Review and Prospects of Digital Leadership

--Based on Text Visualization Analysis

Rui Zhao

School of government, University of International Business and Economics, Beijing 100029, China

ZGZJKZR@163.com

Abstract

The digital era has influenced the development model of organizations and society, resulting in changes in the essence of traditional leadership. These developments need leaders using innovative, dynamic, and continuous learning leadership especially digital leadership to guide organizations toward achieving sustainable development goals, which is a vital strategic attitude and direction. This article aims to review the research development to better understand digital leadership. This article used the bibliometric method to visually analyze the research trend, hotspots, and theoretical framework of digital leadership based on the literature content during the past five years. The conclusion of this article would promote digital leadership research and provide unique insights for future research.

Keywords

Digital leadership; Visualization; Research trend.

1. Introduction

A new round of technological revolutions, as well as industrial change, has accelerated the digital transformation process. Digital technology has altered the social development mode, and drive the transition of operation models and organizational cultures, which provides sustainable development benefits to society [1]-[3]. In general, leaders may influence digital transformation and organizational performance either directly or indirectly [4]. As a result, leaders should enhance digital management capabilities and propose the organizational innovation path in the digital era [2]. With an increasing emphasis on the interface of digital technology and leadership [5], the concept of digital leadership has become a significant issue in the past five years. However, the previous research on digital leadership is not systematic enough, and many issues, such as the overall development trend and research evaluation of digital leadership, remain unanswered. To fill the gap, this article analyzes the research progress of the digital leadership literature during the last five years and explores the framework of the digital leadership research theme.

2. Research Trends and Review of Digital Leadership

This article employs bibliometrics to analyze the literature related to digital leadership by CiteSpace software. The literature source is the Web of Science, and the retrieval formula is "(TS= (digital leadership)) OR TS=(e-leadership)". The time range of the literature is from 2017 to 2022. Finally, 101 articles were selected.

2.1.   Trends of the Literature Numbers

Fig. 1 demonstrates the literature's number of digital leadership over the past five years. The literature number has shown a slight increase in 2017-2020 and has increased significantly to 37 in 2021, which indicates that as the digital economy has grown, studies on digital leadership have attracted the attention of academics, with much literature having been conducted on the topic.
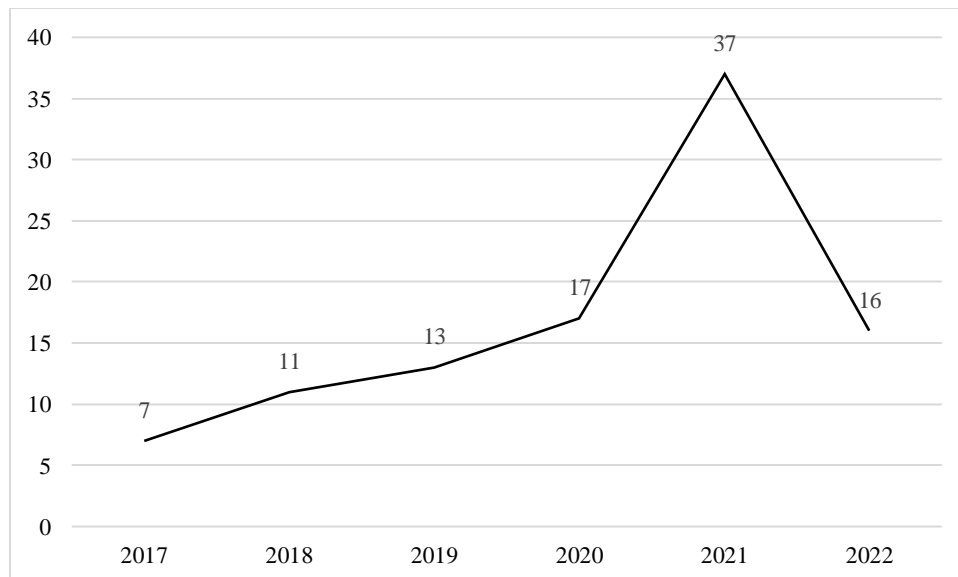

Fig. 1 Digital leadership literature number in 2017-2022

2.2.   Research Hotspots of Digital Leadership

To analyze the research hotspots, this article adopts a visualization method in keyword extraction and clustering analysis. As shown in Fig.2, keywords that appear more than three times are chosen. The research on digital leadership concentrates on "digital leadership" and "digital transformation", including "technology", "performance", "organizational change" and so on, there are also many application scenarios such as "covid-19 pandemic", "education", "health care" and "social media" which indicates that the focus of current research on digital leadership is inextricably related to social development. Particularly, the digital transformation of industries and public emergencies promote the deep integration of digital technology and the real economy to obtain new development dynamism.

