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Submission date: 04-Apr-2024 11:04AM (UTC+0700)
Submission ID: 2335188011
File name: Anonymous_Files.doc (953K)
Word count: 5104
Character count: 31558

Nyimak: Journal of Communication
Vol. X, No. X, Maret 20XX, pp. XX–XX
P-ISSN 2580-3808, E-ISSN 2580-3832
Article Submitted - Revised - Accepted -

Research Trend of Digital Transformation in Government: A Bibliometric Analysis Using Citespace

Abstract

Digital transformation in public services is a step to improve government performance and modernise government systems. This research aims to analyse digital transformation trends in government in the last five years, from 2018 to 2022. The findings show that 340 research articles on digital government transformation were indexed in the Scopus database. The method used is qualitative research with a literature study approach. This research applies bibliometric analysis using CiteSpace software. Next, papers are presented based on several publications, contributing countries, fields of study, authors, affiliated institutions, related issues, and high citations. This research shows an increasing publication trend, with computer science becoming the core discipline in this research. Through analysis of several sources, digital organisational resilience is a dominant trending topic. Additionally, the University of the Aegean is a leading institution. While Draheim is the author with the highest contribution rate, Russia is the largest contributing country. Finally, these results have implications for future development trends in digital transformation in the government sector.

Keywords: Digital Transformation, E-Government, Bibliometric Analysis, CiteSpace.

Abstrak

Transformasi digital dalam pelayanan publik merupakan langkah untuk meningkatkan kinerja pemerintahan dan modernisasi sistem pemerintahan. Penelitian ini bertujuan untuk menganalisis tren transformasi digital dalam pemerintahan dalam lima tahun terakhir, yaitu tahun 2018 hingga 2022. Temuannya, terdapat 340 artikel penelitian tentang transformasi pemerintahan digital yang terindeks di database Scopus. Metode yang digunakan adalah penelitian kualitatif dengan pendekatan studi literatur. Penelitian ini menerapkan analisis bibliometrik menggunakan software CiteSpace. Selanjutnya makalah disajikan berdasarkan jumlah publikasi, negara kontributor, bidang studi, penulis, lembaga afiliasi, isu terkait, dan sitasi tinggi. Penelitian ini menunjukkan tren publikasi yang meningkat, dengan ilmu komputer menjadi disiplin inti dalam penelitian ini. Melalui analisis beberapa sumber, ketahanan organisasi digital menjadi trending topik yang dominan. Selain itu, Universitas Aegean adalah institusi terkemuka. Meskipun Draheim adalah penulis dengan tingkat kontribusi tertinggi, Rusia adalah negara yang memberikan kontribusi terbesar. Akhirnya, hasil penelitian ini mempunyai implikasi terhadap tren perkembangan transformasi digital di sektor pemerintahan di masa depan.

Kata Kunci: Transformasi Digital, E-Government, Analisis Bibliometrik, CiteSpace.

Citation : Ramlan, Aldi & Edi Purnomo. (2020). “**Article Title**”. *Nyimak: Journal of Communication*, 4(1): pp–pp.

INTRODUCTION

Digital transformation is a key driver of change in government to improve transparency, accountability, and efficiency of public services (Castro & Lopes, 2022). Digital transformation has shaped the culture of interaction between government and society in a transparent manner (Akatkin & Yasinovskaya, 2020). As such, governments around the world are aiming for digital governance to create more integrative and responsive systems to deliver superior people-centred services (Misra et al., 2018). This endeavor marks a stride towards enhancing the efficiency and efficacy of public sector service production and delivery, aiming to modernize government systems (Nielsen 2019).

According to Correa-Ospina et al (2021) digital transformation has transformed the public sector, with information and communications technology (ICT) providing new methods for interaction between governments and their citizens. In building a robust public sector infrastructure, technology plays a crucial role by facilitating ongoing innovation and the generation of value for the community (Morte-Nadal & Esteban-Navarro, 2022). The processes used to do so may involve not only technological elements, but also social, political and organisational aspects (Gardenghi et al., 2020). This concept helps the government in terms of transparency, increased accountability and public trust (Mutar et al., 2022). Thus, government transformation can be driven by information technology, which is considered as a key stage in the process.

