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Factors Influencing Citizen Engagement in Digital Government: A UTAUT–TOE Perspective

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ABSTRACT

The digital transformation of government needs to shift from simply digitizing public services to strengthening citizen engagement as an essential part of citizen-driven governance. Nevertheless, digital government evaluation frameworks still focus on technological readiness and service delivery and the factors of citizen engagement are yet to be comprehensively articulated. In this study, we aim to identify and analyze the factors affecting citizen engagement in digital government through a systematic literature review (SLR) with an integrated Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology–Organization–Environment (TOE) perspective. Based on 37 peer-reviewed studies published between 2020 and 2025, we have identified 54 factors that can be categorized into seven main categories: individual determinants, technological context, organizational context, and environmental context. In addition to identifying factors, the study also distinguishes whether the evidence backing each of them is high or low, and which of these factors is consistent across contexts. We find that although individual factors are associated with technology adoption and initial engagement, the structural and sustainable factors affecting citizen engagement are strongest and more consistently experienced across the organization and environment. This study contributes theoretically to the understanding of citizen participation as a systemic digital governance phenomenon through the integration of UTAUT-TOE and to the policy-making and digital public service managers to design more inclusive and participatory digital government initiatives. Future work is in order to empirically confirm the findings and their real-world utility across different administrative and socio-economic settings, especially in developing countries.

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1. INTRODUCTION

The digital transformation of government has gone beyond simply digitizing administrative processes to a citizen-centric governance model. Modern digital government is not just about the availability of online services or bureaucratic efficiency but about how citizens can play a role in developing policy, providing public services, and creating public value together. It is the way citizens interact and shape policy making that is critical to good policy quality, public trust, and the digital transformation of government [1], [2]. International frameworks in digital government worldwide place the importance of citizen engagement. The United Nations is at the center of the Digital Government Model Framework and digital infrastructure and data centricity in the digital government process [3]. The OECD also believes that digital participation has three positive effects: it can improve policy effectiveness, increase citizen participation, enhance capacity and

trust, and increase government legitimacy and transparency [4]. But we know that citizen involvement is indeed the foundation to digital government, but how to implement it in practice and in the evaluation framework is not just a matter of policy implementation but also evaluation frameworks.

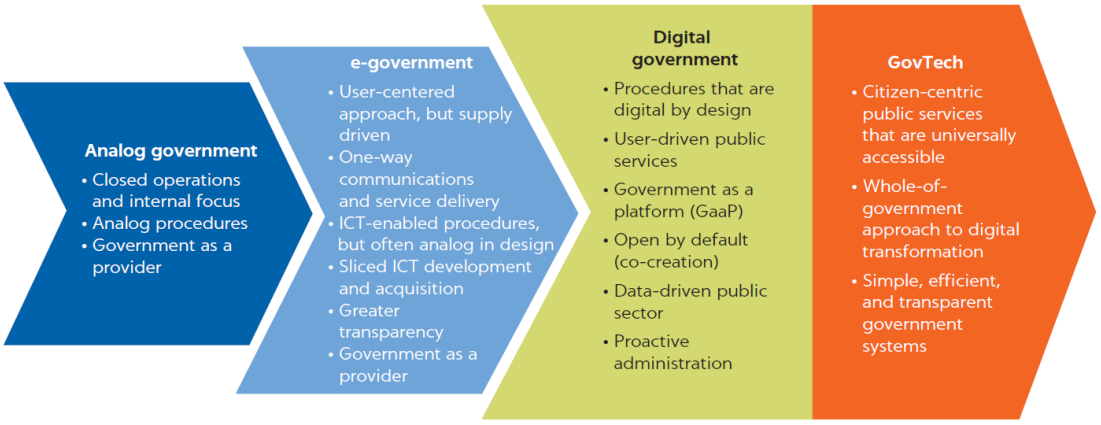
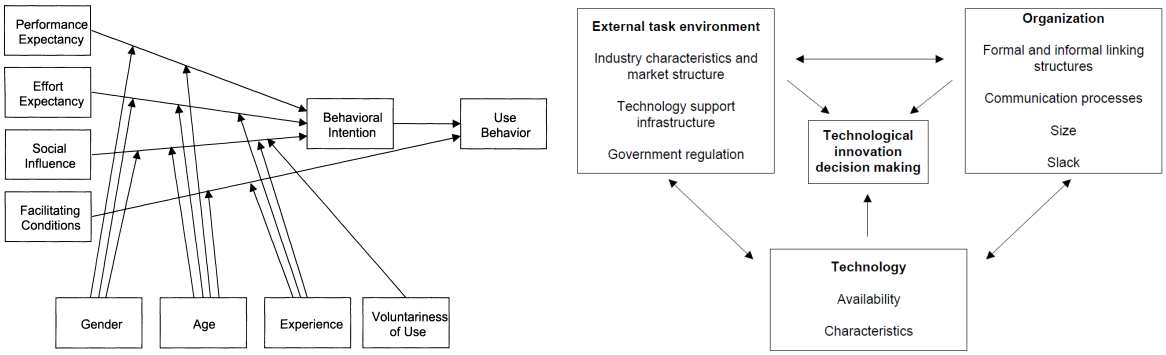


Figure 1. Evolution of digital government [2].

