

Bibliometric Analysis on the Digital Leadership in the Scopus Database Using RStudio Bibliometrix

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Abstract

This study adopted a bibliometric analysis based on the data obtained from the Scopus online database as of December 2022. This methodological approach allowed for a comprehensive exploration of the evolution of digital leadership research. Based on the 'keywords' search results, the study finalized 155 valid documents for further analysis. The author then utilised bibliometric analysis in R using the built-in function Biblioshiny to examine the evolution of a research field in digital leadership. This article reports the results using standard bibliometric indicators, particularly on the growth rate of publications, analysis of the citation, and research productivity. As the results revealed, there is an increased growth rate of digital leadership literature over the years since 2002. Germany leads the way in productivity with 12 (7.74%) published documents, followed by Indonesia with 10 (6.45%) and Malaysia with 10 (6.45%). However, despite having only four articles, Greece had the highest average number of citations each year when compared to other countries. Mihardjo, L.W.W. has so far the most influential author with 5 publications, 43 citations and an average of 10.75 citations per year. Additionally in this study, keyword analysis was also conducted to identify high frequency keywords that led to the identification of three major research clusters: (1) digital leadership, (2) digital transformation, (3) leadership, and (4) digitalisation. Three clusters are captured based on high frequency keyword cluster analysis: (1) the influence of digital leadership on digital transformation, (2) the digitalisation in education context, and (3) the digital governance of organisations. Overall, the increasing number of works on digital leadership indicates a growing awareness of its importance and specific requirements. These findings underscore the expanding scope and relevance of digital leadership, suggesting avenues for future research in areas like digital transformation and governance.

Keywords: Bibliometric Analysis, Bibliometrix, Digital Leadership, Digital Transformation, Leadership

Introduction

Digital leadership is the ability to lead and manage organizations and teams effectively in a digital environment. It involves the use of digital technologies and tools to improve

communication, collaboration, and decision-making, as well as the ability to adapt to and navigate the constantly changing landscape of the digital world. As the use of digital technologies has become increasingly widespread and essential to the functioning of modern organizations, the role of digital leadership has evolved significantly. In the early days of the internet, digital leadership may have simply involved the ability to use email and basic office software effectively. However, as technology has become more advanced and integrated into all aspects of business and society, the demands on digital leaders have increased significantly. Today, digital leaders must be able to effectively use a wide range of tools and platforms, such as social media, cloud-based collaboration tools, and data analytics, to drive innovation and improve efficiency. They must also be able to anticipate and adapt to changes in the digital landscape, and lead their teams through the challenges and opportunities that these changes present. Overall, digital leadership is a dynamic and evolving field that requires a combination of technical skills, strategic thinking, and adaptability. As the use of digital technologies continues to grow and change, digital leaders will need to stay up-to-date and continuously develop their skills and expertise in order to effectively lead their organizations and teams in the digital age.

Digital leadership is an emerging research field that combines digital and leadership, making it a potential area of research. There have been numerous studies conducted on digital leadership, examining various aspects of the concept and how it applies in different contexts. Some studies have focused on the characteristics and traits that make a successful digital leader, while others have looked at the role of digital leadership in organizational performance and innovation. A single study found that digital leaders tend to have a number of key characteristics, including a strong vision, the ability to inspire and motivate others, and a focus on continuous learning and development. They also tend to be open to new ideas and ways of thinking, and are able to adapt and change course quickly in response to changing circumstances. Other studies have found that organizations with strong digital leaders tend to have higher levels of innovation and performance. For example, digital leaders who were able to effectively leverage technology and data to make informed decisions were more likely to achieve higher levels of financial performance. Another study found that organizations with digital leaders who were able to create a culture of innovation and encourage employee participation were more likely to be successful in the digital economy. In general, the research suggests that digital leadership is a key factor in the success of organizations in the digital age. Effective digital leaders are able to use technology and data to drive innovation and improve performance, and they are able to adapt and navigate the constantly changing landscape of the digital world.

Currently, although digital leadership studies have accumulated on a global scale, the differences in research methods, goals, and perspectives have led to fragmentation and confusion of research results. Therefore, it is necessary to shift through the digital leadership literature, clarify the research contexts, record research progress, and predict research trends. The biggest digital leadership challenge is the integration of technologies from the most diverse areas of knowledge. Overcoming the integration difficulties between technologies from different areas is fundamental for the development of digital leadership. Individuals still have to make the right decisions and implement this leadership to achieve digital transformation. However, to make the right decisions, we need to understand the local and global impacts of these changes. Furthermore, there is no theoretical consensus on the thematic axes of this research field. However, the adoption of emerging technologies seems to be the pillar of digital leadership. There is a gap related to the topics addressed in digital

leadership, and the thematic clusters of this research field are not entirely clear. Thus, this study aims to fill this gap by emphasising the most statistically relevant clusters. The present study also contributes to the research field by systematising knowledge with an innovative methodology, and presents the information related to digital leadership.

