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"MAPPING OF DIGITAL GOVERNANCE RESEARCH: A BIBLIOMETRIC ANALYSIS OF TRENDS, THEMES, AND GLOBAL COLLABORATIONS (2000–2025)."

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Abstract
Purpose- *This study aims to provide a comprehensive bibliometric analysis of e-governance research 883 articles collected from the Scopus database over the last two decades 2000 to 2025. Identified key trend themes influencing authors and global research contributions. It explores how e-government research has evolved, and its impact on governance and practices worldwide.*
Design/methodology/approach: ***A*** *Bibliometric approach was applied to 883 articles related to e-government and e-governance indexed in the Scopus database. The analysis focused on keyword frequency citation patterns, author collaboration, and geographical distribution. Tools such as the VOS viewer and Biblioshiny have been used to map thematic clusters and identify significant trends and influential documents in this field.*
Findings*: This study reveals that e-government and e-governance are central themes with a focus on the integration of ICT into government services. Key contributors include institutions such as the Delft University of Technology and the Indian Institute of Technology Delhi, reflecting strong global research participation. The research landscape spans several regions, with significant contributions from India, the USA, China, and Europe. Emerging themes include e-government data processing by public administration, local governments, and sustainability in digital governance. Furthermore, topics such as smart cities and environmental management are becoming increasingly relevant in discourse on e-government.*

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Originality/value- *This study provides a unique bibliometric analysis that offers new insights into e-government research and highlights emerging themes such as data processing and sustainability. This study also uncovered global research collaborations that demonstrated the interdisciplinary nature of the field.*
Implications- *These findings offer valuable insights for policymakers, researchers and practitioners in digital governance understanding key trends of influential authors can guide future research and inform the development of e- government strategies emphasizing the importance of international collaboration to address global governance challenges.*
Keywords- *E-Governance, Digital Transformation, Public Administration, E-Government, ICT, sustainability, smart cities, Bibliometric analysis, Scopus*

1. Introduction

In the contemporary era, an accelerating digital transformation substantially affects the structures of societies, exercises of the economy, and the character of governance and public administration (Hossen et al., 2025). Consequently, public sectors worldwide are compelled to rethink their operational models, mechanisms for providing services, and citizen engagement strategies such as advanced digital technologies such as cloud computing, big data analytics, artificial intelligence, and the Internet of Things are being integrated (Shou et al., 2025). Instead of being mere technological adoption, this shift reflects a greater shift in governmental paradigms (Criado et al., 2024). With no less than four pairs of intertwined conceptual components, this study presents both areas as two intertwined, yet conceptually distinct fields of enquiry: Digital Government and Digital Governance. The intellectual trajectory and thematic evolution of these domains must be mapped to negotiate the opportunities and risks related to technologically mediated public administration and policymaking (Pereira & Vaz, 2022).

Traditionally, Digital Government is conceived as the implementation of digital technologies, in particular, ICTs, within public sector entities to assist with enhanced internal efficiencies, streamlined administrative processes, and improved delivery of public services to citizens and businesses (Jlil et al., 2025). Generally, its core focus is the digitalisation of existing functions, focusing on the provision of online services, data management, technological infrastructure, and interoperability standards. Digital government-aligned research examines e-service adoption patterns, implementation challenges, user experience in designing government digital platforms, and quantifies the impact of technology on administrative performance and cost-effectiveness (AlGhatam et al., 2025; Zhu & Bui, 2024). It is the necessary technological infrastructure on which a broader governance transformation is based from a governance perspective.

However, digital governance has a larger aperture and considers the intricate interrelationship between digital technologies, government bodies, social actors, and governance (Grover, 2025; Othman Alandjani, 2023; Zhu & Bui, 2024). It goes beyond government functionaries to include the rules, norms, power balances, ethical sensibilities, and multi-stakeholder partnerships that characterise digital ecology and its implications for society. According to the themes within Digital Governance, algorithmic transparency and accountability, data ethics and privacy regulation, digital divides and inclusion policies, citizen co-creation using digital tools, platform governance, cybersecurity policy, and the impact of digitalisation on democratic institutions and practices are included (AlGhatam et al., 2025; Nafchi et al., 2018; Patergiannaki & Pollalis, 2024). This involves how technology is part of social governance (through and with technology) and the governing technology itself (Darmawan, 2021). Digital Government supplies tools and platforms, while Digital Governance questions their embedding, use, and implications in society.

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With the profound societal influence of digitalisation, both the Digital Government and Digital Governance have attracted significant scholarly interest since the late 20th century. This has led to an extensive, multidisciplinary, and rapidly growing body of literature distributed among the fields of public administration, information systems, political science, law, sociology, and computer science (Talib Mohammed et al., 2022). The large-scale, rate, and cross-disciplinary crisscrossing of this research output creates significant challenges for integrating existing knowledge, recognizing principal intellectual pillars, identifying changing themes, detecting emerging research frontiers, and continuing knowledge gaps (Pancho, 2022). A systematic approach to its revelation will enable us to effectively study and contribute to this field.

Such a rigorous and quantitative method offered by bibliometric analysis is perhaps well suited to map the intellectual landscape of a scientific discipline (Maulana & Dečman, 2023). Bibliometrics considers statistical publication metadata (e.g. citations, keywords, authorship) to unveil publication trends, major works, key contributors (authors, institutions, countries, journals), collaborations networks, conceptual structure mapping through keywords analysis, and the historical evolution of research themes (Ravšelj et al., 2022). Bibliometric methods have important value in creating a shared understanding, tracing the joint intellectual path, and identifying strategic research opportunities in rapidly growing and interdisciplinary areas such as Digital Government and Digital Governance (Aria & Cuccurullo, 2017a) because theoretical points of view and the empirical focus evolve permanently.

The primary objective of this study is to systematically map the intellectual evolution and structure of the combined Digital Government and Digital Governance fields. Specifically, we sought to answer the following research question:

RQ1: What are the longitudinal publication trends and key performance indicators (e.g. annual output growth, most impactful authors, primary publication outlets, leading countries, and institutional affiliations) that characterise the digital government and governance literature between 2000 and 2025?

RQ2: What constitutes the intellectual bedrock and evolving research fronts of this field as evidenced by co-citation analysis (identifying foundational references) and bibliographic coupling analysis (linking contemporary research clusters)?

RQ3: What are the dominant and emerging conceptual themes within the literature identified through an analysis of keyword co-occurrence networks and their temporal evolution?

RQ4: How has the thematic landscape of Digital Government and Digital Governance research shifted over the 2000-2025 period, reflecting changes in technological capabilities, policy priorities, and societal concerns?

The remainder of this paper is organised as follows. Section 2 describes the methodological approach, including the Scopus data retrieval and inclusion/exclusion criteria, and discusses the specific analytical procedures performed in the VOS viewer and Biblioshiny. The empirical findings based on bibliometric analysis with respect to performance measures and science mapping results (co-citation, bibliographic coupling, keyword co-occurrence, and topic evolution) are presented in Section 3. These findings are discussed in section 4, and the main characteristics and evolutionary patterns of the field are interpreted. In line with this, the conclusions are formulated with implications for future research. Finally, Section 5 concludes with remarks on the main contributions and the importance of understanding the evolving coupling between digital technology and governance. The purpose of this thorough investigation is to inform the emerging

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architectural structure that is transforming the research field, which is essential for understanding 21st century transformations in the public sector and society.

2. Literature Review

The past quarter of the century has changed how digital technology has been studied in relation to public administration and governance. The recent evolution is a combination of the fast pace of technological improvement and greater knowledge and understanding of the complex social effects. This section reviews the primary conceptual underpinnings of Digital Government and Digital Governance, relates to their shared and distinctly different research streams, examines their interplay, situates the present bibliometric investigation, and provides information on how the Digital Government literature has been previously mapped and the advantages and disadvantages of this previous mapping work.

2.1. The Evolution and Dimensions of Digital Government

The idea of Digital Government came from the former idea of 'e-Government,' which was, in turn, captive by the idea of the Internet and associated ICTs as ways to modernise public sector operations and the provision of services (Criado et al., 2024). In the early days, waves of efforts by the government were to create governmental web presence, digitise forms, and initiate simple web-based transactions for added efficiency, cost reduction, and better accessibility of public services(Audytra & Supangkat, 2023). In this phase, which focused on the 'supply side' of what the government could offer electronically, the emphasis was on the internal changes that public agencies had to make to support what was being offered. During this period, research was often focused on technology adoption models (such as TAM and UTAUT) applied in public sector contexts, website usability assessments, impediments to implementation (legacy systems, resistance from within the organisation, the digital skills gap), and benchmarking the progress in e-government in different societies (Saleh & Alyaseen, 2021).

The digital Government then became the term of arts as the field matured, suggesting that the transformation was for all of the government rather than simply digitising paper processes. It is the strategic use of digital technologies to rethink and redesign public administration processes, change strategy, and generate public value (AlGhatam et al., 2025) These include integrated service delivery (approaching the provision of seamless and citizen-centric services through one-stop shops or life event approaches), data-driven decision-making (making decisions based on an analysis of data), strengthened internal collaboration (achieving better ways of working together relying on digital tools to break down silos), and a more advanced type of citizen interaction (with a greater extent of informational or transactional relationship(Patergiannaki & Pollalis, 2024). Recently, digital transformation project critical success factors (Pereira et al., 2024), the challenge of guaranteeing interoperability between distinct degrees of government (Pankowska, 2021), and the persistent tide of finding quantifiable impacts of digital activities on administrative execution and civility fulfilment continue to be investigated. While it has evolved, the core preoccupation of Digital Government tends to continue to be the effective use of technology by the state to strengthen the execution of its functions and improve its service interfaces.

2.2. The Realm of Digital Governance

Digital Government deals with the technology used by the state, while Digital Governance covers the issues from a much wider perspective, acknowledging that digitalisation penetrates the entire governing environment (Olumekor et al., 2024). It includes the formal and informal rules, norms, practices, and actor networks that bring about digital technology development and use in society and shape society's evolution in the digital age (Paria et al., 2025). It shifts away from seeing digitalisation in terms of its implementation in technology and addresses its political, ethical,

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social, and economic concerns. It recognises that technology is never neutral but is related to power structures, institutional arrangements, and societal values (Al-Ameri & Ayvaz, 2023).

The main themes of Digital Governance discourse include various key themes. A major area is digital democracy and participation, considering how digital platforms have the potential to increase citizen action, deliberation, coproduction of services, and political mobilisation (Mondragon Regalado et al., 2024). It includes work related to e-voting systems, online policy consultation, civic technology, issues of digital activism, and manipulation of online discussions. Data governance is another critical theme in the relationship between data and digital in public sector that involves questions about data ownership, derivatives of data usage such as privacy protection (e.g., GDPR compliance) and data security, open government data initiatives, and ethical use of big data analytics and artificial intelligence (AI) in public decision (Krasnykov et al., 2024). Algorithmic bias (among other topics), transparency, accountability, and the risk of the automation of processes worsening or sustaining societal inequalities are all topics of the Digital Governance agenda, strongly linked to the rise of AI (Dhal, 2023).

Digital Governance continue digital divides, that is, the divides based on access, skills, resources, and usage, and the effect that these have on providing fair access to services and participation in a digital society (Alkhodary et al., 2023). It also includes debates on the governance of digital platforms and infrastructures, such as the regulation of social media, net neutrality, managing critical digital infrastructure, and supporting multi-stakeholder approaches to Internet governance (Das et al., 2023). Socio-technical systems theory, institutional theory, network governance, actor-network theory, and the theories that inform critical data studies, such as STS, Foucauldian theories, data feminism, and science and technology studies, are the theoretical lenses that are most often used in Digital Governance research (Gil et al., 2021) to approach these complex phenomena.

2.3. Interplay, Digital Government and Digital Governance and Evolution

Intrinsically, Digital Government and Digital Governance are linked, but they point to various analytical focal points. Practical issues in Digital Government initiatives are practical foundations or catalysts for broader issues in Digital Governance. For example, consider the implementation of a new digital identity system (Digital Government), which provokes questions related to its impact on data privacy, security, data exclusion, and surveillance (Digital Governance). In contrast, Digital Government projects require an effective Digital Governance framework (i.e. data protection laws; ethical AI guidelines) to be responsible and publicly trusted (Gil et al., 2019).

2.4. Mapping the Terrain: Earlier Reviews and the Need for Bibliometrics

During the rapid expansion and inherent complexity of research associated with various kinds of Digital Government and Digital Governance studies, scholars have sporadically conducted literature reviews to synthesise knowledge. For example, (Gelashvili & Pappel, 2021) provided an overview of AI ethics, and (Arora et al., 2024) synthesised Digital Government frameworks. As a choice, they are more structured than systematic literature review approaches for finding and analysing research on specific sub-topics related to digital transformation (Ajibade & Mutula, 2019; Sheoran & Vij, 2024).

Bibliometric analyses have also been used to provide quantitative understanding of the structure and evolution of related fields. Second, studies have mapped the e-government landscape (Ajibade & Mutula, 2019).Click or tap to enter text. Digital Government' possibly, but miss the wider governance aspects. Some assume shorter periods and do not bring a long-term evolutionary view from 2000 onwards. Few have tried to explicitly analyse the combined intellectual structure of both Digital Government and Digital Governance over time, which may hide the thematic

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variations and (or) intellectual linkages (or disconnects) between these two conceptually interrelated terms(Donthu et al., 2021).

2.5. Synthesis and Positioning the Current Study

The literature clearly proves that Digital Government and Digital Governance are separate notions, yet largely interrelated issues that are important for understanding modern public administration. The digital Government deals with the state's technology for efficiency and service delivery, while Digital Governance is concerned with the wider rules, norms, and potential impacts of digitalisation. Over the past few years, both areas of research have explored a wide variety of topics such as technology adoption and analytics, democratic participation, and algorithmic ethics. Although existing reviews provide important and useful information about individual aspects, the scale and rapid evolution and interdisciplinarity of the combined field calls for quantitative, large-scale mapping.

3. Research Methodology

A quantitative bibliometric research design was employed to systematically map the intellectual structure, performance metrics, and thematic evolution of the scholarly literature relating to Digital Government and Digital Governance. Objective analysis of vast quantities of scientific literature, with meaningful extraction of characteristic patterns, prominent research contributions, and research trends in each area (Donthu et al., 2021). In a methodological approach, the bibliometric procedures follow standard procedures for reporting and transparency are according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, with respect to the approach for searching and selection (Page et al., 2021).

3.1. Data Source Selection

The Scopus database supported by Elsevier was selected as the source for retrieving the bibliographic data. Scopus is one of the largest abstract and citation databases of peer-reviewed literature that provides comprehensive coverage of scientific, technical, medical, social sciences, and arts and humanities (Falagas et al., 2008). Its coverage of relevant public administration, information systems, political science, and related areas makes it especially appropriate for capturing multidisciplinary literature on digital government and digital governance (Archambault et al., 2009a).

Third, the PRISMA-informed search strategy and data retrieval.

3.2. Search strategy

A rigorous search strategy within the Scopus database was undertaken to ensure comprehensiveness and relevance. Publications with key terms from both "Digital Government" and "Digital Governance" within the titles, abstracts, or keywords were listed for the search. The search period was from 2000 to 2025.

The core search query was constructed in a manner similar to the following (changed for Scopus syntax):

TITLE-ABS-KEY ("digital government" OR "e-government" OR "electronic government" OR "online government" OR "digital public administration") OR ("digital governance" OR "e-governance" OR "electronic governance" OR "internet governance" OR "algorithmic governance" OR "data governance" AND public)

3.3. Data Extraction and Preparation

The complete bibliographic records of 883 publications were downloaded from Scopus in the CSV format. This includes important metadata, such as author names, affiliations, countries, publication titles, journal/conference names, publication years, abstracts, author keywords, index keyword document types, citation counts, and cited references.