Two decades ago, the initiation of digital transformation in public services marked the commencement of efforts aimed at enhancing the performance and results of service delivery within the public sector, while also advancing the modernization of governmental systems (Nielsen 2019). Innovations in digital transformation impact the behavior of citizens, their information requirements, and the manner in which individuals communicate (Gasova & Stofkova, 2017). While according to Norling et al (2022) digital transformation has garnered significant scientific attention within the government sector, a phenomenon relatively uncommon in empirical research on digital transformation within the public sector. The new paradigm of digital transformation, in each policy, optimises the production process, so that work productivity and government management enable operational control to respond to changes in a timely manner (de Menezes et al., 2022). Therefore, it is becoming increasingly important to develop in improving the quality of public services.

In recent years, government has undergone a significant digital transformation by providing new opportunities for governments and their citizens to interact (Correa-Ospina et

al., 2021). Digital transformation has become a prevalent aspect of contemporary social and economic progress, offering considerable digital benefits to societies globally (Dobrolyubova, 2021a). The concept taken from the private sector emphasizes the importance of new technology in maintaining competitiveness in the Internet era, where services and products can be accessed both online and offline (Mergel et al., 2019). Thus, the transformation of online services is perceived as a method to enhance customization and automation within the system.

According to Chung & Kim (2019b) building digital governance is not limited to the functions or work of one field, because the concept of digital transformation is not just about creating a new framework for government. This concept is an integral part of a strong foundation in public services that can provide impetus for continuous innovation and create added value in the public, private, and community sectors in general (Morte-Nadal & Esteban-Navarro, 2022a). These include enhanced effectiveness in delivering public services, greater engagement of citizens in decision-making processes, streamlining of bureaucratic procedures, heightened transparency, and the mitigation of corrupt behaviors. Numerous academics argue that the adoption of digital transformation can foster the sustainable progression of government operations and deliver numerous advantages to society (Wang, Liu, and Xiong 2022). Therefore, digital transformation and the implementation of e-government are considered an important step in improving the quality of public services and promoting sustainable development.

The potential benefits for society from digital transformation in the domain of e-government are plentiful and valuable (Sidek and Ali 2019). The e-government system is one aspect of digital transformation in the public sector (Akbar et al. 2022). Countries with efficient e-government have successfully reduced the administrative burden on society through improved government performance, transparency and accountability (Agbozo & Asamoah, 2019a). E-government is largely a buzzword that brings about changes in the scope of digital government (Mergel et al., 2019). E-government is a transformation of public services that has been implemented by many countries in continental Europe (Morte-Nadal & Esteban-Navarro, 2022b). Therefore, the concept is gaining importance in public sector governance.

E-government provides better services by using *digital transformation* by public authorities that focus on using innovation to collect, transmit, process, or analyse data (Yuliantini 2023). So that it is expected to facilitate the community in accessing public services. In addition, according to Chung & Kim (2019b), when viewed from the point of view of using

information technology for e-government, the most crucial is to advocate government policies and improve service delivery with the aim of reducing corrupt practices, driving revenue growth, increasing transparency, convenience, and facilitating financial efficiency in the public sector (Agbozo & Asamoah, 2019b). Therefore, good implementation of information technology in e-government can provide significant benefits to the government and society as a whole.

According to Khairunnisa et al (2023) other significant challenges in implementing e-government include inadequate data integration, limited adoption of e-government in public services and governance, reliance on outdated technology incompatible with contemporary industrial advancements, insufficient competency among personnel, cultural and departmentalized mentalities within government institutions, limited collaboration among stakeholders, absence of visionary digital leadership, and disparities in infrastructure accessibility, particularly in remote regions. This transformation must change the way public institutions collaborate with each other and with citizens (Mutar et al. 2022).

