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E-Leadership Within Public Sector Organisations: A Systematic Literature Review

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Abstract: E-leadership has become particularly prominent in the public sector over the last five years. The urgent shift requires more remote work and management via information and communication technologies. In recognition of its ever-growing popularity, the objective of this article is to provide a systematic review of the existing literature on e-leadership within public sector organisations and identify key research approaches and outcomes. The analysis provides a framework of research on e-leadership in public sector entities, by focusing on various theoretical, methodological, empirical and contextual perspectives, specifically tailored to public sector organisations. The detailed framework, presented here, incorporates dimensions, approaches, clusters and findings of previous research (articles, published in the period 2013–2022), aiding a deeper understanding of the phenomenon and its practical implementation. The study complies with PRISMA 2020 requirements. As it shall be demonstrated, interest in the phenomenon surged during the pandemic, particularly within educational and management disciplines. The findings highlight a predominant focus on leadership within educational institutions, whilst areas such as healthcare and public governance remain under-researched. The most common theoretical approach adopted is associated with the transformational leadership theory and encompasses three main interpretations. Specifically, it evaluates e-leadership as a strategic approach, a leadership process and a leadership transformation. Qualitative methodology predominates in e-leadership research within the public sector, with quantitative and mixed-method approaches being less frequent. Addressing the challenges identified by previous research, such as competency and infrastructure deficiencies, is crucial for advancing knowledge of e-leadership in the public sector and improving sustainable performance.

Keywords: e-leadership; e-leadership research; public sector organisations; systematic review

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1. Introduction

Globalisation significantly influences organisational performance. It requires continuous change and agility, wider adoption of digitalisation, connectivity of technology and people on a daily basis, and efficient leadership in a fast-paced world [1,2]. An increased digitalisation with the aim to enhance the quality of citizen-oriented services is one of the

aspects that have considerably transformed organisational processes in the public sector. Although e-leadership emerged prior to the COVID-19 pandemic, the crisis marked a critical turning point that necessitated sudden and extensive changes across both private and public sectors, compelling organisations to implement urgent measures, such as the adoption of remote work and the integration of management and leadership through information and communication technologies (ICT). Such dynamics are commonly referred to as e-leadership.

In the literature, the term "e-leadership" often overlaps with virtual leadership, remote leadership and digital leadership [3,4]. Whilst they all depict a focus on leadership in digital, virtual or remote environments and in ICT-mediated contexts [5], they also exhibit a variety of nuanced differences. Virtual leadership typically refers to managing teams working entirely in virtual spaces, whilst remote leadership emphasises the management of dispersed teams with a focus on communication, emotional intelligence and technological tools [3,6]. Similarly, digital leadership is associated with the use of blended electronic and traditional communication methods and technologies to drive change, improving the efficiency, quality, transparency, participation and accessibility of public services, particularly in educational settings [5,7–10]. Additionally, some studies highlight the need for e-leadership in public sector organisations to be considered as a component of the broader concepts of e-government and e-governance [11–13]. As such, the analysis of the phenomenon of e-leadership cannot omit the examination of other terms, used interchangeably within the literature. However, this article focuses specifically on leadership in electronic, digital, remote and virtual environments.

Digitalisation in the public sector is pivotal in driving innovation and supporting more sustainable performance [14]. It is supported by the United Nations Sustainable Development Goals (SDGs), particularly SDG 16 (Peace, Justice, and Strong Institutions), as it strengthens the long-term impact of digital governance [15]. Previous studies have shown that a leadership style that embraces the utilisation of ICT tools and platforms encourages employees to demonstrate positive behaviour towards sustainability, such as a circular economy, to support and maintain sustainable practices [16]. Empowered employees willingly engage with technology, as it improves individual performance and enhances the organisation's sustainability by fostering practices that ensure long-term viability and efficiency [17]. Moreover, as Broccardo et al. [18] demonstrate, it not only exhibits a positive effect on sustainability and sustainable performance, but also improves transparency and accountability.

Whilst numerous studies examine the concept of e-leadership [11,19–28], they often lack focused attention on specific research approaches in studies within the public sector. Several studies have already provided a literature review of e-leadership in public sector organisations [9,29–32]. However, they are specifically focused on e-leadership in a particular region or group of public sector organisations. Despite the growing significance of e-leadership in the public sector, there is an observable gap in the analysis of research findings, particularly regarding the main dimensions of theoretical, methodological and contextual perspectives, and empirical outcomes. Such scarcity of research hinders the development of a cohesive framework of existing e-leadership research and its practical implications. Consequently, this article aims to provide a detailed framework of research on e-leadership within public sector organisations. The study contributes to a more comprehensive understanding of the phenomenon in various public sector entities, particularly in terms of specific theoretical, methodological, empirical and contextual research perspectives, explored thus far in the existing literature.

The systematic literature review, provided in this article, answers two main research questions. Firstly, what are the main theoretical and methodological approaches employed

in studies on e-leadership within public sector organisations? Secondly, what are the main findings, identified by existing research, relevant for e-leadership development and practice? The systematic literature analysis identified the framework of previous research on e-leadership in public sector organisations by focusing on various theoretical, methodological, empirical and contextual perspectives, specifically tailored to public sector entities.

Methodologically, this article relies upon a systematic literature analysis (qualitative approach). Following the application of selection criteria, 32 publications were selected for inclusion in the study, offering a comprehensive understanding of e-leadership research in the public sector in the period 2013–2022.

The structure of this article is as follows. The first section examines e-leadership in the context of e-government, incorporating the evolution of the phenomenon. The second part outlines the research methodology employed in the investigation of research on e-leadership and its dimensions within public sector organisations. The third section presents the findings, following the systematic literature analysis. Finally, the article offers a discussion of the developed framework, identifying the dimensions and specifics of the existing research on e-leadership within public sector organisations, and a summary of key conclusions.

2. The Complexity of E-Leadership Concept

Digital transformation leads to a fundamental reorganisation of services, both in private and public sector settings. The aim of such comprehensive reforms is to enhance the efficiency of employee and civil servant activities and aid the effective delivery of services, ultimately leading to greater citizen satisfaction [33]. The advent of ICT has facilitated a shift from traditional to digital communication methods. Advances in science and technology have given rise to e-leadership—a concept that reflects the contemporary trends in modern management [34]. Such ICT-management trends are closely linked to the digitalisation of the public sector, particularly within governmental institutions. Consequently, the concepts of e-governance and e-government are crucial for the analysis of e-leadership in the public sector.

E-governance focuses on the relationship between government and citizens. Its aim is to improve communication, facilitate the expression of citizen preferences and evaluate policies [35]. E-governance introduces a new notion of citizenship, encompassing both the responsibilities and the needs of citizens [36]. E-governance involves the strategic use of ICT to enhance governance structures, systems, and procedures, fostering an inclusive, participatory, accountable, transparent, and responsive government, whilst ensuring that service delivery sustainably meets the needs of citizens [37]. In the context of e-governance, e-leadership is understood as the application of ICT within public sector activities to enhance service quality, operational efficiency and democratic engagement. As such, e-governance implies a broader scope of activities, compared to e-leadership, as it further addresses the dynamics of government–citizen interactions.

E-government seeks to improve services, work processes and products, utilising tools, such as transactional websites, customized software, coordinated electronic interfaces and electronic complaint systems. It further focuses on the internal perspective of communicating, coordinating and motivating individuals, tasked with the provision of services and products [12]. The shift from traditional e-government to digital government highlights the importance of both technological advancements and citizen-centric policies that promote long-term sustainability [15]. The success of e-government implementation is ensured by agile leadership, which can speed up e-government implementation processes. Recent scientific debates have highlighted the necessity of digitalising internal human resource management processes within public sector organisations, incorporating government en-

tities, in order to ensure the successful implementation of e-government. This includes the practical application of e-leadership and a power dimension, related to ICT, whereby managers, possessing more in-depth technology-related knowledge, are better equipped and more confident in the implementation of ICT changes and related policies [11,12,38,39]. Consequently, e-leadership can be described as a system of e-government with a primary focus on internal organisational processes, rather than the external relations between public sector organisations and citizens [13].

Within the literature, e-leadership is defined as a process of social influence, mediated by advanced ICT tools, that exerts a social impact, thereby changing attitudes, feelings, thinking, behaviour and performance [11,12,19]. It specifically refers to elements associated with the Internet, electronic resources, and the virtual environment [5]. Typically, it is analysed at three levels—macro, meso and micro [25]. The macro level addresses e-leadership in terms of its strategic implications for organisational change and transformation, incorporating aspects such as planning, decision-making and control. The studies on the meso level focus on changes in the work context, resulting from the adoption of information technology and social networks, and their potential impact on leadership practices. Finally, at the micro level, e-leadership is considered as manifested through various means, such as attitudes, behaviour and emotions exhibited by supervisors and subordinates.

COVID-19 is universally recognised as an emergency, bringing about a significant degree of uncertainty and exerting an adverse impact on all aspects of public and private life. The pandemic necessitated the implementation of quarantine measures, leading to a closure or a severe restriction of all services, the cancellation of events, and limitations regarding personal interaction [40]. The unprecedented situation has exposed deficiencies related to the management of the crisis by governments and public sector organisations, and has highlighted areas in urgent need of improvement [41]. The state of emergency significantly altered work organisation patterns, leading to a sudden shift towards remote work. Within the literature, the phenomenon is defined as a method of organising work-related activities, whereby employees perform their duties from locations outside of their usual workplace, or simply working from anywhere at any time [26]. In such instances, remote work was often mandated for all employees, irrespective of their individual capacity and needs. Such an approach overlooks employees' ability to manage social isolation and adapt to significant changes [42–44]. As Dwianto et al. [29] point out, the COVID-19 pandemic prompted a sudden transition from traditional workplace settings to remote work from home. Prior to the crisis, teleworking was a rare occurrence; however, it became the norm almost instantaneously. Personal interaction was largely supplanted by virtual communication, and there was a notable increase in the use of digital tools, such as Microsoft Teams, Zoom and various social networks. Additionally, whereas working hours were previously strictly regulated, the pandemic saw a shift towards a more flexible approach. Remote work at the beginning of the pandemic was generally appraised positively and regarded as a smooth process, although personal and societal experiences varied. Later studies addressed various challenges related to the practice, and questioned the effectiveness of remote work, particularly during emergency situations [45]. The study of Dwianto et al. [29] further identified several issues. According to them, remote work in ASEAN countries contributed to a decline in work quality and a deterioration in work–life balance, with both managers and employees working longer hours than before. Similarly, the tendency was confirmed by other scholars, analysing e-leadership in European countries [46,47].

The pandemic compelled the public sector to swiftly adopt new technologies, enabling employees to work from home whilst ensuring that the quality of service delivery to citizens remained unaffected [33]. Due to the increase in remote work-related activities, e-leadership became an integral part of public sector management, rendering a leader's

knowledge and skills pivotal [13,30,46–49]. In order to lead effectively in a virtual environment, particularly during emergency situations, individuals in supervisory positions are required to adapt constantly to changing and uncertain environments. As such, they are expected to possess good ICT knowledge and expertise, combined with well-honed social communication skills [1,50]. They must offer support, implement innovative solutions and effectively communicate these to employees during a crisis. Moreover, their leadership, albeit in a virtual environment, must encourage subordinates to express their thoughts freely, participate in the decision-making process, cooperate and take responsibility for fostering a positive organisational environment. Strong leadership, particularly during crises, ensures that targets are reached in a timely manner, whilst ensuring that citizens' needs are met, regardless of the challenges.

Unsurprisingly, under the pressures created by the COVID-19 pandemic, e-leadership has gained significant traction. Moreover, recent post-pandemic research on e-leadership confirms that, regardless of the varying scales of remote work capabilities across different countries and public sector organisations, the significance of the phenomenon persists. Notwithstanding the return to office requirement, a significant number of leadership processes—such as task delivery, communication, and control—continue to rely on ICT tools [46,47]. However, it has proven to be an increasingly complex process, with additional challenges calling for a nuanced approach to its study. The impact of such unprecedented disruptions of e-leadership in the public sector underscores the need for a thorough investigation of the existing research directions and findings. To address these deficiencies, the ensuing chapter elucidates the methodology of the systematic literature review, offered in this article.

3. Research Methodology

The primary method employed in this study is a systematic literature review. Such an approach is utilised to acquire comprehensive knowledge on a particular subject, trace the historical development of scholarly understanding, identify gaps in the existing body of literature, assess areas of controversy, and determine whether a specific topic is marked by consensus or ongoing debate. Moreover, it serves to elucidate relationships between concepts and substantiate the significance of a problem for further investigation [51]. As a stand-alone research method, the literature review is predominantly featured in studies, aimed at analysing existing literature on a specific topic, without the collection or analysis of primary data. Usually, the intention is to identify potential avenues to explore for future research [52]. Rather than generating entirely new knowledge, a systematic literature review seeks to synthesise and summarise existing knowledge by drawing upon previously conducted research on a particular subject [51].