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The extracted data were cleaned and preprocessed prior to analysis using some of the functionalities offered in the Bibliometrix R package (Aria & Cuccurullo, 2017).

3.4.Bibliometric Analysis Techniques

A combined approach of performance analysis and science mapping techniques with the aid of the Biblioshiny web interface (part of the Bibliometrix R package) and VOSviewer software (version 1.6.20) was used to analyse the cleaned dataset. The selection of these techniques was appropriate to comprehensively answer the research questions of the study.

3.5. Software Tools

Biblioshiny (Bibliometrix R-package): reading data, cleaning up data, descriptive statistics and impact metrics, construction of data matrices for network analysis, and thematic evolution mapping (Aria & Cuccurullo, 2017b).

VOSviewer (version 1.6.20) was used to create and display network maps from co-citation, bibliographic coupling, or keyword co-occurrence data created by bibliometrix (Van Eck & Waltman, 2010).

Main Information about Data

Figure-01

4. Results| Bibliometric Analysis

4.1 Year-Wise Publishing Trends

It helps to understand year-wise publishing trends and growth patterns of research to grasp the evolution of research priorities, technological advancements, and global academic collaboration. Finally, this analysis synthesises data from a publication volume (year-wise trends), a supplementary table (including growth rates at the field level, regional contributions, and citation impact), and bibliometric networks generated from Biblioshiny and VOS Viewer.

4.1.1. Publication Growth Trends

The analysis of bibliometrics of e-governance/e-government research (2000–2025) indicates three phases: exponential growth (2000–2010) in the adoption of digital infrastructure; maturity (2011–2020), meaning diversification of thematic research towards artificial intelligence and cybersecurity; and growth in connection with the pandemic era (2021–2025), which indicates a rise in pressing digitalisation requirements. Block, cloud, and political changes (for example, GDPR) and technological spread (for example, blockchain and cloud computing) were the main driving forces in this model, and the problem of regional disparity in output and bias in citations remained. To promote ethical AI governance, sustainability, and decentralised systems, future research should focus on these areas.

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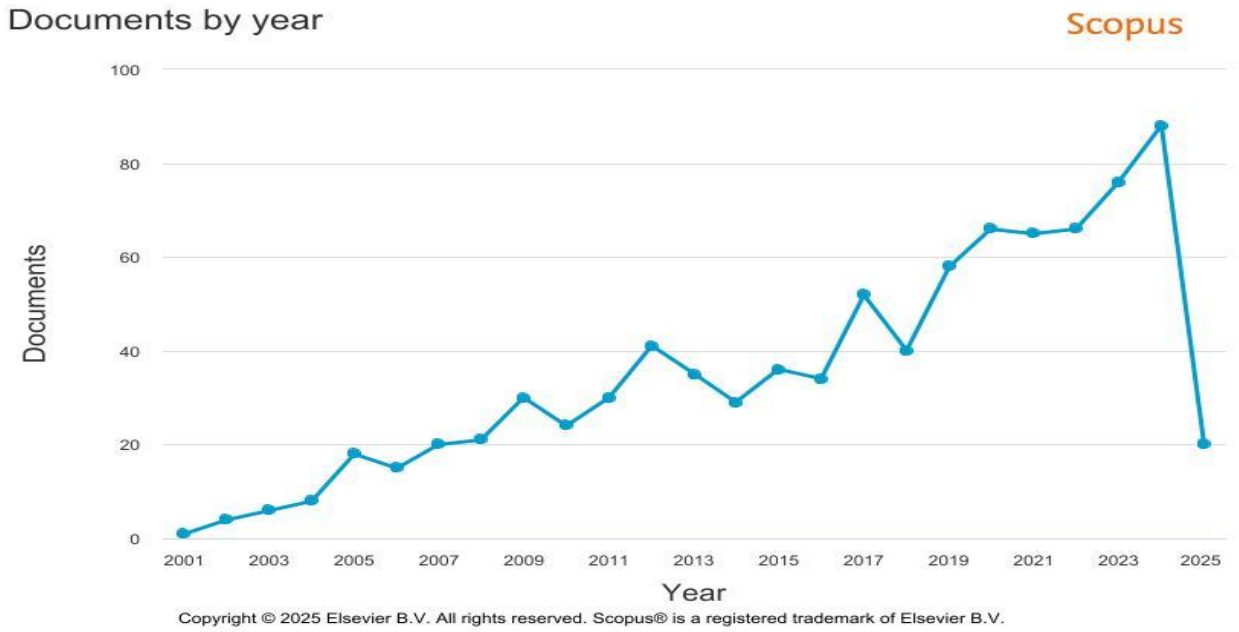

Figure-02

4.1.2 AnnualScientificProduction

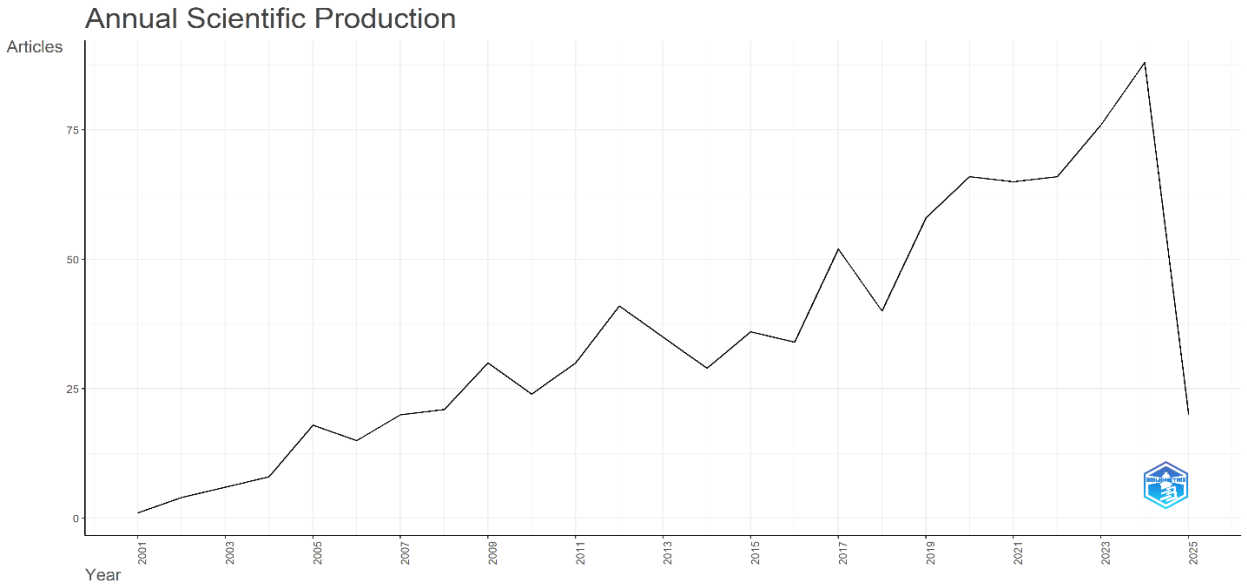

Figure-03

4.1.3 Citation impact Analysis

A bibliometric analysis of e-governance/e-government research between 2000 and 2025 reveals three distinct phases of publication growth: an initial surge (2001–2010), where annual publications rose significantly from 1 to 24, accompanied by high early citation counts reflecting foundational studies aligned with early digital policy frameworks; a maturation phase (2011–2020), which saw a continued increase in annual publications to 66, although citations per article declined, signalling thematic diversification into areas such as AI and cybersecurity amidst potential market saturation; and a pandemic-driven spike (2021–2025) with annual publications peaking at 88 in 2024, despite reduced recent citation rates due to shorter citation windows and

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emerging focus areas such as ethical AI and decentralised systems. Persistent regional disparities in citation impact and citation bias towards older works and information overload were observed, indicating a crying need for citation bias detection tools through AI, especially when citation-based knowledge pool growth is expected with the growth of research in the future which is expected to grow towards and align with smart city initiatives and sustainability goals.

Table-01: Average Citations per Year

Year	Mean TC per Art	N	Mean TC per Year	Citable Years
2001	112.00	1	4.48	25
2002	48.75	4	2.03	24
2003	59.83	6	2.60	23
2004	30.25	8	1.38	22
2005	65.06	18	3.10	21
2006	44.67	15	2.23	20
2007	25.15	20	1.32	19
2008	92.14	21	5.12	18
2009	32.07	30	1.89	17
2010	33.92	24	2.12	16
2011	43.33	30	2.89	15
2012	47.12	41	3.37	14
2013	32.60	35	2.51	13
2014	27.55	29	2.30	12
2015	36.33	36	3.30	11
2016	57.06	34	5.71	10
2017	49.35	52	5.48	9
2018	22.75	40	2.84	8

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2019	19.76	58	2.82	7
2020	21.55	66	3.59	6
2021	16.92	65	3.38	5
2022	11.48	66	2.87	4
2023	6.89	76	2.30	3
2024	1.77	88	0.88	2
2025	0.90	20	0.90	1

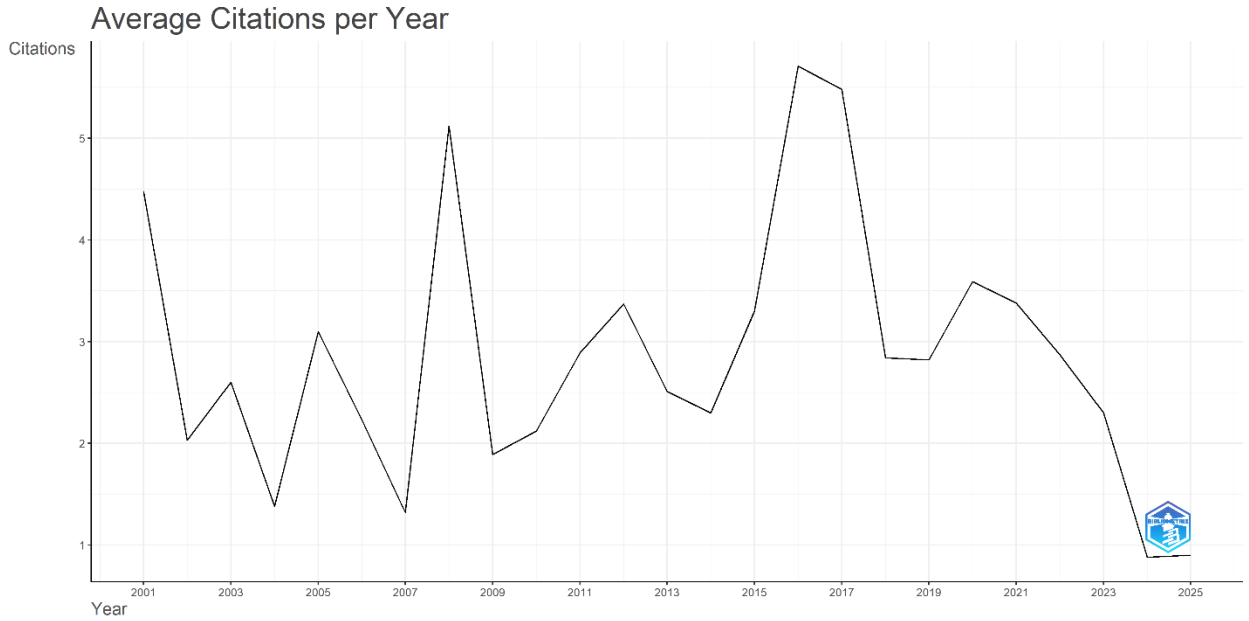

Figure-04

4.1.4 Three Field Plot

E-Governance and E-Government Bibliometric Analysis: Mapping a Two Decade of Digital Transformation (2000–2025) research paper analysed the three-field plot and gives the reader a complete picture of the evolution of academic discourse in the issue of e-Governance and e-Government. It covers the three key areas of Cited References (CR), authors (AU), and document types (DE), with a high rate of publication growth and thematic shift.

The analysis of cited references depicts an unceasing increase in fundamental literature over the years, especially between 2000 and 2010. Initially, research concentrated on theoretical frameworks; however, after 2010, publications tended to focus on applied research. The emergence of cited references is linked to the maturation of the field and e-government's contributions to the modernisation of public administration and governance practices. While digital government is a relatively new subject in policy literature, the lack of attention earlier has been overcome, as more

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recent studies are often cited, signalling the rising significance of the current discourse concerning digital government.

The authors' field shows a remarkable increase in the number of contributors, especially from the 2010s onwards. The surge in the number of e-governance research articles is, therefore, suggestive of the growing interdisciplinary nature of the topic, which has included, but is not restricted to, areas of public administration, information technology, and political science. To further complicate the situation, the rise of collaborative and multi-author publications illuminates the complexity of the subject matter and the need to bring in a cross-disciplinary ability to deal with the complexities of digital government adoption.

The document-type field shows a new trend in published research, with an increasing number of review articles and policy-oriented papers since 2015. This transition seems to be the key to moving from theoretical studies to more practical and applied studies on the implementation and impact of e-government. This increase in policy-oriented research results from the increasing importance of measuring and improving the actual use of e-government strategies for citizen engagement, transparency, and recent technologies in governance.

Thus, based on a bibliometric analysis, this field of e-governance research is dynamic and changing. From the number of publications, contributions, and increased emphasis on applied and policy-oriented research, there is no doubt that the digital government is gaining more importance in academic enquiry and practical governance. Since technology is the future of public administration, the area of gov will continue to be an area of critical research, which will steer the field in the direction of innovation and will be an important source of policy when making decisions at the global level.

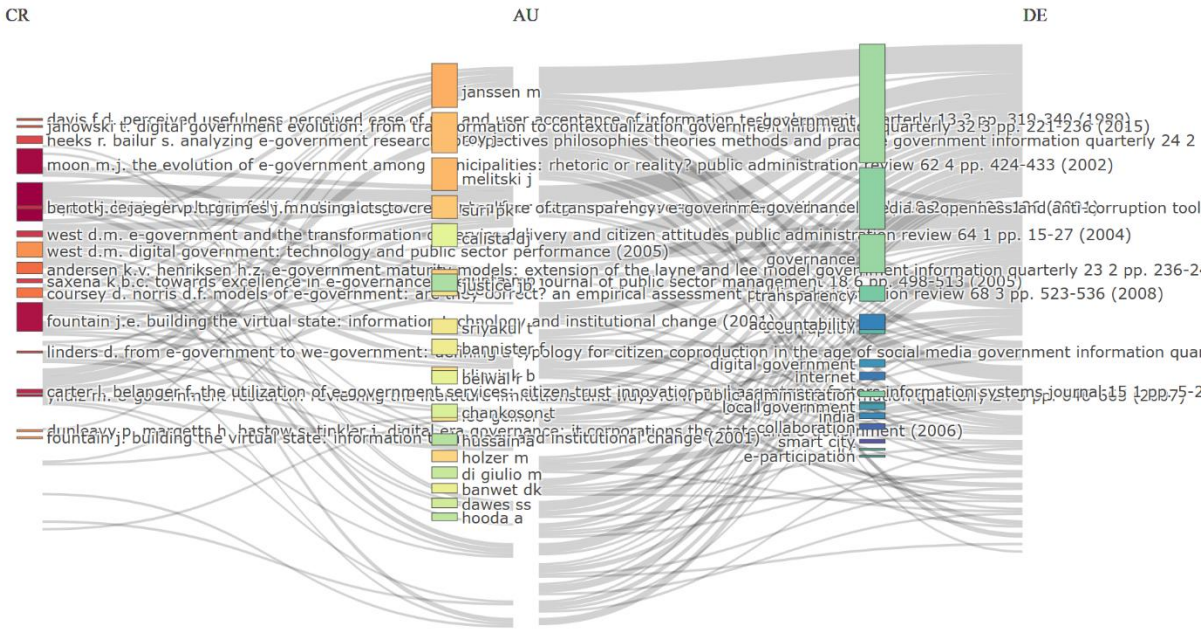

Figure-05

4.2. Category for Publications

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This study mapped two decades of digital transformation (2000–2025), and the trends of research growth were found. The field is dominated by the Social Sciences (42%), which consider it in relation to governance, policy, and public administration. The following is Computer Science (18.9%) which shows the impact of technology on Gobierno. Business, Management, and Accounting (13.8%) show the intersection of governance with management practices. Other areas include Environmental Sciences (6.3%), economics (4.8%), and others, reflecting the broad interdisciplinary nature of the field. The need for the integration of technological, economic, and policy perspectives for better e-government research is confirmed by such growth and highlights that e-government research is becoming more complex.