Some previous research according to Su et al (2021) the problem in the context of government is the lack of understanding of effective strategies to deal with changes that occur during digital transformation. Digital transformation enables the adoption of advanced information and communication technologies to change the way governments operate, interact with society, and deliver public services (Doukidis, Spinellis, and Ebert 2020). In the context of e-government, there is a shift from traditional approaches towards the utilisation of digital technologies to improve government efficiency, public participation, accessibility, and accountability (Pedrosa et al., 2022). These concepts present new concepts in public administration and provide opportunities to implement the latest practices in effective governance and responsiveness to the needs of the people.

This research aims to examine the development of digital transformation research in government. As digital transformation progresses, the criteria employed to assess the process evolve alongside technological advancements. This adjustment is necessary because the impacts of digitization on government performance vary, contingent upon the stage of digital transformation being experienced (Dobrolyubova 2021b). This concept plays an important role in improving services and has good potential for efficiency through automation, data integration, and faster access to information (Wang and Ma 2022). Therefore, research is still needed to identify the trend of digital transformation towards government performance that focuses on public services by utilising new technologies.

RESEARCH METHOD

This research uses a qualitative methodology with a literature review approach to examine articles regarding digital transformation in government. The data sources used were relevant scientific articles utilising the keywords "digital transformation" and "government" in the title, abstract and keywords. The analysis of data involved examining the yearly publication count, contributions by country, areas of study, authorship, cited sources, relevant topics, affiliations, and referenced papers. In addition, the Citespace visualisation tool was used to provide a visual analysis of keyword occurrence.

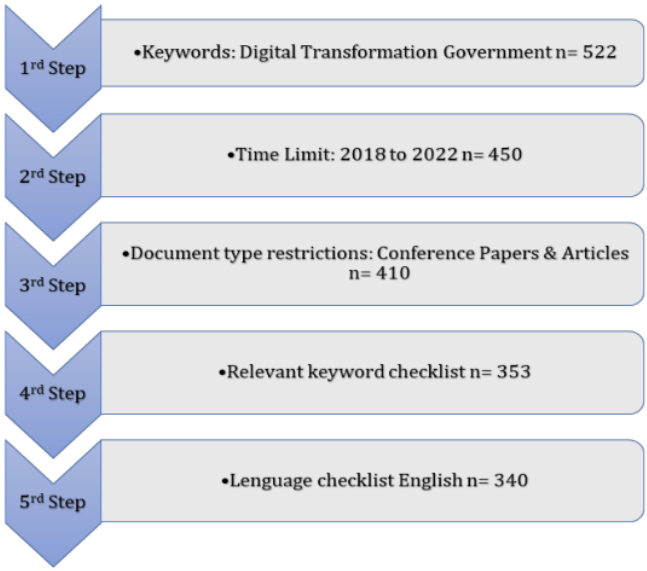

Figure 1. Data Collection Stages.
Source: Scopus Database (2023)

Collecting articles from the Scopus database involves a multi-stage process. The initial stage entails conducting a search using two keywords, namely "Digital Transformation" and "Government", which resulted in 522 documents. In the second stage, the search was limited to a five-year time span from 2018 to 2022, and 450 documents were found. In the third phase, the identification of document types earmarked for analysis was undertaken, specifically Conference Papers and Scientific Articles, totaling 410 documents. In the fourth stage, keywords related to digital transformation and e-government were reduced, resulting in 353 documents. Finally, in the fifth stage, English-only documents were prioritised, resulting in 340 relevant documents being analysed (Fig. 1).

DISCUSSION

In a period of five years, from 2018 to 2022, there is an increase in the number of

studies related to digital transformation. In 2018, there was an increase in the number of publications from 24 to 78 until 2020. In the following year, 2021, there was a slight increase in research interest with the number of publications reaching 80. Kenaikan tersebut hanya sebanyak 2 publikasi, sementara pada tahun berikutnya terjadi peningkatan yang signifikan menjadi 111 publikasi (Fig. 2).

