Bibliometric Analysis of Electronic Petitions and Digital Complaint Systems

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Article Info

ABSTRACT

This study conducts a bibliometric analysis of electronic petitions and digital complaint systems, with the objective of delineating the intellectual framework, research progression, and collaborative networks within this expanding domain. The investigation utilized data obtained from the Scopus database (2000–2025) and deployed Bibliometrix (R package) and VOSviewer for performance evaluation and scientific mapping. The findings reveal three primary topic clusters: (1) digital records and health informatics as essential infrastructure; (2) user-centered interaction and citizen participation; and (3) mobile applications and financial integration as nascent frontiers. The United States, Australia, and the Netherlands lead in international collaboration, indicating robust transnational research relationships. The research theoretically integrates e-petition and complaint system studies within a cohesive framework of digital participatory governance, while practically offering insights into the design, policy, and implementation methods for inclusive and responsive e-government systems. Limitations encompass reliance on a singular database and restricted qualitative interpretation, indicating that future study ought to integrate bibliometric mapping with case-based analysis to enhance contextual comprehension.

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1. INTRODUCTION

In the past two decades, the rise of digital governance has redefined how citizens interact with public institutions. Governments across the world increasingly adopt *e-participation* tools to strengthen transparency, accountability, and inclusiveness in public decision-making [1]. Among these innovations, electronic petitions (e-petitions) have become a prominent channel for civic engagement, allowing citizens to express collective demands through online platforms rather than through traditional paper-based petitions. E-petition systems are seen as mechanisms that reduce participation barriers, enable more immediate feedback, and increase citizens' trust in democratic processes [2], [3]. The diffusion of such platforms in Europe, North America, and Asia reflects the growing importance of digital public participation within the broader

framework of *open government* and *e-democracy* [4], [5].

Parallel to e-petitions, the implementation of digital complaint systems—online mechanisms that allow users to submit service complaints, suggestions, or grievances—has become a key component of public service reform and digital accountability. These systems, often developed by municipalities and central government agencies, aim to improve public responsiveness, monitor service quality, and collect actionable data for policy evaluation [6], [7]. In contrast to e-petitions, which serve a deliberative or agenda-setting role, digital complaint systems are primarily transactional, facilitating citizen feedback within service delivery contexts [8] Nonetheless, both share an underlying principle of enhancing participatory governance through *Information and Communication Technology (ICT)* platforms.

Despite the growth of these systems, research on e-petitions and digital complaints remains scattered across disciplines such as public administration, communication, and information systems. Studies on e-petitions tend to focus on platform design [5], civic engagement outcomes [9], and legislative responsiveness [10], whereas research on complaint systems emphasizes digital service satisfaction [11], government responsiveness [12], and data-driven accountability [7]. However, there has been limited effort to integrate these literatures and identify shared theoretical frameworks and trajectories. As a result, there is a growing need to map and understand how these digital tools have been conceptualized and empirically studied over time.

The bibliometric approach provides a suitable methodology for addressing this research gap. Bibliometrics quantitatively examines publication data, citations, and co-occurrences to reveal the intellectual structure and evolution of a research field [13]. Using tools such as *VOSviewer* or *Bibliometrix*, scholars can visualize co-authorship networks, thematic clusters, and citation trends to better understand how knowledge develops across domains[14]. Bibliometric studies have proven particularly useful in emerging interdisciplinary areas such as e-government [15], open data [16], and civic technology [17], revealing knowledge fragmentation and research frontiers. Applying bibliometric analysis to the combined field of e-petitions and digital complaint systems can thus yield valuable insight into their intellectual foundations, key contributors, and research trajectories.

Furthermore, the increasing digitization of citizen–state interactions underscores the need to evaluate how research on digital participation aligns with evolving governance paradigms. The integration of e-petition systems with other civic technologies, such as crowdsourcing platforms and social media analytics, suggests an ongoing convergence toward *digital co-production* [18]. Similarly, complaint management systems are being reshaped by machine learning, sentiment analysis, and open data architectures [19]. By mapping bibliometric patterns, researchers can assess how these developments are reflected in the scientific literature, identify gaps in theoretical approaches, and anticipate emerging areas such as algorithmic accountability, digital inclusion, and participatory policy analytics.

Although research on electronic petitions and digital complaint systems has expanded considerably, it remains fragmented and lacks a consolidated knowledge structure. There is no comprehensive bibliometric synthesis that jointly examines both domains as interconnected mechanisms of digital citizen participation. Existing studies often focus narrowly on individual case analyses or system evaluations, leaving a gap in understanding the overall evolution, citation networks, and conceptual linkages that define this research area. This fragmentation limits cumulative knowledge, impedes theoretical integration, and hinders the identification of future research directions. Therefore, a systematic bibliometric analysis is essential to reveal the intellectual landscape, thematic evolution, and key actors shaping the study of e-petitions and digital complaint systems.