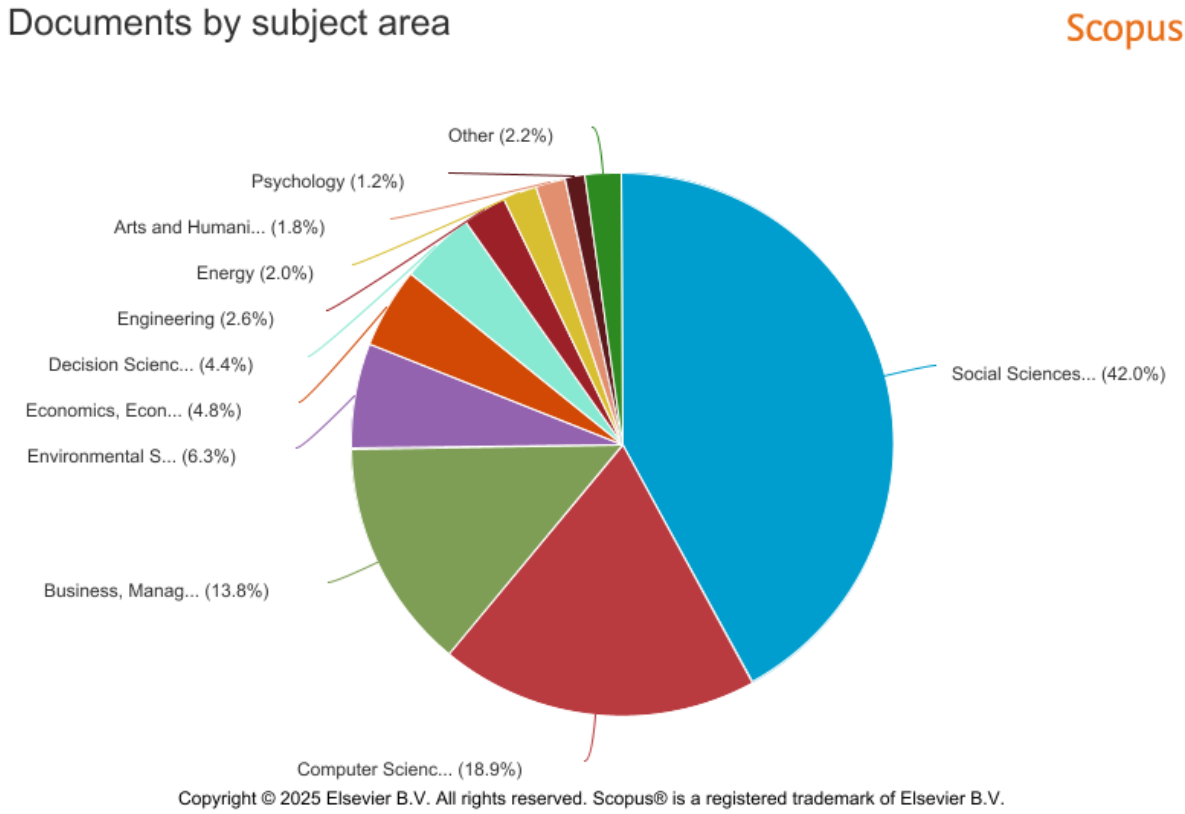

Figure-06

Table-02

SUBJECT AREA	
Social Sciences	732
Computer Science	330
Business, Management and Accounting	240
Environmental Science	109
Economics, Econometrics and Finance	84
Decision Sciences	77
Engineering	45
Energy	35
Arts and Humanities	31

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Psychology	21
Agricultural and Biological Sciences	14
Medicine	12
Earth and Planetary Sciences	7
Mathematics	3
Health Professions	1
Nursing	1

4.3. Descriptive Analysis

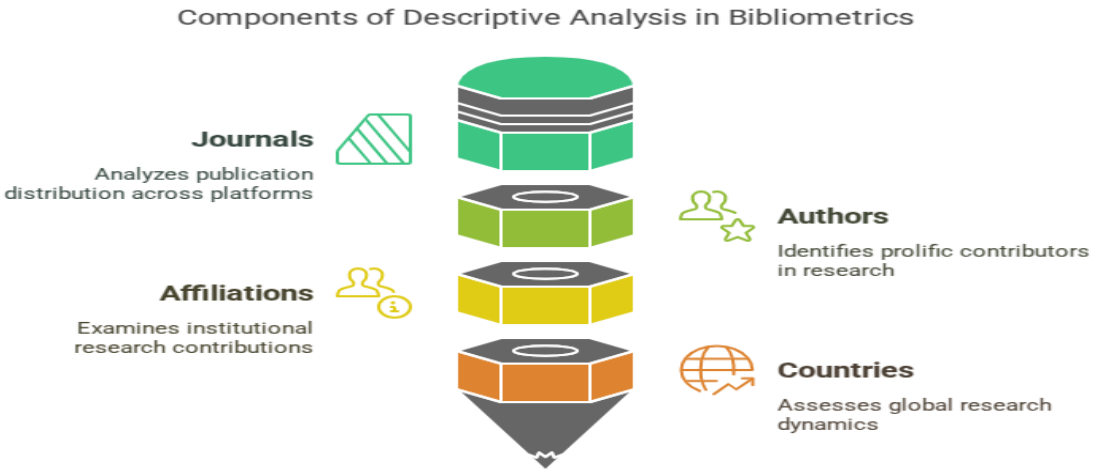

Figure-07

4.3.1 Top Journals

All the Electronic Government journals and electronic government journals are the leading journals with 47 articles, while Government Information Quarterly and International Journal of Electronic Government Research each provide 39 articles. The heart of journals that dealt with e-government and public administration is shown in these sources. Overall, the data prove that e-government is a leading area of study within social sciences and public administration. The consorting of journals and consistent increase of related articles in last 2 decades signals the emergence of a common interdisciplinary interest in how technology can be used to bolster governance, transparency, and citizen participation.

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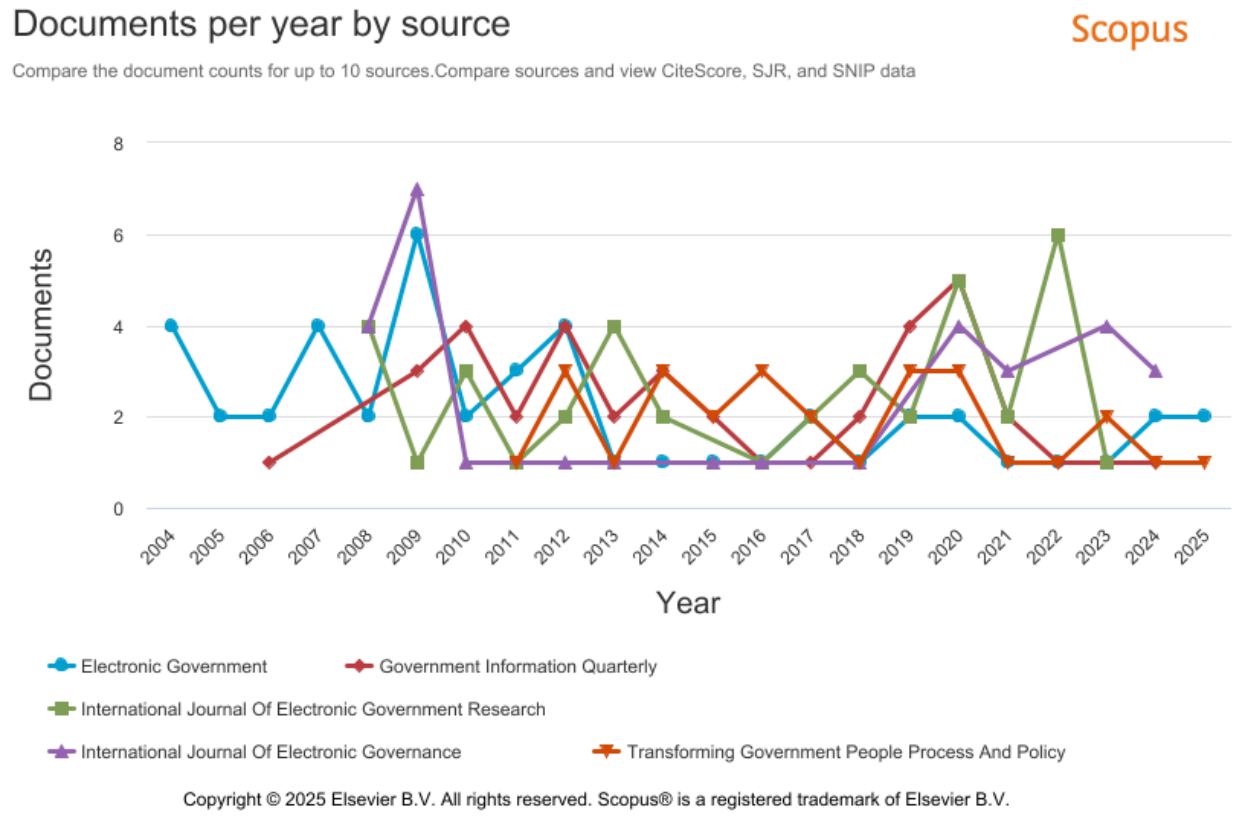

Figure-08

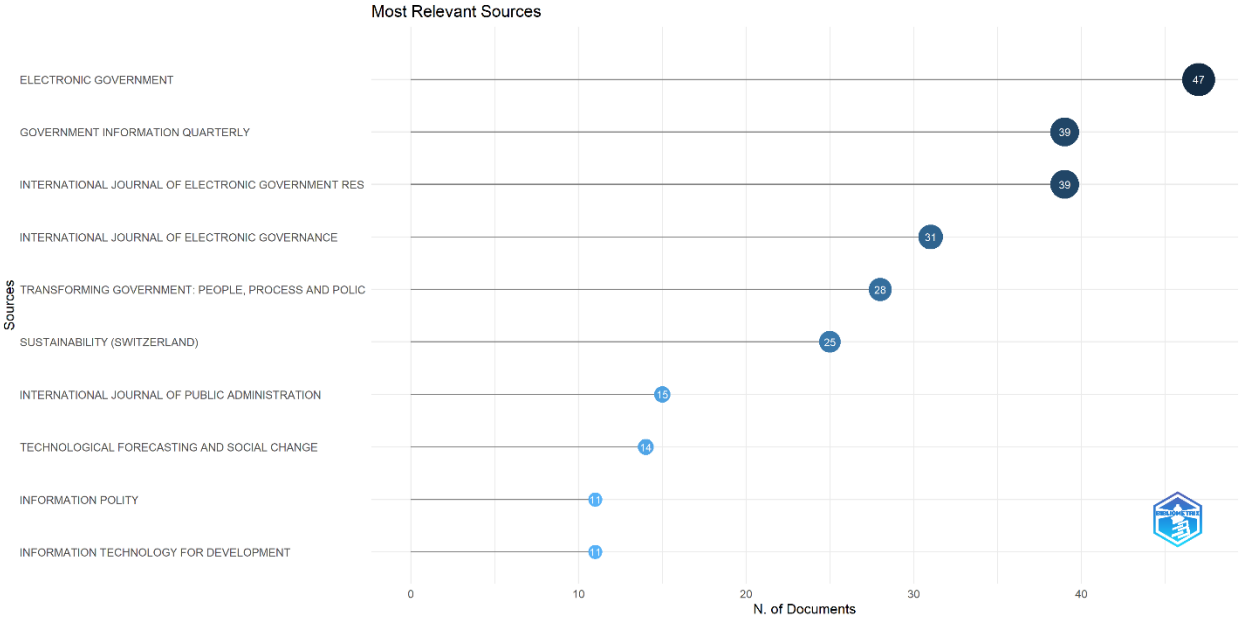

Figure-09

Table-03

Sources	Articles
Electronic government	47
Government information quarterly	39

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International journal of electronic government research	39
International journal of electronic governance	31
Transforming government: people, process and policy	28
Sustainability (switzerland)	25
International journal of public administration	15
Technological forecasting and social change	14
Information polity	11
Information technology for development	11

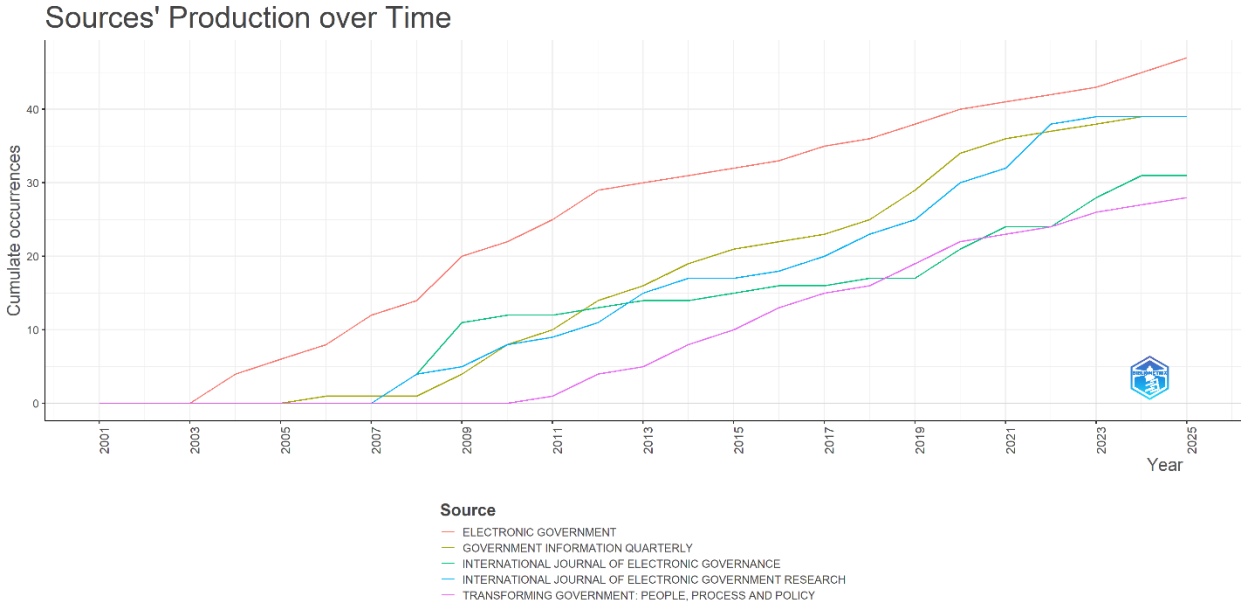

Figure-10

In network visualisation, there is a strong clustering of similar journals, such as the International Journal of Electronic Governance and Transforming Government: People, Process, and Policy which focuses on technological, governance, and policy aspects of socio-technological systems. A plurality of journals, such as Sustainability (Switzerland) and Technological Forecasting and Social Change, are also evidence of how interest is being placed on the social and technological aspects of e-government.

