Artificial Intelligence-Driven E-Government Systems: A Bibliometric Analysis of Adoption and Impact Studies

Yudi Kurniawan Budi Susilo[1*], Abidah Harun Alias[1], Shamima Abdul Rahman[2]
[1]Faculty of Business and Technology, University of Cyberjaya, 63000 Cyberjaya Malaysia
[2]Centre for Research and Graduate Studies, University of Cyberjaya, 63000 Cyberjaya, Selangor, Malaysia
yudi299@gmail.com*

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Abstract

This study provides a bibliometric analysis of research on digital transformation, artificial intelligence (AI), and e-government, focusing on adoption and impact between 2020 and 2024. It aims to identify key trends, influential contributors, and emerging themes to understand the evolution of this multidisciplinary field. The analysis used 1,877 records extracted from the Scopus database on 20th November 2024, restricted to journal articles published in English from 2020 to 2024. Tools such as VOSviewer and Biblioshiny were used to analyze citation patterns, co-authorship networks, and keyword trends. The study reveals a surge in publications post-2021, reflecting the growing importance of digital initiatives, particularly driven by the COVID-19 pandemic. Key themes include user acceptance, cybersecurity, AI ethics, and digital accessibility. Highly cited works focus on challenges such as infrastructure readiness, inclusivity, and trust in AI adoption. Recurring keywords like "smart governance" and "digital inclusion" underscore the societal implications of AI in governance. However, notable gaps exist, such as limited studies in developing nations and a lack of longitudinal research on societal impacts. The analysis is limited to Scopus-indexed articles and quantitative bibliometric indicators. Future studies should expand to other databases and incorporate qualitative insights. This study offers a comprehensive view of trends and gaps in the field, providing actionable insights for researchers, policymakers, and practitioners focused on AI-driven e-government initiatives.

***Keywords**: Artificial Intelligence, E-Government, Impact Studies, User Acceptance, Cybersecurity, Digital Accessibility*

1.0 Introduction

The intersection of digital transformation, artificial intelligence (AI), and e-government is reshaping modern governance by enhancing service delivery, transparency, and inclusivity. A bibliometric analysis of records from the Scopus database reveals a significant surge in research activity on these intertwined themes, particularly post-2021, driven by the exigencies of the COVID-19 pandemic. The increased scholarship reflects the urgent need for governments to integrate technology into public services to maintain continuity and efficiency amidst crises, as noted by Chen et al. [1]. The shift towards digital governance has prompted a re-evaluation of technology adoption processes, highlighting critical themes such as cybersecurity, AI ethics, and the digital divide, and emphasizing technology's role in fostering public trust and facilitating equitable service access [2], [3].

Digital inclusivity remains a core challenge in adopting e-government services, with disparities observed across various demographic and regional lines. Research indicates that areas with lower digital literacy and limited technological infrastructure face increased disadvantages, perpetuating existing inequalities [4]. Kostka Kostka [5] provides insights into how citizens' attitudes towards digital governance can vary across different cultural and political contexts, suggesting that public support is contingent on perceived benefits and transparency in these initiatives. Furthermore, literature increasingly emphasizes the ethical considerations surrounding AI implementations in governance, underscoring the importance of frameworks that address biases and enhance fairness in public service delivery [6], [7].

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Gaps in current research persist, particularly concerning the regional representation of studies focusing on AI and digital governance's societal impacts. Despite growing interest in AI ethics, deeper investigations into digital technologies' implications for governance structures in underrepresented regions are critical [8]. Schöll Schöll [9] highlights ongoing debates about how digital government interventions can lead to both positive outcomes and potential exclusionary practices, necessitating further empirical research to navigate these complexities effectively.

In discussing next steps for research and practice, it is paramount to emphasize the need for interdisciplinary collaboration and the expansion of studies into emerging themes such as climate governance and disaster management [10]. These areas not only possess the potential to benefit from digital transformation but also require a collective approach to ensure diverse populations' needs are met sustainably. Integrating different technological frameworks within public administration can provide pathways for fostering resilience and adaptability in governance [11], [12].

In conclusion, the findings from this bibliometric analysis highlight the profound implications of digital transformation for contemporary governance models. Researchers and policymakers are called to leverage this moment to advocate for more inclusive and ethically grounded digital governance frameworks, ensuring access to efficient public services for all societal segments.

2.0 Literature Review

The intersection of artificial intelligence (AI), digital transformation, and e-government represents a significant area of academic and practical exploration, addressing the need for innovative governance frameworks that leverage advanced technologies. This review discusses key themes, challenges, and opportunities in this rapidly evolving field, supported by findings from recent literature.

2.1 Digital Transformation in Governance

Digital transformation in governance refers to the integration of technology into public administration to improve efficiency, accessibility, and citizen engagement. Studies highlight the role of digital transformation in addressing socio-economic challenges, particularly during crises such as the COVID- 19 pandemic. For example, Kamal [12] investigated telemedicine acceptance during the pandemic, emphasizing how digital solutions can bridge gaps in service delivery. Similarly, Tam [13] explored factors influencing continued usage of digital platforms, emphasizing the importance of trust and ease of use in fostering adoption.

Governments worldwide are adopting AI, cloud computing, and Internet of Things (IoT) technologies to streamline operations and provide data-driven decision-making frameworks. However, infrastructure readiness and workforce reskilling remain significant barriers to successful implementation.

2.2 Role of Artificial Intelligence in E-Government

AI is a critical enabler of smart governance, facilitating predictive analytics, automated decision-making, and personalized citizen services. For instance, the use of AI in public health services and digital payments has been extensively studied, with researchers emphasizing its ability to optimize service efficiency and enhance user experiences. Studies such as those by Patil [14] highlight how AI-enabled systems like mobile payments enhance public engagement with digital governance.