This study aims to conduct a comprehensive bibliometric analysis of scholarly publications on *electronic petitions* and *digital complaint systems* to map the intellectual structure, research trends, and thematic evolution within this field. Specifically, the objectives are to: (1) analyze the annual publication trends and citation patterns from 2000–2025; (2) identify the most influential authors, institutions, and journals contributing to this domain; (3) examine co-occurrence networks of keywords to detect dominant themes and emerging topics; and (4) explore potential conceptual overlaps between e-petition and digital complaint research. The results are expected to contribute to both academic and practical domains by providing an integrated understanding of how digital participatory mechanisms are studied, thus guiding policymakers, technologists, and scholars in designing more inclusive and data-driven governance systems.

2. METHODS

This study adopts a quantitative bibliometric design to systematically map and analyze the scientific literature related to *electronic petitions* and *digital complaint systems*. Bibliometric analysis enables the identification of publication trends, intellectual structures, and thematic evolutions in a given field through the statistical evaluation of bibliographic data [13]. Following established methodological frameworks [14], [20], this research employs both performance analysis and science mapping. Performance analysis measures the productivity and impact of publications, authors, and journals, while science mapping explores the conceptual, intellectual, and social relationships among research components through co-citation, co-authorship, and co-word networks. This dual approach allows for a comprehensive understanding of how research on electronic petitions and digital complaint systems has evolved and interconnected over time.

The data were collected from the Scopus database, which is one of the most comprehensive and widely used academic indexing services for bibliometric studies due to its multidisciplinary coverage and accurate citation tracking [21]. The search was conducted in September 2025 using the following Boolean query: ("electronic petition*" OR "e-petition*" OR "online petition*") AND ("digital complaint*" OR "online complaint system*" OR "grievance redressal" OR "feedback platform").

The search was limited to journal articles, conference papers, and reviews published between 2000 and 2025 to capture the full evolution of the digital governance era. Only documents written in English and indexed in Scopus were included to ensure consistency of metadata. Duplicates, non-scholarly materials, and documents not directly related to governance or public participation (e.g., commercial or marketing complaint systems) were excluded after a manual screening process. The final dataset was exported in BibTeX format for subsequent analysis, containing bibliographic metadata such as author names, affiliations, keywords, abstracts, and cited references.

The bibliometric data were analyzed using Bibliometrix (R-package) [14] and VOSviewer [22]. Bibliometrix was used for data cleaning, descriptive statistics, and temporal trend analysis, including publication output by year, citation counts, and source impact. VOSviewer was applied to generate visual network maps of co-authorship, co-citation, and keyword co-occurrence to identify research clusters and thematic relationships. Thematic evolution and keyword trends were further examined using *Thematic Map* and *Trend Topic* functions to trace the emergence of key research areas across different periods. To ensure the reliability and validity of results, the analysis followed the PRISMA flow approach for systematic document selection and was cross-validated through manual verification of high-impact publications. Together, these methods provide a transparent and replicable framework for understanding the knowledge structure and future trajectories of scholarship on electronic petitions and digital complaint systems.