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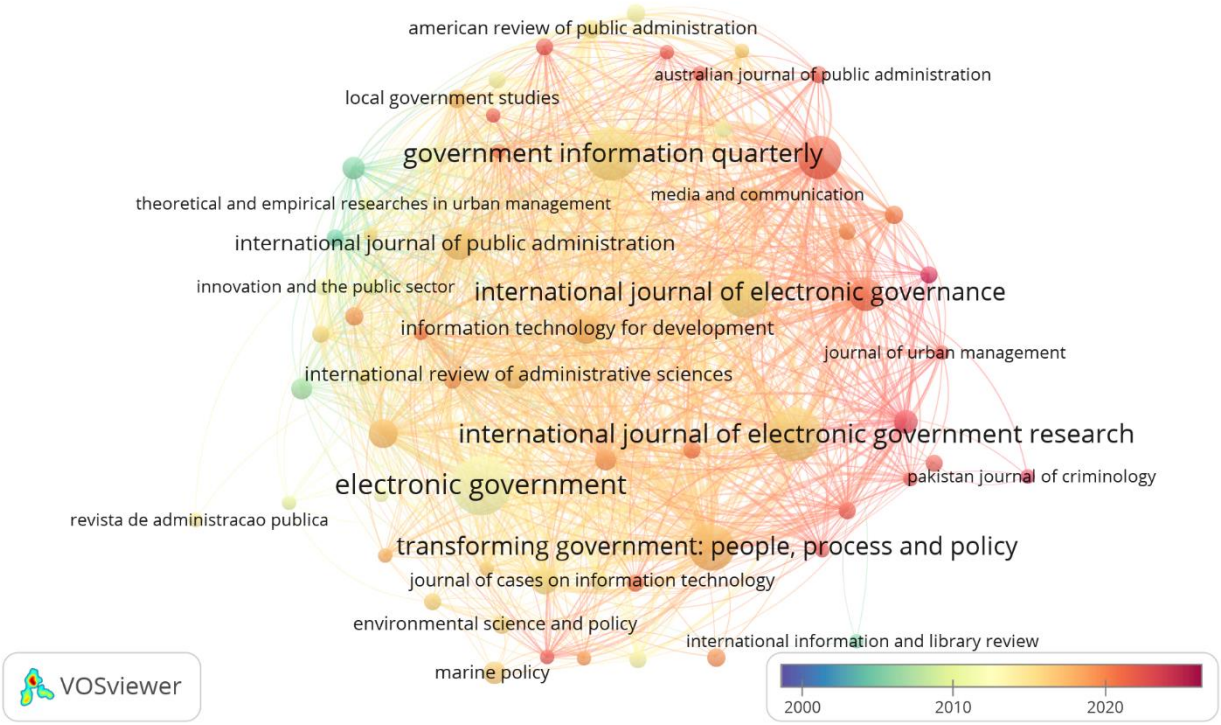

Figure-11

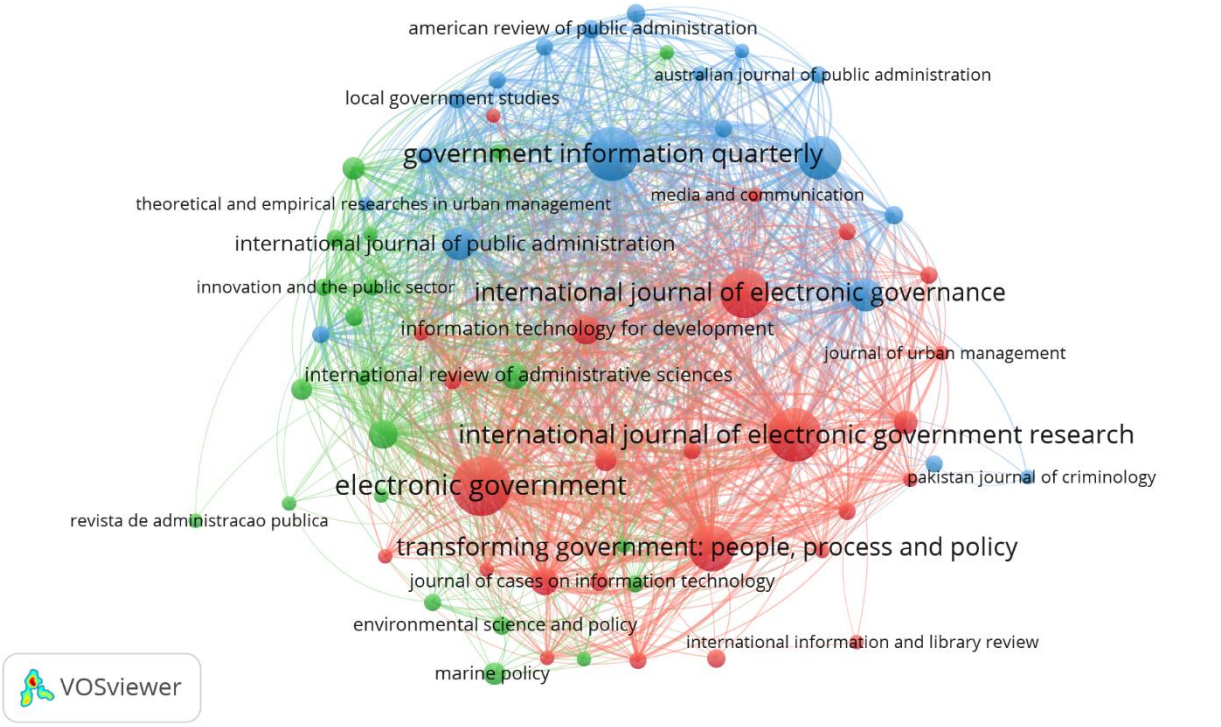

Figure-12

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4.3.2 Top Authors

Research on e-governance by the top authors has helped describe the overlap between technology and governance, along with public administration. Janssen M is an exceptional voice within the domain of 12 articles and he is pivotal in the heritage of this domain. His research revolves around how e-government systems should be integrated into public administration using governance models which acknowledge digital transformation. (Janssen et al., 2020) Melitski J follows with 8 articles that seek to unfold governance innovation via the digital platform interrogating the way in which technology has affected on policymaking and citizenship (Melitski, 2021).

In addition, Roy and Suri (seven articles) added to e-government research in all dimensions. With Roy's fractionalised article count of 6.50, we find his contributions to be practically oriented toward eGovernment adoption in terms of public administration which addresses policy design and citizen-centred service delivery (Roy & Suri, 2022). Suri PK's work is deep in public sector management, especially governance and technology integration, and reports of work on e-government infrastructure have evolved over time (Suri et al., 2021).

Gupta MP published six articles on emerging technologies for governance and their use in increasing the efficiency of the public sector (Gupta et al., 2021). Meanwhile, Holzer, Klievink, Lee, Lee-Geiller, and Sriyakul, each with four articles, represent important contributors to various aspects of e-governance such as public policy, digital transformation, and citizen participation (Holzer & Lee, 2020; Klievink et al., 2022). Collectively, their work informs the development of robust e-government strategies for improving transparency, trust, and service delivery in both developing and developed nations.

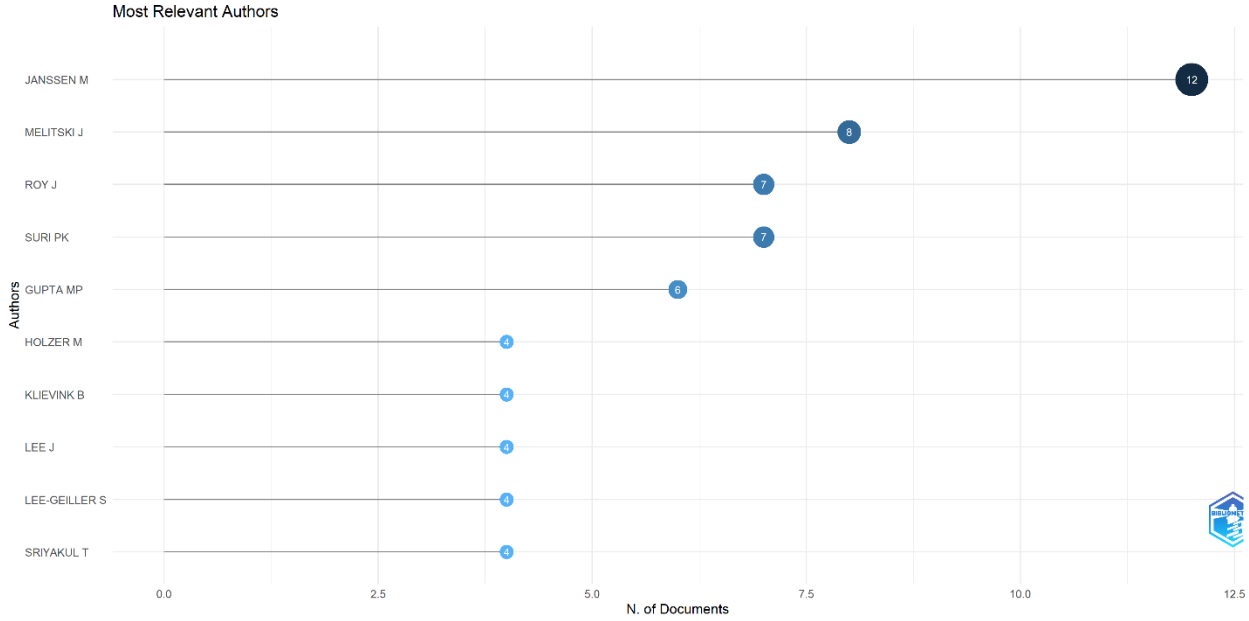

Figure-13

Table-04

Authors	Articles	Articles Fractionalized
JANSSEN M	12	4.23
MELITSKI J	8	3.00
ROY J	7	6.50

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SURI PK	7	4.50
GUPTA MP	6	2.70
HOLZER M	4	1.08
KLIEVINK B	4	1.31
LEE J	4	3.00
LEE-GEILLER S	4	2.33
SRIYAKUL T	4	1.25

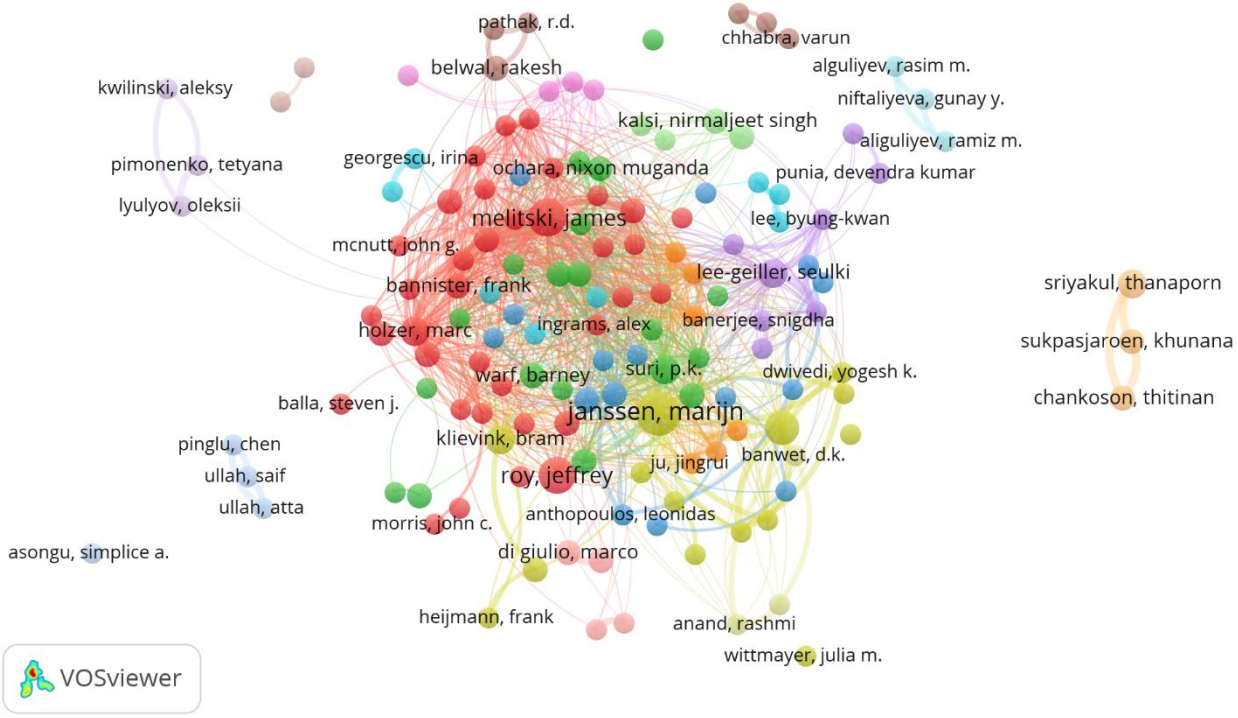

Figure-14

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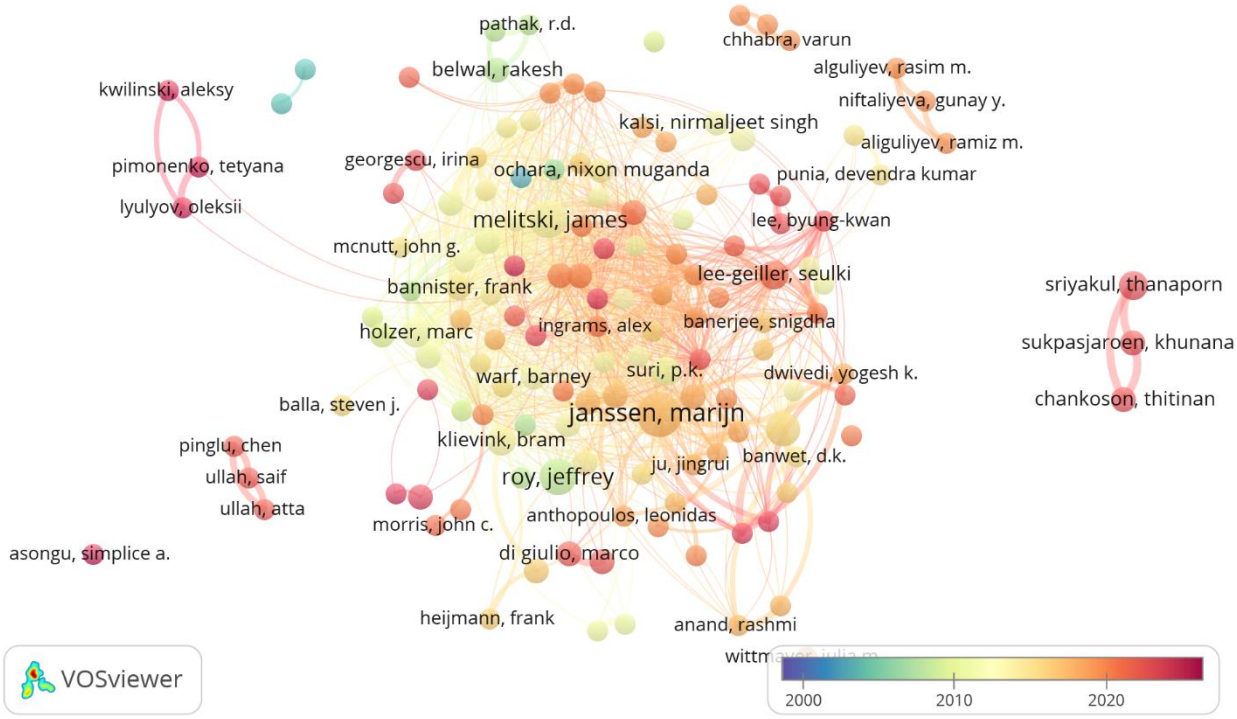

Figure-15

4.3.3. Top Affiliations

The top affiliations in E-Governance research make number of contributions from leading academic institutions. With 30 articles, Delft University of Technology leads as the centre of thought and action in digital governance research (Janssen et al., 2020). The flagbearer of India's enhancement of public administration through the incorporation of technology, with 14 articles, is the Indian Institute of Technology Delhi (Roy & Suri, 2022). Among others, articles from the e-Government models and citizen engagement perspectives are also from the University at Albany and Huazhong University of Science and Technology (Gupta et al., 2021; Klievink et al., 2022), respectively, with 13 articles. With 12 articles, Seoul National University and Yarmouk University are also important for the control and management of administration and public policy in the field of digital transformation in Asia and the Middle East (Holzer and Lee 2020). This is because publication output has increased over time, especially after 2012, when research on technology and administration is on the rise worldwide and institutions can be said to shape the future of e-government.