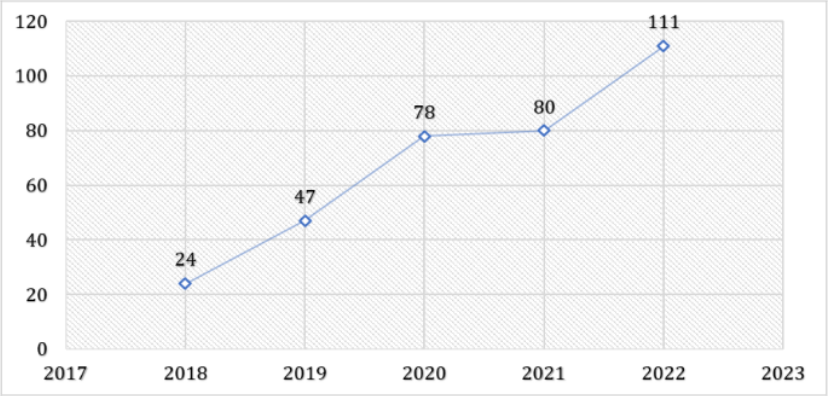

Figure. 2 Publication Trend per Year
Source: Scopus Database

These studies may address topics such as digital technology adoption, implementation strategies, change management, information security, and the resulting socio-economic impact (Rytova et al., 2020). These findings suggest that digital transformation has become an increasingly important topic in the research field over this five-year period. The increase in the number of publications from year to year shows the growing interest and efforts to understand and dig deeper into the role and impact of digital transformation in various sectors (Fig. 2).

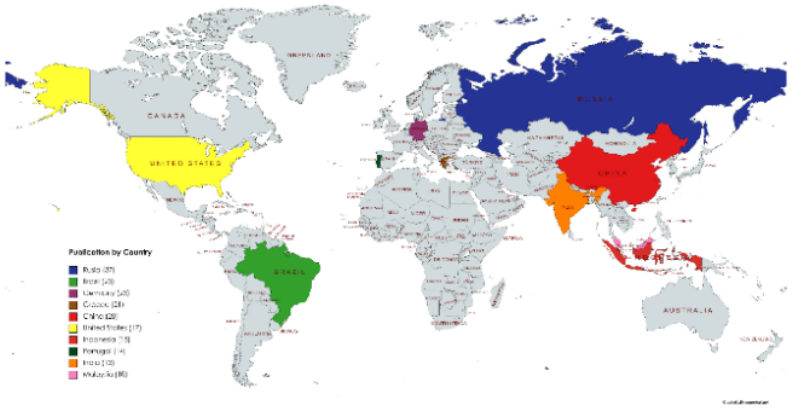

Figure. 3 Country Publication Trend.
Source: Scopus Database using Map Chart

A total of 65 countries published research on digital transformation government. The

countries with the highest number of publications include Russia (N=37), Brazil (N=23), Germany (N=23), Greece (21) and China (N=20). This research is used to implement and propose digital transformation in the government sector (Chung and Kim 2019). These results highlight the importance of co-operation and knowledge between different countries to achieve transformation in government. By understanding the different contexts and experiences of countries around the world, we can learn from each other to develop the best strategies that work in each context. Through international collaboration, we can accelerate efficiency and effectiveness through digital transformation of government (Fig. 3).

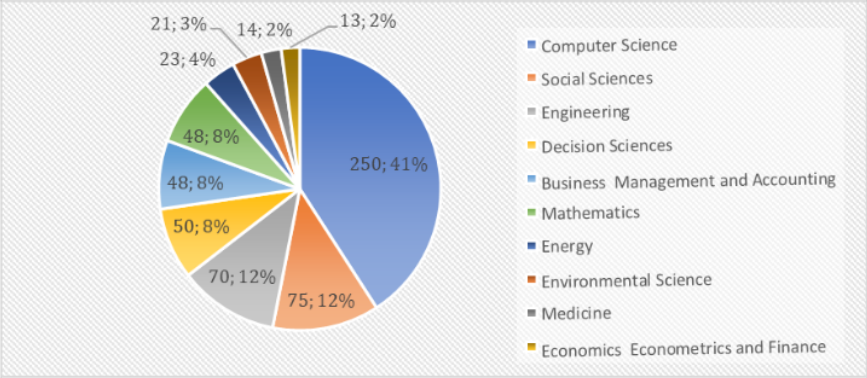

Figure 4. Highest Subject Presentation.
Source: Scopus Database

Figure 4, Analysis results by subject with the highest citations related to government digital transformation. Referring to the views of Morte-Nadal & Esteban-Navarro (2022) information and communication technology (ICT) is a key element of a strong public sector infrastructure, driving sustainable innovation and creating value for society. The search results show that the computer science field of study dominates with a percentage of 41% of the highest number of citations. This discovery indicates that the emphasis is placed on the aspects and utilization of information technology in the transformation of government. The computer science field of study makes important contributions to applying information and communication technologies in the context of government as well as supporting the innovation required to achieve effective digital transformation.