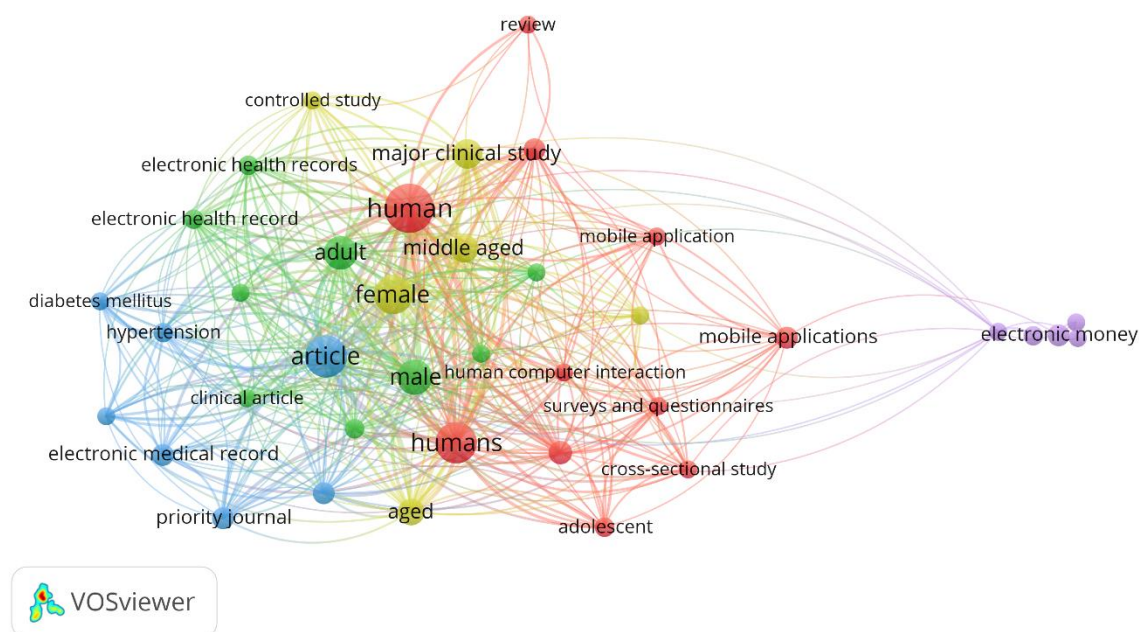## 3. RESULTS AND DISCUSSION

3.1 Keyword Co-Occurrence Network

Figure 1. Network Visualization
Source: Data Analysis Result, 2025

Figure 1 reveals the principal centre cluster, mostly highlighted in red and green, encompasses phrases such as human, female, male, adult, middle-aged, and significant clinical trial. This signifies that a substantial segment of the research in the dataset focuses on health informatics connected to humans and demographic analysis. The convergence of these concepts indicates a multidisciplinary combination of clinical research and digital system applications, including e-health, medical records, and user-centric data. It also indicates that the majority of studies in this field utilize health-related populations as their principal research subjects, highlighting medical, demographic, and behavioural viewpoints.

The blue cluster links keywords such as electronic medical record, electronic health record, clinical paper, and priority journal. This cluster signifies the digital health infrastructure subdomain, concentrating on the storage, dissemination, and utilization of health information. These studies frequently

examine the efficacy, interoperability, and governance of electronic data systems. The robust link between the "human" and "article" nodes indicates that publications on e-health record administration are fundamental to this body of literature. The cluster's density indicates that the medical documentation and information systems domain is a solid and mature research topic, functioning as the technological foundation for extensive e-governance and citizen data management initiatives.

A notable domain is the red–yellow cluster, with terms such as mobile application, mobile applications, human-computer interface, and surveys and questionnaires. This domain examines the digital interface and user engagement aspect, wherein researchers investigate the interactions between citizens or patients and mobile platforms and digital systems. The correlation between mobile applications and cross-sectional studies indicates that the majority of research utilizes survey-based approaches to

assess usage, usability, or satisfaction. It illustrates the increasing impact of human-computer interaction (HCI) concepts in the design of user-centered digital public service and health-related complaint systems, mirroring patterns observed in e-petition usability research and online grievance platforms.

The little purple cluster on the right, linking electronic currency to the wider network, represents an emerging study domain that integrates electronic transactions with public digital infrastructures. The limited connections between electronic currency and mobile applications suggest that digital payment or e-wallet technologies are starting to converge with other modalities of electronic service provision. This subject, however underdeveloped, has the potential to become a significant multidisciplinary theme, especially if complaint systems and petition platforms start incorporating digital payment verification or blockchain authentication for identity and trust management.

The network's structure exhibits a significant level of theme interconnection, indicating that research on electronic systems—be it health-related, participatory, or transactional—is profoundly interdisciplinary. The prevalence of general terminology (person, article, adult) and methodological indicators (review, cross-sectional research) indicates a well-established field characterized by regular empirical replication and systematic reviews. Simultaneously, peripheral nodes such as electronic currency and mobile applications signify a shift towards contemporary technology advancements. This trend indicates a transition from conventional record-keeping and clinical informatics to expansive digital interaction ecosystems that amalgamate user experience, data analytics, and service co-production, reflecting the conceptual evolution of electronic petition and complaint systems in digital governance studies.
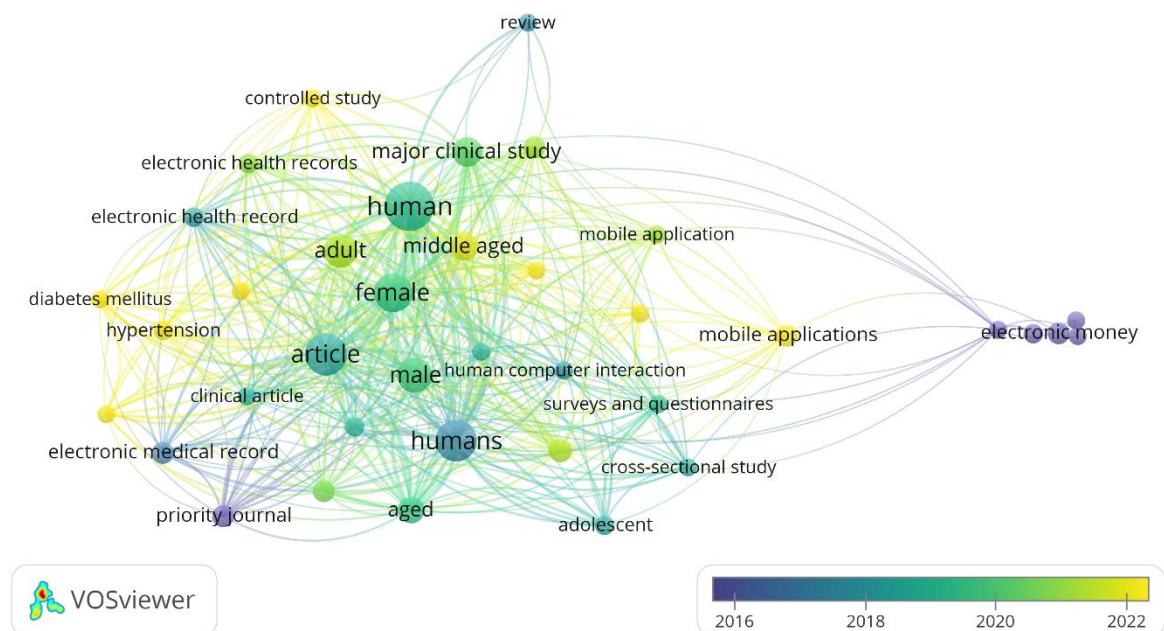