Fig. 2 Keywords map of 2017-2022 digital leadership research

The clustering of digital leadership literature is shown in Fig. 3. There are eight clusters, including leadership styles, information technology, education, network dynamics, virtual teams, faculty engagement, industry 4.0, and digital activism. These clusters reflect the basic theoretical framework of digital leadership. In terms of application scenarios of digital leadership, there are education, organizational management, digital governance paradigm, and other fields. In terms of relevant stakeholders of digital leadership, there are several leadership roles, i.e., business leaders and teachers. In terms of the management elements, these keywords can be divided into three categories: enterprises' digital culture, digital technology, and digital theory, which has driven academics to pay attention to the theoretical exploration of "network dynamics" and develop a theoretical system suitable for the digital economy.
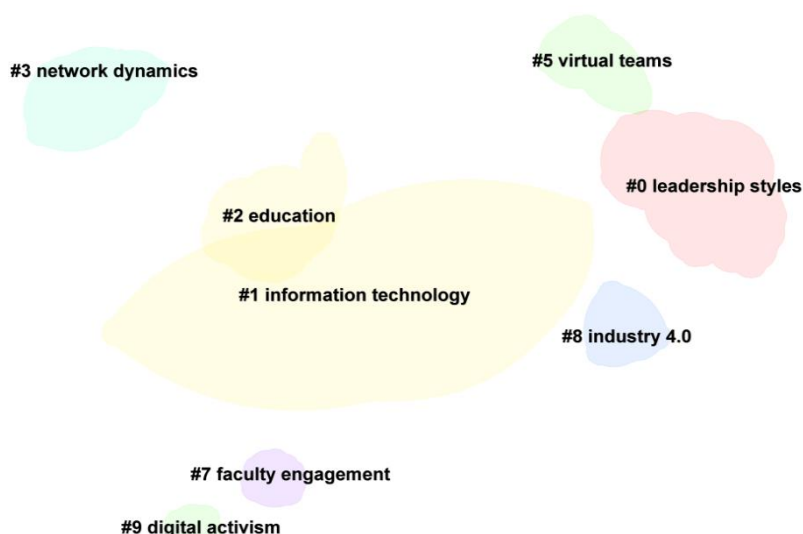

Fig. 3 Clusters map of 2017-2022 digital leadership research

2.3. Evolution trend of digital leadership research

To analyze the research evolution trends, this article uses the time zone distribution map to show the time sequence and span of digital leadership. Fig.4 shows the evolution trend of digital leadership research.

The preliminary exploration period of digital leadership research, which corresponds to 2017, is the first stage. In this period, academics pay more attention to the digital transformation dividend released by the fourth industrial revolution focused on the intelligent information transformation of traditional service industries and explored the important role of digital leadership in the education service industries. During this period, how digital leadership can contribute to digital education reform has become a critical issue in the education management field. Digital leadership plays a prominent role in the education system resources integration, information technology transmission, the teaching methods improvement, and has become a new force for education ecology.

During the second phase from 2018 to 2019, the results in the literature are relatively rich. Scholars explored digital leadership in "social media" and "healthcare transformation" fields. At this phase, new concepts such as "knowledge worker", "boundary management", "digital platform" and "decision making" emerge, which shows that as a new management paradigm, digital leadership has begun to play a role in the organization's value creation mechanism.

In the third phase between 2020-2022, the research is continually evolving into a problem-driven perspective. With the emergence of keywords like "evolution", "performance", and "leadership style", academics are increasingly focusing on the concept of digital leadership and some derivative topics, such as "leadership and organizational digital change", "corporate digital strategy" and "digital knowledge management", which has promoted application