Bibliometric analysis is becoming increasingly popular as one of the approaches to uncovering research trends/patterns. It is of great value to grasp the topics and trends of the research field from an overall perspective. This bibliometric study (also known as a scientometric study) typically uses mathematical/statistical tools as an approach to assessing the quantity and quality of published materials in order to observe trends or patterns in a particular area of research. In addition, a comprehensive bibliometric analysis helps to make predictions and research growth in a specific research area. Some of the most common aspects observed in the bibliometric analysis include publication classification, citations, authorship information, publication impact, and focus country. Despite the increased interest in digital leadership research, there have been very few attempts to report the trend of previous publications, particularly those using the bibliometric technique with RStudio Bibliometrix. This study conducts a bibliographic analysis of all types of publications connected to "digital leadership" or "digital leader" as published in the Scopus database of December 2022 in response to the limitation of works analyzing the field of digital leadership studies. Therefore, using the Bibliometrix, and Biblioshiny packages in R tools, we systematically combed 155 digital leadership related-studies from 2002 to 2023 to give an analysis of all publications including the document types, source of publishing, year of publication, citation analysis, and high frequency keywords.

The existing bibliometric analysis is mainly based on publications, journals, keywords, countries, institutions and authors, and lacks the exploration of hot topic development tendencies and the analysis of keywords clustering. Although the literature review can analyze the state of research and existing problems of existing research in a given period of time, the method is subjective and has a limited number of articles analyzed. Since the research scope is mainly at the regional level, the research space and time scale are limited, and the global trend of digital leadership cannot be accurately grasped. Therefore, this study aims to fill this gap and answer research questions by examining global trends and academic networks that incorporate research into digital leadership.

Research Questions

Specifically, the research objectives of this paper were as follows:

Research Questions	Method	Analysis
1. What is the current research status of digital leadership?	Literature timing analysis	The law of document growth counts the number of documents related to digital leadership by year in order to grasp the trend of scholar's attention to digital leadership as a whole.
2. What is the distribution of the main research forces in the field of digital leadership?	Main research author analysis	The papers of major research scholars can well reflect the development of disciplines and provide effective solutions for solving complex problems.
	Main research country analysis	The publication of papers in different countries can reflect the emphasis and influence of a country on the field of digital leadership.
3. What are the research hotspots in the field of digital leadership?	High frequency keyword analysis	Keywords provide a high degree of generalization and refinement of articles. Refined high-frequency keywords in multiple articles can represent research hotspots in this field to a certain extent. High-frequency keyword clustering analysis.
	High-frequency keyword clustering analysis	Cluster analysis uses statistical methods to simplify the complex keyword network relationships into several relatively few clusters. This method can determine several key points that scholars pay attention to in a certain period of time.

Literature Review

According to the latest empirical data from the Eurobarometer survey, digital technology has been proven as being beneficial in the economy because it has offered privileges in people's everyday lives and businesses. In addition, digital technologies, in the last years, have modified information, value and management and incite organizations, except for businesses but also education settings to transform their work processes and adopt radical and innovative changes in their structure and function (Cortellazzo, Bruni & Zampieri, 2019). This has also resulted in digital leadership, which is a leadership behaviour in the digital era that is combined with a leadership style that utilizes digital technology (Zhu, 2015). Digital leadership in education refers to the integration of a portfolio of technologies, tools and instruments like: Internet of Things (IoT), e-platforms (webinars) social media, Artificial Intelligence, Big

Data, Machine Learning (Antonopoulou, 2020). However, digital leadership is fragmented and it has different themes based on different contexts (Ming & Mansor, 2021). Thus, it is necessary to explore the definition and themes of digital leadership and this leadership can be beneficial for various settings and it is a crucial parameter that is necessary to be promoted among leaders (Antonopoulou, et al., 2020).

Materials And Methods

There are several databases for importing bibliographic data such as Scopus, Web of Science (WoS), Dimensions, Cochrane Library, Lens, and PubMed, each has unique properties and functionality. The Web of Science and Scopus are currently the most used literature databases for almost all disciplines. To reduce the possibility of errors and ease the integration and analysis of data with different softwares, we used one database only. In this study, we used the Scopus database as a starting point to extract previous research on digital leadership as it is the largest database of abstracts and citations of literature that have been peer-reviewed (Elsevier, 2021). The database offers publication-specific information such as access type, year, author name, subject, document type, source title, subject, affiliation, nation, source type, and language. In this study, we restricted the search for digital leadership studies based on the title in order to further narrow down the relevant scientific publications on the research area examined. The following search term has been added as a result: (TITLE-ABS-KEY("Digital Leadership" OR "Digital Leader")). In order to further analyze, this query produced a total of 155 documents and the information was obtained on December 23, 2022. These records formed the dataset and were the foundation for the bibliometric analysis in this study. Figure 1 shows the search technique used in this study to identify appropriate articles from the Scopus database. In this study, we used Biblioshiny, a statistical software program used for data mining in bibliometrics, to determine the frequency of co-occurrence of keywords in two academic articles in order to simplify the complicated linkages of keyword networks. For the extraction of other patterns, we also used RStudio Bibliometrix to present comprehensive details in digital leadership research by using a text-mining function.