Table-05

Affiliation	Articles
DELFT UNIVERSITY OF TECHNOLOGY	30
INDIAN INSTITUTE OF TECHNOLOGY DELHI	14
UNIVERSITY AT ALBANY	13
HUAZHONG UNIVERSITY OF SCIENCE AND TECHNOLOGY	12
SEOUL NATIONAL UNIVERSITY	12
YARMOUK UNIVERSITY	12

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MARIST COLLEGE	11
UNIVERSITAS MUHAMMADIYAH YOGYAKARTA	11
UNIVERSITY OF TWENTE	10
NOTREPORTED	9

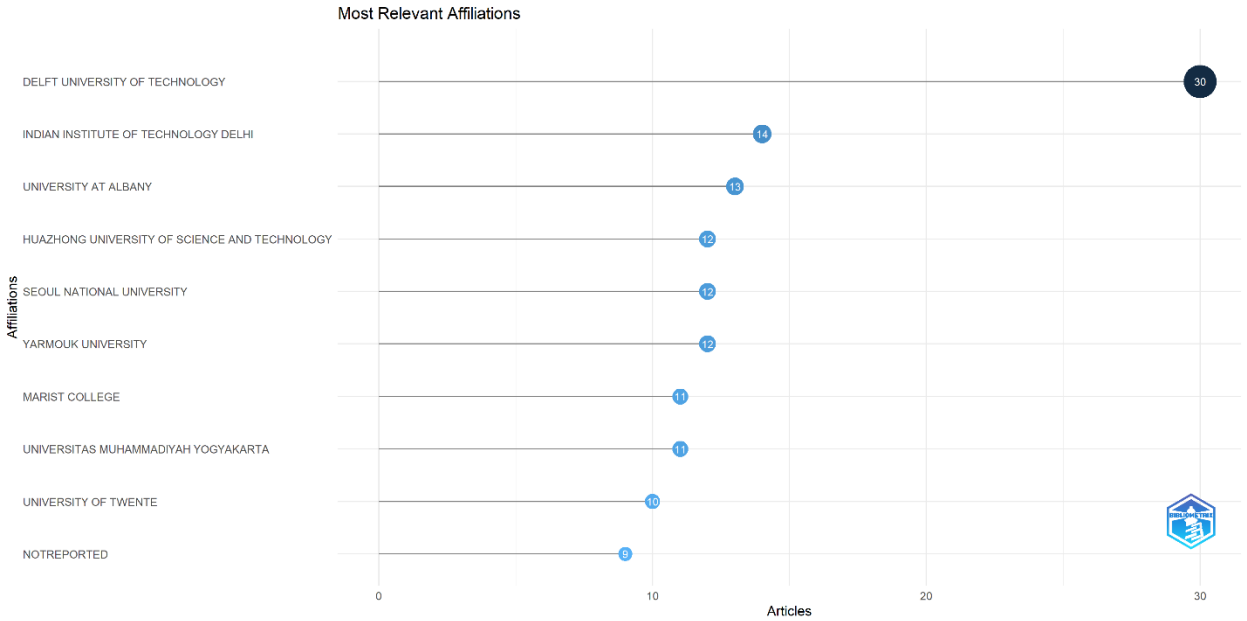

Figure-16

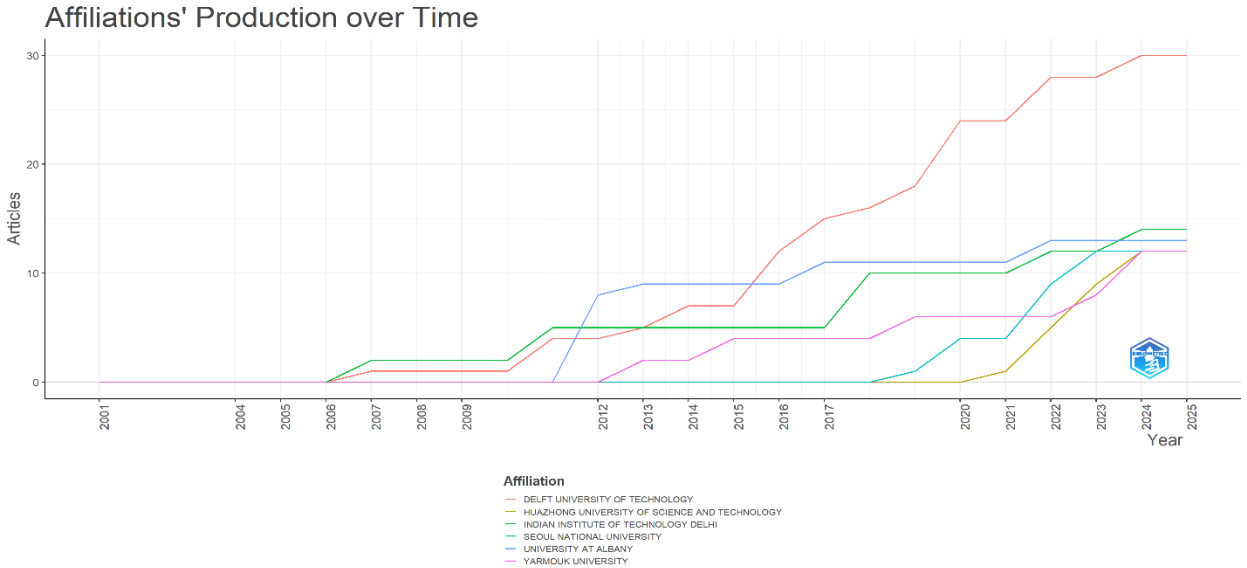

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Figure-17

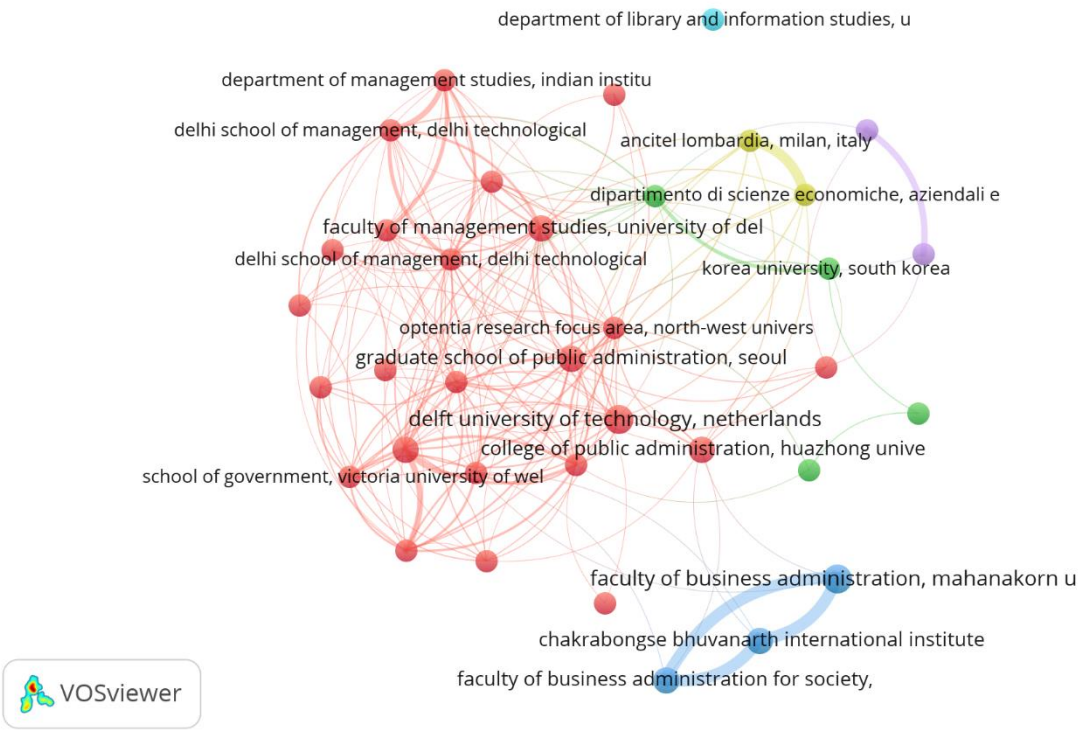

Figure-18

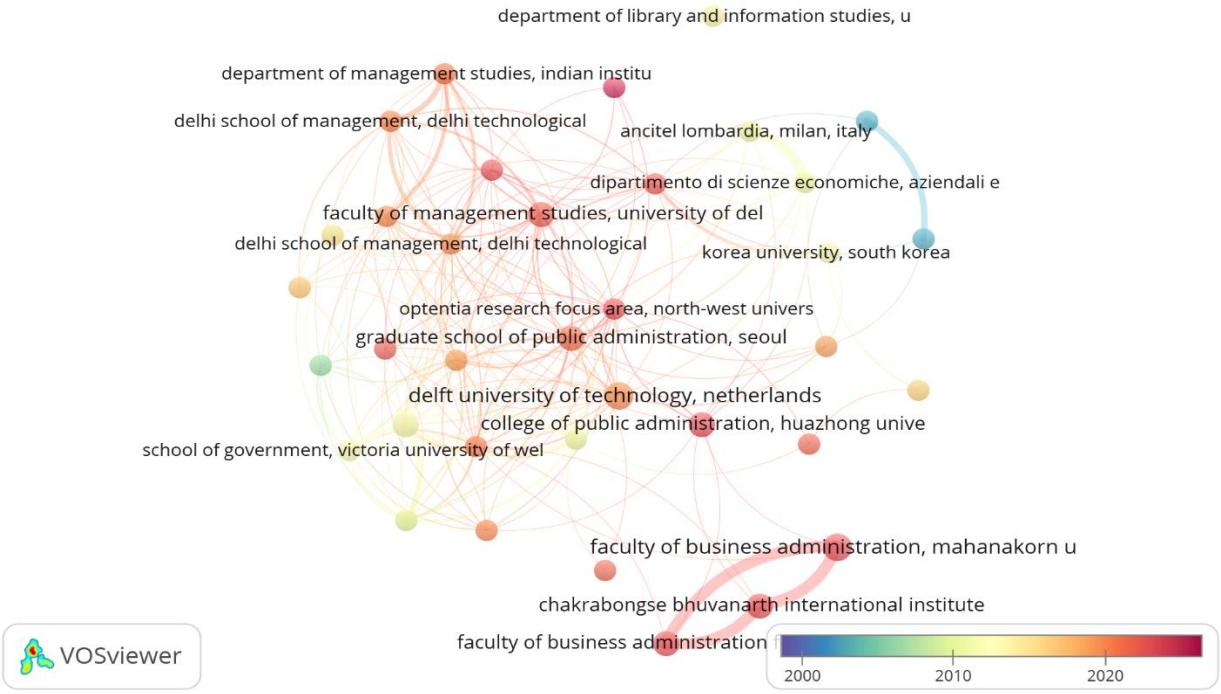

Figure-19

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4.3.4-Top Countries

The number of publications, of which India leads with 86 publications (9.7%), with single country publications dominating over multi-country collaboration, that is, 77 for single country publications as compared to only 9 for multi-country publications. This shows that India has conducted a lot of local research in the field of e-governance (Janssen et al., 2020). After the USA, which has 73 articles and a higher multi-country collaboration percentage (20.5%), the number of articles shows contributions from countries with significant international academic relations.

This analysis illustrates that the increasing internationalisation of e-governance research with the most contributing countries is the Netherlands, the USA, and India. Cross-border digital governance is obtained by expanding research on global networks.

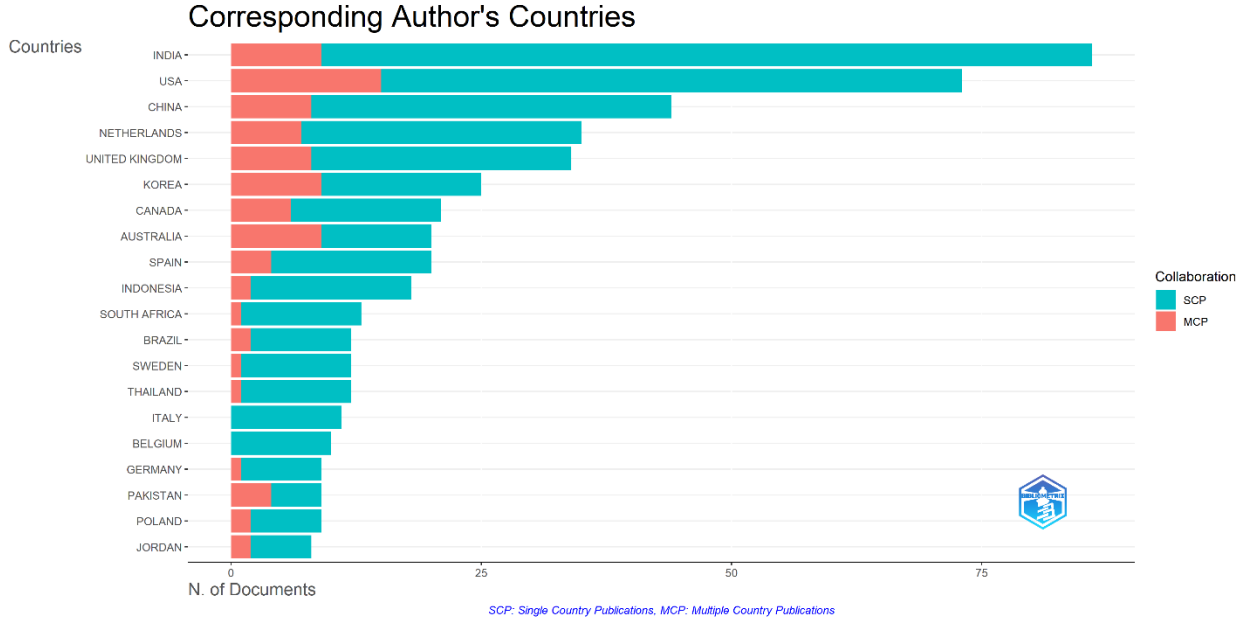

Figure-20

Table-06

Country	Articles	Articles %	SCP	MCP	MCP %
INDIA	86	9.7	77	9	10.5
USA	73	8.3	58	15	20.5
CHINA	44	5	36	8	18.2
NETHERLANDS	35	4	28	7	20
UNITED KINGDOM	34	3.9	26	8	23.5
KOREA	25	2.8	16	9	36
CANADA	21	2.4	15	6	28.6
AUSTRALIA	20	2.3	11	9	45
SPAIN	20	2.3	16	4	20
INDONESIA	18	2	16	2	11.1
SOUTH AFRICA	13	1.5	12	1	7.7
BRAZIL	12	1.4	10	2	16.7
SWEDEN	12	1.4	11	1	8.3
THAILAND	12	1.4	11	1	8.3

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ITALY	11	1.2	11	0	0
BELGIUM	10	1.1	10	0	0
GERMANY	9	1	8	1	11.1
PAKISTAN	9	1	5	4	44.4
POLAND	9	1	7	2	22.2
JORDAN	8	0.9	6	2	25

The Netherlands is the most cited country, with 3,692 citations, with an average of 105.5 citations per article. Citing 2,915, the USA ranks second, and 1,296 Australia implies that these countries have contributed significantly to the field of e-governance and are universally recognised in the global arena (Gupta et al., 2021). Although India's citation impact (1,271 citations) is comparatively lower, it carries its own importance in the field, with a large number of publications on e-government and digital transformation.