In the literature, most digital government initiatives still focus on service provision, infrastructure readiness, and integration and citizen involvement is often considered as an integral part of the solution. Citizen engagement is usually boiled down to the fact that there are digital channels for participation, not the quality of interaction, the depth of participation, or the factors that influence citizen engagement in the world and how well it keeps up. This results in a top-down digital transformation with citizens as service users and not strategic partners of digital public governance [5], [6].

Systems-based approaches to explain citizen engagement in digital government are based on a technology acceptance approach: the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. The UTAUT framework provides an explanation of performance expectancy, effort expectancy, social influence, and facilitating conditions that impact technology users and is very well suited for the study of citizen engagement in digital government. In the context of digital public services, UTAUT has been able to provide insights into how the perception of usefulness, ease of use and social impact of services are affecting the development of these services by citizens [7]. However, this approach tends to see engagement as an individual behavioral response and cannot explain institutional, political and environmental factors in public service implementation. On the other hand, organizational and institutional (Technology–Organization–Environment (TOE) framework) studies have found that organizational readiness, leadership, governance, regulations and environment are key factors in driving digital transformation [8]. The TOE framework is important to understand how the organizational structure and policy environment shape the digital government. But it is difficult to explain this understanding of digital government implementation in isolation from how the perception, motivation and experiences of citizens are at the heart of the digital government ecosystem.

Such a disconnect between individual and institutional approaches creates a conceptual gap in the digital government literature. The models based on individual characteristics are not able to understand why citizen engagement is low despite the extensive proliferation of digital technologies and services in our society. Organizations do not account for the dynamics of citizen behavior and the expectations of digital interactions with government. Most models, according to different DGMM studies, are still concerned with administrative efficiency and service integration, and the factors behind citizen engagement are not systematically and multidimensionally investigated [9], [10].



(a) (b)

Figure 2. Individual and organizational acceptance approach [7], [8],
(a) UTAUT [7], (b) TOE [8].

Based on this gap, this research argues that the understanding of citizen engagement in digital government needs to be integrated with the understanding of the interaction between individual, organizational, and environmental factors. The UTAUT-TOE framework provides a theoretical basis to analyze citizen engagement through the lens of individual perceptions, public institutional readiness, and the broader regulatory and social context. The framework of citizen engagement can be considered not only as a technology adoption problem, but also as a system of digital governance.

So, this paper is to identify and synthesize the factors that influence citizen engagement in digital government in the framework of a Systematic Literature Review (SLR) from the UTAUT-TOE perspective. In particular, this paper categorizes citizen engagement factors into three levels: individual, organizational, and environmental; examines the patterns and interrelationships between the factors; and analyzes the impact of the factors on the overall impact of these factors, and proposes an integrated conceptual framework to explain citizen engagement in digital government. Our research is theoretical in that it expands the application of UTAUT-TOE in digital government and conceptual in that we create a multidimensional citizen engagement framework and practical in that it provides policy designers and managers of digital public services with an analytical basis in which they can develop the systems and models to make digital government more inclusive, participatory, and sustainable.

2. RESEARCH METHOD

SLR was used in this research to answer the research questions. SLR is a secondary review methodology that aims to collect, assess and synthesize scientific evidence in a systematic, transparent and replicable way to minimize bias and to provide a level of unbiased synthesis of information [11]. A combination of various primary studies results from several of them gives a complete picture of a topic and supports evidence-based research and decision-making practices [12]. SLR in this study is based on Kitchenham's method (SLR in the research literature) to form a structured framework in three phases: planning, implementation, and reporting [13]. In the planning phase, we need to identify the need for the SLR, establish research questions, and develop a review protocol to conduct a literature search process, inclusion and exclusion criteria, and analysis. The objective of this phase is to maintain the same process of literature review and minimize any bias in the literature review process from the beginning of the process. The implementation phase is followed by a literature search in the relevant academic databases, selecting primary studies in the manner of a certain protocol, the quality of the literature, data extraction and synthesis. The findings from the different studies are then analyzed and integrated to gain an idea of the causes and effects of citizen engagement. The reporting phase is then devoted to presentation of the SLR results in a transparent and systematic manner; this is in terms of the research process, the research methodology, the nature of the studies that were analysed and the main findings and their implications. Such transparent reporting is used to support the replication of the research findings and the credibility of the SLR results [14]. This three-phase approach

allows for the SLR to be comprehensive and result in valid, accountable and relevant findings for building a conceptual framework for citizen engagement in digital government.