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2025

This overlays visualization map from VOSviewer depicts the temporal progression of keywords in research concerning electronic systems, public interaction technologies, and

digital governance. The color gradient—from blue (representing older studies, circa 2016) to yellow (indicating more current studies, circa 2022)—illustrates the evolution of study themes throughout time. During the initial phase (blue nodes), subjects such as electronic medical records, electronic health records, and priority journals prevailed. This illustrates the initial emphasis on data digitization, documentation, and health information systems, wherein digital platforms were predominantly utilized for record-keeping and operational efficiency rather than for participatory involvement. This phase signified the institutional adjustment to digitization, establishing the technological underpinnings for extensive e-participation systems.

During the mid-phase of study (green nodes), approximately from 2018 to 2020, the theme focus broadened to encompass human, female, male, adult, middle-aged, and human-computer interaction topics. These expressions indicate an increasing emphasis on user-centric methodologies and the human aspects of technology adoption. Researchers commenced investigating the interactions between residents or users and digital systems, analyzing behavioral patterns, satisfaction levels, accessibility, and demographic involvement. This signifies a conceptual shift from exclusively technical studies to sociotechnical frameworks, corresponding with public administration .

and digital democracy research that prioritizes inclusivity, usability, and social feedback in system design. This phase corresponds with the growing focus on citizen use, equitable participation, and the legitimacy of platforms within electronic petitions and digital complaint systems.

In the latest phase (yellow nodes)—spanning about 2020–2022—the terms mobile application, mobile applications, and electronic money are positioned on the perimeter, signifying the advent of mobile and financial integration within digital governance ecosystems. This signifies that the research domain is broadening beyond desktop and institutional systems to encompass mobile-based, real-time, and transactional applications. The emergence of electronic currency indicates an interdisciplinary convergence among fintech, civic technology, and digital service provision, which is particularly pertinent for contemporary e-petition and complaint systems that now integrate functionalities such as e-wallet verification, digital identity, and mobile notification feedback. The overlay visualization delineates a distinct temporal progression—from fundamental digital records to human-centric engagement, culminating in mobile and financial integration—illustrating the overarching evolution of digital governance towards increasingly interactive, personalized, and data-driven public systems.
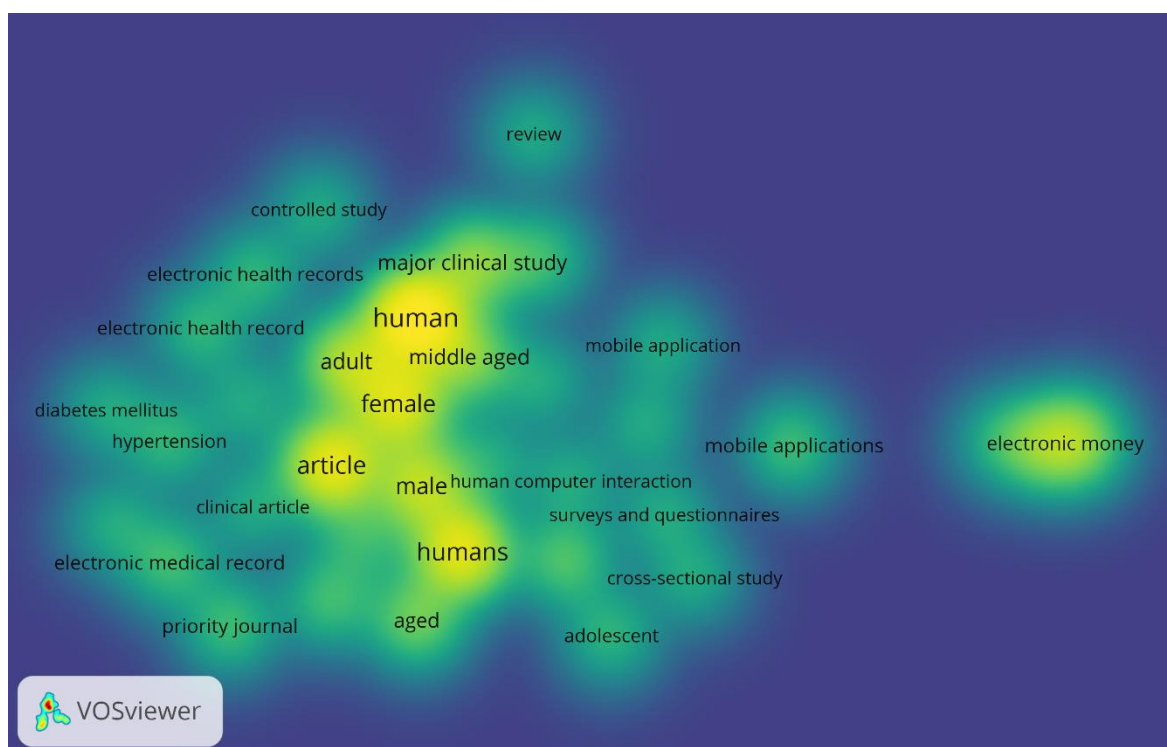
Figure 3. Density Visualization
Source: Data Analysis, 2025