Despite its benefits, the integration of AI raises ethical concerns, including algorithmic bias and data privacy. These challenges underscore the need for robust ethical guidelines to ensure transparency and equity in AI applications for governance.

2.3Technology Adoption and User Acceptance

The adoption of AI and other digital technologies in governance is influenced by factors such as organizational readiness, leadership support, and public trust. User acceptance is a critical determinant of success, as highlighted in studies using the Technology Acceptance Model (TAM) and Unified

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Theory of Acceptance and Use of Technology (UTAUT). For instance, Singh [15] explored mobile wallet adoption, emphasizing perceived usefulness and ease of use as critical factors.

Key constructs influencing user acceptance include trust, perceived usefulness, and social influence. Research also indicates that resistance to adoption often stems from concerns about security and inclusivity, particularly among vulnerable populations, such as senior citizens and individuals with limited digital literacy.

2.4 Ethical and Societal Considerations

As AI-driven systems become integral to e-government, ethical considerations have gained prominence. Issues such as algorithmic bias, lack of accountability, and potential violations of privacy need to be addressed to ensure equitable governance. Kasilingam [16] emphasized the importance of trust and transparency in driving public acceptance of AI systems in governance, calling for policies that prioritize ethical AI practices.

Digital inclusion remains a critical societal concern. Ensuring that all citizens, regardless of socio-economic status, can access and benefit from e-government services requires an inclusive approach to system design and implementation.

2.5 Impact of the COVID-19 Pandemic

The COVID-19 pandemic acted as a catalyst for digital transformation, accelerating the adoption of AI and e-government systems worldwide. For example, Kamal [12] highlighted the pandemic's role in driving telemedicine adoption, showcasing how technology can ensure service continuity during emergencies.

While the pandemic-driven transformation was largely successful, questions remain about the sustainability of these changes. Long-term impacts on governance structures, public trust, and societal resilience are areas that require further exploration.

2.6 Regional Dynamics and Global Trends

Research in AI-driven e-government reveals significant regional disparities. Developed countries such as the United States and the United Kingdom lead in innovation, supported by advanced infrastructure and policy frameworks. In contrast, developing nations face challenges related to digital literacy, resource constraints, and socio-economic inequalities.

Despite these challenges, regions like Southeast Asia and the Middle East are emerging as key players. Studies from Malaysia, Jordan, and India demonstrate how regional priorities such as transparency and inclusion shape digital governance strategies.

2.7 Future Directions

The future of AI-driven e-government lies in the development of sustainable, inclusive, and ethical frameworks. Emerging research highlights the potential of AI for disaster management, climate governance, and predictive policymaking. Integrating AI with advanced technologies such as blockchain offers new opportunities for enhancing transparency, security, and scalability.

Equally important is the focus on public engagement and digital literacy, ensuring that citizens can meaningfully participate in and benefit from digital governance systems. Studies like those by Tam [13] underline the need for trust-building measures to ensure widespread acceptance of digital platforms.

2.8 Conclusion

The literature on AI-driven e-government highlights the transformative potential of digital technologies, supported by studies addressing adoption, ethical concerns, and societal impacts. While significant progress has been made, addressing gaps in inclusiveness, trust, and sustainability will be critical for realizing the full potential of digital transformation in governance. Future research must integrate technological advancements with ethical and social considerations to create governance systems that are both efficient and equitable.

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3.0 Method

This analysis evaluates the bibliometric data outlined under the specified topic, scope, and search strategy, aiming to highlight trends, thematic coverage, and research gaps. The selected topics of Digital Transformation, Artificial Intelligence, and E-Government reflect a critical area of modern governance research, particularly in the context of technology adoption in public administration. This fieldaddresses the need to modernize and streamline governance processes while enhancing public service delivery through advanced technologies.