innovation and digital theory development. Additionally, the practical application of various management scenarios continues to support further discussion on digital leadership, and more forward-looking research findings on social welfare may become available in the future.
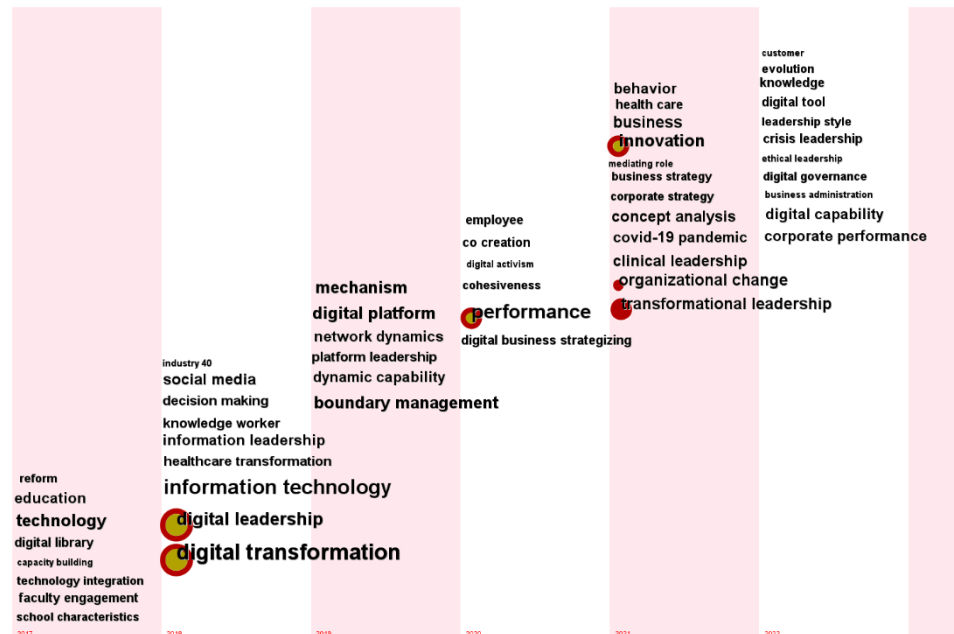

Fig. 4 Time zone distribution map of digital leadership research in 2017-2022

3. Theoretical Framework of Digital Leadership

To deepen the understanding of digital leadership, this article further sorts out the collected literature based on keyword and cluster analysis, and identifies the four topic lines, including the definition, mechanism, influencing factors, and promotion approach.

Topic 1: What is digital leadership—— the definition of digital leadership

Scholars have defined digital leadership from different viewpoints, but there are still no agreements. According to research findings, digital leadership may be classified into two types, as shown in Table 1. Many pieces of literature have discussed that digital leadership refers to the leadership ability of leaders to cultivate a favorable digital cultural environment [6] and promote digital sustainable values by learning and using digital technology [7]. The ability has an impact on the attitude, feeling, thinking, and behavior of individuals and groups. So, digital leadership is not only digital-dominated leadership but also focuses on achieving coordinated development between new digital application scenarios and leadership under a series of core value orientations such as innovation, openness, inclusiveness, and win-win.

Table 1   The digital leadership definitions

Perspective	Authors	Definitions of digital leadership
The perspective of functional elements	Van Wart M. (2019)	The effective use and blending of electronic and traditional methods of communication. There are some basic elements: digital communication, digital social skills, digital team construction, digital technology skills, and digital credibility.[8]
The perspective of Digital behavior - process	Van Wart, M., et al (2017)	The ability to effectively select and use ICT to manage staff and organizations.[7]

	Roman, Alexandru V. (2018)	Using information communication technology to guide the change of followers' behavior and cognition.[9]

Topic 2: How does digital leadership exist--Research on the generation mechanism of digital leadership

Internal elements such as leaders' digital awareness and organizational demand changes together with external factors promote digital leadership development. Among them, digital awareness, as an important endogenous power and an essential critical condition for digital leadership, enables leaders to actively understand the implementation of technologies, as well as continue to take action to participate in digital research, testing, and improvement.

Topic 3: How does digital leadership change --Research on the influencing factors of digital leadership

Leader characteristics and environmental elements are typically influential aspects of digital leadership. Leadership elements that influence the implementation of digital leadership include leaders' technical skills, perception of digital technology, and assessment of digital information technology to some degree [10]. And the design characteristics, subordinate characteristics, consistency of moral values, and mutual trust of personnel in virtual organizations are the main environmental factors affecting digital leadership [11].

Topic 4: How can leaders respond to the digital era--The promotion approach of digital leadership

(1) Micro level: improvement of leaders' digital awareness and ability

Digital awareness, as part of leadership, is necessary to be discussed in the context of specific perspectives. Leaders should hold the digital vision, thinking, and subjective initiative, and then practice the application of digital technology to improve their digital leadership. They should also focus on the employment demands, and actively cultivate multiple big data application-oriented talents to support digital transformation.