This density visualization map from VOSviewer illustrates the concentration of research activity based on keyword frequency and co-occurrence intensity. The color gradient—from blue (indicating low density) to yellow (indicating high density)—signifies regions where research issues are most vigorously debated. The prominent yellow zone surrounding terms like human, female, male, adult, and article indicates that the studies within this dataset are predominantly focused on human-centric digital systems and user-oriented applications. This indicates the prevalence of research examining demographic and behavioral dimensions of technology adoption, especially in situations related to digital records, user engagement, and participatory interaction. The robust clustering of electronic health records, electronic medical records, and significant clinical studies indicates that foundational research in this domain emerged from digital health and governance frameworks, wherein human involvement was analyzed concerning system usability and data integration.

Simultaneously, the existence of smaller luminous areas on the right side—particularly for mobile applications and electronic currency—indicates nascent yet progressively important research topics. These domains indicate a recent focus on mobile interaction systems and digital transaction technologies, signifying a transition from institutional digital administration to customized, mobile, and financial participation ecosystems. The relative seclusion of the electronic money node suggests that this subject is nascent and continues to evolve as an interdisciplinary nexus among e-governance, fintech, and citizen service innovation. This density map illustrates a research domain in transition, shifting from data-centric investigations to interactive and transactional digital engagement, reflecting the evolution of electronic petition and complaint systems towards integrated, user-driven, and financially interconnected digital governance frameworks.
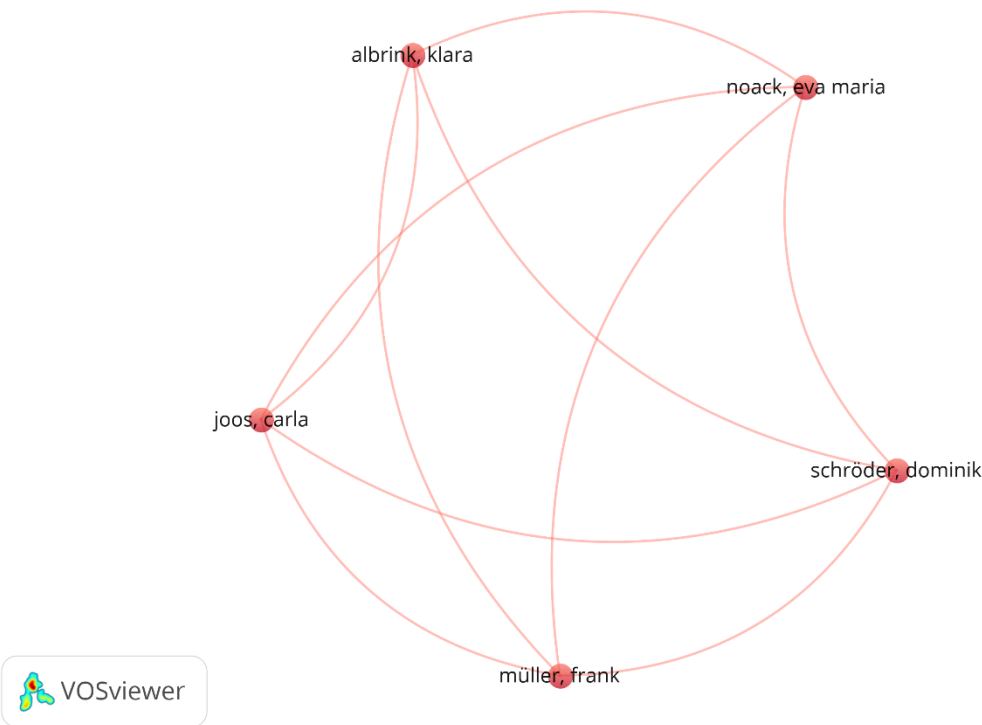
3.2 Co-Authorship Network