The research strategy of this study adhered to the six key steps, outlined in the systematic literature review procedure [53]. The first stage involved the formulation of the review question and the development of a search strategy, grounded in explicit inclusion criteria, in order to identify suitable studies. As a second step, this was followed by source identification, with studies identified from multiple databases and information repositories. Employing carefully developed inclusion criteria, the third stage involved study selection, data extraction and bias assessment. It was followed by data analysis as a fourth stage, employing quantitative (descriptive statistics) and qualitative (content analysis) methods. The content analysis of the selected articles was conducted by grouping, systematising and categorisation, focusing on identifying themes. The categories (themes) identified in the process of content analysis, provided the titles of the approaches, clusters and findings, included in the framework of previous studies on e-leadership within public

sector organisations. The fifth step involved the presentation of results, with the final, sixth step, focused on the interpretation of findings and conclusion.

Following the guidelines, proposed by Moher et al. [54], inclusion and exclusion criteria for the sources were established prior to the review process (see Table 1).

Table 1. Criteria for article selection.

Inclusion of Articles	Exclusion of Articles
Articles published between 2003 and 2022	Articles published before 2003
Articles written in English and Lithuanian *	Articles written neither in English or Lithuanian
Articles evaluating e-leadership in public sector organisations	Articles where research was conducted in educational institutions treating e-leadership as a distance learning tool Articles where research was carried out in non-public sector organisations
Articles with open full-text access	Duplicates

* As some publications on e-leadership in municipalities (written by Lithuanian authors) were cited in subsequent studies, some of the latest research (written in Lithuanian) by the same authors was included in the sample.

The selection criteria were devised in a way that ensured a sufficient volume of studies, whilst ensuring accuracy and reliability. The topic of the article as well as the content of the abstract were very important for the selection of texts. Two main requirements were followed. Firstly, the article had to be focused on e-leadership as the ICT intermediated interlinks between supervisors and subordinates. Secondly, the research had to be conducted in the public sector or using secondary resources, oriented towards public sector specifics. As the data for the research were collected by authors based at an institution where full access to academic publications was not always available due to institutional limitations, accessibility was adopted as a further selection criterion. Such a methodological approach facilitated the identification of research questions and offered the opportunity to conduct a comprehensive analysis of the e-leadership phenomenon, including its implementation. Although it is not feasible to generalise the insights provided here to other sectors nor to compare findings across different time periods, this study offers a valuable framework regarding research on e-leadership within public sector organisations from 2013 to 2022. In doing so, it highlights key approaches, clusters, and findings associated with this research framework.

In order to ensure the accuracy of this study, articles were retrieved from a variety of databases, such as Business Source Ultimate (EBSCO), CEEAS (EBSCO), Academic Search Ultimate (EBSCO), Education Source (EBSCO), PubMed Central, ScienceDirect Journals, Springer Online Journals Complete, ELABA and ERIC. The selection of databases was informed by their relevance to the subject matter, with an initial examination of 17 databases, ultimately narrowing to 7, based on the volume of suitable publications identified through keyword searches. To further expand the sample, additional databases, such as CEEAS and ELABA were reviewed, with a specific focus on those, containing articles relevant to research on public sector organisations. The search was conducted using the following search terms: “e-leadership”, “e-management”, “electronic leadership”, “digital leadership”, “remote leadership”, and “virtual leadership”. These terms were selected after a thorough review of the scientific literature, focusing on concepts that are frequently used interchangeably with e-leadership to ensure a comprehensive analysis of the phenomenon within public sector organisations. Although terms such as “remote management” or “electronically-mediated leadership” are used in previous research, this

study did not incorporate them. "Remote management" is a term predominantly employed in research of e-leadership within business sector organisations, which diverges from the focus of this study—public sector entities. Similarly, "electronically-mediated leadership" is a term used in research, focused on the interlinks between students and their teachers [55]. As already mentioned, this study excluded articles where research was conducted in educational institutions, depicting e-leadership as a distance learning tool. Therefore, just mentioned terms were used for the search. The database searches relied upon specific filters, including topic/keyword, open full-text access, publications from 2003 till 2022 (20 years), and articles (the search for academic texts was conducted over September and October 2022). However, whilst the search was focused on the period 2003–2022, the final sample incorporated articles published between 2013–2022. As such, it provides a significant overview of the period, during which e-leadership became relevant for the context of public sector organisations.

Initially, the search yielded 5168 scientific publications. Following the application of all relevant filters, the results were refined to 2563 articles. Further selection, based on titles and abstracts, resulted in a final collection of 99 articles for detailed analysis (see Figure 1 and the PRISMA Flow Diagram in the Supplementary Materials).

Following a full-text analysis, 32 articles were selected that specifically examined e-leadership within public sector organisations, ensuring that the phenomenon was considered as leadership in digital, virtual or remote environments and in ICT-mediated contexts, and not as a tool for distance learning or as a competency (see Appendix A Table A1).

After the application of the search filters, the term "e-management" yielded the highest number of initial results, with a total of 757 articles. However, following a more focused selection by topic and abstract, only five of these articles were deemed potentially suitable, with only one meeting all the search criteria. The phrase "digital leadership" led to the inclusion of nine articles in the systematic literature review, representing the highest number of articles selected, based on topic and abstract. The search term "e-leadership" produced the largest number of articles that met all the search criteria, with a total of 17 scientific publications included in the final analysis. A comprehensive list of the selected articles with codes (A1–A32) is provided in Appendix A (see Table A2).

The research instrument employed for the systematic literature analysis comprised a series of questions, evaluating four key dimensions (contextual, theoretical, methodological and empirical perspectives) of the existing literature, including:

- What are the characteristics of articles within this field, such as the geographical distribution of authors, the diversity of scientific disciplines represented, and the range of public sector organisations studied?
- Which leadership theories are predominantly applied in these studies, and what theoretical variations and the principal research directions can be identified?
- What is the variety of methodological approaches adopted?
- What are the main implications of the results of the specific study? What challenges are highlighted in the articles? How is the impact of e-leadership evaluated across different levels (micro, meso, and macro)?

The dimensions of the framework presented here were developed employing a deductive approach (already targeted by the primary idea of the research). However, approaches, clusters and findings identified in the development of the framework were derived via an inductive approach. Stemming from the content analysis of the articles included in the sample, it identified their theoretical and methodological perspectives, as well as their empirical outcomes. The visualisation of the framework is provided in the discussion section as a main outcome of this study.

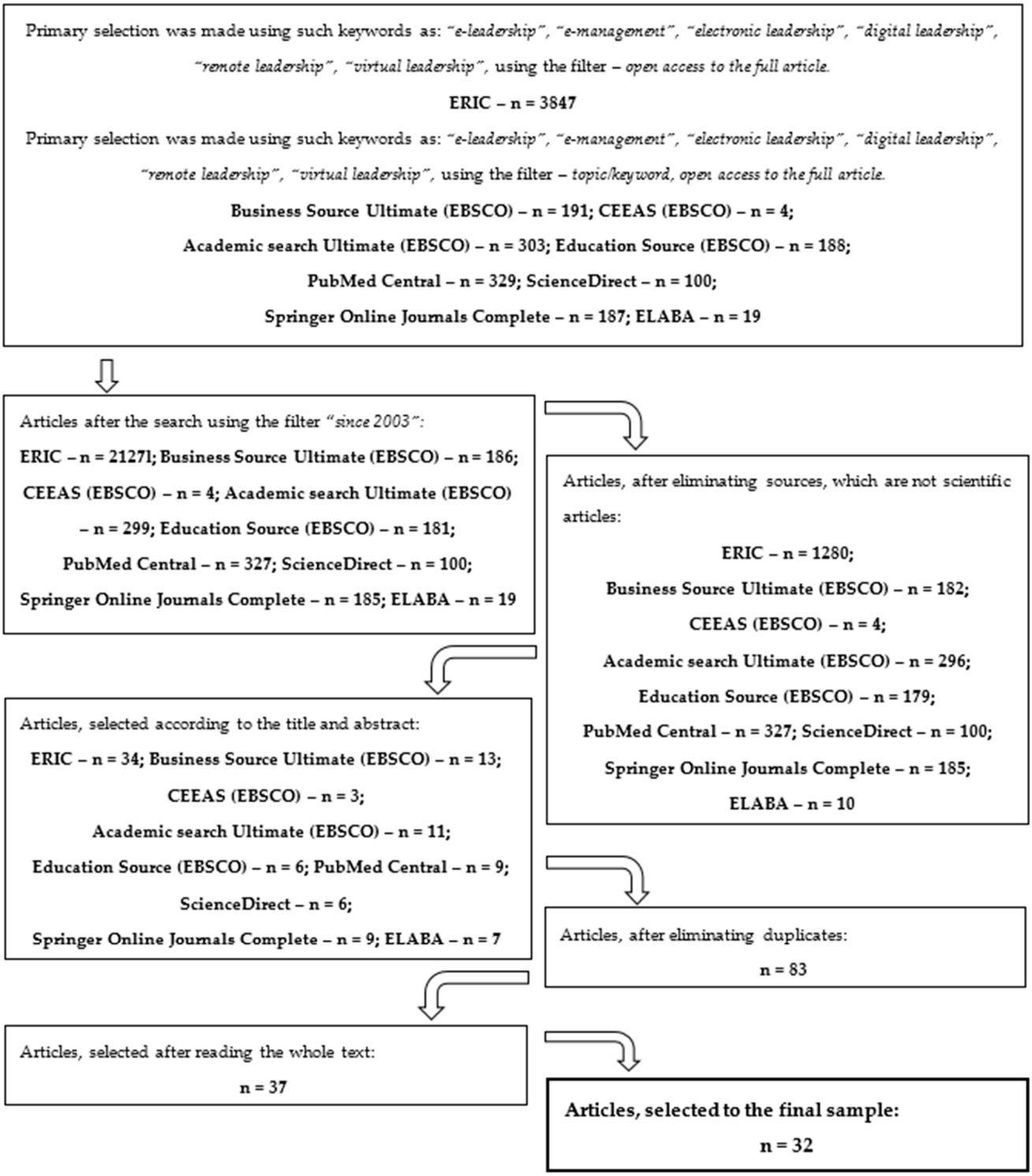

Figure 1. Procedure of article selection (sampling).

The empirical research was carried out in the period 2022–2023, with the retrieval of the articles conducted in September/October 2022. The data analysis, such as the identification of the dimensions, approaches, clusters and findings, was performed manually. The visualisation was provided using various software—Zotero 6.0.36, VOSviewer 1.6.20 and the free version of Canva (https://www.canva.com/, accessed on 3 May 2025). Zotero 6.0.36, designed for managing bibliographic data and associated research materials, assisted in the extraction of keywords, by using qualitative content analysis of the abstracts of all articles, included in the sample. The bibliographic data file from Zotero was uploaded to

VOSviewer 1.6.20—a software tool, which aided the construction and visualisation of the bibliometric networks. Canva was utilised to produce the final framework.

The research has followed PRISMA 2020 requirements for the systematic literature review [56]. Therefore, PRISMA 2020 for Abstract Checklist, PRISMA 2020 27-item checklist and PRISMA 2020 flow diagram for new systematic reviews were provided as the Supplementary Materials of this article.

4. Results

4.1. Characteristics of the Literature

The systematic literature review included 32 articles that conformed to all predefined selection criteria. Although the search incorporated a period, longer than 20 years, the number of relevant articles published prior to 2010 was limited, with only a small selection from 2013 included in the final analysis (see Figure 2). However, a notable surge in the popularity of e-leadership within public sector organisations is evident from 2019 onwards. The increased attention coincides with the global onset of the COVID-19 pandemic, during which public sector organisations were forced to transition to remote work and management practices. Consequently, since 2019, academic interest in e-leadership has continued to expand, particularly within the context of e-management in public sector organisations.

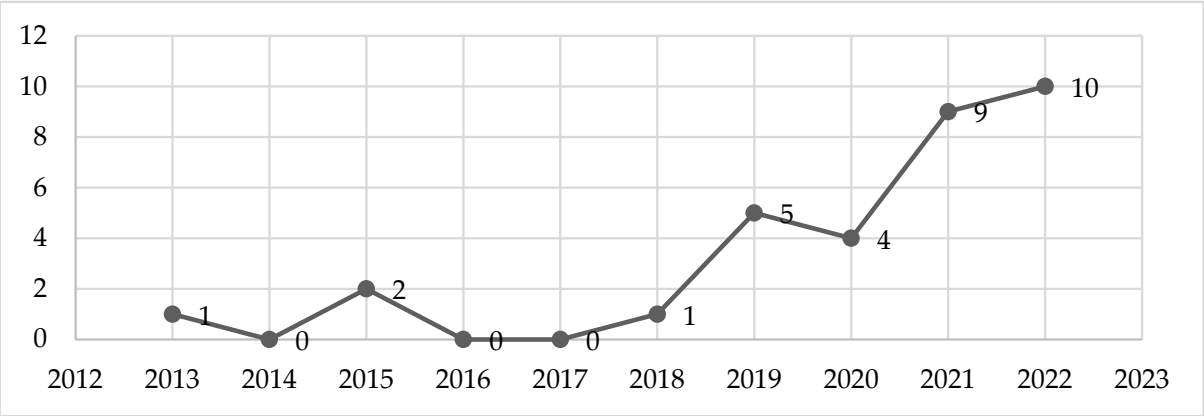

Figure 2. Division of articles, included in the study, according to the year of publishing, N = 32.