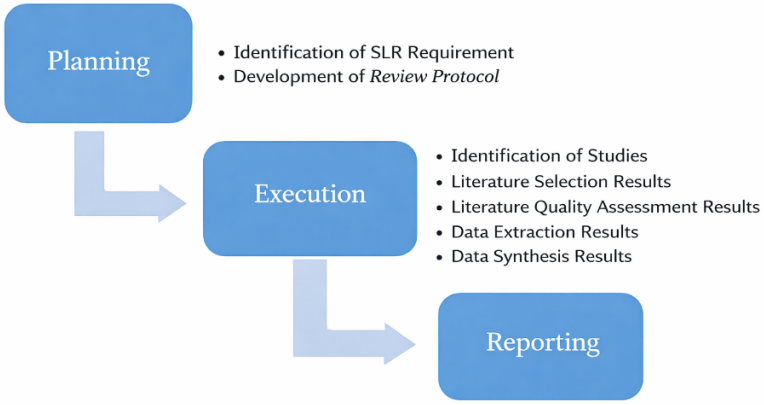


Figure 3. SLR method stages [11], [13].

The literature search was performed from 24 July to 31 July 2025 in seven academic databases: ProQuest, IEEE Xplore, ScienceDirect, ACM Digital Library, Scopus, Taylor & Francis, and Sage Journals. The searches were done in a given time frame to have consistency in the databases and avoid time bias. The searches were done for all studies from 2020 to 2025 for this is the most recent research on digital government and citizen engagement. Literature selection was based on the primary goal of the research, to identify and aggregate the factors affecting citizen engagement in digital government. To ensure that the literature selection is consistent, this research used the PICOC (Population, Intervention, Comparison, Outcome, Context) framework to choose studies. On the population side, research on citizen engagement in the context of digital government was selected. The research was based on studies that show that citizens are the primary actors in digital interaction with the government through digital public services, online participation and technology-based decision making. The intervention aspect refers to various digital initiatives, mechanisms or approaches to increase citizen engagement, including digital service design, public participation platforms, digital governance, data openness policies, and the implementation of supporting technology in government. Literature is selected by studying the link between the interventions and changes in citizen engagement in terms of levels or quality of citizen engagement. In this study, we used the comparison aspect to identify the different and consistent factors in citizen engagement in the context of different digital government studies and settings. So the researchers can also identify differences and similarities in factors which affect citizen engagement across different contexts and not only have one model to work with. The outcome aspect is the main focus of literature selection, so findings that identify or explain the determinants of citizen engagement. These include individual (e.g., usefulness, ease of use, and digital literacy), organizational (e.g., institutional readiness, leadership, and governance), and environmental (e.g., regulation, public trust, and digital divide). The context aspect includes multiple contexts of digital government implementation across countries, such as public policies, governance frameworks and digital government practices. Knowing the factors of citizen engagement will provide us with a more comprehensive analysis than a single region and/or system. To ensure the quality and relevance of the sources, we consider the following criteria:

1. Database sources: Literature is sourced from top universities (Scopus, Web of Science, IEEE Xplore, ScienceDirect, ACM Digital Library, Taylor & Francis, Sage Journals).
2. Time period: Literature published in the current year is a reflection of the current state of digital government and citizen engagement.
3. Keywords: The keywords that are used provide an overview of the factors which influence citizen engagement, both in terms of being conceptual and empirical.
4. Further screening criteria include: Subject Area (Engineering, Technology, Computer Science, Information Systems, Administrative Science, Government, Public Sector, Management, and Sustainability); Document Type (Journal Articles and Conference Proceedings); Language

(Literature in English); Articles published in the last stages and from academic journals or SRCTYPE: "j".

We selected literature for the research purpose in stages and layers to ensure that the articles considered were relevant for the purposes of the research where the reasons for citizen engagement in digital government are addressed. First, the keywords that were considered were used and the articles were to be written in English, published between 2020 and 2025 and are scientific publications in the form of journal articles or conference proceedings. Articles were rejected if the keywords were not used, they were written in a language other than English, published before 2020, or were not peer-reviewed scientific publications. Then we chose title and abstract selection and selected articles that can be read in the full text and which are related to citizen engagement in digital government. We also excluded articles that are not available in full text, that are identical to the other articles, or that are not related to citizen engagement (e.g., technical aspects of systems that do not relate to citizen engagement or interaction). The articles were then taken from the first two selection steps to the full text selection stage with the primary objective to understand the depth of the article. The preserved articles should be able to explain the key factors that affect citizen engagement, whether it is conceptual, theoretical or empirical. The articles that do not clearly define, explain or analyze the key factors in citizen engagement will not be considered in the future. For completeness and reproducibility, database-specific search queries were performed using the same logical expressions adapted to the database syntax and field structure. For relevance and precision, title, abstract, and keywords fields were searched.