This initiative represents a move aimed at enhancing the efficiency and effectiveness of public sector service production and delivery, with the goal of modernizing government systems (Nielsen 2019). Overall, the contribution of the field of computer science in digital transformation research provides an understanding of change in the government sector. Through the integration of knowledge and approaches we can develop sustainable strategies to achieve

efficiency and effectiveness in the management of public affairs with information and communication technologies (Fig. 4).

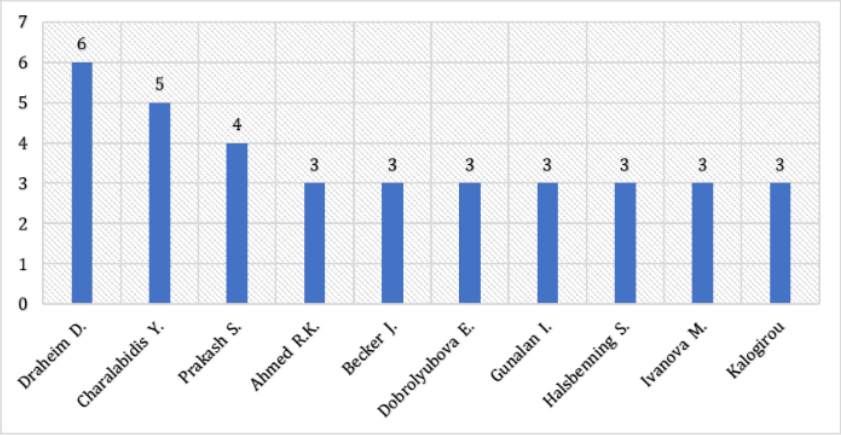

Figure 5. Authors with the Highest Number of Publications.
Source: Scopus Database

Figure 5 above shows the ten articles with the highest citation counts related to the topic of Digital Transformation in Government. The authors with the most citations on Digital Government are Draheim (2021) with 6 citations. The substantial number of citations also contributes novel insights regarding several papers that serve as crucial references, among them the article titled "*Data Exchange for Digital Government: Where Are We Heading? ADBIS2021 Keynote*". This provided new knowledge and insights into relevant and significant studies in the context of digital transformation of government. These articles can provide a strong basis for cultivating a more profound comprehension of the concept and execution of digital transformation within the governmental context (Fig. 5).

Moreover, it was observed that certain authors are engaged in multiple fields of study with identical publications. This occurs when the theme or title of the author's research meets the criteria for a multidisciplinary field. For instance, in this particular case Ahmed et al (2020) with the title "*Challenges in the Digital Transformation of Courts: A Case Study from the Kurdistan Region of Iraq*", and the work of Ivanova & Putintseva (2020) "*Approaches to evaluation of digital transformation of government: Comparative analysis of indicators in the central and eastern european countries*" these two articles are interpreted as representing two areas of study, namely delving into the theme of digital transformation and public services. This provides an overview of other studies that have faced similar situations. The findings show the interconnectedness and complexity of digital transformation studies in public services. Authors involved in several fields of study can provide diverse perspectives and contribute to implementing digital transformation in

the context of public services (Fig. 5).