An examination of *the geographical distribution of authors* conducting research on e-leadership in public sector organisations, reveals that academics, working for US research institutions, are particularly interested in the topic. Indeed, 25 per cent of the articles analysed in this study were authored by US scholars. A further 12.5 per cent were published by Lithuanian authors, reflecting an observable increase in the popularity of e-leadership within Lithuanian public sector organisations since 2019. Moreover, 7.5 per cent of the articles analysed originated from Indonesia and Malaysia—countries in which the topic of e-governance is gaining traction in both the private and public sectors. Finnish authors contributed with 5 per cent of the articles, whilst the rest of the analysed publications were authored by scholars from such countries as Ireland, Spain, Greece, Poland, Latvia, Estonia, Turkey, Jordan, Kuwait, Pakistan, China, South Korea, Australia, and South Africa.

The analysis of keywords identified *the common keywords* associated with the terms "e-leadership", "virtual leadership" and "digital leadership" in the titles and the abstracts of the articles analysed (see Figure 3a). The network visualisation revealed that the principal common keywords associated with the term "e-leadership" include study, COVID, pandemic, technology, interview, leader, communication, need, effect, and perception (Figure 3b). Similarly, the common keywords related to "virtual leadership" include study,

COVID, pandemic, leadership, principal, development, communication, interview, need, and development (Figure 3c). In addition, the most common keywords associated with "digital leadership" include study, COVID, pandemic, technology, leadership, research, development, leader, and principal (Figure 3d). All three terms share commonly utilised keywords, such as COVID, pandemic, and technology, which demonstrates that the pandemic has spurred interest in e-leadership within the context of a crisis in the public sector.

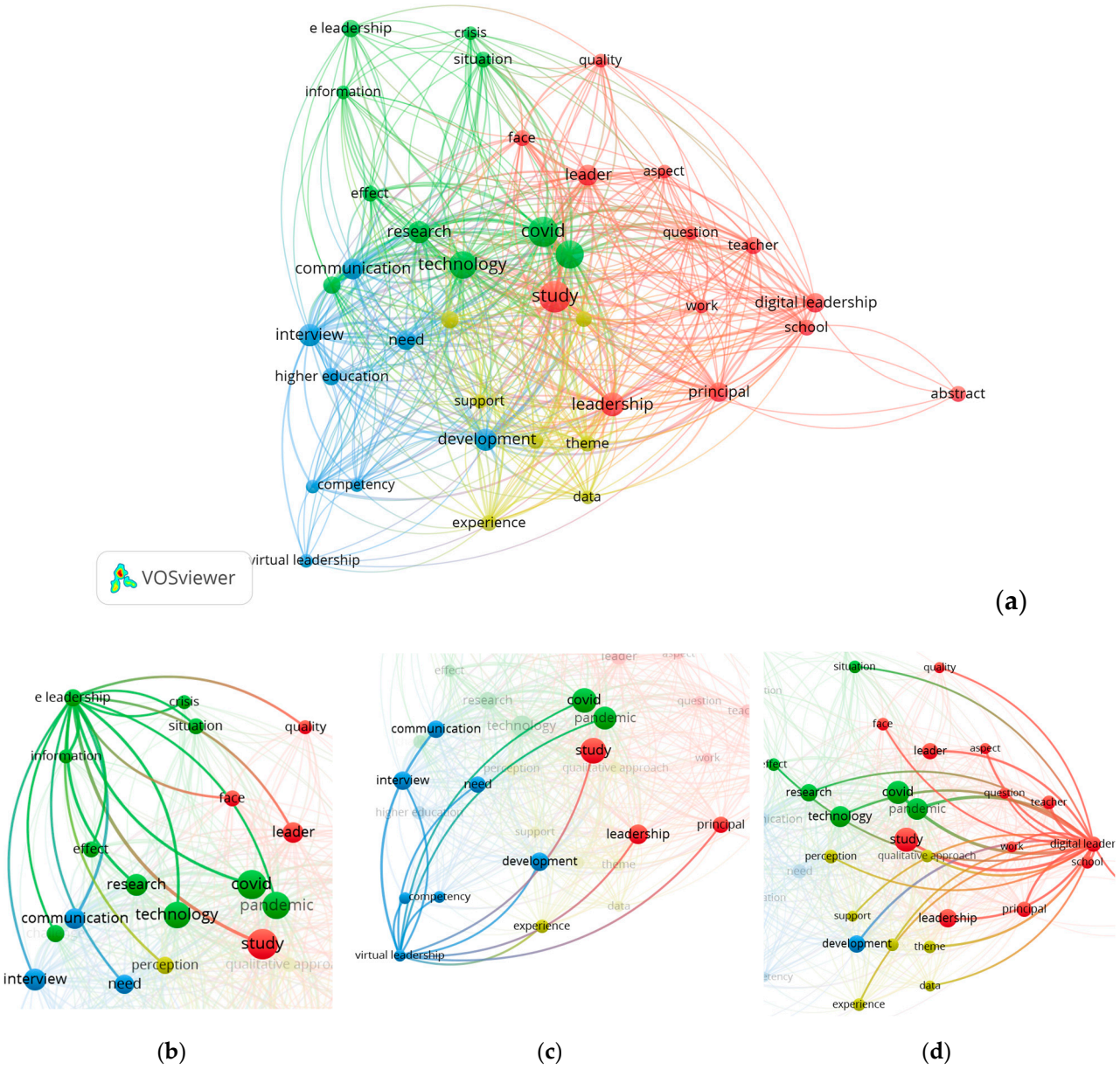

Figure 3. Network visualisation of keywords.

This is further confirmed by the analysis of the main terminology and the publication period of the articles analysed (see Figure 4). It is evident that "e-leadership" garnered significant attention in research conducted and published in 2020. In contrast, the term "digital leadership" gained prominence in 2021, whereas "virtual leadership" was predominantly utilised in 2019, prior to the onset of the pandemic.

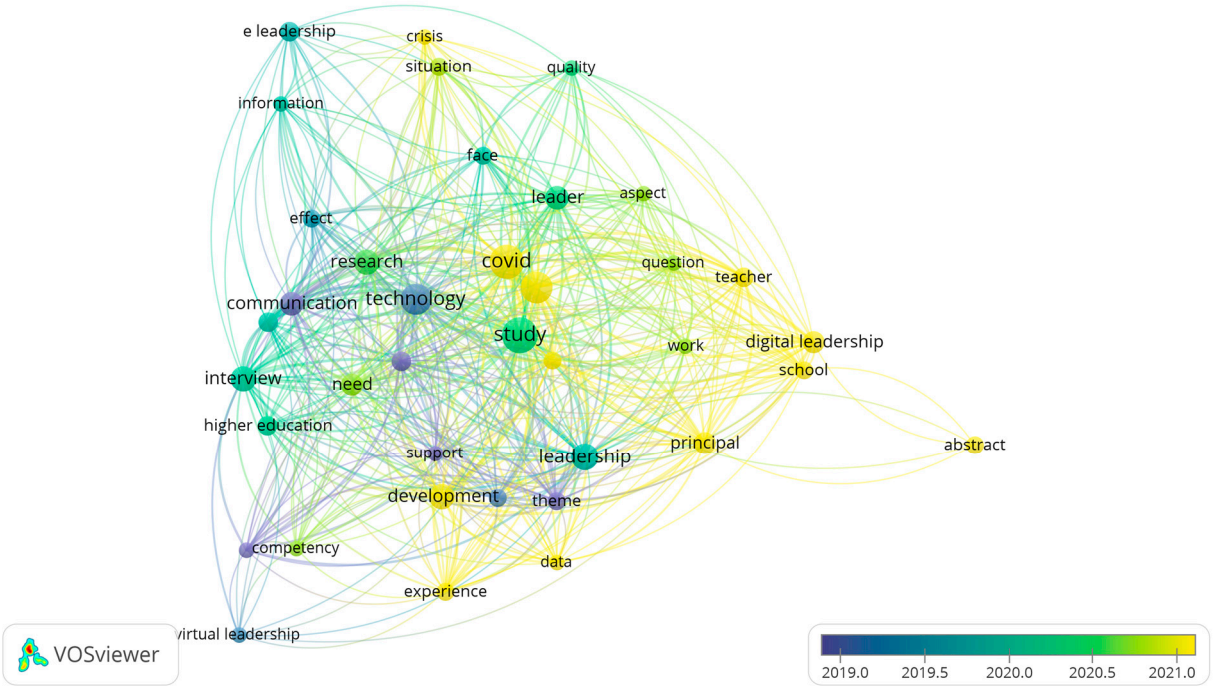

Figure 4. Overlay visualisation of keywords according to the publication period.

The analysis of the popularity of e-leadership in public sector organisations amongst scholars from *different scientific fields (disciplines)* reveals that the majority of authors are positioned within the field of management sciences (see Table 2). Moreover, a large proportion of the studies analysed here were conducted in educational settings, which demonstrates that the topic is also very pertinent within the field of education sciences. Whilst e-leadership remains most popular amongst academics from the fields of management and education (pedagogy) sciences, the analysis demonstrates that they often collaborate with scholars from other scientific fields, such as information technologies, politics, psychology and health sciences.

Table 2. Scientific fields of authors, studying the topic of e-leadership in public sector organisations.

Scientific Field	Codes of Articles
Information technology	A6; A8; A19
Political science	A11
Psychology	A4; A13; A22; A32
Healthcare	A6; A15
Education	A1; A2; A3; A9; A12; A14; A17; A18; A19; A20; A21; A25; A26; A27; A29; A31
Management	A5; A7; A8; A10; A11; A13; A15; A16; A20; A21; A22; A23; A24; A26; A28; A30; A31

The evaluation of the *public sector organisations, subject to e-leadership research*, demonstrates that the majority of studies focus on educational institutions, ranging from primary schools to higher education establishments, and local government bodies (see Table 3). Conversely, there is a notable scarcity of research, focused on healthcare organisations. It should be noted that research on e-leadership in other types of public sector organisations remains wanting.

Table 3. Public sector organisations on which the e-leadership research focuses.

Type of Organisations	Codes of Articles
Local government bodies	A6; A10; A11; A16; A22; A24; A31
Education organisations	A1; A2; A3; A5; A7; A9; A12; A13; A14; A17; A18; A19; A20; A21; A25; A27; A28; A29; A30; A32
Healthcare organisations	A8; A13; A15

It is worth elaborating further on the specifics of research within the most represented educational institutions. A number of studies recognised e-leadership not merely as an educational tool or competency, but as a leadership process. As noted by Saraih et al. [8], effective e-leadership facilitates the successful implementation of technology and enhances the quality of teaching and learning. As such, its primary objective within educational settings is to improve learning outcomes. Unlike e-leadership in other types of institutions, learning outcomes are readily quantifiable and observable, which permits the evaluation of its successful implementation.

The analysis presented here further examines *research directions in e-leadership* in various types of public sector organisations (see Table 4).

Table 4. Connections between research focus and groups of public sector organisations.

Groups of Public Sector Organisations	Research Focus	Codes of Articles
Local government bodies	Competencies related to e-leadership	A6; A31
	E-leadership in practice	A10; A11
	Impact of e-leadership—challenges and opportunities	A16; A22
	Processes of e-leadership	A23
Education organisations	Competencies related to e-leadership	A1; A3; A9; A17; A18; A19; A28; A29; A32
	Processes of e-leadership	A2; A5; A21; A27
	Impact of e-leadership—challenges and opportunities	A7; A14; A20; A25
	Digital communication	A12; A17; A30
	Innovations in educational technologies	A19
Healthcare organisations	Impact of e-leadership—challenges and opportunities	A13
	E-leadership in practice	A15
	Digital communication	A8

As illustrated in Table 4, the predominant focus of research pertains to the competencies of e-leadership amongst managers in educational institutions. When the competencies and attributes required for effective digital management of employees are identified, such studies can be categorised at the micro level. As expected, the analysis indicates that the implications of e-leadership—encompassing both challenges and opportunities—are more frequently examined within educational settings. The authors of the reviewed articles explored the relationship between motivation, job satisfaction, and e-leadership, as well as the ways in which e-leadership facilitates the transformation of schools into professional learning organisations.