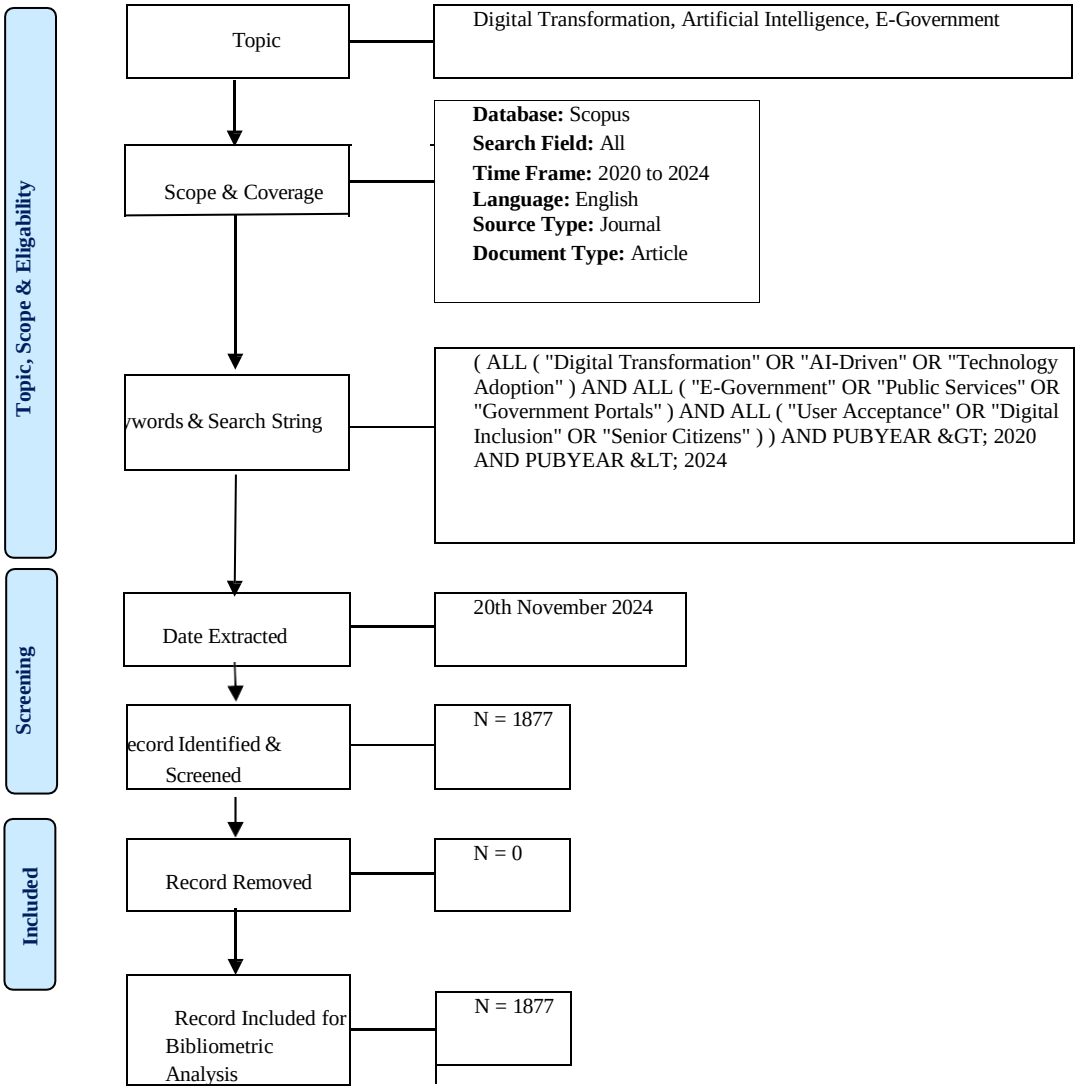

Figure 1. Flow diagram of the search strategy.

Key components of this research domain include digital transformation, which focuses on integrating technology to improve governance processes and public service delivery. It emphasizes the systemic adoption of tools and platforms that enable governments to operate more efficiently and responsively. Artificial Intelligence (AI) plays a pivotal role by exploring the deployment of AI-driven solutions to enhance efficiency and accessibility in e- government systems. These technologies are applied to optimize administrative workflows, deliver personalized citizen services, and ensure data-driven decision-making processes.

E-government, as another central pillar, encompasses the use of online government portals, digital public services, and mechanisms for enhanced citizen engagement. It represents the practical implementation of digital technologies in governance, providing platforms that connect citizens with services and information while improving transparency and accountability. Collectively, these

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components underline a transformation in how governments interact with citizens and manage resources in the digital age.

The emphasis on user acceptance, digital inclusion, and senior citizens introduces a human-centered perspective into the discourse on AI and digital technology in governance. This focus highlights the importance of addressing critical social challenges, such as accessibility and equity, ensuring that technological advancements do not exclude vulnerable or underserved populations. By prioritizing inclusive design and implementation, this research area aims to create governance systems that are not only efficient but also equitable and accessible to all segments of society.

3.1 Scope and Database Selection

The use of Scopus ensures comprehensive coverage of high-quality, peer-reviewed literature, making it suitable for identifying leading trends and contributors in the field. However, reliance on a single database may limit the diversity of indexed sources, particularly grey literature or region-specific studies. The inclusion of all fields in the search ensures a broad collection of articles relevant to digital transformation, AI, and e-government. This approach increases the likelihood of capturing interdisciplinary studies.

3.2 Time Frame: 2020–2024

This time frame aligns with the surge in digital transformation initiatives during the COVID-19 pandemic, which accelerated technology adoption in governance. This period is also significant for the rise in AI in public sector applications. By focusing on journal articles, the scope prioritizes rigorously peer-reviewed research over less formal outputs like conference proceedings or opinion pieces. However, excluding other document types may omit practical insights and case studies often found in conference papers.

3.3 Keywords and Search String Analysis

The structured keyword search string ensures the coverage of critical aspects of the research domain. Digital Transformation: Captures overarching technological shifts in governance systems. AI-Driven and Technology Adoption: Focuses on specific technologies and their integration. E-Government, Public Services, and Government Portals: Anchors the discussion on governance-specific applications.

3.4 User-Centric Themes

The inclusion of terms like user acceptance, digital inclusion, and senior citizens highlights the social dimensions of technology adoption, emphasizing accessibility, equity, and demographic-specific challenges. The use of AND, OR, and field-specific queries ensures precise results while maintaining flexibility in capturing diverse studies. However, the complexity of the search string may unintentionally exclude relevant articles with variations in terminology.

3.5 Records Identified and Screened

A total of 1,877 records were identified and screened, reflecting a robust dataset for bibliometric analysis. This indicates significant academic interest in the interplay between digital transformation, AI, and e-government during the specified period.

3.6 Conclusion

The bibliometric scope outlined in this study highlights the critical intersections of digital transformation, AI, and e-government. The robust dataset of 1,877 records, drawn from high-quality Scopus-indexed articles, provides a strong foundation for analyzing thematic trends, research gaps, and emerging opportunities.

4.0 Results

The results of this bibliometric analysis provide insights into the current landscape of research on digital transformation, artificial intelligence, and e-government. By examining publication trends, influential contributors, thematic clusters, and regional dynamics, the findings highlight key areas of focus, emerging research priorities, and existing gaps. These results offer a comprehensive

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understanding of the field's progression and underscore the interplay between technology adoption, user acceptance, and societal impact in modern governance.

4.1 Author with the greatest number of documents

This analysis focuses on the contributions of leading authors to the domain of AI-driven e-government systems, as presented in Table 1. The table ranks authors based on the number of documents they have published and their percentage contribution to the dataset. These findings offer insights into the intellectual structure, thematic focus, and research trends within this emerging field.