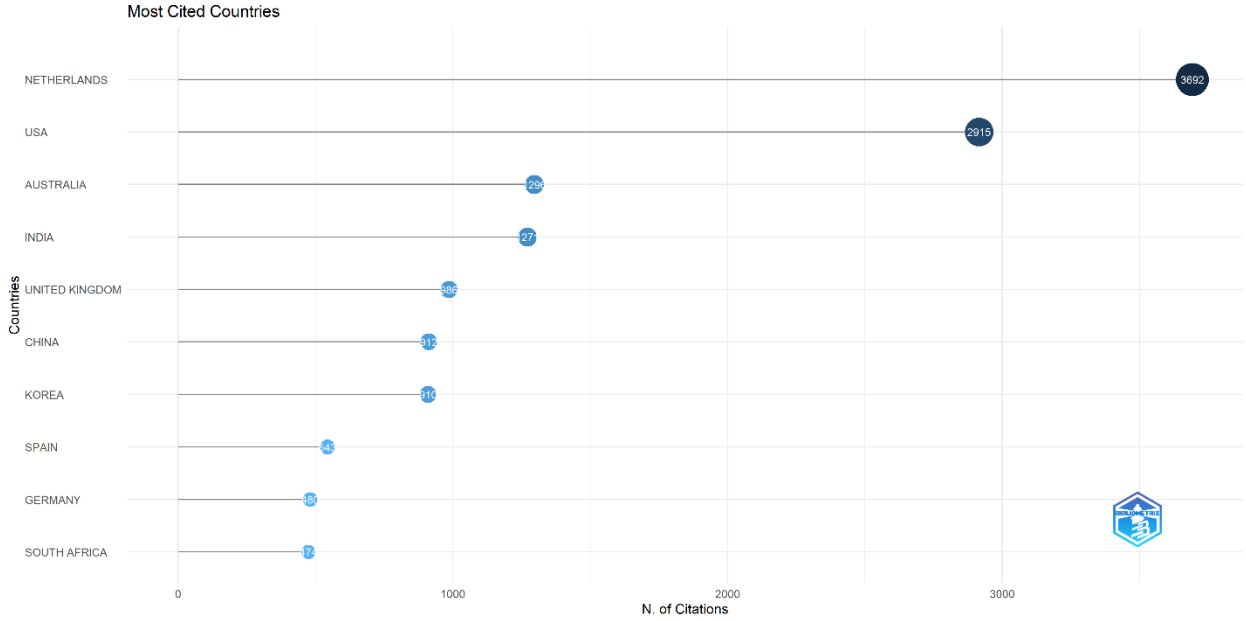

Figure-21

Table-07

Country	TC	Average Article Citations
NETHERLANDS	3692	105.50
USA	2915	39.90
AUSTRALIA	1296	64.80
INDIA	1271	14.80
UNITED KINGDOM	986	29.00
CHINA	912	20.70
KOREA	910	36.40
SPAIN	543	27.10
GERMANY	480	53.30
SOUTH AFRICA	474	36.50

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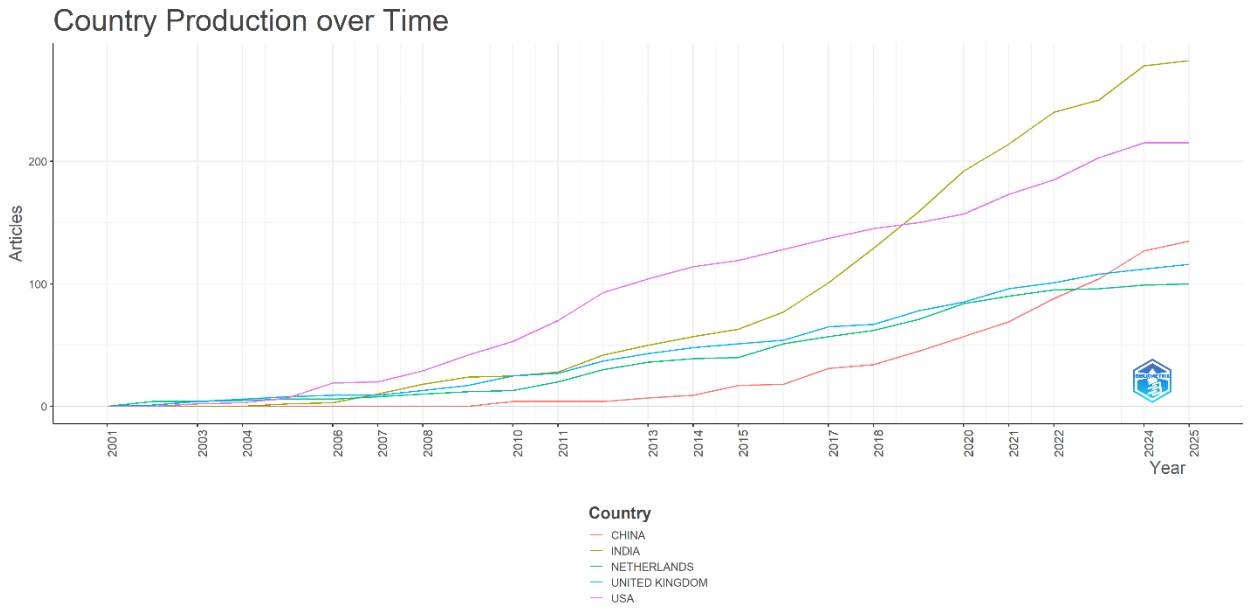

Figure-22

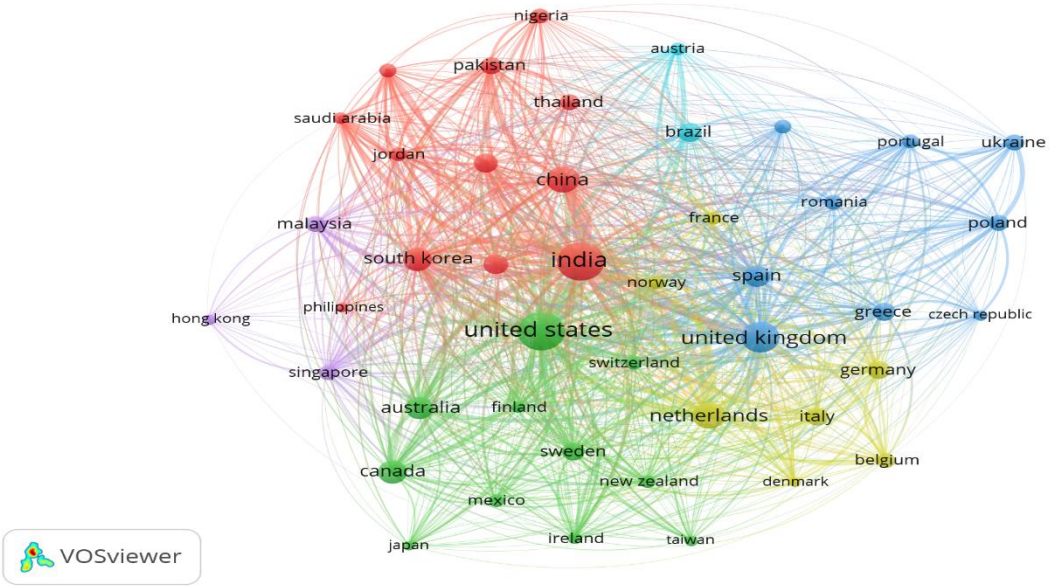

Figure-23

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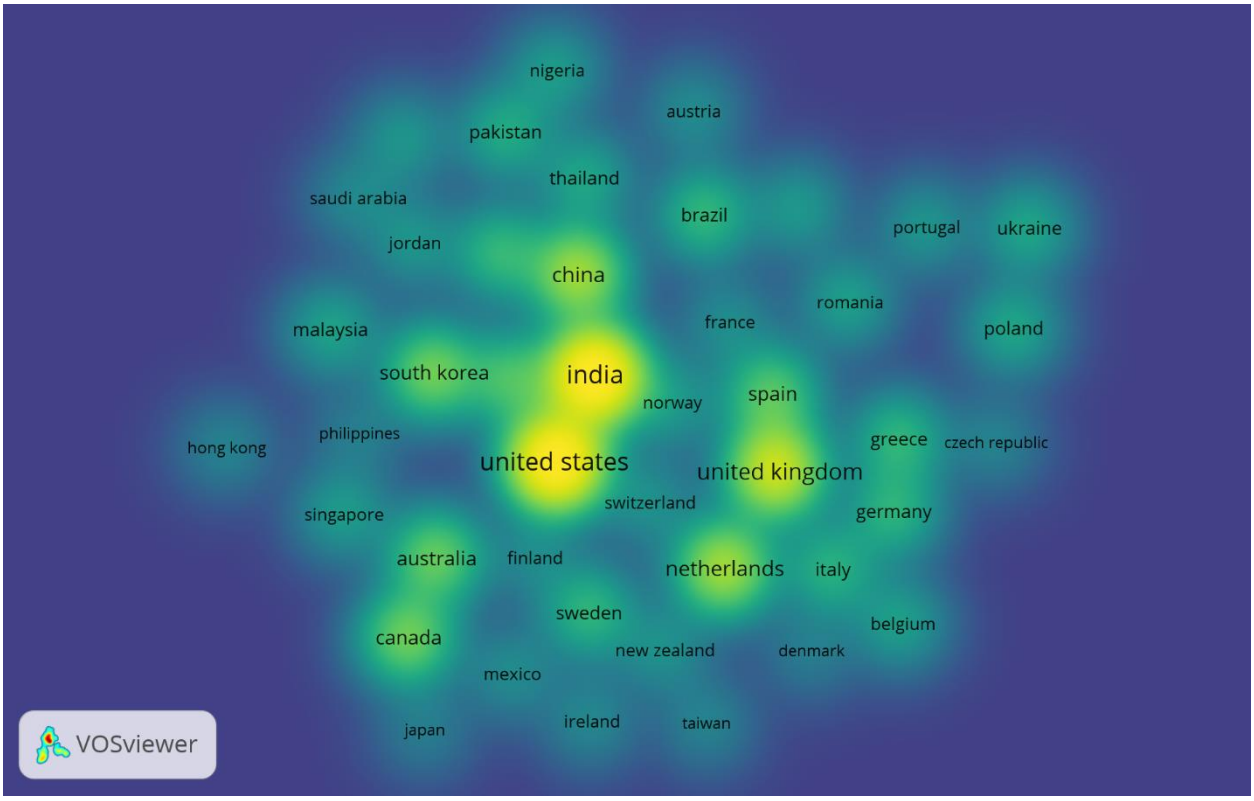

Figure-24

Network analysis has led to the observation that e-governance research is a global issue, and collaborations have occurred in India, China, the USA, and Europe. Australia, South Korea, and Canada are particularly shaped by high percentages of multi-country publications (MCP), indicating that these countries conduct research in more than one country within this space (Melitski, 2021). Examples of countries with a higher proportion of MCPs and thus a higher proportion of international collaborations (albeit with a relatively lower total number of publications) include Pakistan and Brazil.

4.4 Top Cited Documents

Among the most globally cited documents in e-governance are the main repercussions of the understanding and developmental process of e-governance models. The top of the list is taken by Teo TSH (2008), 1,095 global citation rank, from J Manage Inf Syst for being a foundational methodology document for the integration of information systems into governance frameworks; it serves as a reference in subsequent research work concerning digital transformation. Meijer A (2016) comes close behinds with his work in Int Rev Adm Sci that examine the nexus of technology, public administration, and citizen participation in governance processes and its place in the transparency and inclusive governance discourse with 1,037 citations. According to Stafford-Smith M (2017), with 646 citations in Sustainability Sci, sustainability ad e-Governance converge since sustainability should be integrated in the government system. In turn, Gov Inf Q, with 630 citations, further probes the role of technology in government transparency and accountability as well as technological advancement in service delivery by Bertot JC (2012).

Furthermore, Janssen M has also been quite prolific, the citation numbers resulting from his papers in J Bus Res (2017) and Gov Inf Q (2013) attesting to this, and his subject area is the organizational aspect of e-Government system implementation. Other works which also stand out are of

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Schuppan T (2009) and Evans D (2006) as they help develop models for ICT integration into government operations. Taken together, these highly cited documents offer a full framework for understanding the paradigm shift of technology in governance, which includes the introduction of technology as a force to improve transparency and accountability, as well as integrating sustainability in digital government practices. Owing to its continued relevance, e-governance research has been continuously growing as a vital area for the study of public administration and policy.