Figure 4. Author Collaboration Visualization
Source: Data Analysis, 2025

Figure 4 illustrates to comprehend the intellectual framework and foundational contributions in health insurance policy and public health governance, it is crucial to identify the most prominent and often cited publications that have affected global discourse and policy formulation. The subsequent table delineates ten pivotal studies that have profoundly impacted academic research, institutional policymaking, and international health changes from 2007 to 2023. These works jointly illustrate the progression of health governance frameworks, the increasing focus on social determinants of health, and the incorporation of insurance-based strategies in attaining universal health coverage. This study seeks to demonstrate how evidence-based policy, extensive data infrastructure, and international collaboration have enhanced both the theoretical comprehension and practical application of public health governance systems by analyzing the citation patterns and thematic focuses of these seminal publications.
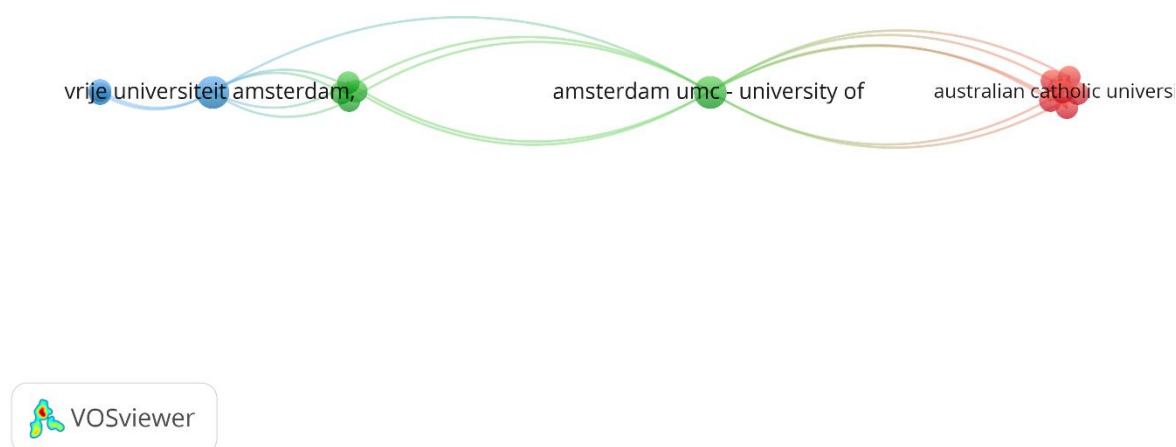
Figure 5. Affiliation Collaboration Visualization
Source: Data Analysis, 2025

Figure 5 This institutional collaboration map, illustrated by VOSviewer, represents the network of research affiliations that contribute to the field. The nodes symbolize universities, while the connecting lines denote co-authorship or co-affiliation relationships among them. The visualization underscores a transnational collaborative framework between European and Australian academic institutions. Vrije Universiteit Amsterdam and Amsterdam UMC – University of Amsterdam constitute the European research hub, distinguished by collaborative efforts and joint authorship, whereas Australian Catholic University serves as a formidable counterpart in the Asia-Pacific region. The color differentiation (blue for Europe, green for intermediary links, and red for Australia) indicates separate yet complementary geographic clusters that share information via international collaborations. This configuration suggests that research on electronic petitions and digital complaint systems, or related digital governance subjects, is enhanced by cross-continental collaboration, merging European expertise in e-governance design with Australian contributions in digital engagement and public service innovation.
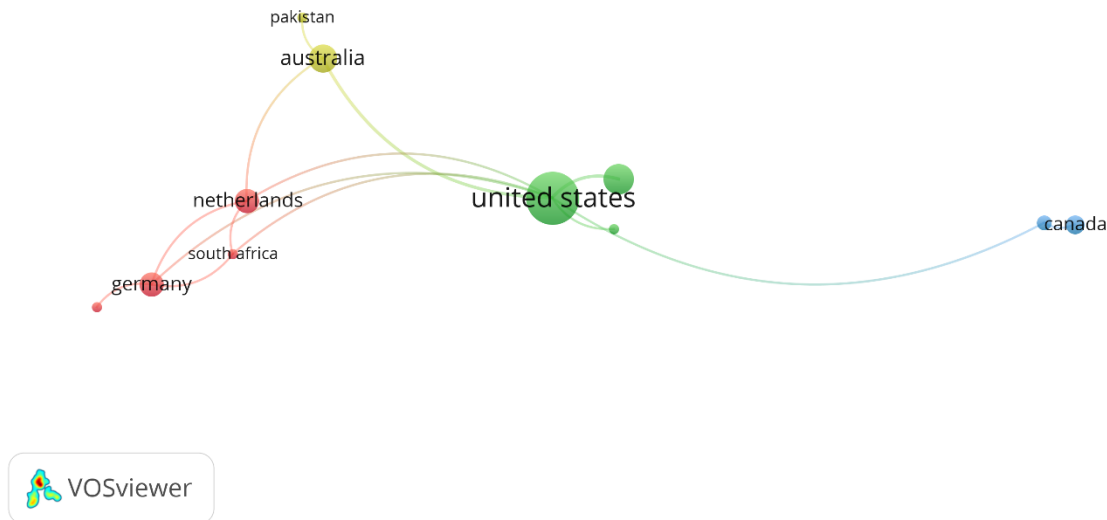
Figure 6. Country Collaboration Visualization
Source: Data Analysis, 2025