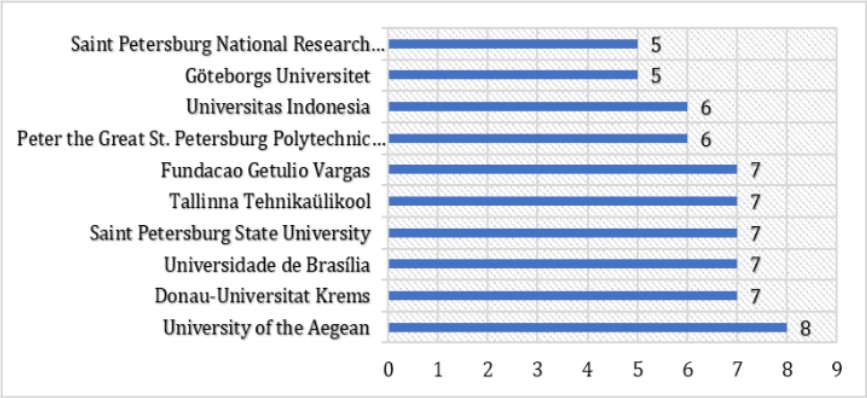

Figure. 6 Number of Affiliated Publications.
Source: Scopus Database

Several affiliated institutions had publications with the highest number of citations as shown in Figure 6, including the University of the Aegan with 8 publications. One of them, the work of Alexopoulos et al (2021) with the title *"How Blockchain Technology Changes Government: A Systematic Analysis of Applications"*. And several other affiliates, such as Donau-Universitat Krems, Universidade de Brasília, Saint Petersburg State University, Tallinna Tehnikaülikool and Fundacao Getulio Vargas each have 7 publications. Meanwhile, other affiliates only had 5 and 6 publications.

Many scholars believe that digital transformation can promote the sustainable development of the government and bring many benefits to the society (Wang et al. 2022). This is due to the diverse effects of digitisation on government performance, which depend on the stage of digital transformation being undergone (Dobrolyubova 2021b). These results show the significant contribution of some institutions in research and publications on governance transformation. These institutions play an important role in enriching the understanding of the concept, implementation and impact of digital transformation in the context of government. Publications that receive a high number of citations also indicate that their research and contributions are widely influential and recognised by other researchers in the field (Fig. 6).

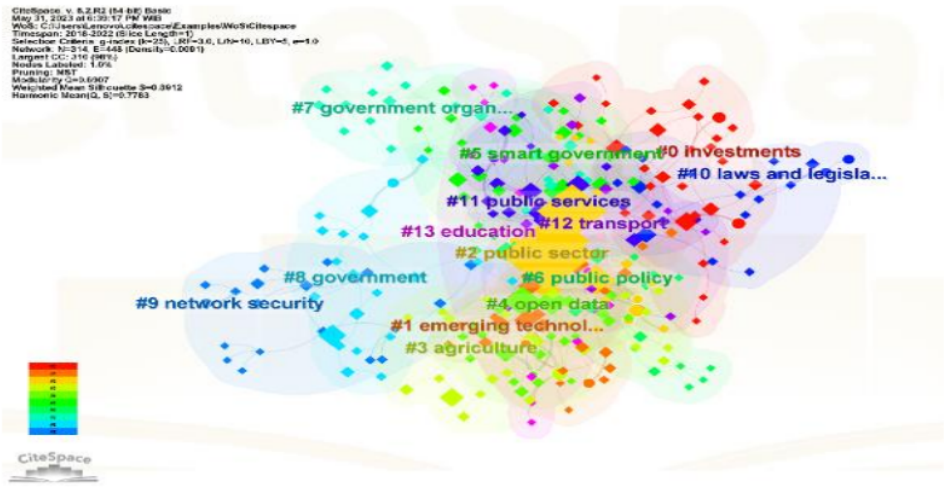

Figure. 7 Keyword Network Visualisation
Source: Keyword-processed using Citespace

Figure 7 above shows the visualisation obtained as 13 clusters (173) items. Citespace analysis translates Scopus data and reads themes through content. Each cluster has a different value, cluster #0 (16) items, cluster #1 (16) items, cluster #2 (19) items, cluster #3 (9) items, Cluster #4 (16) items, cluster #5 (16) items, cluster #6 (14) items, cluster #7 (9) items, cluster #8 (9) items, cluster #9 (10) items, cluster #10 (11) items, cluster #11 (16) items, cluster #12 (4) items, and cluster #13 (8) items. From the analysis, 10 clusters mapped the research topics of *digital transformation government*. While three clusters #9, #11, and #12 have no connection about the research. Differences in the number of items and topics in each cluster were determined by network visualization from Citespace (Fig. 7).