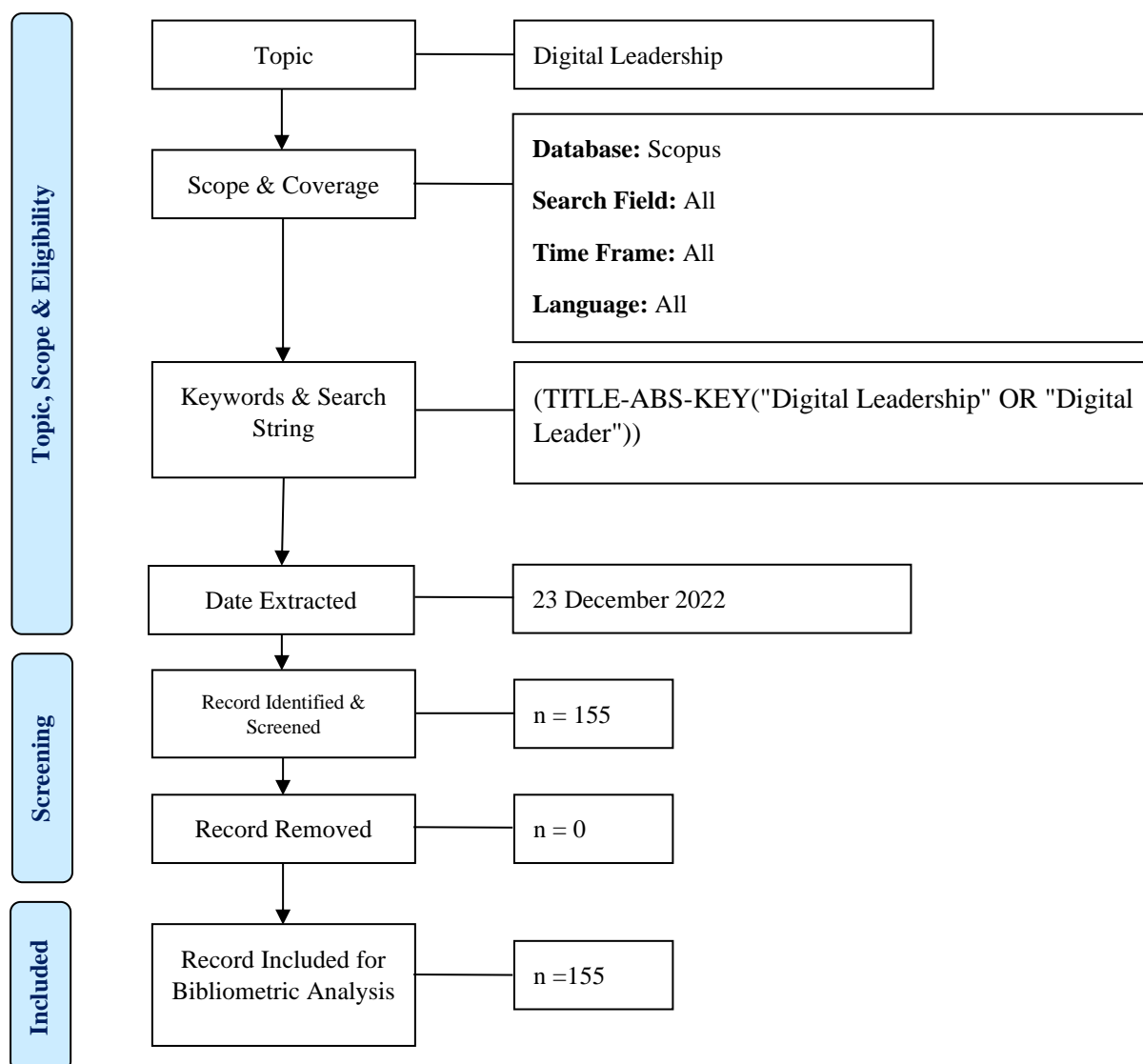


Figure 1. Flow diagram of the search strategy.

Source: Zakaria et al. (2021)

Analysis And Findings

With recent developments of bibliometrics software, it is possible to analyse a scientific field, topic, or subject of interest. This software processes bibliometric data by using mathematical algorithms. This involves statistical rules, word count laws, co-citation count, bibliographic coupling, keyword co-occurrence, and other techniques (Aria & Cuccurullo, 2017; Van Eck & Waltman, 2010). We chose the Bibliometrics software R package because the keyword count and strategy map creation features were adequate for this study. We used Bibliometrics features like collaborative network analysis and strategic mapping. When two or more authors had collaborated on an article, the software created a collaborative network. In this way, we were able to understand the dynamics of the production of the studies. Thus, this study not only helps in expanding the knowledge base on the research topic, but also in understanding the evolution of digital leadership to further support research in this field.

Literature Timing Analysis

It can be seen from Figure 1 that although the number of articles issued in individual years has increased accordingly, the number of documents has generally increased year by year,

and the research can be roughly divided into three stages. (1) Initial stage (2002–2014): the study of digital leadership was in its infancy, with fewer publications. (2) Volatility growth stage (2015–2018): the number of documents began to fluctuate in growth. The global study of digital leadership began roughly in 2016 and then down and up for 2017 and 2018. (3) Rapid development stage (2019–present): the number of documents has grown rapidly. As the world experienced the importance of digital technologies during and after pandemic COVID-19, the global research on digital leadership is further deepened. This shows that while digital technology is growing rapidly, people are beginning to pay attention to the digital leadership and digital transformation, especially for the era of the post pandemic.

