Development*, *Benchmarking*, *Contributions to Management Science*, *Education Information Technologies*, among a total of 37 journals and 134 articles. Core journals are important for meta-analyses, literature reviews, and systematic reviews. They constitute the main body of literature (Fleming et al., 2014). When conducting a general evaluation, the graphic is important for visualising which sources the literature in the relevant field focuses on (Eifert, 2022). It also contributes to accessing scientific information, creating a bibliography, and selecting journals.

Table 2*Evaluation of the Data Used in the Study According to Bradford's Law*

Number of Journal Articles			Number of Articles	
Zone	N	%	N	%
1	37	%13,35	134	33.08
2	108	%38,98	168	41.48
3	132	%47,65	103	25.43
Total	277	%100	405	100

This table presents a bibliometric analysis of the distribution of the journals and articles used in the study, evaluated within the framework of Bradford's Law. This study covers a comprehensive analysis of 277 journals. Although they account for only 13.35% of the total journals, Zone 1 core journals account for (33.08%) of the total publications, indicating a high publication density in this subject area. Zone 2, which accounts for (38.98%) of the journals, corresponds to 41.48% of the total articles, indicating medium-sized contributing journals. While Region 3 contains the highest number of journals (47.65%), only 25.43% of published articles are published, indicating that the topic is more scattered and infrequently addressed in the literature. This distribution is generally consistent with Bradford's Law. This finding is of great importance in terms of identifying target journals, especially in the context of academic publication strategies.

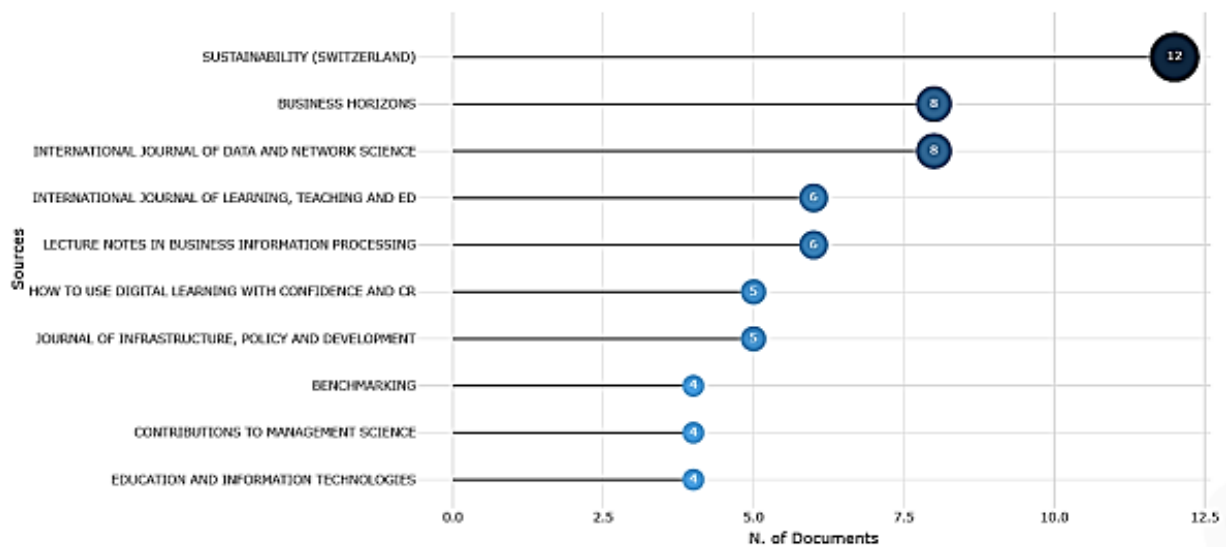
Figure 4*Most Relevant Sources*

When the distribution of publications on the concept of digital leadership is analysed, the journal with the highest number of studies is Sustainability (Switzerland), which stands out by far with (n=12) publications. The journal's impact factor of 3.3 indicates that it has significant academic visibility in terms of sustainability-oriented studies; it also reflects a strong interest in the intersection of digital leadership with sustainable development and corporate strategy. The second-ranked journal, Business Horizons, with eight publications, exhibits a higher academic impact than the first-ranked journals, which have an impact factor of 5.8. This finding indicates that research on digital leadership is not only prevalent in public and educational spheres, but also in strategic management and business contexts. International Journal of Data and Network Science (n=8), which shares the third place with the same number of publications, focuses on