This study discusses e-government processes as one of the most important applications of digital transformation among societies (Lytras and Şerban 2020). Based on the findings, several trends can be identified. Firstly, there is a variation in the number of items between each cluster, indicating a difference in the focus or issues addressed in the research. Clusters with a higher number of items, such as cluster #2, indicate more significant issues or topics in the research. Furthermore, the pattern of relatively similar number of items in some clusters, such as clusters #0, #1, #4, and #5 (all have 16 items). Similarly, in clusters #3, #7, and #8 (each with 9 items), this finding indicates a relationship or interconnectedness between the topics covered in these clusters. In addition, the presence of clusters with a lower number of items, such as cluster #13, illustrates the existence of topics that received less attention in the study (Fig. 7).

Table 1. Articles with the Highest Number of Citations.

Cluster ID	Label	Citations
#0	banking system	17 digital economy, 15 economics, 8 economic and social effects
#1	digital disruption	21 smart city, 18 artificial intelligence, 15 local government
#2	digital organisational resilience	300 digital transformation, 166 e government, 68 digital government
#3	governance innovation	20 digitalisation, 17 covid 19, 6 Janowski T, 2015
#4	open data	44 public administration, 32 metadata, 12 open data
#5	information technology	13 information and communication technology, 12 case study, 11 government is
#6	correlating analogue	18 decision making, 16 public policy, 15 information management
#7	government organisation	6 enterprise architecture, 5 government organisations, 5 government institutions
#8	corporate environment performance	22 government, 9 innovation, 7 article
#10	great divide	13 interoperability, 9 Vial G, 2019, 8 laws and legislation
#13	cooperative network interaction	33 digital technology, 4 commerce, 3 comparative analysis

Source: Citation Summary using Citespace

In Table 1, a bibliometric analysis conducted by selecting keywords in published articles, there is a close relationship between the dominant themes of digital transformation government. Some of these topics such as *banking systems, digital disruption, digital organisational resilience, governance innovation,* and *open data* are integral parts of digital transformation in government.

Referring to the views of Agbozo & Asamoah (2019a) digital transformation contributes to improving the quality of public services. This can be categorised through Table 1. Cluster #2 shows the most cited keywords regarding *"digital organisational resilience"* including *digital transformation* (300), and *e government* (166), and *digital government (*68). These findings suggest that digital organisational resilience is a closely related topic and the focus of research that implements technology in digital transformation in government. E-government is evolving and transitioning which can increase the likelihood of sustainable development through digital transformation of government (Castro & Lopes, 2022).. Digital transformation as the main keyword with 300 citations, shows the focus on the application of information and communication

technologies in government processes to improve the efficiency and effectiveness of managing public affairs (Table 1).

By combining the findings from the analysis with the concepts outlined earlier, the government can better understand the important role of *digital transformation* in achieving the goal of efficiency and effectiveness in managing public affairs. Overall, the findings suggest that there is a close relationship between the concept and practice of *digital transformation*. Research in this cluster focuses more on how organisations, including governments, adopt digital technologies to deal with change, improve operational efficiency and deliver services to the public (Table 1).

CONCLUSION

In this study, it was found that the publication trend is increasing. There were 340 research documents from 2018 to 2022, with Russia being the largest contributor. From the analysis, it was found that the field of computer science is the main discipline involved in this research. Through the analysis of several sources, it was found that "digital organisational resilience" was the dominant topic trend. In addition, the University of the Aegan was identified as the leading institution in this research, and Draheim was listed as the highest contributing author. Finally, this research plays an important role in expanding our understanding of the digital transformation of government as an effort to improve the quality of public services through digital technology. The discoveries carry notable implications for the future trajectory of digital transformation within government development.

ACKNOWLEDGEMENT

We would like to express our gratitude to all those who have contributed to the completion of this article. Their contributions have been very helpful in improving the quality of this article. In addition, we would also like to thank my supervisors, teaching assistants, and colleagues for the fruitful discussions that helped us in refining this article.

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