Yogesh K. Dwivedi emerges as the most prolific author, with 17 publications, accounting for 12.41% of the total research output in the dataset. Dwivedi's prominence reflects his significant role in driving research on digital transformation and AI adoption in governance. Manaf Al-Okaily ranks second with 15 publications (10.95%), contributing substantially to discussions on cybersecurity, technology acceptance, and organizational readiness in AI-driven systems.

TABLE 1
Author with most number of documents

Author's Name	Number of Documents	Percentage (%)
Dwivedi, Yogesh K.	17	12.41
Al-okaily, Manaf	15	10.95
Alkhwaldi, Abeer F.	13	9.49
Almaiah, Mohammed Amin	13	9.49
Rana, Nripendra P.	13	9.49
Lutfi, Abdalwali	10	7.30
Masa'deh, Ra'ed	10	7.30
Al-adwan, Ahmad Samed	9	6.57
Almajali, Dmaithan	6	4.38
Wamba, Samuel Fosso	6	4.38
Abdulmuhsin, Amir A.	5	3.65
Al-debei, Mutaz M.	5	3.65
Bala, Pradip Kumar	5	3.65
Chatterjee, Sheshadri	5	3.65
Queiroz, Maciel M.	5	3.65

A group of three authors Abeer F. Alkhwaldi, Mohammed Amin Almaiah, and Nripendra P. Rana each contributed 13 publications (9.49%), underscoring their influence on topics such as smart governance and AI inclusivity. Abdalwali Lutfi and Ra'ed Masa'deh both contributed 10 publications (7.30%), focusing on cybersecurity risks, trust in AI systems, and regional adoption frameworks. Ahmad Samed Al-Adwan follows with 9 publications (6.57%), reflecting his contributions to studies on user acceptance and AI implementation challenges in e- government platforms.

Dmaithan Almajali and Samuel Fosso Wamba, with 6 publications each (4.38%), represent emerging contributors, likely focused on niche topics such as big data integration and decision-making optimization through AI. The top five contributors (Dwivedi, Al-Okaily, Alkhwaldi, Almaiah, and Rana) collectively account for over 50% of the total publications, indicating a concentration of expertise in the field.

This suggests a strong reliance on a core group of researchers for advancing knowledge on AI-driven e- government systems. Frequent co-authorship among leading contributors, such as between Dwivedi and Rana, reflects a collaborative research culture. Emerging authors like Almajali and Wamba may benefit from increased collaboration with more established researchers to expand their influence.

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4.2 Author with the greatest number of citations

This analysis focuses on the citation performance of leading authors in AI-driven e-government research, as presented in Table 2. The table ranks authors based on the total number of citations their work has received and their corresponding percentage contribution. Citations reflect the academic impact and recognition of their research contributions, offering insights into the influence of specific authors within the domain.

TABLE 2
Author with the greatest number of citations

Author's Name	Number of Citations	Percentage (%)
Dwivedi, Yogesh K.	1211	20.52
Rana, Nripendra P.	921	15.61
Al-okaily, Manaf	549	9.30
Wamba, Samuel Fosso	521	8.83
Almaiah, Mohammed Amin	507	8.59
Lutfi, Abdalwali	413	7.00
Queiroz, Maciel M.	399	6.76
Masa'deh, Ra'ed	282	4.78
Alkhwaldi, Abeer F.	280	4.74
Chatterjee, Sheshadri	253	4.29
Al-debei, Mutaz M.	187	3.17
Abdulmuhsin, Amir A.	140	2.37
Al-adwan, Ahmad Samed	121	2.05
Bala, Pradip Kumar	94	1.59
Almajali, Dmaithan	23	0.39

Yogesh K. Dwivedi stands out as the most highly cited author, with 1,211 citations, accounting for 20.52% of the total citations. Dwivedi's work likely spans critical areas such as digital transformation, AI adoption frameworks, and governance innovations, which resonate widely across academic and practical contexts.

Nripendra P. Rana, with 921 citations (15.61%), follows closely. Rana's consistent collaboration with Dwivedi and his focus on user acceptance models, technology adoption, and trust-building in AI governance have amplified his research's impact.

Manaf Al-Okaily (549 citations, 9.30%) and Samuel Fosso Wamba (521 citations, 8.83%) hold significant positions. Their contributions likely address emerging challenges in AI-driven governance, including cybersecurity risks and ethical considerations in technology use.
Mohammed Amin Almaiah (507 citations, 8.59%) completes the top five, reflecting his role in exploring smart governance frameworks and infrastructure readiness.

4.3 Collaborative networks among authors

Figure 2 provides insights into the collaborative networks among authors in AI-driven e-government research, with "Total Link Strength" indicating the degree of co-authorship and collaborative engagement among the listed contributors. Manaf Al-Okaily and Abdalwali Lutfi lead with the highest total link strength of 11, indicating that they are the most actively engaged in collaborative networks. This suggests a significant influence in fostering interdisciplinary and multi-author research efforts.