digital leadership from a technical and systemic perspective, focusing on data network systems and digital transformation components. It is followed by International Journal of Learning, Teaching and Educational Research and Lecture Notes in Business Information Processing with (n=6) publications. The concentration in these journals reveals how the theme of digital leadership is integrated with educational technologies, learning processes, and information systems. In general, this distribution shows that digital leadership is addressed with a multidimensional and interdisciplinary approach, ranging from sustainability to business management, data science to educational technologies.

Figure 5

Most Related Authors



When the authors with the highest number of publications on the concept of digital leadership are analysed, Na Na ranks first with (n=12) publications. He is followed by Abbu H (n=6) and Karaköse T (n=6), with an equal number of publications. Each with an equal number of publications, they were followed by Gudergan G (n=5), Malik M (n=5), Mıhardjo LWW (n=5), Mugge P (n=5), and Raziq MM (n=5). This distribution shows that certain authors stand out in the literature covered by the study and that there is a significant concentration in publication production. The high number of publications suggests that these individuals have gained competence and expertise in their fields and are frequently preferred for research collaborations. Moreover, such analysis is of strategic importance for the development of potential academic partnerships. In conclusion, this graph not only provides a quantitative assessment but also makes visible the centres of knowledge production in the research ecosystem.

Table 3*Most Cited Countries*

Countries	Total Citation	Average Article Citation
Indonesia	339	9.70
Germany	323	15.40
China	308	14.70
Italy	234	26.00
France	232	77.30
Greece	194	64.70
Malaysia	192	10.10
UK	186	12.40
USA	179	13.80
Türkiye	165	11.00

According to the data, the total number of citations countries receive in digital leadership-themed publications and the average number of citations per article show not only academic productivity but also the level of scientific impact. France is the most remarkable country, with a very high average of 77.3 citations per article, despite 232 total citations. Similarly, Greece and Italy have an average citation value of 64.7 and 26.0, respectively. It is understood that the studies conducted in these countries are strong in terms of both quality and impact. They are published in high-quality journals and are frequently cited in the literature. On the other hand, although countries such as Indonesia, China, and Germany rank high in the total number of citations, their average number of citations is relatively lower, indicating that although the number of publications in these countries is high, the impact level of each publication remains limited. Turkey, on the other hand, has a balanced but moderate impact, with 165 citations and an average citation value of 11.0. Overall, this analysis suggests that academic activity across countries should be assessed not only in terms of quantity and quality.

Table 4*Most Cited Articles*

Author	Journal	Title	Scientific Contribution	Total Citation	Annual Total Citation
(Benitez vd., 2022)	Information and Management	Impact of digital leadership capability on innovation performance: Role of platform digitisation capability	This study empirically analyzes the relationship between digital leadership capability and innovation performance and determines that digital leadership enhances innovation through platform digitisation.	196	49
(Karakose vd., 2021)	Sustainability	Examining Teacher Perspectives on School Principals'Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic	The study emphasised that teachers' level of digital technology use during the COVID-19 pandemic was perceived as adequate. The results also demonstrate that principals could effectively integrate digital tools into their leadership practices.	148	29.60

Author	Journal	Title	Scientific Contribution	Total Citation	Annual Total Citation
(Borah vd., 2022)	Technology in Society	Linking social media usage and sustainable SME performance: The role of digital leadership and innovation capabilities	The study concludes that the use of social media has a positive and significant impact on innovation and SME performance.	138	34.50
(Peter vd., 2020)	Journal of Strategy and Management	Strategic action fields of digital transformation: An exploration of the strategic action fields of Swiss SMEs and large enterprises	This study identifies seven primary strategic action fields that reflect common understanding among Swiss managers and employees and facilitates a nuanced view of digital transformation processes.	127	21.17
(Schiuma vd., 2022)	International Journal of Entrepreneurial Behaviour & Research	The Transformative Leadership Compass: Six Competencies for Digital Transformaion Entrepreneurship	To support digital transformation entrepreneurship, a general profile of the digital transformation leader was developed.	119	29.75