In addition, scholars investigated the influence of e-leadership on teachers' adoption of technology, the processes employed by managers, and the practices associated with the implementation of e-leadership initiatives. In the context of local government institutions, researchers have placed an emphasis on the competencies required by managers for the successful implementation and application of e-leadership. Moreover, scholars evaluated

the operational changes and processes, necessary for the successful implementation of e-leadership, along with their impact on both employees and the organisation.

The analysis presented here further examined *the methodological approach* of the studies evaluated (see Table 5).

Table 5. Characteristics of e-leadership research: type, sample, research participants.

Code of Article	Research Type	Sample	Targeted Group(s)
A1	Qualitative research	10	Administrative leaders (managers), leading virtual teams in higher education
A2	Qualitative research	50	Deans, directors and heads of departments of public universities
A3	Qualitative research	28	Leaders of virtual schools
A4	Quantitative research	265	Representatives of various fields: public services, data processing, health care, administration, consulting, training and civil service
A5	Qualitative research	24	Rectors, deans, high school directors
A6	Quantitative research	546	Employees utilising virtual workplaces in municipal administrations
A7	Mix method research	100, 31	Members of virtual teams
A8	Qualitative research	13	Nurses and their leaders (managers)
A9	Quantitative research	402	Teachers in national secondary schools
A10	Qualitative research	7	Leaders—various levels
A11	Qualitative research	8	Representatives of municipal administrations in both leading and subordinate positions
A12	Qualitative research	16	Principals, assistant principals, teachers and staff of schools
A13	Mixed methods research	39 working groups	Child protection and family care providers, elderly care providers, management groups, professional staff groups, political organisations
A14	Qualitative research	12	Directors awarded the Digital Director Award
A15	Mixed methods research	21	Articles with empirical research included, related to roles of remote managers and their responsibilities, remote manager–employee relations
A16	Qualitative research	2	Representatives of municipal administrations in both leading and subordinate positions
A17	Qualitative research	6	Direct managers—deans, heads of departments
A18	Quantitative research	249	Members of the administration—academic leaders, managers
A19	Mixed methods research	310	Principals of schools
A20	Mixed methods research	270, 10	Principals and district officers
A21	Mixed methods research	177	Heads of higher education institutions, administrative staff
A25	Quantitative research	517	School principals and teachers from public primary schools
A26	Qualitative research	49	Articles addressing the specific concept of e-leadership and studies, related to leadership and organisational changes in the field of higher education
A27	Qualitative research	2	Heads of educational institutions
A28	Quantitative research	1082	Heads of schools—principals, senior assistants and heads of departments
A29	Qualitative research	89	Teachers with a master's degree
A30	Quantitative research	216	Heads of business schools
A31	Mixed methods research	243	Employees in municipalities
A32	Mixed methods research	412	Webinar participants

The analysis demonstrates that over 50 per cent of scholars adopted an interpretive methodological approach. The studies primarily employed qualitative methods, specifically focussing on semi-structured interviews. A smaller proportion of the articles (25 per cent)

applied a positivist methodological approach and offered an account, based on quantitative research. As our findings show, mixed-methods design remains seldom utilised. It is worth noting that, within qualitative research, the experiences of institutional or group leaders were given precedence compared to those of their subordinates.

4.2. Theoretical Variations of E-Leadership in Public Sector Organisations

Following the content analysis of all articles included in the systematic literature review, it was identified that several authors associate e-leadership in public sector organisations with the concept of digital transformation [30,57]. Digitisation refers to the implementation or increased utilisation of information and communication technology (ICT) by individuals, organisations, economic sectors, and societies. As argued in the literature, the introduction of ICT tools leads to various outcomes, including acceleration, enhanced abstraction, flexibility, and individualisation of processes and outcomes [57]. It is within the processes of ICT implementation that e-leadership emerges, suggesting that it can be regarded as an integral part of the digital transformation within public sector organisations.

Nevertheless, the concept of e-leadership in the literature, pertaining to public sector organisations, is predominantly elucidated through the lens of leadership theories (see Table 6).

Table 6. Leadership theories applied to explain the concept of e-leadership.

Theory of Leadership	Essence	Positive Impact on e-Leadership	Codes of Articles
Dialogic leadership	The leadership is a process that creates, develops, and consolidates leadership practices for all members of a community.	- appropriate communication skills - critical reflections - culture of honest conversation	A13
Contextual leadership	The leadership brings out the unique situational reality of the environment in which the leader exists. Behaviours, traditionally considered effective for leadership, may be constrained by the contextual environment.	- evaluation of the contextual environment	A3
Distributed leadership	The leadership emphasises the contribution of all members of the organisation to the practice of leadership and includes their various actions. It is a shared form of leadership amongst organisational members.	- cooperation - distribution of responsibility - confidence - continuous improvement	A11; A26
Complexity leadership	The leadership should be seen not only as a position and power, but also as an emergent interactive dynamic that changes under the influence of multiple relationships in a complex institutional environment.	- assessment of dynamic interaction - adaptation of the organisation - changes	A12
Transactional leadership	The main feature of transactional leadership is the exchange between the leader and the members of the organisation, when a monetary or other form of reward is received for the work performed.	- building relationships in the team - development of team culture - clear influence of the leader - communication efficiency - mutual benefit	A15; A31
Transformational leadership	A of leadership, requiring managers and staff (leaders and employees) to work together to achieve strategic and operational goals, focusing on the development of the leader and organisational members, initiating changes. The theory is based on motivation, influence and mutual consideration, which can instil a sense of trust in employees.	- communication efficiency - building trust - prevention of work isolation - building relationships - development of team culture	A1; A4; A9; A15; A17; A22; A26; A30; A31
Visionary leadership	The focus is on integrating the vision of the digital leader in the future development of the organisation.	- increases the efficiency of decision-making processes - supports the common vision of technology integration - transformation and improvement are encouraged	A25; A29

Theoretical models of leadership create favourable presumptions for the establishment of e-leadership and its role in strengthening the organisational practice. Scholars, investigating e-leadership within public sector organisations, often employ the transformational leadership theory. The theory posits that leaders can transform their followers by increasing their awareness of the significance of organisational outcomes, thereby inspiring them to prioritise their collective vision rather than their individual interests [58]. Proponents of transformational leadership embrace employee motivation and foster a greater commitment among followers to engage in innovative strategies and initiatives [59]. Both transformational and transactional leadership styles have been instrumental in cultivating relationships within an online environment [3]. Moreover, transformational leadership is argued to possess the ability to emerge during challenging times, characterised by high levels of uncertainty [60]. Consequently, employing such theoretical lens, scholars depict e-leadership as a transformational leadership process. The dynamics were well pronounced during the COVID-19 pandemic. In this period, marked by significant change and uncertainty, remote work became the norm, necessitating higher levels of employee motivation and effective performance under unprecedented conditions.

The analysis of the academic articles included in this review confirms three predominant definitional orientations (directions): e-leadership as a leadership process, as a strategic approach, and as a leadership transformation (see Table 7).

Table 7. Definitial orientations of e-leadership in the public sector.

Orientations	Codes of Articles	Branches	Codes of Articles	Themes	Codes of Articles
Leadership process	A2; A10; A11; A12; A15; A16; A20; A22; A23; A24; A28	Performance management through ICT	A2; A10; A11; A12; A16; A20; A23; A24	Marketing through ICT	A10
				Information dissemination through ICT	A10; A20; A22
				Service delivery through ICT	A10
				Decision-making using ICT	A10; A28
				Information management using ICT	A10
		Communication through ICT	A11; A16; A20; A22		
		Team management through ICT	A15; A23	Organising work using ICT	A28
				Task allocation through ICT	A28
				Social impact through ICT	A24
				Motivation through ICT	A23
				Team problem solving using ICT	A28
				Choosing the right electronic tools	A15; A26
				Choosing the right policies	A15
Strategic approach	A9; A21; A29	Technology integration aligned with the organisation's vision	A9	Mobilising digital tools	A9
				Adoption of digital tools	A9
		Strategic planning	A9; A12	Orientation towards future dynamics through ICT	A12
				Adoption of digital tools	A9
		Applying effective strategies	A29	Using ICT to achieve organisational objectives	A29
Leadership transformation	A2; A9; A10; A12; A18; A22; A24; A25; A31	Changes in management processes	A9; A25	Change management	A31
				Transition to ICT applications	A18; A25
				Transition to computer networks	A18
				Digitising human resources management	A24
				Transition to remote interaction	A22
				Developing trust in virtual environments	A31
				More efficient operations	A18

The table delineates the three definitional orientations of e-leadership within the public sector. It further provides information regarding overarching branches and themes,

within which the definitional orientations are positioned. The principal orientation is "Leadership process", which encompasses performance management, communication, and team management through ICT, as evidenced by multiple articles. This indicates a focus on enhancing organisational efficiency and effectiveness through the use of digital tools. A "Strategic approach" orientation is also present, emphasising technology integration aligned with organisational vision, strategic planning and the application of effective strategies. This suggests a deliberate alignment of digital tools with long-term goals. According to Somantri [61], e-leadership represents a strategic approach to organisational management that focuses on future dynamics through the utilisation of advanced technologies. Similarly, Karakose et al. [62] assert that e-leadership is the effective application of strategies to leverage organisational digital data for goal attainment. Lastly, "Leadership transformation" pertains to changes in the management processes, including a transition to ICT tools and digitalisation of human resources management. This orientation reflects the adaptation required in leadership roles, conducive to fostering trust and efficiency in virtual environments. Based on the findings of this study, the definition of e-leadership, most commonly employed within the context of public sector organisations, focuses on a leadership process, implemented via ICT tools. Definitions framing e-leadership as a strategic approach, aimed at achieving organisational objectives are less frequently utilised. Our findings underscore the multifaceted nature of e-leadership and its critical role in modernising public sector operations through digital integration.

4.3. Challenges of E-Leadership in Public Sector Organisations

The studies included in the systematic literature analysis make a distinction between external and internal factors in their assessment of the implementation of e-leadership. External factors include competition, public comparisons, the diffusion of technology in comparable organisations, and user perceptions and concerns related to the adoption of technology. Conversely, internal factors refer to aspects, such as awareness, the specificity of tasks, and the simplification of management processes—including in-depth knowledge of technologies and their application, as well as a preference for utilising these technologies [63]. Furthermore, the studies analysed identify barriers to the successful development of e-leadership within public sector organisations, which are categorised into three groups: external factors (those arising outside the organisation), internal factors (organisational–structural), and factors, related to human resource competencies (see Table 8).

A substantial part of the studies conducted on e-leadership in public sector organisations focuses on human competencies, with authors frequently identifying various factors that hinder its development. Scholars highlight a lack of employee competencies and specialised training as major obstacles to the advancement of e-leadership. Day and Burbach [22] point out a scarcity of skilled or experienced team leaders, noting that they often lack the prerequisites required for effective leadership. The main skills and competencies that should be developed involve trust building, communication, team building, technology usage, AI usage and development, leadership style, employee recognition and motivation, personal adaptability and flexibility, adherence to ethical principles and responsiveness in case of concerns [7,64]. As such, there is an urgent need to enhance both the technical and intercultural competence of virtual team leaders. Rybnikova et al. [30] further emphasise that whilst organisations are in possession of a range of sophisticated technical tools, a significant proportion remains underutilised due to employees' lack of competencies. Additionally, leaders often lack the training required to effectively manage virtual teams, relying primarily on their prior experience in virtual environments, as noted by Alward and Phelps [59].

Table 8. Factors hindering the development of e-leadership in public sector organisations.

Category of Factors	Factors	Codes of Articles
External	Challenges associated with cyber security	A3; A16
	Lack of appropriate legal framework	A10; A16; A23; A24; A25
	High cost of technological devices	A5
	Unhelpful political decisions	A24
	Quality of internet coverage	A16; A17; A27
	Infrastructure challenges	A3; A5; A9; A10; A17
Internal	Lack of financial resources	A5; A10; A21; A23
	Lack of strategic approach	A11
	Lack of technology and software	A1; A3; A5; A10; A16; A17; A24; A25; A27
	Lack of well-functioning systems and programs	A13; A16; A24
	Lack of ICT specialists	A10; A11
Related to competencies	Lack of specialised training	A1; A3; A7; A10; A11; A13; A16; A24
	Lack of experience amongst leaders	A5; A7; A10; A19
	Lack of competencies amongst employees	A7; A10; A11; A13; A19; A24; A25; A27
	Employees' resistance to change	A5; A10; A11; A25
	Lack of interest and motivation	A10

The external challenges are linked to the lack of robust legal and political support, and insufficient infrastructure. The internal challenges are associated with the provision of technological and other resources. In summary, the principal challenges, related to the competencies required, are associated with the lack of knowledge, specialised training and experience amongst personnel. Therefore, to successfully develop e-leadership within public sector organisations, it is essential to address these deficiencies and implement strategies, aimed at improving personnel competencies.