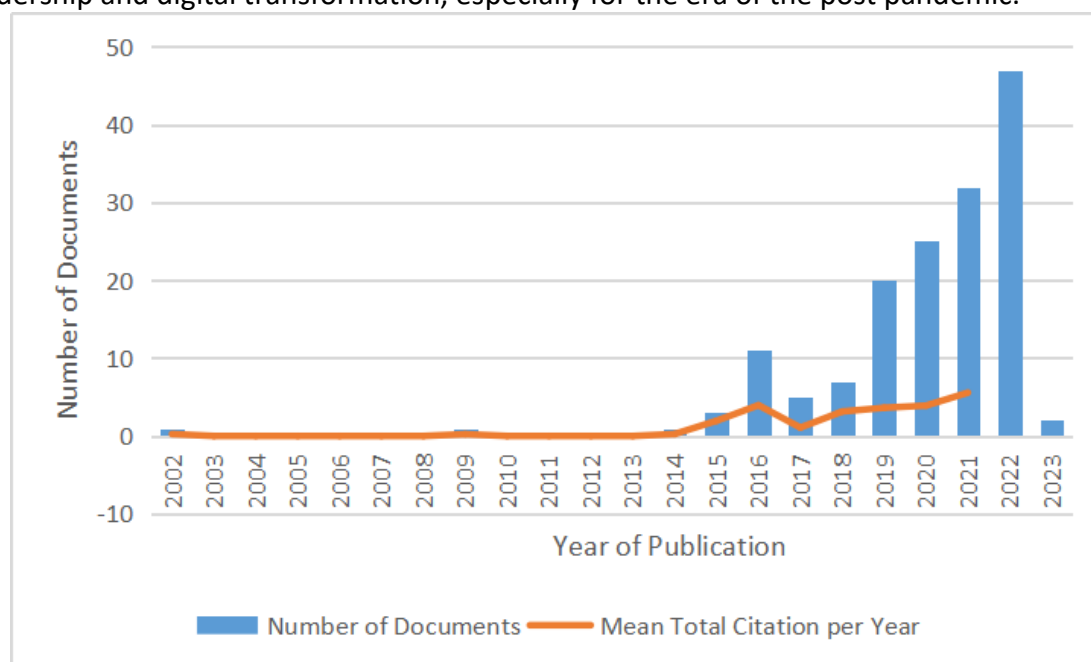


Figure 2. Number of articles in each year in the field of digital leadership.

Judging from the average citations per item, there were three articles published on digital leadership research in the Scopus database in 2015, but the citations were a high 1.95 compared to previous years. However, after 2015, the annual average citations per item showed a trend of decreasing volatility, with a total citation frequency of only 20. It can be seen that the average quality of the literature on digital leadership research is not high and the comprehensive influence is insufficient. This indicates that the research level of digital leadership needs to be further improved.

Main Research Author Analysis

In this study, the Lotka's law distribution map is drawn. The ordinate indicates the proportion of authors of different literatures to all authors, and the abscissa indicates the number of documents. The dotted line in the figure is a general image description of Lotka's law. As can be seen from Figure 3, there are 417 scholars who published a paper, accounting for 92.9% of the total. The number of scholars who published more than two papers was 21, accounting for 4.7% of the total (see Table 1). It can be seen that the authors of the digital leadership research field and the number of documents are similar to the dotted line in the figure, which basically conforms to the general law of Lotka's law. This suggests that the number of writers who have only produced one or two publications in the subject of digital leadership is rather high. The majority of academics in this topic are new, and the research is not extensive.