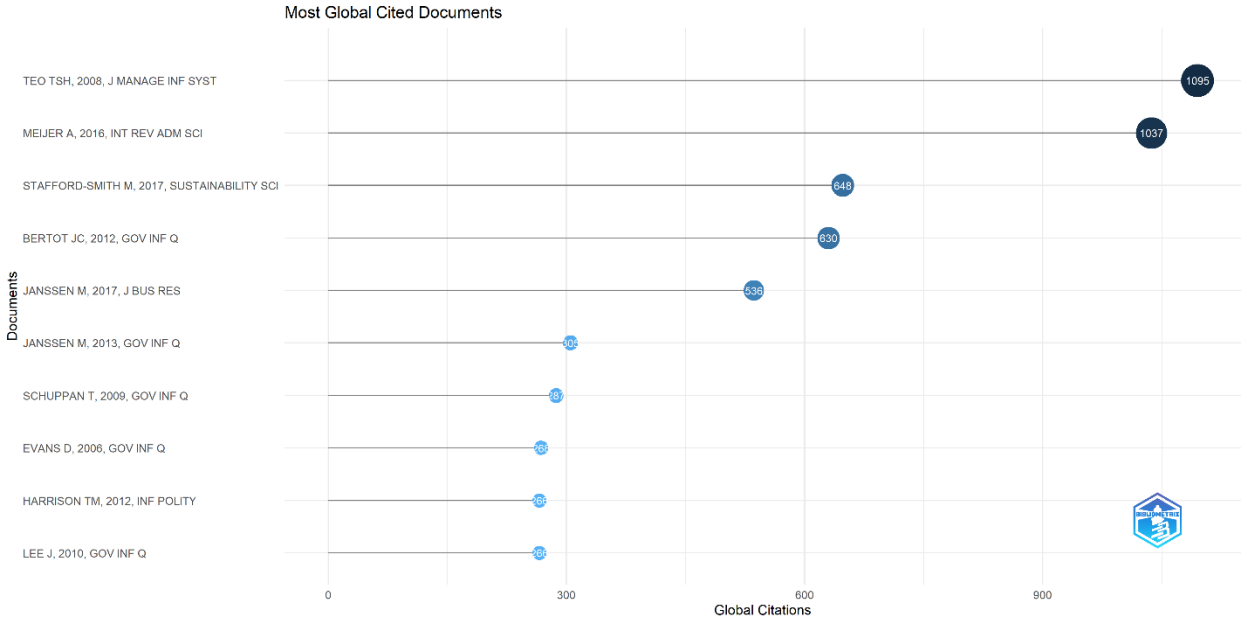

Figure-25

Paper	DOI	Total Citations	TC per Year	Normalized TC
TEO TSH, 2008, J MANAGE INF SYST	10.2753/MIS0742-1222250303	1095	60.83	11.88
MEIJER A, 2016, INT REV ADM SCI	10.1177/0020852314564308	1037	103.70	18.17
STAFFORD-SMITH M, 2017, SUSTAINABILITY SCI	10.1007/s11625-016-0383-3	648	72.00	13.13
BERTOT JC, 2012, GOV INF Q	10.1016/j.giq.2011.04.004	630	45.00	13.37
JANSSEN M, 2017, J BUS RES	10.1016/j.jbusres.2016.08.007	536	59.56	10.86
JANSSEN M, 2013, GOV INF Q	10.1016/j.giq.2012.11.003	305	23.46	9.36
SCHUPPAN T, 2009, GOV INF Q	10.1016/j.giq.2008.01.006	287	16.88	8.95
EVANS D, 2006, GOV INF Q	10.1016/j.giq.2005.11.004	268	13.40	6.00
HARRISON TM, 2012, INF POLITY	10.3233/IP-2012-0269	266	19.00	5.64
LEE J, 2010, GOV INF Q	10.1016/j.giq.2009.12.009	266	16.63	7.84

Figure-26

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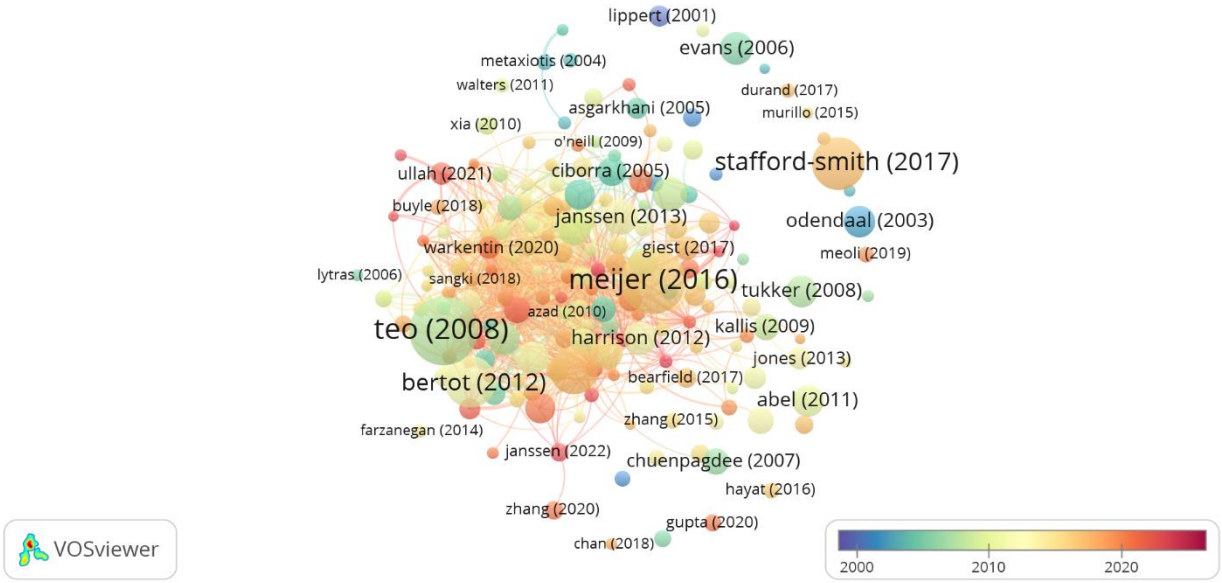

Figure-27

4.5- Keywords Co-occurrence Analysis

These key insights are based on keyword cluster analysis.

The core of this study is the E-Government Cluster, which has 391 mentions. Various subconcepts are connected, such as E-Governance, Government Data Processing and ICT, which portray the digitalisation of government functions and ICT integration in public administration. For example, keywords such as e-participation, smart cities, and websites emphasise the importance of technology to increase the level of citizen engagement and the efficiency of government systems. Governance is a governance cluster with 276 mentions and is highly coupled with e-government system implementation and management. In particular, the Governance Approach symbolises that the study is all about different frameworks and approaches to adopting e-governance practices. This cluster also links to the terms sustainability, democracy, policymaking, and the public sector, which means that e-government systems are embedded in a broader political, social, and economic context.

Public Administration (85 mentions) is linked to both E-Government and Governance within the Public Administration Cluster. Clustering within this field also includes the concept of public sector management and local governments, as it demonstrates the importance of local and national administrative bodies in obtaining and using digital government systems. The second cluster overlaps with the keywords public policy and government websites which are of interest in policy implementation.

Europe, the United States, China, India, Developing Countries, based on these keywords, show global and regional perspectives with widespread application and challenges of e-government systems at the regional level. Given the importance of citizen participation and that of the public sector in the governance cluster, the dynamics of citizen involvement in government decision making and better service delivery through digitised channels is increasing. Finally, cluster analysis shows a clear emphasis on digital technologies as a means of improving public governance, public administration, and public engagement. E-Government, Governance, and

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Public Administration are inseparable in the sense that they are inexorably united by the complexity and polythematic nature of the phenomenon of digital government transformation

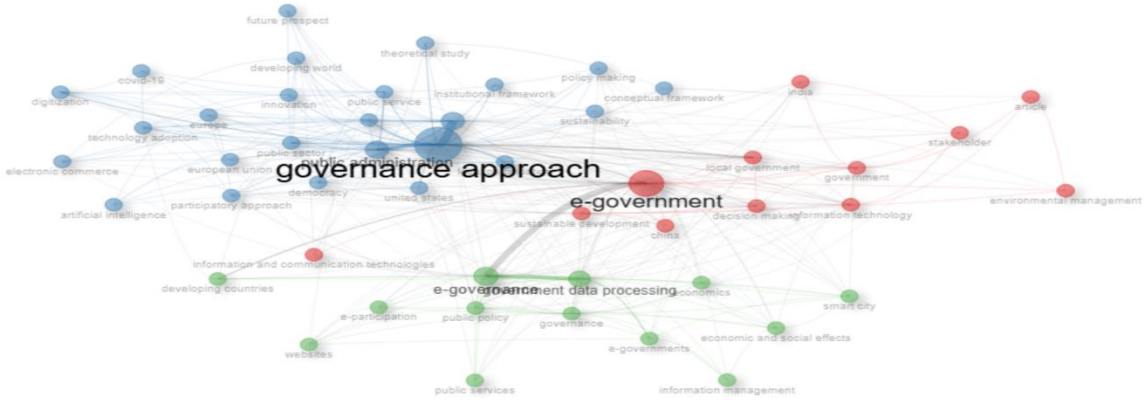

Figure-28

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Figure-29

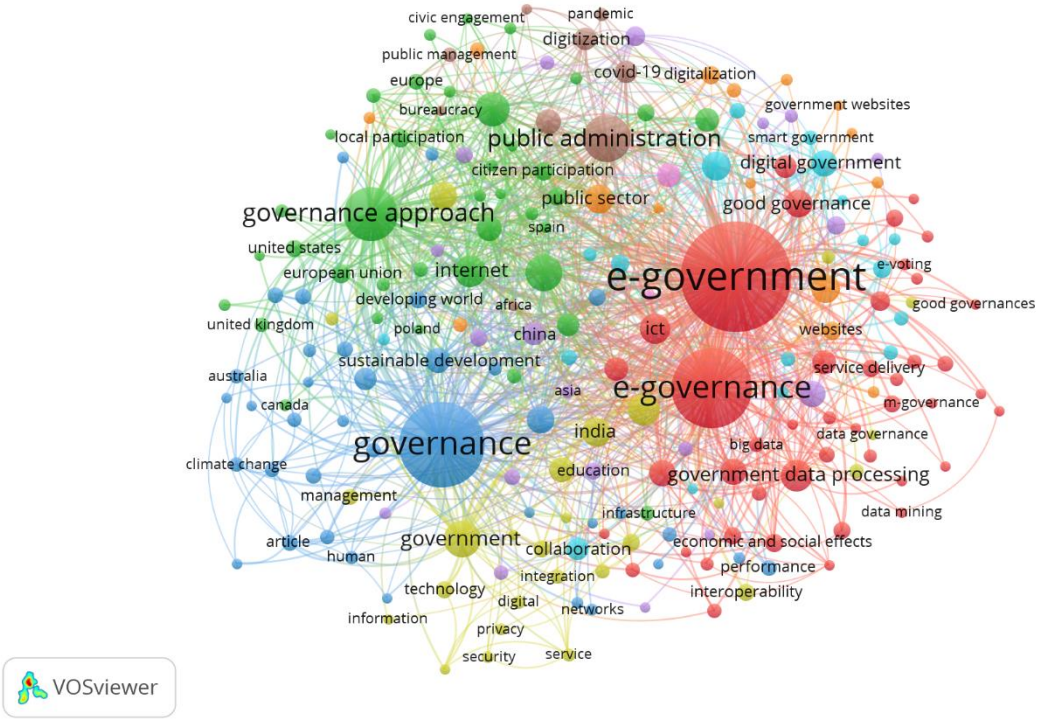

Figure-30

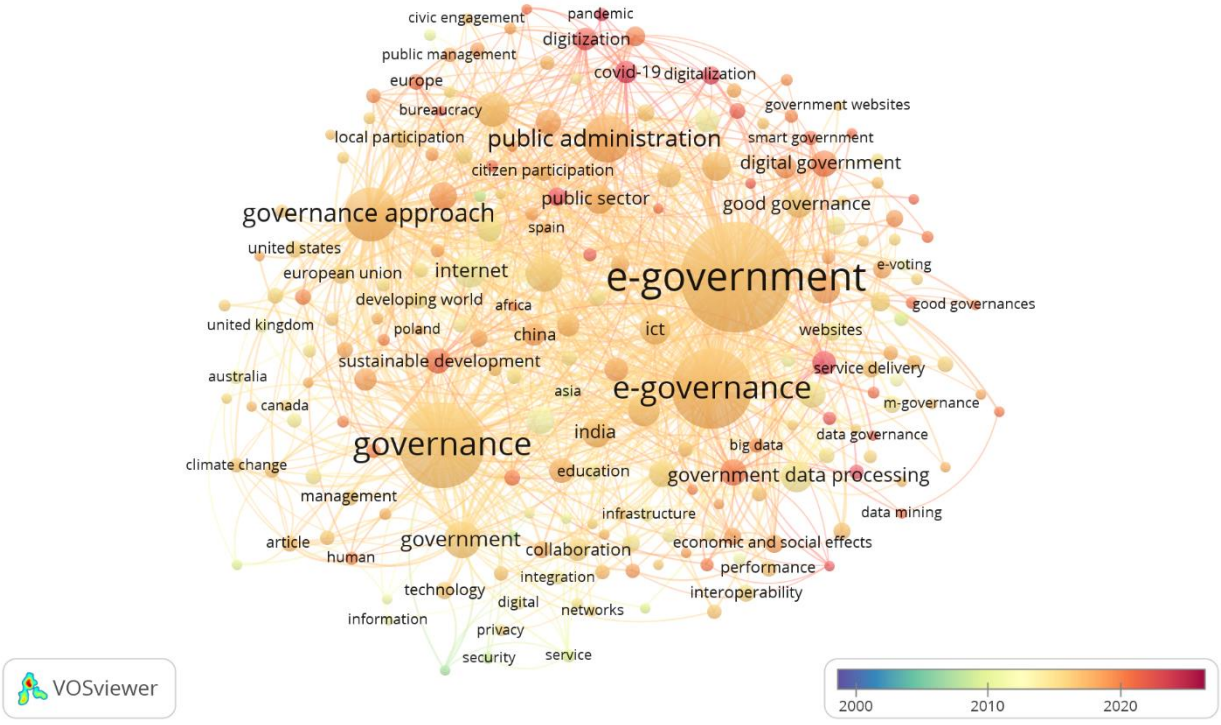

Figure-31

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Table-08

Keyword	Occurrence
E-government	391
Governance	276
E-governance	236
Governance Approach	111
E-Government	104
Public Administration	85
Government	53
Local Government	52
Information And Communication Technology	44
Government Data Processing	40

4.6-Words Mapping Analysis

Digital transformation concepts related to governance dominate the word cloud. The most clearly dominant terms are e-government (106 occurrences) and Governance Approach (111 occurrences), corresponding to the main topics of the study on the implementation of technology in governance frameworks. These keywords indicate that digital systems should be adopted worldwide to improve public administration and governance practices.

Figure-32

This is further complemented by the word tree visualisation, which displays a range of interrelated words, such as public administration, local government, government data processing, or e-governance, which alludes to the multiplex character of e-government systems. The terms information and communication technology suggest that the study of this case centres on technological infrastructure, while the public sector gives rise to another aspect, that is, the role of government institutions in adopting and managing these systems.

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Figure-33

These findings are further corroborated by e-government, e-governance, public administration, and local government as the most discussed words in the word frequency analysis. However, this shows a keen interest in the part played by digital governance in improving government services for supplying them more effectively, including citizens' participation and the transparency of services. Finally, keyword analysis shows that e-government and the Governance Approach are keywords in the literature and symbolise the increasing influence of digitalisation in making public administration, governance models, and delivering services more effective. These terms are interlinked, complex, and multidisciplinary, and are related to technology, governance, public sector management research, and e-governance research.