Figure 6 reveals the nation collaboration network map produced by VOSviewer illustrates the worldwide research alliances in the field. Each node signifies a country, with its size reflecting the volume of articles generated, while the connecting lines illustrate the intensity of international co-authorship relationships. The United States is the most influential and productive nation, establishing robust collaborative relationships with Australia, the Netherlands, and Canada, so underscoring its pivotal role in advancing international research on digital systems and governance innovation. The robust connections among Australia, Germany, and the Netherlands illustrate strong transcontinental cooperation, indicating a common academic emphasis on digital participation, electronic record systems, and user interaction research. Nations like Pakistan and South Africa, however peripheral, exemplify the progressive globalization of this study field, as emerging economies start to collaborate with established Western institutions. The network exhibits a core-periphery structure predominantly led by Western nations, highlighting that knowledge production in electronic petitions and digital complaint systems remains primarily concentrated in the Global North, yet is becoming increasingly interconnected via international academic collaboration.

3.3 Citation Analysis

This table includes the most-cited papers that significantly influence the convergence of digital health technology and clinical treatment, specifically with digital mental health and behavioral monitoring. These studies, conducted between 2006 and 2021, collectively illustrate the progression of digital tools, ranging from initial electronic health recording to advanced AI-driven and mobile-based interventions. This analysis elucidates how the intersection of technology, data, and healthcare practice has enhanced our comprehension of digital well-being, cognitive assessment, and mental health intervention in clinical and everyday settings, through an examination of citation trends and thematic diversity of these works.

Table 1. Top Cited Research

Citations	Authors and year	Title
180	Piau, A., Wild, K., Mattek, N., Kaye, J. (2019)	Current state of digital biomarker technologies for real-life, home-based monitoring of cognitive function for mild cognitive impairment to mild Alzheimer disease and implications for clinical care: Systematic review
59	Silva, G.R.R., Pitangui, A.C.R., Xavier, M.K.A., Correia-Júnior, M.A.V., De Araújo, R.C. (2016)	Prevalence of musculoskeletal pain in adolescents and association with computer and videogame use
49	Philip, P., Dupuy, L., Morin, C.M., ... Auriacombe, M., Micoulaud-Franchi, J.-A. (2020)	Smartphone-based virtual agents to help individuals with sleep concerns during COVID-19 confinement: Feasibility study
49	Hillen, R.J., Burger, B.J., Pöll, R.G., Van Dijk, C.N., Veeger, D. (2012)	The effect of experimental shortening of the clavicle on shoulder kinematics
45	Khan, M.A.H., Cruz, V.O., Azad, A.K. (2019)	Bangladesh's digital health journey: reflections on a decade of quiet revolution
36	Dowds, M.M., Lee, P.H., Sheer, J.B., ... Zainea, K.L., Glenn, M.B. (2011)	Electronic reminding technology following traumatic brain injury: Effects on timely task completion
32	van Doorn, M., Nijhuis, L.A., Egeler, M.D., ... Alvarez-Jimenez, M., Nieman, D.H. (2021)	Online Indicated Preventive Mental Health Interventions for Youth: A Scoping Review
27	Kaufman, C.S., Jacobson, L., Bachman, B.A., Kaufman, L.B. (2006)	Digital documentation of the physical examination: moving the clinical breast exam to the electronic medical record
20	Jiang, A.C., Panara, A., Yan, Y., Rao, S.S.C. (2020)	Assessing Anorectal Function in Constipation and Fecal Incontinence

Source: Scopus, 2025

The bibliometric data outlined above highlights significant milestones in the advancement and utilization of digital health and mental health technology. The highly referenced article by [23], with 180 citations, presents a thorough systematic review of digital biomarker technologies for home-based cognitive monitoring, marking a crucial advancement in personalized and preventive healthcare for conditions like mild cognitive

impairment and Alzheimer's disease. Research by [24] and [25] expands the technological dialogue by examining health consequences associated with digital behavior, including musculoskeletal strain from prolonged screen exposure and the utilization of smartphone applications to alleviate sleep issues during pandemic lockdowns.