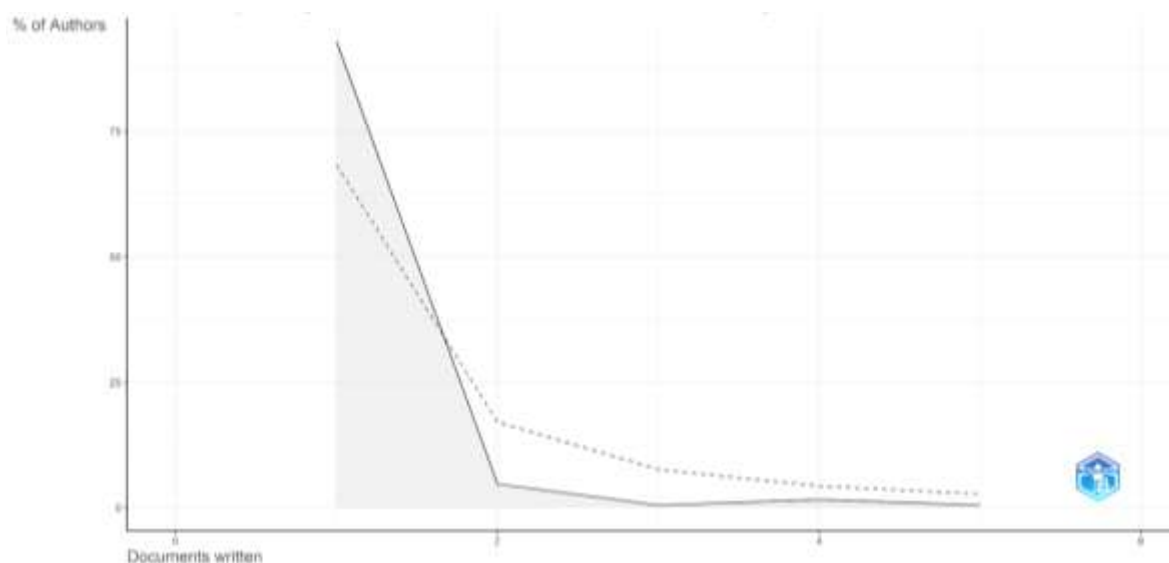


Figure 3. The frequency distribution of scientific productivity.

Table 1.

Distribution of authors and their publications.

Documents Written	No. of Authors	Proportion of Authors
1	417	92.9%
2	21	4.7%
3	2	0.04%
4	7	0.16%
5	2	0.04%

In Figure 4, the shade of the color indicates the citation of the author, and the size of the circle indicates the amount of paper published. Table 3 lists the top 10 high-yield authors in the field of digital leadership. Mihardjo, L.W.W. is the author with the most papers published and the highest citations. Mihardjo has written articles in the subject of digital leadership since 2019. His main focus of research is to investigate the impact of digital leadership in business model innovation and customer experience, which was published in Management Science Letters in 2019 and was cited 29 times. Mihardjo believes that the role of digital leadership, whether it directly or indirectly influences the customer experience orientation in developing business model innovation. In view of this, Frust conducted his research through a survey to 88 senior leader respondents from Indonesia telecommunication firms, in which Smart-PLS application was used to analyze the data. The results of the study indicate that the practical implications of these findings are recommended for the senior leader of management of telecommunications industries in Indonesia to strengthen digital leadership capability in conjunction with the development of business model innovation and customer experience orientation. As Mihardjo stated, the further

research can be explored by expanding the sample, industry, statistical application and longitudinal study. Although Elidjen is listed first in the top-authors' production over time in Figure 3, he is second to Mihardjo in the top 10 influential authors in the field of digital leadership as he co-authored a few publications with Mihardjo.

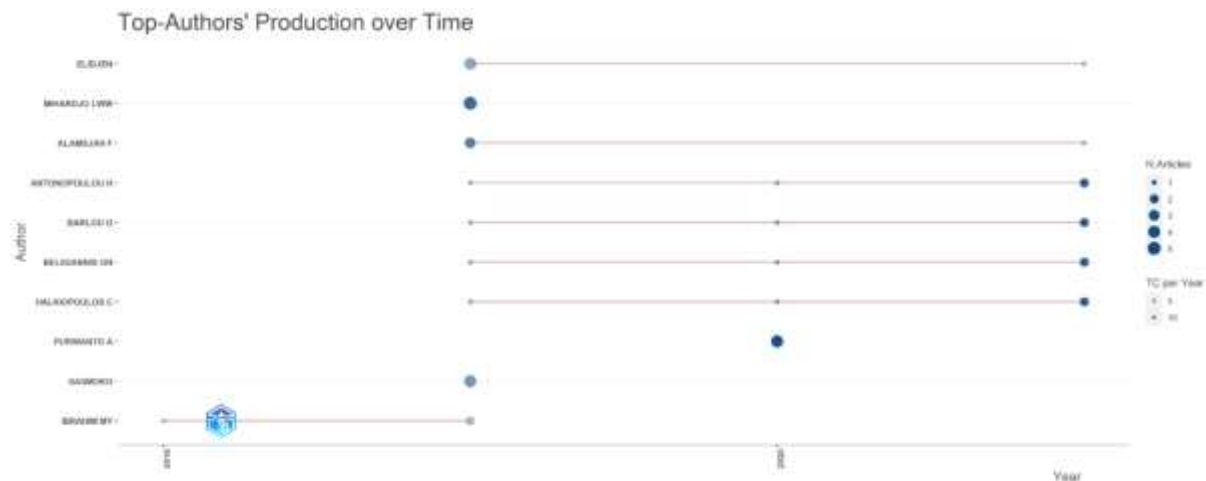


Figure 4. Authors' production over time in the field of digital leadership.

Table 2.

Top 10 influential authors in digital leadership.

Author	Year	Number publications	of Total citation	Total citation per year
MIHARDJO LWW	2019	5	43	10.75
ELIDJEN	2019	4	14	3.5
PURWANTO A	2020	4	42	14
SASMOKO	2019	4	23	5.75
ALAMSJAH F	2019	3	33	8.25
ANTONOPOULO U H	2021	2	24	12
BARLOU O	2021	2	24	12
BELIGIANNIS GN	2021	2	24	12
HALKIOPOULOS C	2021	2	24	12
IBRAHIM MY	2019	2	5	1.25