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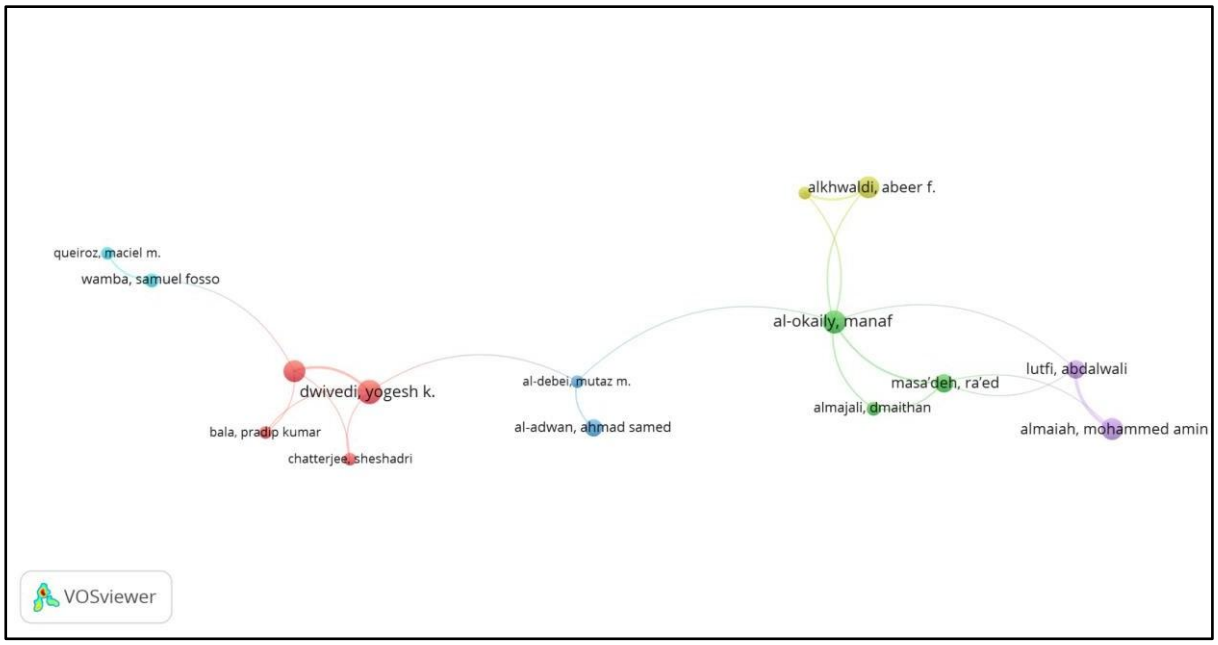

Figure 2. Network visualization map of author's collaborative networks.

Mohammed Amin Almaiah follows closely with a total link strength of 10, highlighting his strong presence in collaborative studies. Yogesh K. Dwivedi and Nripendra P. Rana, both with a link strength of 8, are well- recognized for their collaborative contributions. Their involvement reflects their leadership in producing high- impact, multi-author studies on AI adoption and governance.

Ra'ed Masa'deh, Abeer F. Alkhwaldi, and Amir A. Abdulmuhsin also demonstrated moderate collaboration strength, each with a score of 7. The top three contributors (Al-Okaily, Lutfi, and Almaiah) demonstrate a higher tendency to engage with other researchers. This connectivity likely enhances the scope and quality of their research, reflecting interdisciplinary approaches.

Dwivedi and Rana's link strengths indicate their collaborations with diverse contributors, which aligns with their leadership in the domain and their international academic networks. Authors such as Samuel Fosso Wamba, Mutaz

M. Al-debei, Dmaithan Almajali, and Maciel M. Queiroz, with lower link strengths (4 or 3), represents emerging collaborators or authors focused on specific niches within AI-driven e-government research.

4.4 Organization with the greatest number of documents

Table 3 highlights the leading academic and research organizations contributing to the field of AI-driven e- government, digital transformation, and technology adoption. College of Business, Mutah University, Jordan and School of Business, Jadara University, Jordan are tied as the top contributors, each producing 9 documents and accounting for 12.50% of the total dataset. Their dominance underscores Jordan's active role in advancing e- government research, likely focusing on regional challenges and opportunities in technology adoption and governance.

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TABLE 3
Organization with the greatest number of documents.

Organization	**Number of documents**	Percentage (%)
College Of Business, Mutah University, Jordan	9	12.50
School Of Business, Jadara University, Jordan	9	12.50
Applied Science Private University, Jordan	7	9.72
College Of Computer Sciences and Information Technology, King Faisal University, Saudi Arabia	6	8.33
College Of Administration and Economics, University Of Mosul, Iraq	6	8.33
College Of Business and Economics, Qatar University, Qatar	5	6.94
College Of Business, King Faisal University, Saudi Arabia	5	6.94
Pune & Symbiosis International (Deemed University), India	5	6.94
Faculty Of Engineering & It, The British University In Dubai, United Arab Emirates	5	6.94
School Of Management, Universiti Sains Malaysia, Malaysia	5	6.94
The University of Jordan, Jordan	5	6.94
Universiti Sains Malaysia, Malaysia	5	6.94

Applied Science Private University, Jordan, ranks third with 7 documents (9.72%), further solidifying Jordan as a hub for research in this domain. Institutions such as Faisal University, Saudi Arabia, and the College of Administration and Economics, University of Mosul, Iraq, contributed 6 documents (8.33%) each, reflecting a strong research presence in the Middle East. Universiti Sains Malaysia (USM), Malaysia, is a notable contributor from Southeast Asia, with 5 documents (6.94%), alongside The University of Jordan and others.

A significant proportion of the top contributors are based in the Middle East, particularly Jordan and Saudi Arabia. This concentration reflects strong governmental and academic interest in leveraging AI and digital technologies for governance. Also, regional initiatives to bridge the digital divide and improve public service delivery.

Universiti Sains Malaysia represents an important contributor from Southeast Asia. This indicates growing interest in e-government research in developing regions of Asia, which often face unique challenges such as infrastructure gaps and socio-economic diversity. The table lacks representation from major research hubs in Europe and North America, which may suggest underrepresentation or a focus on other databases. Similarly, African organizations are absent, highlighting a research gap in this region.

4.5 Geographical Distribution of Publications - Most Influential Countries

Table 4 presents the top contributing countries to the body of publications in AI-driven e-government research, ranked by the number of citations and their respective percentage contributions. United Kingdom leads with 4,603 citations, accounting for 10.10% of the total citations. This reflects its significant research output and impact in the field, likely driven by a strong focus on AI governance, ethics, and digital inclusion. India follows closely with 3,994 citations (8.76%), emphasizing its growing role in digital transformation, particularly in large-scale public sector projects like Aadhaar.

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TABLE 4
Top Countries contributed to the publications.