4.4. Impact of E-Leadership in Public Sector Organisations

Stana et al. [25] identify three distinct levels of e-leadership—micro, meso and macro—which permits a more nuanced approach to the assessment of the phenomenon. The macro level focuses on the strategic implications of e-leadership for organisational change and transformation, particularly in relation to the implementation and adoption of technology. The meso level deals with changes occurring within the organisation and its work context, such as the utilisation of information technology and social networks, and examines their influence on e-leadership. At the micro level, e-leadership is conceptualised as a daily activity and a mode of leadership practice.

The analysis of the effects of e-leadership on public sector organisations identifies both positive and negative aspects. The positive effects include outcomes that scholars recognise as beneficial to the organisation (A5; A10; A11; A13; A25; A28) and are described using terms, such as "benefit" (A5; A10; A12; A18), "advantages" (A10; A18; A24), "improves" (A5; A13; A12; A15; A19; A22), "helps" (A2), and "gives an advantage" (A21). Conversely, negative effects encompass outcomes, identified explicitly as detrimental (A4; A11; A17; A24) and are conveyed through terms such as "challenges" (A1; A3; A24), "causes stress" (A16), "complicates" (A32), "disadvantage" (A7), and "problem" (A11; A20).

All positive and negative effects identified through the systematic literature review are summarised in Table 9.

Table 9. Levels of the impact of e-leadership.

Level	Impact	Aspects of Impact	Codes of Articles
Micro	Positive	Ensuring faster and more efficient communication	A4; A9; A11; A12; A24; A28; A31
		Increasing the flexibility of working time and location	A5; A6; A8; A9; A13; A18; A24; A28; A32
		Creating greater independence of employees	A5; A13; A22; A24
		Increasing job satisfaction	A5
		Developing the ability to recruit geographically dispersed talent	A9; A13
		Ensuring convenient and efficient data access and sharing	A6; A11; A18; A22; A24; A28
		Reducing stress	A5; A24
		Building trust amongst team members	A31
		Reducing the influence of personal relationships on work performance	A18
	Negative	Unclear communication, deficiencies in non-verbal communication	A1; A4; A7; A11; A13; A24
		Relationships of trust amongst team members are difficult to build	A1; A11; A32
		Decreased job motivation	A4; A7; A11; A13; A23
		Leader is harder to reach	A4
		Worse understanding and diminished clarity of information	A4; A16; A23
		Digital exclusion	A5; A11; A13; A20; A24
		Less commitment of employees	A11; A17
		Lower possibility to monitor and control employees	A11; A23
		Increased workload and working hours	A11; A13; A16
		Decreased participation	A13
		Worse group dynamics	A13
		Increased tension	A24
		Constant availability, loss of personal–professional life balance	A24
Meso	Positive	Shortening the time of administrative operations	A9; A13; A18; A21
		Increasing operational efficiency	A9; A13; A24
		Automation of activities	A6
		Saving financial resources	A4; A9; A13; A18; A21; A24
		Improving work results	A12; A19; A28; A31
		Simplified provision of services to citizens–customers	A9
		Increasing work performance and productivity	A12; A18; A24
		Bringing the organisation and its customers closer	A24
		Reducing bureaucracy	A11; A18
		Simplifying procedures	A18
		Increasing the accuracy and objectivity of performed operations	A18
		Increasing accountability and transparency	A9; A12; A21
		Improving performance productivity and quality of public services	A22
		Creating the ability to connect employees with interested parties in a short space of time	A24
	Negative	Alienation from company culture, values, beliefs and norms	A17
		Difficulties in developing a positive attitude towards change	A11
Macro	Positive	Increasing management efficiency	A9
		Increasing organisational efficiency	A9; A24
		Building customer and citizen trust	A9
		Ensuring implementation of technology and digital transformation	A12; A25; A29
		Building stronger relationships and collaboration with stakeholders	A12; A14; A31
		Increased efficiency in identifying and overcoming potential obstacles	A25
		Ensuring faster response to changes	A15
	Negative	Difficulties in following the mission and the vision	A3

In the assessment of the impact of e-leadership in public sector organisations, authors typically differentiate between its positive and negative effects at the micro level. Some of the positive effects frequently highlighted are improved speed and efficiency of communication, along with enhanced access to and sharing of data. Moreover, the flexibility of working hours and locations is recognised as a significant advantage. According to Claassen et al. [57], advancements in existing technologies and the adoption of e-leadership facilitate mobile work in flexible environments. Information and communication technologies allow leaders to work from anywhere and at any time, enabling them to maintain organisational order, disseminate information and enhance the effectiveness of team communication [65].

Conversely, one of the negative consequences of e-leadership, often acknowledged by authors, is the absence of non-verbal communication, which can lead to misunderstandings. Leaders of virtual teams must be particularly mindful of their verbal communication due to the lack of non-verbal cues [22]. Additionally, scholars have examined the implications of e-leadership adoption, noting a decline in employee motivation. Syvänen and Loppela [66] observed that levels of employee engagement, motivation, and focus during remote interactions were substantially lower than those experienced in face-to-face settings, exhibiting detrimental effects on group processes and dynamics. Leaders also reported challenges in motivating their subordinates, and some individuals experienced feelings of exclusion [66].

Evaluating the meso-level effects of e-leadership within public sector organisations, scholars predominantly identify positive outcomes. They include financial savings, time reduction in administrative operations and improved work performance. According to Braun et al. [67], communication with leaders via email or other electronic means is both convenient and cost-effective. Moreover, the implementation of electronic management facilitates the provision of services to customers and transforms general administrative processes by making them more efficient, quicker, and less costly [61]. Ibrahim [65] found that e-leadership positively enhances intra-team communication and overall team performance. However, some negative consequences at the meso level have also been noted, such as alienation from the organisation's culture, values, beliefs, and norms, as well as difficulty in fostering a positive attitude towards change.

It should be noted that the effects of e-leadership at the macro level have received little attention in comparison. Karakose et al. [62] contend that managers can play a crucial role in facilitating digital transformation through e-leadership. Their involvement is instrumental in cultivating relationships outside the organisation [68]. Additionally, Saraih et al. [8] argue that leaders' utilisation of various social media tools can enhance employee interaction and strengthen relationships with stakeholders.

In summary, scholars recognise both positive and negative effects in their appraisal of e-leadership in public sector organisations. Favourable outcomes include improved communication efficiency, flexibility in work arrangements, and enhanced financial and operational performance at the micro and meso level. Conversely, negative consequences, acknowledged by the authors, include the absence of non-verbal communication, potential decline in employee motivation and alienation from organisational culture. Furthermore, whilst positive effects of e-leadership at the macro level have emerged, such as facilitating digital transformation and strengthening relationships with stakeholders, they remain underexplored in the existing literature.

5. Discussion

The main result of the systemic literature analysis is the framework developed for the purposes of this study (see Figure 5). It visualises the results of the analysis of research on e-leadership within public sector organisations in the period 2013–2022, and synthesises information, such as theoretical backgrounds, methodological strategies, em-

pirical findings and research publication specifics. The framework includes four main dimensions—theoretical approach, methodological approach, empirical outcomes (findings) and contextual issues. Specifically, there are 10 approaches with 126 findings, 69 of which are grouped under 12 clusters.

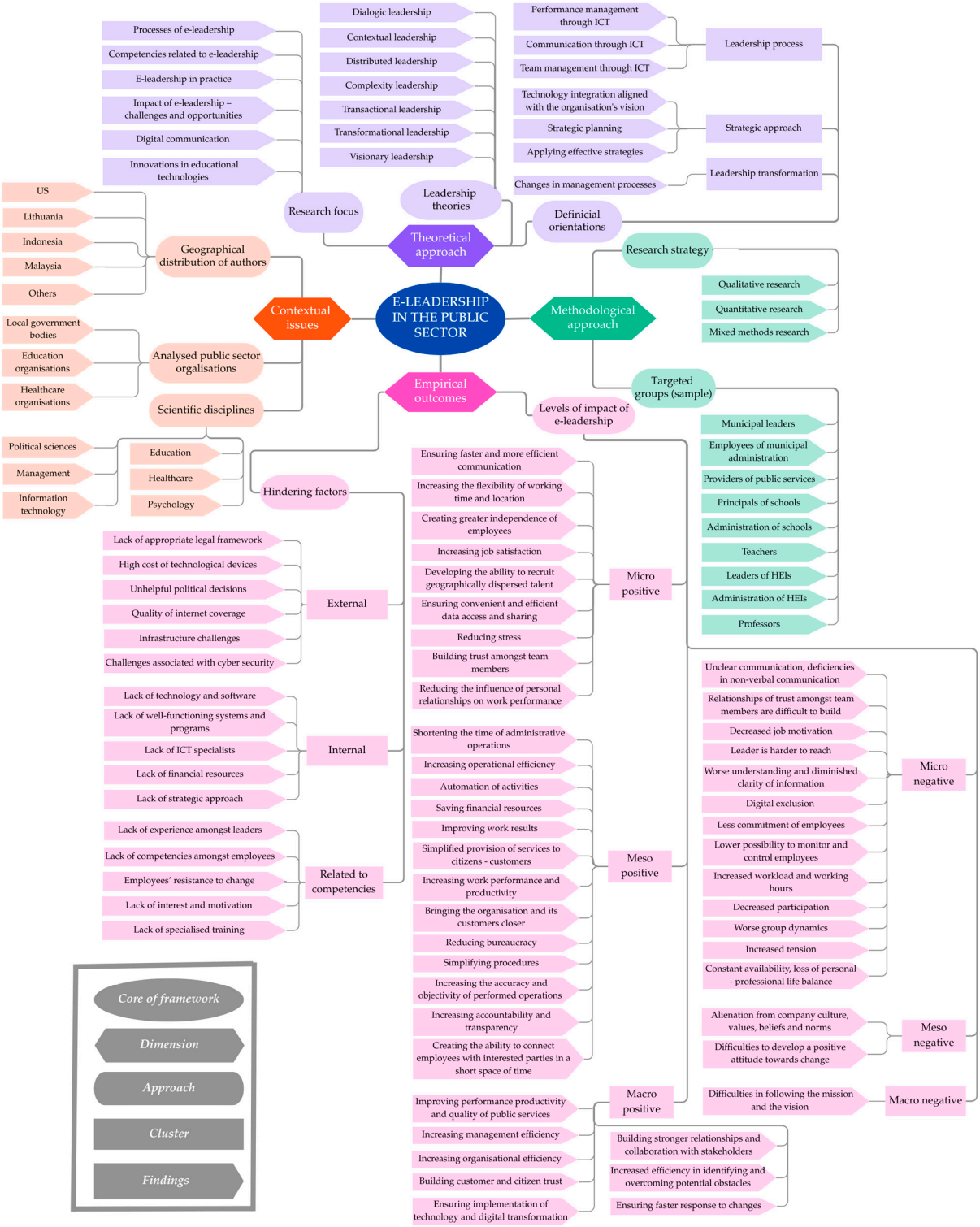

Figure 5. Framework of research on e-leadership within public sector organisations (2013–2022). The framework may be accessed online https://www.canva.com/design/DAGmHnpXEuQ/mxonS5xjthWnQ8_SUn0Lbg/view?utm_content=DAGmHnpXEuQ&utm_campaign=designshare&utm_medium=link2&utm_source=uniquelinks&utlId=h91d17ff1a9 (accessed on 12 May 2025).

The main theoretical and empirical implications stemming from the studies evaluated here deserve further elaboration.

The application of e-leadership within public sector organisations has seen a significant increase, prompted by the COVID-19 pandemic, which was marked by a sudden shift to remote work. The crisis necessitated the development of new technologies to facilitate work-from-home arrangements, ensuring that the quality of service delivery to citizens was not compromised [33].

Between 2018 and 2021, scholarly interest in e-leadership has grown exponentially, with an ever-expanding diversity of subjects addressed [27]. Our systematic literature analysis indicates that, during the COVID-19 pandemic, the popularity of e-leadership topics and research within public sector organisations began to gain traction, and this trend is continuing. However, when compared to the findings of Karakose et al. [27], it is evident that the increased interest in e-leadership within the public sector has not been as pronounced as the one observed in the private sector. The analysis demonstrated that the majority of scholars focus on the phenomenon of e-leadership specifically within educational institutions, often conceptualising it as a leadership process rather than merely as a teaching tool or competency. Furthermore, there is a notable scarcity of research exploring e-leadership in other public sector organisations. Despite the growing body of scientific inquiry, the ongoing digital transformation within public sector organisations necessitates further research across various levels of public management, including ministries, municipalities, and other entities.

As has been noted, e-leadership is predominantly examined within the Asian region, particularly within the fields of business administration and management [57]. However, the systematic literature analysis conducted by the authors of this study revealed that e-leadership in public sector organisations is most frequently a subject of inquiry in the US, particularly amongst representatives of the education and management disciplines. There is a notable lack of interdisciplinary studies addressing the topic in public sector organisations, which restricts a comprehensive understanding of its impact on organisational management processes as well as on employees themselves.