Main Research Country Analysis

The relevant information of the top 10 countries with the number of published documents is shown in Table 3. It can be seen from Table 3 that: (1) the research strength of developed countries is significantly stronger than that of developing countries. Among the top 10 countries, only China, Malaysia, Indonesia, Greece and India are developing countries. (2) The number of European and American countries is significantly higher than that of Asia (as shown in Figure 4). Germany is ahead of the world in terms of its number of publications and its publications is about 7.74% of the samples. This is due to Germany having launched a new digital strategy, named Digital Strategy 2025, which aims to put it back among the top-performing European countries when it comes to technology. The Digital Strategy 2025 programme, which was adopted in 2016 for a 10 year period, describes the priorities of the German Government, namely the development of digital capabilities and the promotion of the use of new tools with the aim of enhancing Germany's digitalisation processes. The strategy is based on 10 pillars important for digitalisation, including a pillar that focuses on introducing digital education and throughout the stages of one's life. In that regard, this strategy grasped Germany scholars' attention on exploring digital leadership as Germany will be one of the leaders in digital infrastructure in the education sector by 2025. (3) On the whole, the influence of countries with a small amount of publications is not necessarily weak, such as Greece and Italy. Their total citation frequency is significantly higher than some countries with more publications.

Table 3.

Paper Status of The Main Countries Engaged In Digital Leadership From 2001 To 2023

Country	Article s	SCP	MCP	Freq	Total Citation	Average Article Citations
Germany	12	11	1	0.077	94	7.83
Indonesia	10	10	0	0.065	27	2.70
Malaysia	10	10	0	0.065	51	5.10
United kingdom	7	6	1	0.045	84	12.00
China	6	4	2	0.039	13	2.17
Usa	6	4	2	0.039	58	9.67
Greece	4	2	2	0.026	77	19.25
India	4	3	1	0.026	14	3.50
Italy	3	3	0	0.019	33	11.00
Korea	3	3	0	0.019	6	2.00

Note: SCP stands for single-country publication. MCP stands for multiple-country publication.

The number of documents issued in Germany is the highest in the world, with a volume of 12 articles. However, the average citations per item in Germany is only 7.83, which is still a certain gap compared with the citations of other countries. This shows that the overall quality level of Germany's digital leadership literature is moderate. Interestingly, although the total articles of Greece is just four, it showed a high significant number for its average citations per item (19.25) compared to other top influential countries. According to Zarifopoulos (2019), the Greek Deputy Minister for Digital Governance, responsible for Digital Strategy and for attracting investment in Digital Technology, said that Greece is a country that has ever been

lagging far behind the rest of European countries in digital governance and overall use of technology, ranking 25th out of the 27 EU countries on EU's Digital Economy and Society Index (DESI), for 2019. In that regard, modernizing the state through the use of technology has been at the very top of the new Greek government's agenda ever since it took office following the July 7th, 2019, Greece national election. The newly formed Ministry of Digital Governance put together a comprehensive strategic plan (incorporated in the, so called, Bible of Digital Transformation), to digitize the public sector, provide online services to Greek citizens, strengthen the population's digital literacy and incorporate innovative technologies in all sectors of the Greek economy. As a result, the effective leadership of digital transformation, especially in the field of digital leadership, has become an emerging issue that needs to be explored.



Figure 5. Country scientific production in the field of digital leadership.

Keyword Analysis: High-Frequency Keyword Analysis

The keywords are a high level summary of the article, and the high frequency keywords that extract many articles can represent the research hotspots in this field to a certain extent. In order to better explore the research hotspots of digital leadership, four words with a frequency greater than 10 were selected for analysis. As can be seen from Table 4: (1) the hottest areas of research appear in digital leadership, digital transformation, leadership, and digitalisation. It can be seen that the impact of digital leadership, that is digital transformation, is a research hotspot in this field with the frequency of occurrence is 26 times. Among them, there are many studies on leadership, and the frequency of occurrence is 16 times. This can explain that leadership is the main factor affecting the digital transformation. For example, Abbu et al., (2022) reported that the critical leadership skills needed for successful digital transformation differ from what has proven to be most effective in the past. In the digital landscape, leadership must change from an emphasis on competency to a focus on trust. Furthermore, Antonopoulou et al. (2022) in their research also indicated that a good leader who practices transformational leadership and is prepared with the necessary digital skills would be more effective in carrying out administrative responsibilities in an academic environment.

Table 4.

High frequency keywords and their occurrence in the field of digital leadership

Terms	Occurrences
digital leadership	81
digital transformation	26
leadership	16
digitalisation	12

Keyword Analysis: High Frequency Keyword Clustering Analysis

According to the relative position of each keyword in the multi-dimensional scale analysis and the classification of the tree dendrogram, the keywords are divided into three major clusters (see Figure 6 and Figure 7).