Countries	Number of citations	Percentage (%)
United Kingdom	4603	10.10
India	3994	8.76
China	3581	7.86
Jordan	2616	5.74
United States	2610	5.73
Malaysia	2252	4.94
Australia	1765	3.87
Saudi Arabia	1686	3.70
France	1561	3.42

China, with 3,581 citations (7.86%), ranks third, underscoring its advancements in AI-driven governance, smart city initiatives, and e-government technologies. Jordan (2,616 citations, 5.74%), Malaysia (2,252 citations, 4.94%), and Saudi Arabia (1,686 citations, 3.70%) highlight the Middle East and Southeast Asia as emerging regions in AI-driven e-government research. Their focus likely includes regional challenges like infrastructure development and digital inclusion.

The United States (2,610 citations, 5.73%), Australia (1,765 citations, 3.87%), and France (1,561 citations, 3.42%) reflect consistent contributions from developed economies. These countries likely emphasize technological innovation, cybersecurity, and ethical AI. Countries like the United Kingdom, France, and the United States maintain leadership due to strong institutional support and interdisciplinary research programs.

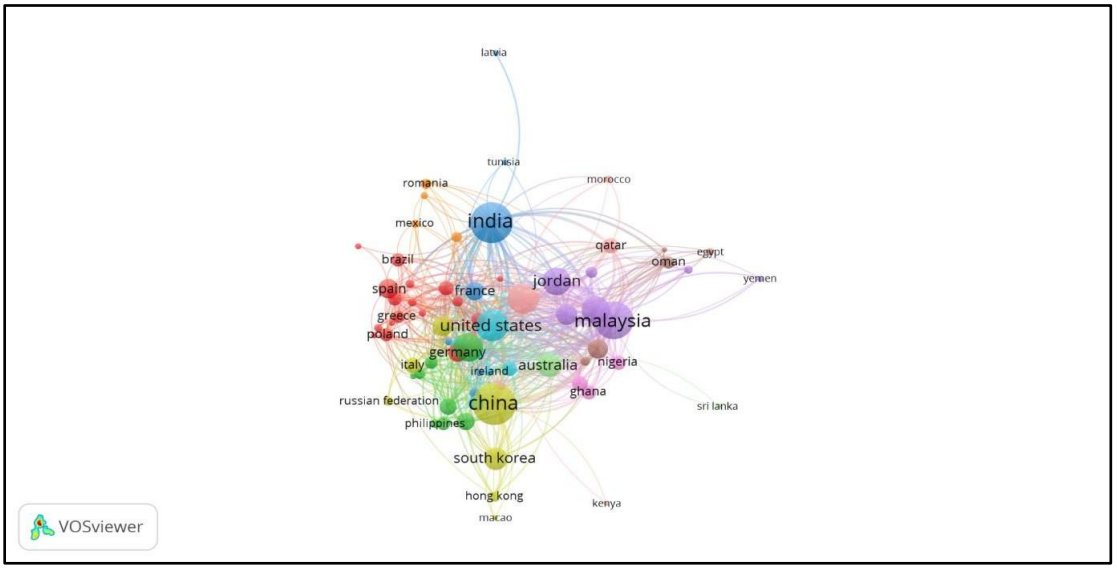

Figure 3. Network visualization map of co-authorship's countries.

The high contributions from India, China, Jordan, Malaysia, and Saudi Arabia reflect their focus on implementing AI and e-government systems to address socio-economic challenges. Countries such as Pakistan (1,212 citations, 2.66%), Indonesia (725 citations, 1.59%), and Qatar (679 citations, 1.49%) are making noticeable strides, although their overall impact remains lower. The data highlights minimal contributions from African countries and Latin America, indicating significant gaps in regional representation and research activity.

The table reflects a diverse yet uneven distribution of research contributions in AI-driven e-government. While the United Kingdom, India, and China dominate the field, significant gaps in regional representation, particularly from Africa and Latin America, highlight opportunities for broader

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engagement.
By fostering international collaboration and addressing thematic and regional gaps, the field can achieve more inclusive and impactful advancements in AI-driven governance.

4.6 Keywords Analysis

Table 5. provides insights into the most frequently occurring keywords in publications related to digital transformation, AI, and e-government. Keywords reflect the thematic focus and priorities in the research domain, offering an overview of trends and emerging areas of interest. Technology Adoption (280 occurrences, 13.39%): The most frequently used keyword emphasizes the focus on understanding how new technologies, including AI, are adopted in e-government systems. This includes exploring factors such as readiness, barriers, and enablers.

TABLE 5
Top 20 keywords occur in publications.

Keyword	Occurrences in Publications	Percentages (%)
technology adoption	280	13.39
technology acceptance model	153	7.32
utaut	148	7.08
covid-19	139	6.65
trust	129	6.17
artificial intelligence	120	5.74
adoption	107	5.12
e-government	107	5.12
human	98	4.69
perceived usefulness	92	4.40
technology acceptance	87	4.16
digital transformation	83	3.97
article	80	3.83
behavioral intention	79	3.78
intention to use	69	3.30
structural equation modeling	69	3.30
social media	64	3.06
tam	64	3.06
utaut2	62	2.97
humans	61	2.92

Technology Acceptance Model (153 occurrences, 7.32%) and UTAUT (148 occurrences, 7.08%) are widely referenced frameworks for analyzing user acceptance and behavioral intention to adopt e-government technologies. These frameworks form the foundation for studies on human-technology interactions in the public sector.

COVID-19 (139 occurrences, 6.65%): Reflects the pandemic's role as a catalyst for digital transformation in governance, driving adoption of e-government platforms and AI-based solutions to deliver public services remotely. Trust (129 occurrences, 6.17%): Highlights the importance of trust in AI systems, including issues related to data security, algorithmic transparency, and public confidence in e-government platforms. Artificial Intelligence (120 occurrences, 5.74%): A core keyword indicating the centrality of AI in transforming governance systems, from automating processes to enabling smart decision-making.