(2) Medium level: leadership improvement based on the sustainable development of the organization

Leaders are crucial participants in promoting the organization's digital revolution, thus the digital leadership promotion strategy based on organizational performance management and sustainable growth has also become one of the important research contents. Its path mainly includes organization strategy guidance, policy research supervision, digital infrastructure construction, employee welfare commitment, interpersonal relationship improvement, and team encouragement.

(3) Macro level: promoting national governance capacity

In general, the nation and its government also need to pursue high-quality development through digitalization. Digital government construction, elimination of data islands, and digital leaders' cultivation are the three main steps that the government should take to fundamentally improve the governance capability. Furthermore, the government also needs to establish a digital leadership evaluation and incentive mechanism to set up the necessary guarantee for the cultivation and promotion of digital leadership.

4. Conclusions and Research prospects

4.1. Conclusions

As a new issue, digital leadership has received extensive attention in recent years. The researchers have recognized the importance and potential value of digital leadership. However, from the perspective of the number of publications, the field is still in its early stages. Four themes together constitute the research framework of digital leadership, including definition,

mechanism, influencing factors, and promotion approach. From the analysis results, digitalization has affected and changed organization management and country governance. Leaders are not only the participants but also the crucial drivers in the process of digital transformation. Leaders should hold the digital horizons, create a digital culture, and value digital technology to face the challenges in the new era.

4.2. Research prospects

Although leadership is a popular concept in organizational science, digitalization is a relatively new and unexplored issue. Hence, it's necessary for academics to conduct a systematic investigation to promote digital leadership research.

Firstly, from the perspective of research methods, the existing research still focuses on the qualitative interpretation of relevant theoretical concepts at the level of leadership, and the research on the scientific methods and quantitative evaluation system of digital leadership evaluation is still lacking. So, the construction of a quantitative research method system should be taken into account and used to explore important issues, such as the internal mechanism of digital leadership, and clarify the internal relationship between its influencing factors.

Secondly, some unresolved issues should be given more attention in further research, such as the logic of digital leadership enabling the construction of digital government, the differences of digital leadership in different regions as well as the role of digital leadership in the new public management in the post-epidemic era.

References

[1] Ashkenas R. We still don't know the difference between change and transformation, Harvard Business Review, Vol.21 (2015) No.1,p.3.

[2] Schiuma G, et al. The transformative leadership compass: six competencies for digital transformation entrepreneurship, International Journal of Entrepreneurial Behavior & Research, Vol.28 (2022) No.5,p.1273-1291.

[3] Frankenberger K, et al. The Digital Transformer's Dilemma: How to Energize Your Core Business while Building Disruptive Products and Services(Wiley, America 2020),p.1-400.

[4] Rohana S M, Abdullah C Z. Leadership competencies and organizational performance: Review and proposed framework, International Journal of Academic Research in Business and Social Sciences, Vol7 (2017) No.8, p.824-831.

[5] Montgomery V A N, Roman A, Pierce S. The rise and effect of virtual modalities and functions on organizational leadership: tracing conceptual boundaries along the e-management and e-leadership continuum, Transylvanian Review of Administrative Sciences, Vol12(2016) No.Special Issue, p.102-122.

[6] Magesa M M, Jonathan J. Conceptualizing digital leadership characteristics for successful digital transformation: the case of Tanzania, Information Technology for Development, Vol28 (2022) No.4,p. 777-796.

[7] Montgomery V W, et al. Integrating ICT adoption issues into (e-) leadership theory[J]. Telematics and Informatics, Vol34 (2017) No.5,p.527-537.

[8] Van Wart M, et al. Operationalizing the definition of e-leadership: identifying the elements of e-leadership, International Review of Administrative Sciences,Vol85 (2019) No.1,p.180-197.

[9] Roman A V, et al. Defining e-leadership as competence in ICT-mediated communications: an exploratory assessment, Public Administration Review,Vol79 (2019) No.6, p.853-866.

[10] Savolainen R. Elaborating the conceptual space of information-seeking phenomena[J]. Information Research, Vol21 (2016) No.3, p.1-29.

[11] Avolio B J, et al. E-leadership: Re-examining transformations in leadership source and transmission[J]. The Leadership Quarterly, Vol25(2014), p.105-131.