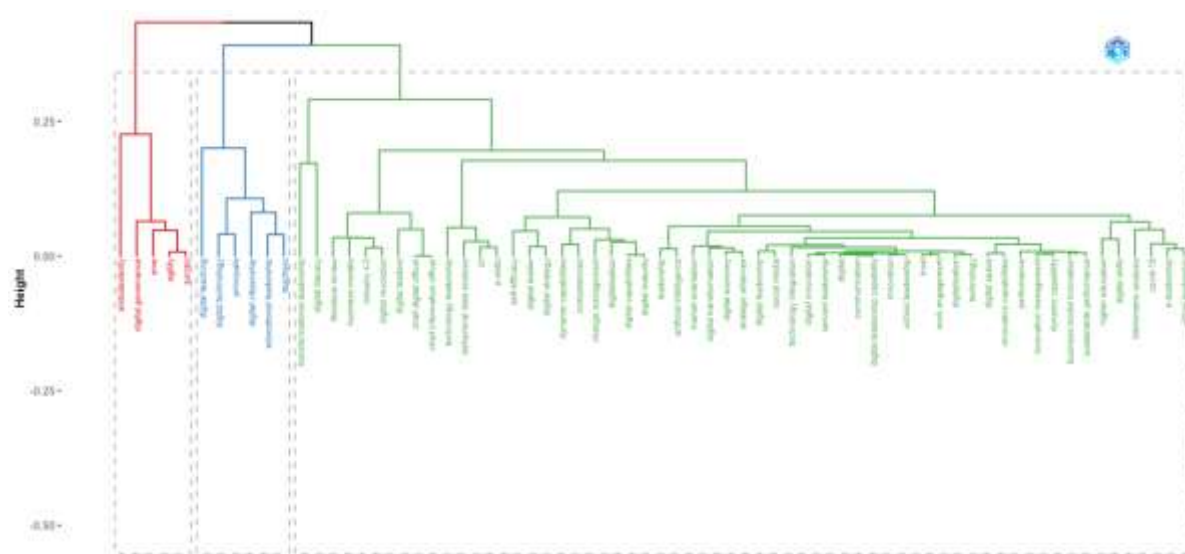


Figure 6. Topic dendrogram of hierarchical cluster analysis of keywords in the field of digital leadership.

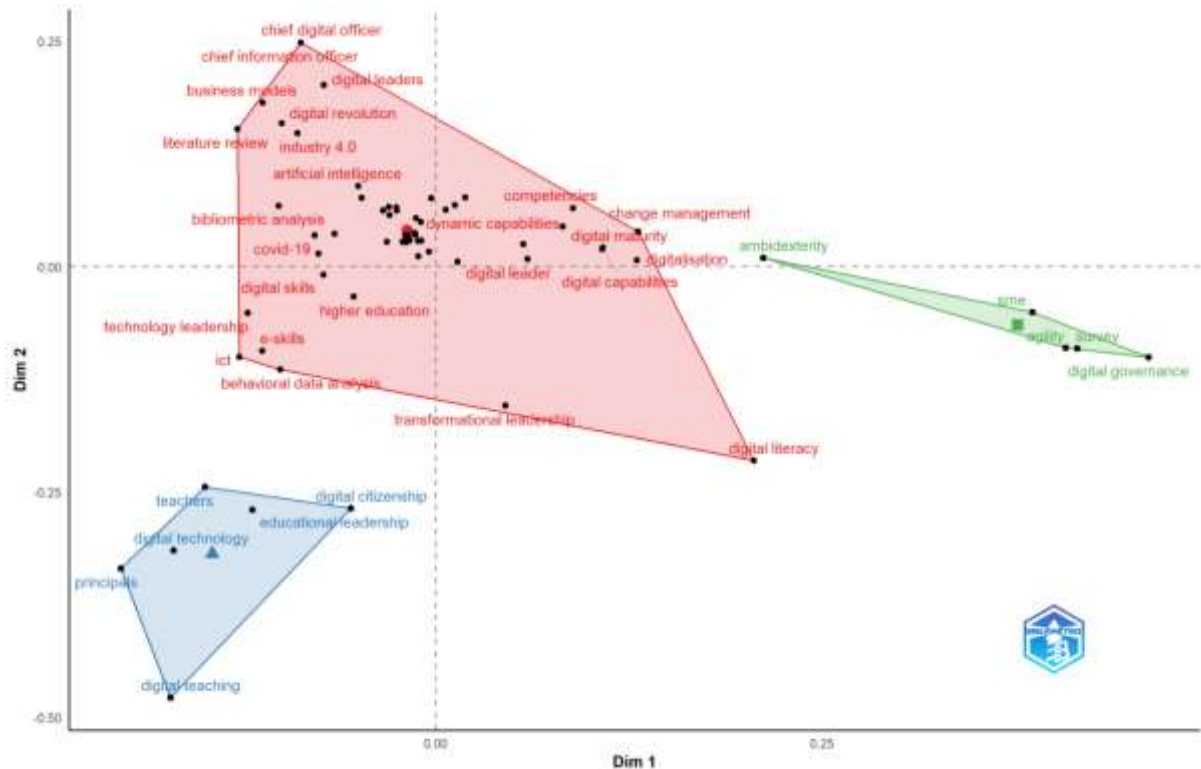


Figure 7. Conceptual structure map with Multidimensional scaling analysis of high frequency keywords in the field of digital leadership.