Table 4 lists the most cited articles. When the table is examined, the article titled “Impact of digital leadership capability on innovation performance: The role of platform digitisation capability” by Benitez et al. (2022) ranks first with (n=196) citations. The total annual citation count for this article was (n=49). This article evaluates the relationship between digital leadership and innovation performance. Subsequently, the article titled “Examining Teacher's Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic” by Karaköse et al. (2021) was cited (n= 148) times, and its total annual citation was calculated as (n= 29.60). The study investigated the increasing interest in the digital approach and how it affects telecommuting and leadership roles in the field of education. The article “Linking social media usage and SMEs' sustainable performance: The role of digital leadership and innovation capabilities” published by Borah et al. (2022) ranks third with (n=138) and (n=34.50) total citations per year. This study investigates the relationship between social media use and innovation capabilities to improve sustainable SME performance. When the ranking is examined, Schiuma et al. (2022) (n = 119) is being at the bottom of the list in terms of the number of citations. However, the total number of annual citations is higher than that of Peter et al. (2020), which is in fourth place. Research shows that digital leadership involves more than just using technological tools; it also plays a strategic role in organisational innovation. Citation data reflect growing academic interest in various aspects of digital leadership, such as platform digitalisation and educational management.

Figure 7
Thematic Map

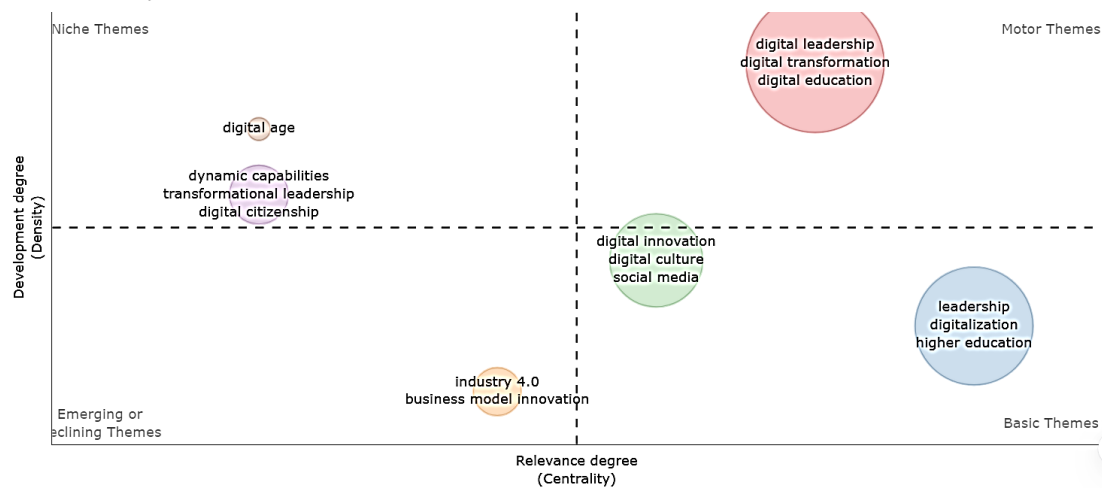


Figure 7 shows the development in thematic areas. Within the scope of thematic mapping analysis, intersecting network clusters are shown as bubbles considering the centrality and density parameters (Callon et al., 1991). The X-axis in the figure represents centrality, while the Y-axis represents density. Whereas centrality expresses the degree of interaction of a particular network cluster with other clusters, density is a measure that shows the strength of the connections within the cluster and the development of themes (Aydin et al., 2024). The thematic mapping technique was evaluated in four areas representing different themes. In this study, the authors' keywords were used in the analysis. The first 50 words were selected, and the number of words represented in each theme was set to 3. Because of the analyses performed, it was determined that there were 6 clusters in 4 themes. When the themes were evaluated separately, motor themes with high density and centrality appeared in the upper right corner, indicating that the themes needed for the study were expressed in this group. The frequencies of digital leadership ($n = 261$), digital transformation ($n = 90$), and e-learning ($n = 7$) were determined. The niche themes in the upper left indicate areas with high density and low centrality. This section presents