Karakose et al. [27] established that virtual teams, leadership and technology were some of the primary research themes in digital leadership between 2008 and 2014. The analysis conducted by the authors of this study indicates that e-leadership research is focused on the change in organisational practice, relations, communication and social–psychological consequences of remote work. Moreover, the need for the development of competencies associated with e-leadership—specifically the characteristics necessary for effective virtual leadership—are the primary focus of research within the public sector. As such, it can be inferred that the studies on e-leadership conducted in public sector organisations primarily reflect distinct research directions.

The analysis of research findings demonstrates that the impact of e-leadership in public sector organisations manifests at different levels. At the micro level, e-leadership results in both positive and negative consequences, such as faster and more effective communication, flexibility in working hours and locations, and convenient access to and sharing of data. Conversely, negative effects include the absence of non-verbal communication, decreased employee motivation and digital exclusion. At the meso level, e-leadership is associated with more pronounced positive outcomes, including financial savings, enhanced work performance, time efficiency, and greater accountability and transparency. However, the impact of e-leadership at the macro level is less frequently explored, with predominantly positive effects identified, such as the facilitation of technology implementation and digital transformation within organisations, stronger relationships with stakeholders, and improved organisational effectiveness.

Based on the data evaluated for the purposes of this study, several questions emerge that warrant further investigation in subsequent scientific and applied studies. One such question that is yet to be addressed is the long-term impact of e-leadership at the strategic and organisational levels of public sector organisations. Previous research focuses solely on short-term consequences, particularly at the interpersonal, or meso, level and their personal impact at the micro level. Furthermore, of particular interest is the question of addressing ways that can facilitate the effective application of e-leadership and mitigate its negative consequences. As already mentioned, remote work, for both the organisation and its employees, is often associated with work overload and alienating organisational culture.

According to recent research in the field, future studies will investigate various aspects of e-leadership, particularly those connected to organisational dynamics, the success of digital transformation initiatives, and the role of e-leadership in fostering collaboration, transparency, accountability, citizen participation, and the enhancement of government services [7]. Importantly, further empirical validation of the proposed framework is needed to strengthen its applicability across different public sector organisations contexts. Longitudinal studies should be conducted to examine the evolution of e-leadership practices and their long-term impact on organisational performance and sustainability, especially in the face of rapid technological change. Moreover, as generative AI systems expand their integration within public sector operations, research should analyse how e-leadership adapts to this technological shift, aiming to establish a robust framework for ethical behaviour and responsible use of these systems in the public sector [69,70]. To generate comprehensive insights, multi-study research employing both experimental and field approaches would be of prime importance [55]. The framework presented here could serve as a valuable foundation for future research, facilitating the identification of sector-specific nuances and offering a pathway to understanding the ongoing evolution of e-leadership within public organisations. Additionally, extending the scope of the analysis to include recent and ongoing studies could offer deeper insights into emerging trends and evolving practices within the field.

The main limitations of this research are related to the small sample of full-text articles selected for this study, and the time frame of the analysis. Due to the limited institutional accessibility, numerous full-text studies were omitted. Consequently, the analysis represents one of the first attempts to systematically overview the current state of public sector-oriented research. However, the results of this overview should be considered cautiously as potentially relevant studies with limited access were not included. As noted, the literature on e-leadership is growing exponentially. Having focused on research from 2013 until 2022, this study provides a comprehensive overview of the dynamics in the specific period, but omits insights from research conducted prior or more recently.

6. Conclusions

Following a systematic analysis of the existing literature, this study offers a comprehensive framework, conducive to a nuanced understanding of e-leadership within public sector organisations. It specifically encompasses contextual, theoretical, methodological and empirical dimensions. As such, the framework not only highlights the diverse approaches adopted in the e-leadership discourse but also delineates the clusters of specific findings, observed during empirical investigations. Following the categorisation of the dimensions, some main insights are provided.

Under the contextual dimension of the framework, it was identified that the popularity of the topic of e-leadership in public sector organisations surged during the pandemic, particularly with the sudden onset of remote work. The main areas of focus in e-leadership research include the competencies of educational institution managers and the impact of

e-leadership on educational settings. Conversely, the topic is infrequently addressed in healthcare institutions, and there is a notable scarcity of research concerning e-leadership in local and central government institutions, such as municipalities and ministries.

Under the theoretical dimension of the framework, it was identified that the phenomenon of e-leadership in public sector organisations is explored through various theoretical frameworks, dependent upon the specific context and organisation under investigation. Most scholars employ the transformational leadership theory, which is particularly relevant in challenging times during which employees require heightened attention and motivation. Data compiled for this study demonstrate that e-leadership in public sector organisations is defined in three main ways: as a strategic approach, as a leadership process, and as a leadership transformation, with e-leadership as a specific process seldom considered. Each of these perspectives is key for the interpretation of e-leadership, particularly regarding a more nuanced understanding of the phenomenon and the consequences it brings in the context of public sector organisations.

Under the methodological dimension of the framework, it was identified that researchers investigating e-leadership in public sector organisations predominantly adopt an interpretive approach, often relying upon qualitative methodologies.

The empirical outcomes dimension argued that the development of e-leadership is impeded by both external and internal factors, including the lack of favourable legal conditions, further exacerbated by infrastructural challenges, and limited access to technology and software. Moreover, public sector organisations frequently encounter challenges related to human competence, such as scarcity of knowledge, specialised training and lack of experience at both managerial and employee levels. As such, to successfully foster the development of e-leadership in public sector organisations, it is essential to address and mitigate these barriers to its effective implementation and application for sustainable performance.

Following a systematic analysis of the literature, this study identifies several areas of controversy within the research on e-leadership in public sector organisations. Whilst the advantages of e-leadership—such as enhanced communication and organisational efficiency—are widely recognised, ongoing debates continue regarding its potential drawbacks, including its impact on employee motivation and issues of digital exclusion. Furthermore, the notable lack of interdisciplinary studies complicates our understanding of the wider e-leadership effects on organisational dynamics and employee experiences, thus highlighting the need for further studies. Future disputes in research are likely to centre on ethical considerations, the social impact of AI, and the influence of digital technologies on leadership, employee engagement, transparency and public trust, particularly within the context of digitalisation of the public sector and sustainability.

Based on research conclusions, actionable recommendations for public sector managers and policymakers are proposed. Both groups should invest in training programmes to enhance digital skills among leaders and employees, thereby bridging skill gaps and supporting effective e-leadership implementation; develop favourable legal and infrastructural conditions, including modernising technology and establishing clear policies to overcome external barriers; promote inclusive, interdisciplinary practices by encouraging cross-sector collaboration; and ensure that ethical considerations, digital inclusion, and employee well-being are integral to e-leadership and digital transformation strategies.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su17104474/su17104474/s1, Table S1: PRISMA 2020 for Abstract Checklist; Table S2: PRISMA 2020 Checklist; Figure S1: PRISMA 2020 flow diagram for the systematic review of e-leadership in the public sector.

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Appendix A

Table A1. Selection of scientific publications based on search phrases (sampling).

No.	Searching Phrase	Open Source	From the Period of 2003–2022	Scientific Publications (Articles)	Based on the Topic and Abstract	Selected to the Final Sample
I. ERIC						
1.	E-leadership	930	456	202	5	4
2.	E-management	2095	1080	735	4	-
3.	Electronic leadership	368	250	166	7	4
4.	Digital leadership	209	159	81	11	2
5.	Remote leadership	81	56	28	-	-
6.	Virtual leadership	164	126	68	7	4
II. BUSINESS SOURCE ULTIMATE (EBSCO)						
1.	E-leadership	4	4	4	2	2
2.	E-management	26	26	22	1	1
3.	Electronic leadership	68	64	64	4	1
4.	Digital leadership	57	57	57	5	1
5.	Remote leadership	7	7	7	2	1
6.	Virtual leadership	29	28	28	-	-
III. PUBMED CENTRAL						
1.	E-leadership	5	5	5	3	-
2.	E-management	-	-	-	-	-
3.	Electronic leadership	171	170	170	2	-
4.	Digital leadership	86	85	85	-	2
5.	Remote leadership	22	22	22	-	-
6.	Virtual leadership	45	44	44	4	-
IV. CEEAS (EBSCO)						
1.	E-leadership	4	4	4	3	2
2.	E-management	-	-	-	-	-
3.	Electronic leadership	-	-	-	-	-
4.	Digital leadership	-	-	-	-	-
5.	Remote leadership	-	-	-	-	-
6.	Virtual leadership	-	-	-	-	-

Table A1. *Cont.*

No.	Searching Phrase	Open Source	From the Period of 2003–2022	Scientific Publications (Articles)	Based on the Topic and Abstract	Selected to the Final Sample
V. ACADEMIC SEARCH ULTIMATE (EBSCO)						
1.	E-leadership	3	3	3	2	2
2.	E-management	-	-	-	-	-
3.	Electronic leadership	141	139	136	4	-
4.	Digital leadership	94	93	93	2	-
5.	Remote leadership	21	21	21	2	1
6.	Virtual leadership	44	43	43	1	-
VI. SPRINGER ONLINE JOURNALS COMPLETE						
1.	E-leadership	2	2	2	1	-
2.	E-management	-	-	-	-	-
3.	Electronic leadership	86	84	84	4	-
4.	Digital leadership	89	88	88	3	1
5.	Remote leadership	9	9	9	-	-
6.	Virtual leadership	1	1	1	1	1
VII. ELABA						
1.	E-leadership	6	6	5	5	4
2.	E-management	1	1	-	-	-
3.	Electronic leadership	1	1	-	-	-
4.	Digital leadership	4	4	1	1	1
5.	Remote leadership	2	2	2	1	-
6.	Virtual leadership	4	4	2	-	-
VIII. EDUCATION SOURCE (EBSCO)						
1.	E-leadership	3	3	3	2	2
2.	E-management	-	-	-	-	-
3.	Electronic leadership	100	96	96	1	-
4.	Digital leadership	49	48	46	2	1
5.	Remote leadership	5	5	5	-	-
6.	Virtual leadership	31	29	29	1	2
IX. SCIENCEDIRECT						
1.	E-leadership	5	5	5	1	1
2.	E-management	-	-	-	-	-
3.	Electronic leadership	44	44	44	1	1
4.	Digital leadership	28	28	28	1	1
5.	Remote leadership	6	6	6	1	1
6.	Virtual leadership	17	17	17	2	1
IN TOTAL:						
1.	E-leadership	962	486	232	24	17
2.	E-management	2122	1107	757	5	1
3.	Electronic leadership	979	853	760	23	6
4.	Digital leadership	616	552	479	25	9
5.	Remote leadership	153	128	100	6	3
6.	Virtual leadership	335	330	270	16	8

Table A2. The list and codes of articles enlisted to the systematic literature review.

Code	Title	Author(s)	Year	Journal	References
A1	Impactful Leadership Traits of Virtual Leaders in Higher Education	Alward, E., Phelps, Y.	2019	Online Learning, 23(3), 72–93.	[59]
A2	Analysis of E-leadership Practices in Ameliorating Learning Environment of Higher Education Institutions	Aurangzeb, W.	2020	Pakistan Journal of Distance and Online Learning, 5(2), 1–16.	[71]
A3	Leading Remotely: Competencies Required for Virtual Leadership	Azukas, M. E.	2022	TechTrends, 66(2), 327–337.	[72]
A4	Emails from the Boss—Curse or Blessing? Relations between Communication Channels, Leader Evaluation, and Employees' Attitudes	Braun, S., Hernandez Bark, A., Kirchner, A., Stegmann, S., Van Dick, R.	2019	International Journal of Business Communication, 56(1), 50–81.	[67]
A5	E-Leadership Analysis during Pandemic Outbreak to Enhanced Learning in Higher Education	Chang, C. L., Arisanti, I., Octoyuda, E., Insan, I.	2022	TEM Journal, 11(2), 932–938.	[50]
A6	How to Evaluate Digital Leadership: A Cross-Sectional Study	Claassen, K., Dos Anjos, D. R., Kettschau, J., Broding, H. C.	2021	Journal of Occupational Medicine and Toxicology, 16(1), 1–8.	[57]
A7	An Exploration of the Moderating Effect of Motivation on the Relationship between Work Satisfaction and Utilization of Virtual Team Effectiveness Attributes: A Mixed Methods Study	Day, F. C., Burbach, M. E.	2015	Creighton Journal of Interdisciplinary Leadership, 1(2), 86–106.	[22]
A8	Interpersonal Connectivity Work: Being there with and for Geographically Distant Others	Hafermalz, E., Riemer, K.	2020	Organization Studies, 41(12), 1627–1648.	[73]
A9	The Effects of Principals' Digital Leadership on Teachers' Digital Teaching during the COVID-19 Pandemic in Malaysia	Hamzah, N. H., Nasir, M. K. M., Wahab, J. A.	2021	Journal of Education and E-Learning Research, 8(2), 216–221.	[10]
A10	E-Management as a Game Changer in Local Public Administration	Vilkaite-Vaitone, N., Povilaitiene, K.	2022	Economies, 10(8), 180, 1–16.	[63]
A11	Digitalisation and E-leadership in Local Government before COVID-19: Results of an Exploratory Study	Rybnikova, I., Juknevičienė, V., Toleikienė, R., Leach, N., Āboliņa, I., Reinholde, I., Sillamäe, J.	2022	Forum Scientiae Oeconomia, 10(2), 173–191.	[30]
A12	Contemporary Communication Conduit among Exemplar School Principals in Malaysian Schools	Saraih, E. F., Wong, S. L., Asimiran, S., Khambari, M. N. M.	2022	Research and Practice in Technology Enhanced Learning, 17(1), 1–23.	[8]
A13	Remote and Technology-Based Dialogic Development during the COVID-19 Pandemic: Positive and Negative Experiences, Challenges, and Learnings	Syvänen, S., Loppela, K.	2022	Challenges, 13(1), 2, 1–24.	[66]
A14	Supporting Professional Development through Digital Principal Leadership	Sterrett, W., Richardson, J. W.	2020	Journal of Organizational and Educational Leadership, 5(2), 4, 1–19.	[68]
A15	Towards Remote Leadership in Health Care: Lessons Learned from an Integrative Review	Terkamo-Moisio, A., Karki, S., Kangasniemi, M., Lammintakanen, J., Häggman-Laitila, A.	2022	Journal of Advanced Nursing, 78(3), 595–608.	[3]
A16	Whether and How does the Crisis-induced Situation Change E-leadership in the Public Sector? Evidence from Lithuanian Public Administration	Toleikienė, R., Rybnikova, I., Juknevičienė, V.	2020	Transylvanian Review of Administrative Sciences, 16(SI), 149–166.	[46]