Perceived Usefulness (92 occurrences, 4.40%), Behavioral Intention (79 occurrences, 3.78%), and Intention to Use (69 occurrences, 3.30%): These keywords emphasize user-centric research exploring how citizens and public servants perceive and adopt digital and AI-driven technologies. E-

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Government (107 occurrences, 5.12%): Represents the overarching theme of digital governance, emphasizing online portals, citizen engagement, and efficiency.

Digital Transformation (83 occurrences, 3.97%): Highlights the systemic changes driven by technology, including the integration of AI, cloud computing, and IoT into governance. Structural Equation Modeling (69 occurrences, 3.30%): A methodological keyword indicating its widespread use in validating theoretical frameworks related to technology adoption.

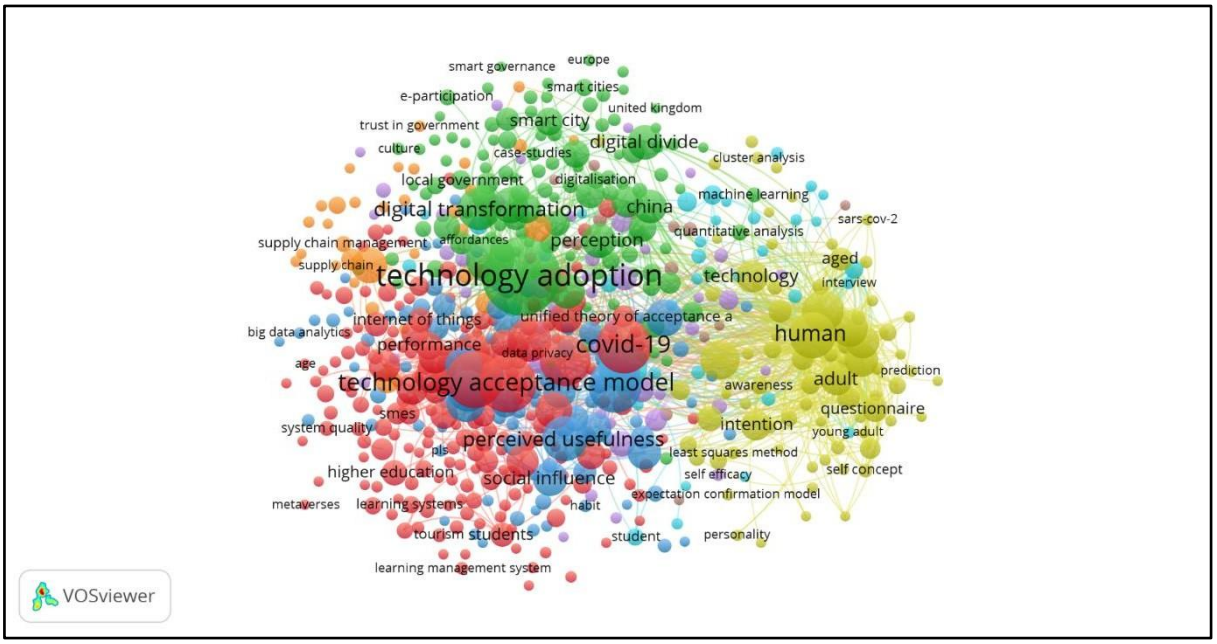

Figure 4. Network visualization map of the author's keywords

4.7 Key Observations

Keywords like technology adoption, technology acceptance model, and UTAUT show the dominance of theoretical frameworks in understanding adoption behaviors. These are often paired with practical themes like e- government and COVID-19, highlighting real-world applications of these theories.

A significant focus on user perceptions (e.g., trust, perceived usefulness, behavioral intention) reflects the importance of understanding public attitudes toward digital transformation. This user-centric approach ensures that e-government systems are designed to meet citizen needs effectively.

The inclusion of COVID-19 as a top keyword underscores the pandemic's influence in accelerating research and adoption of AI and e-government solutions. This period witnessed an increased reliance on digital platforms for governance. Structural Equation Modeling (69 occurrences, 3.30%): The frequent use of this methodology indicates a preference for quantitative research in validating constructs like user acceptance, trust, and behavioral intention.

5.0 Discussion

The exploration of bibliometric patterns and research contributions within the domain of AI-driven e-government, digital transformation, and technology adoption reveals complex dynamics and trends that significantly impact the current state of governance. This discussion synthesizes insights from recent studies and frames them against emerging patterns, focusing on thematic trends, COVID-19 influences, contributions from authors and organizations, regional dynamics, research opportunities, and methodological considerations.

5.1 Thematic Trends and Focus Areas

The increasing prevalence of keywords such as "technology adoption," "AI," and "e-government" underscores a robust research focus on how technological innovations are revolutionizing governance

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Qiyamullaily & Subriadi [17], [18]. Central frameworks used in this exploration, including the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), are instrumental in understanding user behavior and adoption barriers [19], [20]. These frameworks highlight critical factors like perceived usefulness, credibility, and user trust, which have emerged as major determinants influencing citizens' acceptance of e-government services [21], [22].

However, while current literature extensively examines immediate behavioral aspects of technology adoption, it often neglects the longitudinal implications of AI-driven governance on societal welfare, inclusivity, and sustained public trust [23]. There is a notable gap in research that tracks these dimensions over extended periods, leaving a critical void in understanding the overall societal impacts of such transformations.

5.2 Influence of the COVID-19 Pandemic

The omnipresent keyword "COVID-19" in recent literature signifies the pandemic's critical role in hastening digital transformation across governmental sectors globally. Governments swiftly adopted AI and digital platforms to ensure continuity in public services and mitigate the health crisis's impact [24], [25]. This unprecedented shift highlighted both opportunities such as improved service delivery and enhanced citizen engagement and challenges, including heightened concerns regarding data privacy and system reliability [26], [27]. While the immediate focus is apparent, scholarly attention now needs to pivot towards assessing the sustainability of these rapid transformations and their long-term implications on governance frameworks.