the areas of limited interest. The concepts in this part are represented with the frequencies of the following: digital age ($n=4$), dynamic capabilities ($n=7$), transformational leadership ($n=6$), and digital citizenship ($n=4$). The simple themes on the bottom right side include high centrality and low density. The more publications that address these concepts, the more likely these concepts are to move towards motor themes. In this theme, the following elements are represented with frequencies: digital innovation ($n=12$), digital culture ($n=8$), social media ($n=8$), leadership ($n=30$), and digitalisation ($n=13$). The lower left quadrant shows decreasing themes with low centrality and low density. In this section, the topics are Industry 4.0 ($n=6$) and business model innovation ($n=5$). These findings reveal that digital leadership is at the centre of the field, while some themes are open to development and integration.

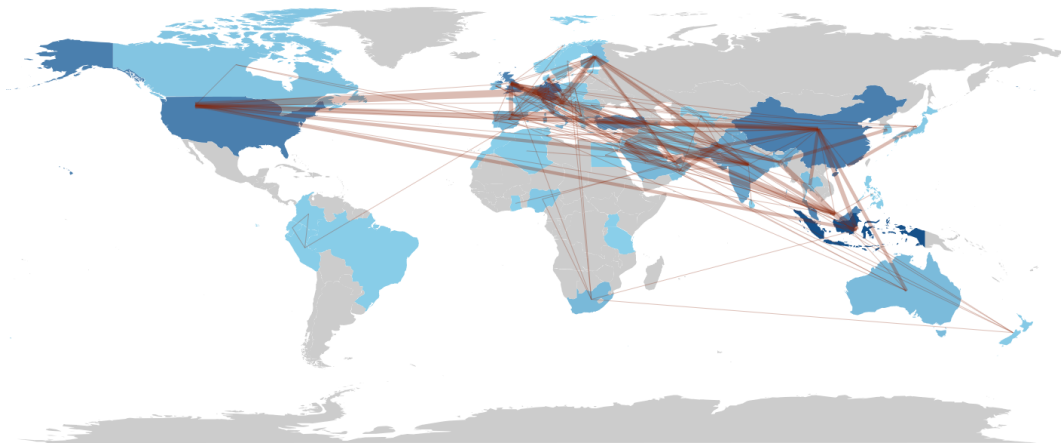
Figure 8*Cooperation Map of Countries*

Figure 8 shows the collaborations of authors on publications on the concept of "Digital Leadership," categorised by their countries of origin. Countries that publish on this concept are indicated with colours ranging from light blue to dark blue. When countries that collaborate most on the concept of digital leadership are listed, Germany and the USA, (n=7) rank first in terms of publications. They are followed by Indonesia and Malaysia (n=5), China, the USA, Jordan, Saudi Arabia, and Bangladesh (n=4). Overall, networks of scientific collaboration are concentrated in the Northern Hemisphere, reflecting global inequality in research infrastructure.

Conclusion

The concept of digital leadership is critically important today with the acceleration of technological transformation. This concept refers to leaders effectively using digital tools to manage organisations and make strategic decisions. Digital leadership includes not only following technological innovations, but also the ability to integrate these innovations into the organisational culture, and the inclusion of employees in digital transformation. In this study, a bibliometric analysis method was used to examine the development of the literature on the concept of digital leadership and to fill gaps. Bibliometric studies are tools that guide a specific field and provide researchers with information about future trends (Akman & Erdirençelebi, 2024). For this purpose, maps and visualisations of studies conducted on the concept of digital leadership in the last decade (2016-2025) were presented. First, 587 studies were identified in the article. Then, data cleaning was performed, and 405 English studies in the fields of "Business, Management and Accounting" and "Social Sciences" were evaluated. The obtained data were analysed using biblioshiny and Vosviewer software integrated with R Studio. When the findings were evaluated, it was determined that digital leadership research is still in the development stage but has not yet matured (Aydın et al., 2024; Purwanto & Irawan, 2023; Tigre et al., 2023).