Table A2. *Cont.*

Code	Title	Author(s)	Year	Journal	References
A17	The Responsiveness of Teacher Education Managers at an ODeL College to Resilience and the Well-Being of Staff Working from Home during COVID-19	van Wyk, M. M., Kotze, C. J., Tshabalala, S. L., Mukhati, F.	2021	International Journal of Educational Methodology, 7(4), 623–635.	[74]
A18	The Role of Universities' Electronic Management in Achieving Organizational Excellence: Example of Al Hussein Bin Talal University	Waswas, D., Jwaifell, M.	2019	World Journal of Education, 9(3), 53–66.	[75]
A19	Principals' Perceptions of the Importance of Technology in Schools	Waxman, H. C., Boriack, A. W., Lee, Y. H., and MacNeil, A.	2013	Contemporary Educational Technology, 4(3), 187–196.	[76]
A20	The Needs of the Virtual Principal amid the Pandemic	Westberry, L., Hornor, T., Murray, K.	2021	International Journal of Education Policy and Leadership, 17(10), n10.	[77]
A21	The Implementation of E-Management Overview in Higher Education	Somantri, M.	2021	Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(6), 1581–1594.	[61]
A22	Transforming the Digital Leadership to Improve Public Service Performance in the COVID-19 Outbreak	Susilawati, D. M.	2021	Economic Annals-XXI, 188(3–4), 31–38.	[58]
A23	Presumptions for E-leadership in Local Self-government in Lithuania	Toleikienė, R., Juknevičienė, V.	2019	Izzivi Prihodnosti, 4(3), 122–139.	[78]
A24	Elektroninis vadovavimas darbuotojams vietos savivaldoje: koncepcinė analizė ir literatūros apžvalga	Toleikienė, R., Juknevičienė, V., Rybnikova, I.	2022	Public Policy and Administration, 21(1), 111–128.	[13]
A25	The Impact of Digital Leadership on Teachers' Technology Integration during the COVID-19 Pandemic in Kuwait	AlAjmi, M. K.	2022	International Journal of Educational Research, 112, 101928, 1–10.	[79]
A26	Dawn or Dusk of the 5th age of Research in Educational Technology? A Literature Review on (E-) leadership for Technology-Enhanced Learning in Higher Education (2013–2017)	Arnold, D., Sangrà, A.	2018	International Journal of Educational Technology in Higher Education, 15(1), 1–29.	[80]
A27	Instructional Supervision and the COVID-19 Pandemic: Perspectives from Principals	Brock, J. D., Beach, D. M., Musselwhite, M., Holder, I.	2021	Journal of Educational Research and Practice, 11(1), 168–180.	[81]
A28	Model of Virtual Leadership, Intra-team Communication and Job Performance among School Leaders in Malaysia	Ibrahim, M. Y.	2015	Procedia-Social and Behavioral Sciences, 186, 674–680.	[65]
A29	Examining Teachers' Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic	Karakose, T., Polat, H., Papadakis, S.	2021	Sustainability, 13(23), 13448, 1–20.	[62]
A30	Social Media e-Leadership Practices During the COVID-19 Pandemic in Higher Education	Kotula, N., Kaczmarek-Ciesielska, D., and Mazurek, G.	2021	Procedia Computer Science, 192, 4741–4750.	[60]
A31	Defining E-leadership as Competence in ICT-mediated Communications: An Exploratory Assessment	Roman, A. V., Van Wart, M., Wang, X., Liu, C., Kim, S., McCarthy, A.	2019	Public Administration Review, 79(6), 853–866.	[12]
A32	Lessons from a Crisis: Identity as a Means of Leading Remote Workforces Effectively	Leonardelli, G. J.	2022	Organizational Dynamics, 51, 1–15.	[82]

References

1. Palmucci, D.N.; Giovando, G.; Vincurova, Z. The post-Covid Era: Digital leadership, organizational performance and employee motivation. *Manag. Decis.* 2025, *ahead-of-print*. [CrossRef]
2. Gledson, B.; Zulu, S.L.; Saad, A.M.; Ponton, H. Digital leadership framework to support firm-level digital transformations for construction 4.0. *Constr. Innov.* **2024**, *24*, 341–364. [CrossRef]
3. Terkamo-Moisio, A.; Karki, S.; Kangasniemi, M.; Lammintakanen, J.; Häggman-Laitila, A. Towards remote leadership in health care: Lessons learned from an integrative review. *J. Adv. Nurs.* **2022**, *78*, 595–608. [CrossRef] [PubMed]
4. Bauwens, R.; Cortellazzo, L. Five decades of leadership and 'disruptive' technology: From e-leadership and virtual team leadership to current conversations on digital leadership. In *Research Handbook on Human Resource Management and Disruptive Technologies*; Bondarouk, T., Meijerink, J., Eds.; Edward Elgar Publishing: Cheltenham, UK, 2024; pp. 105–119.
5. López-Figueroa, J.C.; Ochoa-Jiménez, S.; Palafox-Soto, M.O.; Sujey Hernandez Munoz, D. Digital leadership: A systematic literature review. *Adm. Sci.* **2025**, *15*, 129. [CrossRef]
6. Caulat, G. *Virtual Leadership: Learning to Lead Differently*; Libri Publishing Limited: Oxfordshire, UK, 2012.
7. Elmatsani, H.M.; Widianingsih, I.; Nurasa, H.; Munajat, M.D.E.; Suwanda, S. Exploring the evolution of leadership in government: A bibliometric study from e-government era into the digital age. *Cogent Soc. Sci.* **2024**, *10*, 2414877. [CrossRef]
8. Saraih, E.F.; Wong, S.L.; Asimiran, S.; Khambari, M.N.M. Contemporary communication conduit among exemplar school principals in Malaysian schools. *Res. Pract. Technol. Enhanc. Learn.* **2022**, *17*, 4. [CrossRef]
9. Nuryadin, R.; Sobandi, A.; Santoso, B. Digital leadership in the public sector-systematic literature review: Systematic literature review. *J. Ilmu Adm. Media Pengemb. Ilmu Dan Prakt. Adm.* **2023**, *20*, 90–106. [CrossRef]
10. Hamzah, N.H.; Nasir, M.K.M.; Wahab, J.A. The effects of principals' digital leadership on teachers' digital teaching during the COVID-19 pandemic in Malaysia. *J. Educ. E-Learn. Res.* **2021**, *8*, 216–221. Available online: https://eric.ed.gov/?id=EJ1300492 (accessed on 5 November 2024). [CrossRef]
11. Van Wart, M.; Roman, A.; Wang, X.; Liu, C. Operationalizing the definition of e-leadership: Identifying the elements of e-leadership. *Int. Rev. Adm. Sci.* **2019**, *85*, 80–97. [CrossRef]
12. Roman, A.V.; Van Wart, M.; Wang, X.; Liu, C.; Kim, S.; McCarthy, A. Defining e-leadership as competence in ICT-mediated communications: An exploratory assessment. *Public Adm. Rev.* **2019**, *79*, 853–866. [CrossRef]
13. Toleikienė, R.; Juknevičienė, V.; Rybnikova, I. Elektroninis vadovavimas darbuotojams vietos savivaldoje: Koncepcinė analizė ir literatūros apžvalga. *Viešoji Polit. Ir Adm.* **2022**, *21*, 111–128. [CrossRef]
14. Schork, S.; Özdemir-Kaluk, D.; Zerey, C. Understanding innovation and sustainability in digital organizations: A mixed-method approach. *Sustainability* **2025**, *17*, 415. [CrossRef]
15. Djatmiko, G.H.; Sinaga, O.; Pawirosumarto, S. Digital transformation and social inclusion in public services: A qualitative analysis of e-government adoption for marginalized communities in sustainable governance. *Sustainability* **2025**, *17*, 2908. [CrossRef]
16. Khan, A.Y.; Akhtar, M.; Khan, A.Y. Digitalization for a sustainable performance: Dual-study analysis of digital leadership, circular economy, and technological innovation. *Sustainability* **2024**, *16*, 10465. [CrossRef]
17. Khan, A.N.; Wang, Y.; Khan, N.A.; Ahmad, A. Digital leadership enhances employee empowerment, techno-work engagement, and sustainability: SEM analysis in public healthcare. *Inq. J. Health Care Organ. Provis. Financ.* **2025**, *62*, 00469580251317653. [CrossRef] [PubMed]
18. Broccardo, L.; Truant, E.; Dana, L.P. The interlink between digitalization, sustainability, and performance: An Italian context. *J. Bus. Res.* **2023**, *158*, 113621. [CrossRef]
19. Avolio, B.J.; Kahai, S.; Dodge, G.E. E-leadership: Implications for theory, research, and practice. *Leadersh. Q.* **2000**, *11*, 615–670. [CrossRef]
20. Avolio, B.J.; Kahai, S.S. Adding the "e" to e-leadership: How it may impact your leadership. *Organ. Dyn.* **2003**, *31*, 325–338. [CrossRef]
21. Avolio, B.J.; Sosik, J.J.; Kahai, S.S.; Baker, B. E-leadership: Re-examining transformations in leadership source and transmission. *Leadersh. Q.* **2014**, *25*, 105–131. [CrossRef]
22. Day, F.C.; Burbach, M.E. An exploration of the moderating effect of motivation on the relationship between work satisfaction and utilization of virtual team effectiveness attributes: A Mixed methods study. *Creighton J. Interdiscip. Leadersh.* **2015**, *1*, 86–106. [CrossRef]
23. Kahai, S.; Avolio, B.J.; Sosik, J.J. E-leadership. In *The Wiley Blackwell Handbook of the Psychology of the Internet at Work*; Hertel, G., Stone, D.L., Johnson, R.D., Passmore, J., Eds.; WILEY Blackwell: Hoboken, NJ, USA, 2017; pp. 285–314.
24. Liu, C.; Ready, D.; Wang, X.; McCarthy, A.; Kim, A. E-leadership: An empirical study of organizational leaders' virtual communication adoption. *Leadersh. Organ. Dev. J.* **2018**, *39*, 826–843. [CrossRef]
25. Stana, R.; Fischer, L.; Nicolajsen, H. Review for future research in digital leadership. In Proceedings of the Information Systems Research Conference in Scandinavia (IRIS41), Aarhus, Denmark, 5–8 August 2018. Available online: https://pure.itu.dk/ws/files/84744390/Review_for_future_research_in_digital_leadership.pdf (accessed on 7 November 2024).