Additional contributions, such as [26]'s analysis of Bangladesh's digital health revolution and van [27]'s scoping assessment of online mental health therapies for youth, emphasize the global and preventative aspects of digital health transformation. Preceding fundamental studies, like [28] and [29], illustrate the progressive digitalization of clinical practice via electronic medical records and assistive technologies for individuals with brain injuries. These publications collectively demonstrate a progressive trajectory—from technological feasibility and clinical integration to broader applications of digital tools for psychological assessment, health monitoring, and mental well-being enhancement—highlighting the multidisciplinary and transformative essence of digital mental health research.

Practical Implications

This bibliometric study's findings hold significant implications for policymakers, public administrators, and digital system designers. The mapping of research clusters indicates that the evolution of electronic petitions and digital complaint systems is transitioning from data management and institutional design to user-centric engagement and mobile integration. This history offers practical insights for governmental entities seeking to enhance citizen engagement: digital platforms should prioritize usability, accessibility, and real-time response over basic administrative efficiency. The observed collaboration patterns—especially among institutions in Europe, Australia, and North America—indicate that the successful implementation of these systems relies on cross-national policy learning and standards for technology interoperability. Policymakers can utilize

these international research connections to evaluate best practices and expedite innovation in e-governance. The increasing convergence of mobile platforms and electronic payment systems, as evidenced by the recent appearance of "electronic money" in bibliometric maps, suggests that forthcoming complaint and petition platforms may incorporate hybrid civic-financial features, including verified digital identity, e-wallet verification, and micro-contribution mechanisms to enhance participation authenticity and accountability.

Theoretical Contributions

This study theoretically advances the fields of e-governance, participatory democracy, and digital sociology by providing the inaugural comprehensive bibliometric mapping of research on electronic petitions and digital complaint systems. Prior research frequently analyzed these two domains in isolation—e-petitions as instruments of democracy and complaint systems as mechanisms for administrative feedback—neglecting their common theoretical basis as infrastructures for digital involvement. This research examines keyword co-occurrence, author networks, and thematic evolution, illustrating the transition of the field from technological determinism to socio-technical interactionism, with a focus on citizen agency, digital literacy, and institutional trust as crucial determinants. The research enhances e-participation theory by demonstrating the steady transition of academic discourse from passive information dissemination to participatory, data-driven, and collaborative governance models. The network analysis of nations and institutions offers empirical evidence for the globalization of e-participation research, demonstrating that digital civic engagement transcends regional boundaries and is integrated into a comprehensive, multi-tiered theoretical framework that includes governance, communication, and innovation systems.

Limitations and Future Research

This study, despite its merits, has numerous limitations that must be

recognized. The bibliometric data were solely obtained from the Scopus database, which, while extensive, may omit pertinent publications from other academic sources such as Web of Science, Google Scholar, or local government reports. Future research may utilize multi-database integration or altmetric analysis to obtain a more extensive and varied dataset. Secondly, bibliometric methods inherently emphasize quantitative patterns over qualitative interpretations; hence, they are insufficient for elucidating the contextual nuances, user experiences, or socio-political dynamics of digital participation mechanisms. Future research may integrate bibliometric mapping with systematic literature reviews or case study analyses to enhance theoretical and empirical understanding. Ultimately, although this analysis encompasses literature from 2000 to 2025, the swift advancements in artificial intelligence, blockchain governance, and data privacy rules may soon transform the domain. Ongoing longitudinal monitoring is crucial to observe developing paradigms in citizen-government digital interaction.

4. CONCLUSION

This bibliometric analysis offers an extensive examination of the intellectual framework, theme progression, and international collaboration trends in the study of electronic petitions and digital complaint systems from 2000 to 2025. The analysis indicates that the area has progressed through three principal phases: an initial emphasis on digital documentation and data management, a later transition to user-centered engagement, and the recent advent of mobile and financial integration within digital governance systems. Co-authorship and institutional networks illustrate that research is propelled by robust cooperation among European, North American, and Australian institutions, with the United States serving as the most pivotal node of global influence. The study highlights that these digital methods are increasingly acknowledged not just as administrative tools, but as participatory infrastructures that facilitate openness, responsiveness, and public empowerment. This research provides an empirical basis for enhancing academic investigation and practical innovation in e-governance by mapping knowledge pathways and identifying emergent themes. Subsequent research must persist in amalgamating qualitative insights and interdisciplinary methodologies to elucidate the social, ethical, and policy ramifications of these swiftly advancing civic technologies.

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