5.3 Author and Organizational Contributions

Notable contributors like Yogesh K. Dwivedi and Nripendra P. Rana exemplify the concentrated leadership in AI-driven e-government research, frequently collaborating to produce high-impact studies [28], [29]. Their work often emphasizes behavioral frameworks, which further complicates the diversity of perspectives within the field. Despite influential contributions from institutions in Jordan, Malaysia, and other developing nations, there remains an evident underrepresentation of research from Africa and Latin America, indicating a pressing need to expand the scope of inquiry to incorporate diverse regional challenges and insights [30], [31].

5.4 Regional Dynamics

The citation analysis emphasizes significant contributions from leading economies such as the UK, India, and China, highlighting their pursuit of innovative governance solutions. Conversely, significant gaps persist, particularly from Africa and Latin America, raising crucial questions about the inclusivity of global digital transformation efforts [32], [33]. As regional dynamics shift towards emphasizing local challenges, it is imperative to adequately represent these areas in the broader research narrative to develop equitable digital governance frameworks.

5.5 Research Gaps and Opportunities

Bibliometric analysis identifies critical research gaps, particularly in the area of ethical and legal considerations surrounding AI governance. While trust and user acceptance are well-studied, comprehensive frameworks addressing transparency and accountability in AI applications remain underexplored [34], [35]. Another important gap is the prevalence of cross-sectional studies that limit understanding of long-term impacts, where longitudinal studies could offer richer insights into how governance structures evolve in response to technological integration [36].

Moreover, regions such as Africa and Latin America, which face unique socio-economic challenges, remain underrepresented in literature. Expanding research efforts to include these areas can enrich the understanding of AI and digital transformation's nuanced impacts on governance globally [37], [38].

5.6 Methodological Trends

In examining research methodologies, the reliance on structural equation modeling (SEM) for validating constructions such as trust and perceived usefulness is notable [39], [40]. While quantitative approaches yield important insights, integrating qualitative methodologies like case studies and

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interviews could enhance contextual understanding and enrich the narratives surrounding e-government and digital transformation.

5.7 Future Research Directions

As the field evolves, future studies should focus on areas of sustainability, inclusivity, and broader applicability within the framework of digital transformation and AI in governance. Evaluating the scalability and adaptability of innovations spawned during the pandemic will be crucial in informing long-term governance strategies [41]. Efforts to promote global inclusivity by engaging in underrepresented regions can produce diverse solutions that cater to a wider array of societal needs [42], [43]. Furthermore, interdisciplinary cooperation among scholars can spur innovative ideas and frameworks that address multifaceted governance issues, including ethical considerations, climate governance, and disaster preparedness [44].

5.8 Conclusion

In summary, this analysis elucidates the dynamic interplay between AI-driven e-government research and its contributors, gaps, and emergent themes. While significant strides have been made in understanding adoption and user behavior, addressing identified research gaps particularly in ethical frameworks, regional inclusivity, and longitudinal studies will be fundamental to advancing impactful digital governance strategies. A conscious effort to evolve the field by embracing interdisciplinary approaches will be key to unlocking the full potential of AI in public administration.

6.0 Conclusion

The exploration of digital transformation, artificial intelligence, and e-government, as analyzed in this bibliometric study, reveals the transformative potential of advanced technologies for modern governance. By focusing on adoption and impact between 2020 and 2024, this analysis identified key trends, influential contributors, and emerging themes in this multidisciplinary field. Using a dataset of 1,877 records extracted from Scopus, the study applied tools such as VOSviewer and Biblioshiny to map citation patterns, co-authorship networks, and keyword trends. A rise in publications post-2021 highlighted the growing importance of digital initiatives, particularly those catalyzed by the COVID-19 pandemic, which accelerated the adoption of AI-driven solutions to enhance governance processes and public service delivery.

Recurring themes, such as user acceptance, cybersecurity, AI ethics, and digital accessibility, underscore the broad societal implications of AI in governance. Highly cited works frequently address challenges like infrastructure readiness, inclusivity, and public trust in AI adoption. Notably, keywords like "smart governance" and "digital inclusion" reflect a strong focus on designing governance systems that prioritize transparency and equity.

However, significant gaps persist in literature, including the underrepresentation of studies in developing nations and a lack of longitudinal research on the societal impacts of digital transformation.

The bibliometric evidence revealed a concentration of research contributions from developed nations such as the United Kingdom, China, and India, alongside emerging efforts from regions like the Middle East and Southeast Asia. These findings underscore regional disparities, particularly the limited representation of Africa and Latin America, which signals a critical need for inclusive and collaborative research efforts. The study also demonstrated the centrality of theoretical frameworks, such as the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT), in understanding user behavior and adoption trends.

The integration of advanced analytical tools and methodologies provided actionable insights into the evolution of AI-driven e-government systems. The emphasis on user-centric themes, ethical concerns, and scalability of pandemic-driven innovations offers a roadmap for future research. Expanding thematic scope to address AI ethics, climate governance, and disaster management will

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enhance the societal relevance of the field. Furthermore, fostering interdisciplinary collaboration and including contributions from underrepresented regions can enrich the global understanding of digital transformation in governance.

In conclusion, this bibliometric analysis serves as a comprehensive exploration of the advancements, challenges, and opportunities in AI-driven e-government research. By addressing the identified gaps and embracing broader research methodologies, the field can continue to evolve, creating governance systems that are sustainable, inclusive, and impactful for diverse global populations. These findings provide a foundation for researchers, policymakers, and practitioners to innovate and refine digital governance frameworks in the years to come.

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