26. Torres, F.C.; Baykal, E.; Abid, G. E-leadership and teleworking in times of COVID-19 and beyond: What we know and where do we go. *Front. Psychol.* **2020**, *11*, 590271. [CrossRef]
27. Karakose, T.; Kocabas, I.; Yirci, R.; Papadakis, S.; Ozdemir, T.Y.; Demirkol, M. The development and evolution of digital leadership: A bibliometric mapping approach-based study. *Sustainability* **2022**, *14*, 16171. [CrossRef]
28. Jacobis, R.P.; Sularso, R.A.; Suroso, I.; Utami, E.S. The effect of e-leadership on employee performance: The mediating role of elasticity workplace. *Int. J. Procure. Manag.* **2024**, *19*, 21–36. [CrossRef]
29. Dwianto, R.A.; Mutiarin, D.; Nurmandi, A. Assessing e-leadership in the public sector during the COVID-19 Pandemic in ASEAN. *J. Kebijak. Dan Adm. Publik* **2021**, *26*, 90–111. [CrossRef]
30. Rybnikova, I.; Juknevičienė, V.; Toleikienė, R.; Leach, N.; Āboliņa, I.; Reinholde, I.; Sillamäe, J. Digitalisation and e-leadership in local government before COVID-19: Results of an exploratory study. *Forum Sci. Oeconomia* **2022**, *10*, 174–190. [CrossRef]
31. Kusumah, S.; Agusven, T. Implementation of e-leadership in government: Literature review. *Ann. Rom. Soc. Cell Biol.* **2021**, *25*, 13164–13170. Available online: https://www.proquest.com/openview/030a89debecec48125633bdbb7f1fe4a/1?cbl=2031963&pq-origsite=gscholar (accessed on 29 April 2025).
32. Paschoiotto, W.P.; Sehnem, S.; Cohen, E.D. E-leadership in the Brazilian public sector: The influence of communication quality on team commitment and performance. *Adm. Pública E Gestão Soc.* **2023**, *15*, 1–19. Available online: https://www.redalyc.org/journal/3515/351575641007/351575641007.pdf (accessed on 29 April 2025).
33. Karamalis, P.; Vasilopoulos, A. The digital transformation in public sector as a response to COVID-19 pandemic: The case of Greece. In Proceedings of the XIV Balkan Conference on Operational Research, Thessaloniki, Greece, 30 September—3 October 2020. Available online: https://www.researchgate.net/profile/Athanasios-Vasilopoulos/publication/346657230_The_digital_transformation_in_public_sector_as_a_response_to_COVID-19_pandemic_The_case_of_Greece/links/5fccd749a6fdcc697be4f83d/The-digital-transformation-in-public-sector-as-a-response-to-COVID-19-pandemic-The-case-of-Greece.pdf (accessed on 5 November 2024).
34. Alqudah, M.A.; Muradkhanl, L. E-government in Jordan and studying the extent of the e-government development index according to the United Nations report. *Int. J. Multidiscip. Appl. Bus. Educ. Res.* **2021**, *2*, 310–320. [CrossRef]
35. Gaulė, E.; Žilinskas, G. E-governance in Lithuanian municipalities: External factors analysis of the websites development. *Viešoji Polit. Ir. Adm.* **2013**, *12*, 81–91. [CrossRef]
36. Iyad, D. Electronic governance: An overview of opportunities and challenges. *Munich Pers. RePEc Arch.* **2019**, *92545*, 1–14. Available online: https://mpra.ub.uni-muenchen.de/id/eprint/92545 (accessed on 12 December 2024).
37. Roxas, B. E-governance and sustainable human development in Asia: A dynamic institutional path perspective. *J. Asian Bus. Econ. Stud.* **2025**, *32*, 15–27. [CrossRef]
38. Herlambang, Y.; Susanto, T. E-Leadership: The effect of e-government success in Indonesia. *J. Phys. Conf. Ser.* **2019**, *1201*, 012025. [CrossRef]
39. Louis, R. What leaders should know about e-government. *Socioecon. Chall.* **2017**, *1*, 73–78. [CrossRef]
40. Hamouche, S. COVID-19 and employees' mental health: Stressors, moderators and agenda for organizational actions. *Emerald Open Res.* **2020**, *2*, 15. [CrossRef]
41. Martinez-Cordoba, P.; Benito, B.; Garcia-Sanchez, I. Efficiency in the governance of the COVID-19 pandemic: Political and territorial factors. *Glob. Health* **2021**, *113*, 113. [CrossRef]
42. Sandoval-Reyes, J.; Idrovo-Carlier, S.; Duque-Oliva, E. Remote work, work stress, and work-life during pandemic times: A Latin America situation. *Int. J. Environ. Res. Public Health* **2021**, *18*, 7069. [CrossRef]
43. Jämsen, R.; Sivunen, A.; Blomqvist, K. Employees' perceptions of relational communication in full-time remote work in the public sector. *Comput. Hum. Behav.* **2022**, *132*, 107240. [CrossRef]
44. Kwon, M.; Kim-Goh, M. The impacts of telework options on worker outcomes in local government: Social exchange and social exclusion perspectives. *Rev. Public Pers. Adm.* **2023**, *43*, 754–773. [CrossRef]
45. Paavola, S.; Lakkala, M.; Folger, L.; Preegel, K.; Kokkonen, J.; Bardone, E.; Bauters, M. Transformed knowledge work infrastructures in times of forced remote work. *Inf. Organ.* **2025**, *35*, 100563. [CrossRef]
46. Toleikienė, R.; Rybnikova, I.; Juknevičienė, V. Whether and how does the crisis-induced situation change e-leadership in the public sector? Evidence from Lithuanian public administration. *Transylv. Rev. Adm. Sci.* **2020**, *2020*, 149–166. [CrossRef]
47. Toleikienė, R.; Juknevičienė, V.; Rybnikova, I.; Menzel, V.; Abolina, I.; Reinholde, I. Main challenges of e-leadership in municipal administrations in the post-pandemic context. *Adm. Sci.* **2024**, *14*, 88. [CrossRef]
48. Çuhadar, S. Challenges and opportunities of e-leadership in organizations during COVID-19 crisis. *SEA–Pract. Appl. Sci.* **2022**, *10*, 83–89. Available online: https://ideas.repec.org/a/cmj/seapas/y2022i29p83-89.html (accessed on 12 May 2025).
49. Gilli, K.; Lettner, N.; Guettel, W. The future of leadership: New digital skills or old analog virtues? *J. Bus. Strategy* **2024**, *45*, 10–16. [CrossRef]
50. Chang, C.; Arisanti, I.; Octoyuda, E.; Insan, I. E-leadership analysis during pandemic outbreak to enhanced learning in higher education. *TEM J.* **2022**, *11*, 932–938. [CrossRef]

51. Aromataris, E.; Pearson, A. The systematic review: An overview. *AJN Am. J. Nurs.* **2014**, *114*, 53–58. [CrossRef]
52. Templier, M.; Paré, G. A framework for guiding and evaluating literature reviews. *Commun. Assoc. Inf. Syst.* **2015**, *37*, 6. [CrossRef]
53. Paré, G.; Kitsiou, S. Methods for literature reviews. In *Handbook of eHealth Evaluation: An Evidence-Based Approach*; Lau, F., Kuziemsky, G., Eds.; University of Victoria: Victoria, BC, Canada, 2016; pp. 157–180.
54. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G.; Prisma Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Int. J. Surg.* **2010**, *8*, 336–341. [CrossRef]
55. Höddinghaus, M.; Nohe, C.; Hertel, G. Leadership in virtual work settings: What we know, what we do not know, and what we need to do. *Eur. J. Work Organ. Psychol.* **2023**, *33*, 188–212. [CrossRef]
56. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Br. Med. J.* **2021**, *372*, n71. [CrossRef]
57. Claassen, K.; Dos Anjos, D.R.; Kettschau, J.; Broding, H.C. How to evaluate digital leadership: A cross-sectional study. *J. Occup. Med. Toxicol.* **2021**, *16*, 44. [CrossRef]
58. Susilawati, D.M. Transforming the digital leadership to improve public service performance in the COVID-19 outbreak. *Econ. Ann.-XXI* **2021**, *188*, 31–38. Available online: http://repository.unair.ac.id/id/eprint/114842 (accessed on 7 November 2024). [CrossRef]
59. Alward, E.; Phelps, Y. Impactful leadership traits of virtual leaders in higher education. *Online Learn.* **2019**, *23*, 72–93. [CrossRef]
60. Kotula, N.; Kaczmarek-Ciesielska, D.; Mazurek, G. Social media e-leadership practices during the COVID-19 pandemic in higher education. *Procedia Comput. Sci.* **2021**, *192*, 4741–4750. [CrossRef] [PubMed]
61. Somantri, M. The implementation of e-management overview in higher education. *Turk. J. Comput. Math. Educ. (TURCOMAT)* **2021**, *12*, 1581–1594. [CrossRef]
62. Karakose, T.; Polat, H.; Papadakis, S. Examining teachers' perspectives on school principals' digital leadership roles and technology capabilities during the COVID-19 pandemic. *Sustainability* **2021**, *13*, 13448. [CrossRef]
63. Vilkaitė-Vaitonė, N.; Povilaitienė, K. E-management as a game changer in local public administration. *Economies* **2022**, *10*, 180. [CrossRef]
64. Chouhan, V.S.; Shukla, A. The association between virtual communication and leadership in the post-pandemic era: The role of emotional intelligence. *Asia-Pac. J. Bus. Adm.* 2025, *ahead-of-print*. [CrossRef]
65. Ibrahim, M.Y. Model of virtual leadership, intra-team communication and job performance among school leaders in Malaysia. *Procedia-Soc. Behav. Sci.* **2015**, *186*, 674–680. [CrossRef]
66. Syvänen, S.; Loppela, K. Remote and technology-based dialogic development during the COVID-19 pandemic: Positive and negative experiences, challenges, and learnings. *Challenges* **2022**, *13*, 2. [CrossRef]
67. Braun, S.; Hernandez Bark, A.; Kirchner, A.; Stegmann, S.; Van Dick, R. Emails from the boss—Curse or blessing? Relations between communication channels, leader evaluation, and employees' attitudes. *Int. J. Bus. Commun.* **2019**, *56*, 50–81. [CrossRef]
68. Sterrett, W.; Richardson, J.W. Supporting professional development through digital principal leadership. *J. Organ. Educ. Leadersh.* **2020**, *5*, 4. Available online: https://digitalcommons.gardner-webb.edu/joel/vol5/iss2/4 (accessed on 12 May 2025).
69. Tigre, F.B.; Henriques, P.L.; Curado, C. The digital leadership emerging construct: A multi-method approach. *Manag. Rev. Q.* **2025**, *75*, 789–836. [CrossRef]
70. Sintiya, E.S.; Susanto, T.D.; Ningrum, A.C.P. Electronics-leadership (e-leadership) dalam sektor e-government: Literature review. *J. Nas. Teknol. Dan Sist. Inf.* **2020**, *6*, 158–168. [CrossRef]
71. Aurangzeb, W. Analysis of e-leadership practices in ameliorating learning environment of higher education institutions. *Pak. J. Distance Online Learn.* **2020**, *5*, 1–16. Available online: https://eric.ed.gov/?id=EJ1266659 (accessed on 12 May 2025).
72. Azukas, M.E. Leading remotely: Competencies required for virtual leadership. *TechTrends* **2022**, *66*, 327–337. [CrossRef]
73. Hafermalz, E.; Riemer, K. Interpersonal connectivity work: Being there with and for geographically distant others. *Organ. Stud.* **2020**, *41*, 1627–1648. [CrossRef]
74. van Wyk, M.M.; Kotze, C.J.; Tshabalala, S.L.; Mukhati, F. The responsiveness of teacher education managers at an ODeL college to resilience and the well-being of staff working from home during COVID-19. *Int. J. Educ. Methodol.* **2021**, *7*, 623–635. [CrossRef]
75. Waswas, D.; Jwaifell, M. The role of universities' electronic management in achieving organizational excellence: Example of Al Hussein Bin Talal University. *World J. Educ.* **2019**, *9*, 53–66. [CrossRef]
76. Waxman, H.C.; Boriack, A.W.; Lee, Y.H.; MacNeil, A. Principals' perceptions of the importance of technology in schools. *Contemp. Educ. Technol.* **2013**, *4*, 187–196. [CrossRef]
77. Westberry, L.; Hornor, T.; Murray, K. The needs of the virtual principal amid the pandemic. *Int. J. Educ. Policy Leadersh.* **2021**, *17*, 1–22. [CrossRef]
78. Toleikienė, R.; Juknevičienė, V. Presumptions for e-leadership in local self-government in Lithuania. *Izzivi Prihodnosti* **2019**, *3*, 122–139. Available online: https://ojs.fos-unm.si/index.php/ip/article/view/36 (accessed on 5 November 2024).

79. AlAjmi, M.K. The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait. *Int. J. Educ. Res.* **2022**, *112*, 101928. [CrossRef] [PubMed]
80. Arnold, D.; Sangrà, A. Dawn or dusk of the 5th age of research in educational technology? A literature review on (e-) leadership for technology-enhanced learning in higher education (2013–2017). *Int. J. Educ. Technol. High. Educ.* **2018**, *15*, 24. [CrossRef]
81. Brock, J.D.; Beach, D.M.; Musselwhite, M.; Holder, I. Instructional supervision and the COVID-19 pandemic: Perspectives from principals. *J. Educ. Res. Pract.* **2021**, *11*, 168–180. [CrossRef]
82. Leonardelli, G.J. Lessons from a crisis: Identity as a means of leading remote workforces effectively. *Organ. Dyn.* **2022**, *51*, 100886. [CrossRef]