A significant increase in the number of publications has been observed up to 2024, with the highest number of publications being reached this year at (n=168). The average number of citations per publication was 10.71. The growing importance of digital leadership in the field of international research can be clearly demonstrated by the fact that 27.65% of studies were conducted in collaboration with researchers from different countries. Furthermore, the diversity of the 1,040 keywords employed by the authors indicates an interdisciplinary and multidimensional approach to this research area. In this context, publications

appeared in journals named Sustainability (n=12), Business Horizons (n=8), and International Journal of Data and Network Science (n=8). This distribution shows that the topic of digital leadership is addressed across a wide range of areas, from sustainability, data science, to business management. When the publications were evaluated over the years, it was determined that topics of digital citizenship were most popularly studied in 2016, e-leadership and digital collaboration in 2017, digital transformation and digital citizenship in 2019, digital competence and digital leadership in 2021, innovative business behaviour and knowledge sharing in 2024, and digital adoption and employee motivation in 2025. When the analyses are examined, the data obtained from the co-creation map reveal that this subject is suitable for international cooperation when e-leadership and virtual leadership are used together with the concept of digital leadership (Aydın et al., 2024). Although the concept of e-leadership has attracted attention in the literature, keyword analyses found that 'digital' was used more frequently in discussions about the challenges faced by organisations (Tigre et al., 2023). The thematic clusters, organised by colour coding, provide a comprehensive overview of the technical, pedagogical and managerial aspects of digital leadership, covering topics such as e-learning, digital maturity, information systems and emotional intelligence. This multi-layered analysis shows that digital leadership is a multidisciplinary and strategic research area that also encompasses information systems, organisational behaviour and strategic management. When the authors who published the most on digital leadership are examined, Na Na ranks first, with (n=12) publications. This is followed by Abbu H (n=6) and Karaköse T (n=6), who have equal numbers of publications. This distribution reveals that certain authors stand out in the reviewed literature and that there is a notable concentration of publications. The high number of publications by these authors demonstrates their expertise in the field, making them preferred partners for research collaborations. Among the countries that cooperate the most on digital leadership, Germany and the USA share the first place. When the countries that receive the most citations on the subject are evaluated, Indonesia (n=339) is in the first place, followed by Germany (n=323). It is believed that Germany will lead in the number of publications and citations on digital leadership, due to the emergence of the concept of Industry 4.0 at Hannover Fair in Germany. Additionally, the importance that the German government attaches to digitalisation and its desire to be a pioneer in developments in the field of information technologies contribute to this position (Erer et al., 2023).

Digital leadership is of strategic importance for developing countries such as Turkey, which are in the process of digital transformation. Turkey aims to accelerate digitalisation processes in line with national policies such as Digital Turkey Vision, e-Government applications and National Technology Move (Koç, 2022). In this context, the interaction between the public, private sector and academia supports the formation of governance models based on digital leadership, and the sustainability of digital transformation at the institutional level is ensured through multi-actor collaborations (OECD, 2023). This transformation process requires not only the enhancement of technological infrastructure but also the presence of digital leaders who can develop strategic visions and assume an active role in change management. In order to improve the current situation in Turkey, continuous training programmes should be implemented in areas such as digital strategy development, change management, data literacy and cybersecurity. Furthermore, leadership programmes to reduce the digital divide should be integrated into local governments, and systems for technical support and infrastructure should be established to enable digital leaders to use big data, artificial intelligence, and business intelligence tools in decision-making processes. Despite the results obtained, the study has some limitations. The studies were taken from the Scopus database and may exclude documents obtained from other sources. In addition, although searches were made regarding the concept of digital leadership while designing the research, some articles might not have been included. This is because

different terminologies can be used considering this term. It is thought that making sectoral and country-based comparisons on digital leadership will contribute to the literature. In addition, further research will contribute to the literature to determine the role of developing technologies such as artificial intelligence, blockchain, cloud computing, 5G, machine learning, and big data in shaping digital leadership and their effects on leadership approaches.



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