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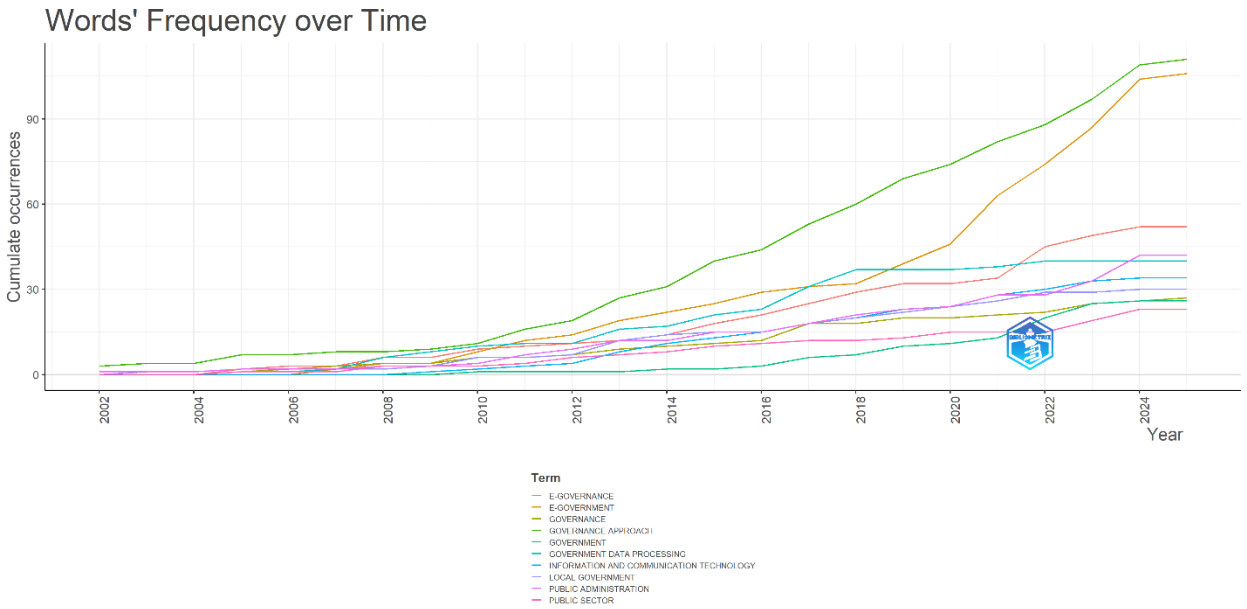

Figure-34

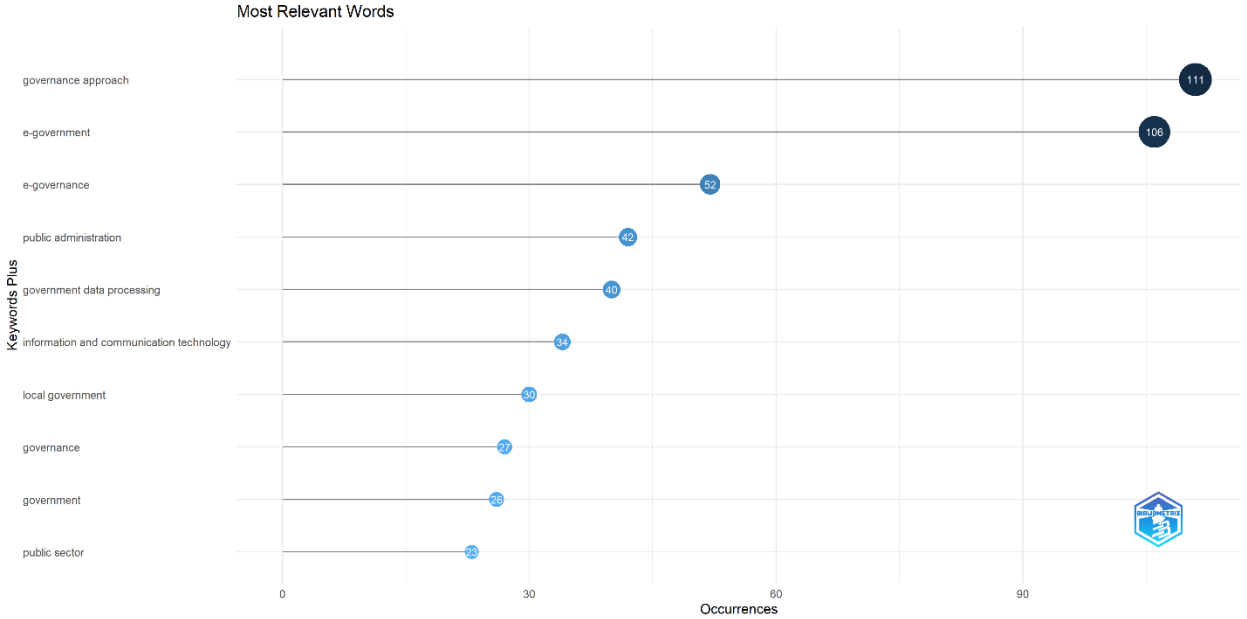

Figure-35

4.7- Thematic Analysis

Map Clustering

These inferences can be made based on the analysis of thematic clusters in visualisations. The core and impactful themes were e-government, e-governance, and the Governance Approach. These terms exist in the high-centrality zone, implying that they are integral and permanent contributors

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to digital governance research. There appears to be a strong linkage between the concepts of e-government and e-governance, suggesting that e-government through the digitisation of government processes remains a major area of literature. The clusters also highlight the role of public administration and communication technology (ICT), in addition to combining the emerging acceptance of digital infrastructure and governance.

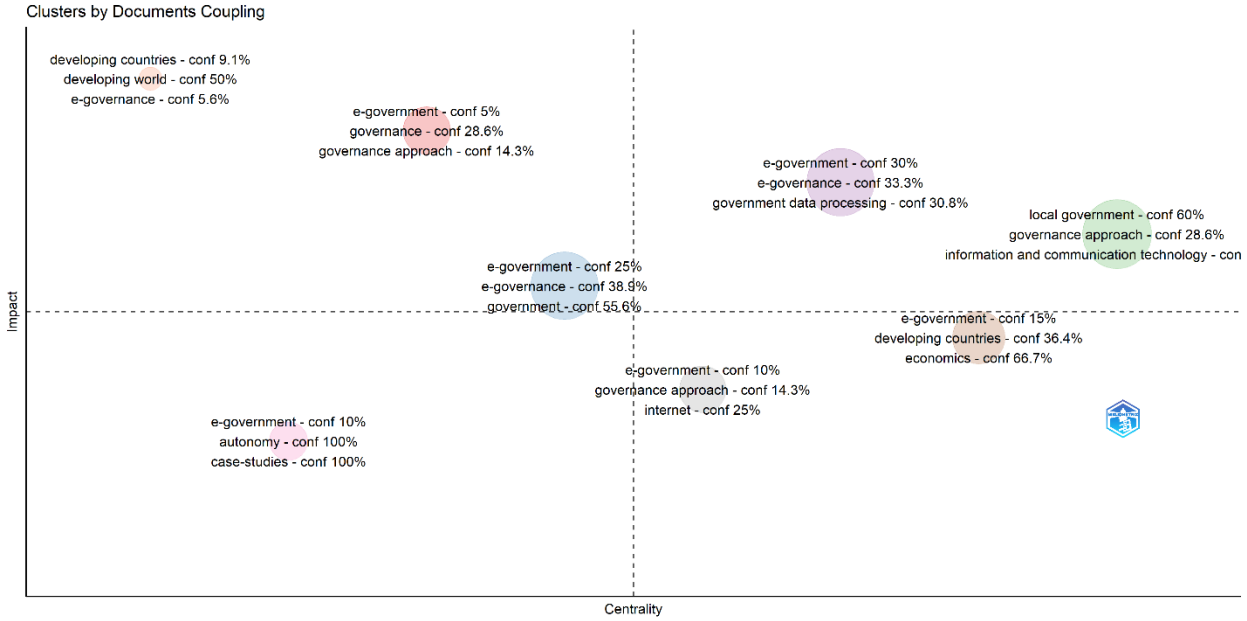

Figure-36

The basic themes quadrant consists of terms such as government, information technology, and sustainability, signifying a good structural understanding of the intricacies of digital government systems, as well as a basic understanding of sustainability and adoption of technology. Moreover, the use of these keywords shows that the concepts of these keywords are well proven in the governance framework of government E and their increasing incorporation into government research with sustainability goals.

The lower left quadrant shows niche themes that are under emerging development but gaining relevance to themes such as environmental management, urban areas, and articles. Analysis of the data processing strategy for e-government suggests that government systems, especially data management and the use of digital tools to enhance government processes, are gaining popularity. The clustering of these terms in niche quadrants can also be seen as an evolution from e-government to data analytics and environmental impact.

It seems Detecting Themes in Developing and Declining positions: the “Eurasia, perception, human” keywords in the lower right quadrant show that these are appearing but lesser central themes. Although these aspects may become important, it is still either developing or investigating the interdisciplinary aspects of governance. In a sense like developing countries, local governments can incriminate to the places where the research is applied in certain geographical areas and in the local-level implementation of governance.

Finally, the analysis finds that the core and most influential themes in the digital governance body of literature are e-government and e-governance. Foundational issues include public administration, ICT, and sustainability, and these central themes are supported by emerging levels, such as government data processing and regional foci, such as environmental management. This

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is a moving picture of research on e- governance with the fundamental issues in governance being addressed side by side with more focused, specialized applications of e- governance.

Thematic Analysis

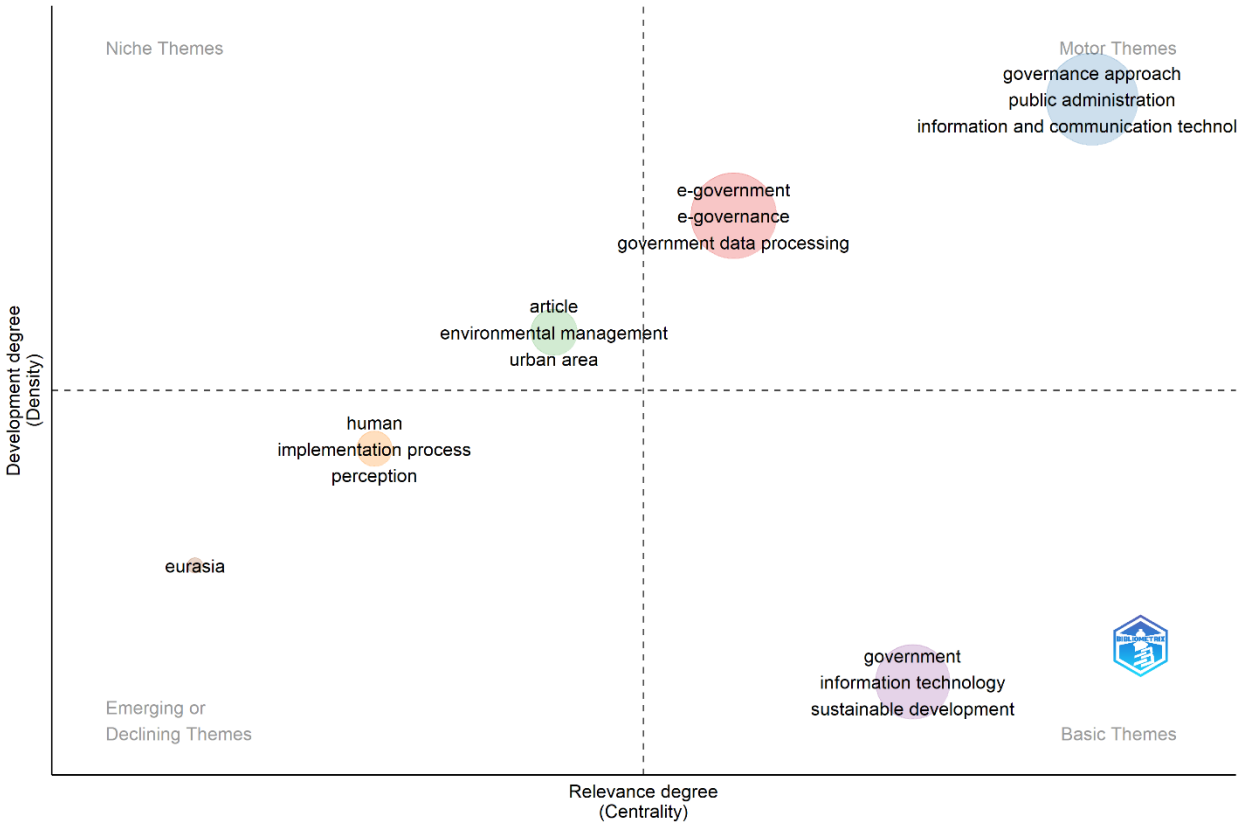

Figure-37

5. Discussion

Over the past two decades, e-government and e-governance have undergone huge changes in study, manifested in the transformative role of digital technologies in governance, public administration, and citizen engagement. The bibliometric analysis included relevant keywords, documents, authors, and affiliations and showed that this field is becoming increasingly complex and interdisciplinary. The other themes, namely e-government and e-governance, are certainly the ones that primarily guided the research, with E-Government (the most often cited keyword, occurring 391 times) being the main theme. The use of these phrases is the movement of government activities from the old style of fulfilling responsibilities to fulfil responsibilities on digital platforms which enhances the delivery of service and engages citizens to take part. The study also shows that in discourse shaping, Delft University of Technology and Indian Institute of Technology Delhi have significantly contributed to both theoretical and applied research areas of e-government systems (Janssen et al., 2020; Roy & Suri, 2022).

Teo TSH, Meijer A (2016) and Janssen M (2017) are very much influential in building up the theoretical basis for digital governance by being the most cited authors. With their work, they have paved the way to understanding how technology can create a transparent government, and

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engender accountability and improved service delivery, subject matters that remained a fundamental axis in the field (Meijer, 2016; Janssen et al., 2020). The research they undertook maintained great significance and a strong citation impact on contemporary government frameworks.

In terms of geographical coverage, India was the most frequent country of the corresponding authors, followed by the following order: interest in e-government is shown to be globally clear, especially in developing countries, where the government is rapidly altering governance models. With the involvement of institutions from Europe, Australia, and South Korea, this field is truly international, with research taking place across different regional contexts and with various problems. In terms of collaboration between these countries, as mentioned above, it shows the significant importance of countries that deal with digital governance issues in collaboration, especially with multi-country publications (MCP) (Gupta et al., 2021).

The results showed that, through thematic analysis, despite e-Government and e-Governance being the motor themes of most papers, they played a dominant role in the literature. The notions of public administration, governance approach, and information technology are closely related to these themes, focusing on the need for frameworks of administrative and ICT integration in governance. These findings are in line with the notion that digital infrastructure is the key to good governance in the 21st century (Janssen et al., 2020). The growing interest in the technical aspects of e-government (handling data, digital infrastructure, and local government adoption of digital tools) is evidenced by emerging themes, such as government data processing, local governments, and the public sector. The positioning of environmental management and smart city concepts in the quadrant of emergence confirms the addition of e-government to the list of sustainable development goals, mostly within urban planning and climate change mitigation. Expand the scope of e-government from administrative efficiency to more societal issues (Stafford-Smith, 2017; Melitski, 2021), which denotes these areas.

Finally, the research concludes that e-government is a key player in development policy towards changing governance practices across the world. Thus, an increasing number of studies have shown that digital governance does not stop at the improvement of service delivery, but at fostering transparency, citizen participation, and sustainability. This research strives to close some of this research gap by investigating the relationship between technology, governance, and social outcomes in the context of e–government systems to contribute to both the literature and the field of practice.

6. Conclusion

This bibliometric analysis provides a comprehensive understanding of e-government and e-governance on a global scale. E-Governance and e-Government at the centre were the key themes that had to do with research on the integration of ICT in public administration. Due to the global aspects of this research, namely the improvement of government transparency, efficiency, and sustainability, cooperation between countries is increasing. Additionally, thematic analysis emphasises the role of the local government in the digital transformation process and its importance in engaging citizens and government data processing.

It is restricted to the scope and diversity of variables because it entails analysing bibliometric data, which ignores the qualitative aspects of research, such as the depth of impact or practical applications of the studies. Second, only research articles indexed in the databases mentioned earlier can be considered for this study, excluding other published outlets such as theses, dissertations, and technical papers. Third, the study analysed the most cited papers which may not

reflect emerging trends or less emphasised areas of research that are gaining high momentum in that field.

These limitations should be addressed in future research through the incorporation of qualitative analysis of the practical impact of e-government research in real governance practices. By expanding this scope to include a broader range of publications, such as grey literature and reports of international organisations, a broader overview of the state of digital governance around the world can be presented. Researchers should also address new emerging technologies, such as artificial intelligence (AI), blockchain, and big data analytics which hold great promise to affect the e-government system. Finally, future studies should integrate these environmental goals with frameworks of digital governance, especially in urban settings and smart city initiatives, due to the current relevance of sustainability and governance.

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