- 1) The first major category of cluster analysis is mainly concerned with the influence of digital leadership on the context of digital transformation. Leadership in the digital era is the combination of leadership competence and capability to optimize the use of digital technology (Sandell, 2013, Sheninger, 2019). As a result, the impact of digital technology on leadership behaviour have also turned the environment and capabilities into becoming more dynamic. The research of Mihardjo et al., (2022) enriched the archetype of leadership in the digital era where Digital leadership became a central factor in the development of dynamic capabilities that enables firm capability to transform into digital capability. They also mentioned that continuous learning to adapt to the changes also takes on a significant role in the development of digital leadership.
- 2) The second major category of cluster analysis is concerned about digitalisation in educational context. School principals play an important role in encouraging integration of digital technologies in teaching among teachers. Teachers' ability and self confidence in digital teaching can be enhanced by school principals. This is backed by the research of Omar and Ismail (2021) that teachers' self-efficacy on ICT can be developing if the principal plays a role as a true technology leader. Thus, school principals need to reconsider the characteristics of technology leadership so that they become role models for the use of ICT in schools.
- 3) The third major category of cluster analysis is concerned about digital governance of organizations. Digital governance is a framework for establishing accountability, roles, decision-making, and change management authority for an organization's digital presence. From the perspective of the origins of the theory of governance, the purpose of governance is precisely to solve problems and achieve stability (Wang, 2018). After COVID-19, it will be important to establish a model of governance that is compatible with

digital technology, so a firm with digital leadership will be a standard component of a digital society. This development as part of organization culture could be driven from manager or leader positions of the organisations that have the digital skills and competencies.

Discussion

The paper has conducted a bibliometric analysis with RStudio Bibliometrics on the topic of digital leadership based on 155 documents identified in the Scopus database and published during the period from 2001 to 2023. The key takeaway of the analysis is that the given topic of digital leadership is relatively new, but with a strong potential for further development. These takeaways, along with some additional findings, are discussed below.

First, the increasing number of publications during the last few years, especially in 2019, demonstrates the starting point of growing popularity of the digital leadership topic although this topic has been researched since 2001. This popularity may be explained by the rapid advancement of digital technologies and solutions, which was accelerated during the COVID-19 pandemic. Publications in reputable journals such as Research Technology Management and Emerging Science Journal indicate the strong interest of academia. However, such interest is still nascent, resulting in a relatively low number of articles published on the topic. Second, analysis of the high frequency keywords reveals that “digital leadership”, “digital transformation”, “leadership”, and “digitalisation” are the most popular keywords. The relative popularity of the keyword “digital transformation” might be explained by scholars wanting to aid an understanding of the influence of digital leadership on digital transformation and to stimulate future research by providing strategic imperatives to achieve digital transformation. The term “digital transformation” should be required for further research as there is a shift of the trending topics towards “digital transformation” and “digital innovation” indicating the relatively recent interest of academia towards the topic.

Third, the fact that “most productive” or “the most influential” does not necessarily mean “the most cited”, whereby, the analysis demonstrates that the higher number of publications does not guarantee more citations. The novelty of the topic might also affect the list of the average citations per year. As interest increases on the digital leadership topic, this might lead to more published documents from leading institutions or countries due to motivating factors, such as government policy which focuses on digital transformation. Fourth, the results of high frequency keyword cluster analysis show that the keywords were divided into three clusters by Multidimensional Scaling, there are (1) the influence of digital leadership on digital transformation, (2) the digitalization in education context, and (3) the digital governance of organisations. The results are interpreted based on the relative positions of the points and their distribution along the dimensions; as words are made similar in distribution, the closer they are represented in the map (Cuccurullo, Aria, & Sarto, 2016). So, for the educational context, school principals should equip themselves with digital skills so that digital transformation could be achieved and not just in the level of digitalisation (Verhoef et al., 2021).

Fifth, topic dendrogram is a diagram of the hierarchical connection or a treelike description between items. According to Campora et al. (2021), the representation weights each object according to the clusters and measures their links. Based on Figure 6, the detectable clusters have been divided into two broad groups or two evolutions of discussion associated with the digital leadership topic, one linked to digital governance and representing the less-explored area of the study, the other focused on digital transformation that have

been more extensively expanded. In the first strand, related terms such as ambidexterity, ability, survey, digital governance, and Small and Medium enterprises (SMEs) seem to be interrelated. In contrast, the second strand has been divided into two blocks: the influence of digital leadership on digital transformation, and digitalisation. Thus, the strategies or approaches of an organization to adapt quickly, and succeed in a rapidly changing, ambidextrous environment should be further researched in future, not only in business context but also in educational context.

Limitation

A limitation of this study is that the analysis was based on a relatively limited number of publications, which is a potential shortcoming that may be attributed to the nascent stage of the subject. This limitation may potentially affect the results of the bibliometric analysis compared to if it had been conducted on a larger sample size. It is also possible that there are publications in digital leadership that were not taken into account. The advancement of digital leadership and its increasing impact on the digital transformation are expected to generate further academic interest and publications on the topic. Therefore, a similar analysis may be conducted at a later date which will have a greater number of observations to compare the validity of the results presented in this paper, and new trends and tendencies.

Conclusion

The results of the analysis described in this paper represent an overview of the topic of digital leadership from 2001 to 2023. In doing so, the objective and hope of the authors of this paper is to generate further interest and catalyze more in-depth research on the topic. The social and economic impacts of digital leadership and the digital innovation caused by digital leaders are particularly promising areas for future studies.

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