Table 1. Literature search keywords

Database	Keyword	Initiation	Title and Abstract	Full Text
ProQuest	("digital government" OR "digital government maturity" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation" OR "involvement") AND ("factors" OR "barriers" OR "drivers" OR "determinants" OR "success factors")	489	98	19
IEEE	("digital government" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation") AND ("factors" OR "barriers" OR "drivers")	107	58	9
ScienceDirect	("digital government" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation") AND ("factors" OR "barriers" OR "drivers")	197	63	4
ACM	("digital government" OR "digital government maturity" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation" OR "involvement") AND ("factors" OR "barriers" OR "drivers" OR "determinants" OR "success factors")	53	28	1
Scopus	("digital government" OR "digital government maturity" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation" OR "involvement") AND ("factors" OR "barriers" OR "drivers" OR "determinants" OR "success factors")	33	28	2
Taylor&Francis	("digital government" OR "digital government maturity" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation" OR "involvement") AND ("factors" OR "barriers" OR "drivers" OR "determinants" OR "success factors")	42	17	1
Sage Journals	("digital government" OR "digital government maturity" OR "maturity model" OR "digital transformation maturity") AND ("citizen engagement" OR "participation" OR "involvement") AND ("factors" OR "barriers" OR "drivers" OR "determinants" OR "success factors")	20	6	1
Total		941	298	37

The retrieved data from different databases were then combined into one dataset. Duplicate records were identified and removed with a manual deduplication process based on title, authorship, year of publication, and DOI. If any inconsistencies occurred, the most complete and recent version of the publication was retained.

The screening process was based on three stages: title screening, abstract screening, and full-text screening. Studies were excluded at every stage if they did not meet the inclusion criteria for citizen engagement, digital government context, and factor identification. There are two independent reviewers who evaluate study eligibility and inclusion. In cases of a dispute in title, abstract, or full-text screening, discussions are conducted and all participants are asked to agree on findings. We were able to make decisions about eligibility based on joint re-evaluation of the study

content. This cross-checking was carried out in all screening phases to remove subjective bias and ensure the reliability of the SLR results.

To ensure the academic quality of the literature examined, all articles which passed the full-text selection stage undergo a literature quality review. Quality is determined according to the following criteria: clarity of research goals, comprehensive review and context of the literature, presentation of related works, clarity of methodology, relevance of results and conclusions, and suggestions for further research. Journal indexing level is also taken into account in terms of quality. This multi-layered selection and quality assessment process ensures that the analyzed literature is well-evidence-based, academically sound, and is suitable for synthesizing citizen engagement factors in digital government. This scoring-based quality assessment minimizes subjectivity in the choice of studies, improves the validity of the review as well as the overall synthesis in which a conceptual framework of citizen engagement is developed based on the UTAUT–TOE perspective.

Table 2. Quality test checklist

Checklist	Criteria
C1	Does the article clearly describe the research objectives?
C2	Does the article provide a comprehensive literature review, background, and research context?
C3	Does the article present related work from previous studies to demonstrate the main contribution of the research?
C4	Does the article clearly describe the proposed architecture or research methodology used?
C5	Does the article report relevant research results?
C6	Does the article present conclusions that are relevant to the research objectives or problem statement?
C7	Does the article provide recommendations for future work or improvements?
C8	Is the article published in an indexed journal (Scopus Q1/Q2/Q3/Q4 or unindexed)?

The quality criteria (C1-C8) are measured using a binary score system, 1 means that the criterion was accomplished and 0 that it was not, thus each study has a maximum quality score of 8 points. Only the studies with a minimum quality score of ≥5 are considered in the final synthesis. The studies with a minimum quality score below that were not included in the final synthesis, as the methodology which was examined was thoroughly studied and relevance was questioned. 37 of the studies included were able to achieve the minimum quality score of ≥5. Most of the studies scored well on the quality criteria (C1) and on the research objectives (C1), methodological clarity (C4) and relevance (C5) of the results. In order to be transparent and traceable, our SLR process is presented by our database sources, keyword strings, screening and excluded research findings in Figure 4. The selection process from our initial search results to our selected studies is also presented in Figure 4. We provide this report in a structured format for future researchers to evaluate and verify our review process. We are also happy to provide detailed screening results and extracted data directly from the authors. The extracted data were used to discover citizen engagement factors and their conceptual position in the UTAUT-TOE framework, as well as the context in which these factors were considered.This structured extraction process ensured that the data were well understood and could be used to justify the findings and discuss the findings. For each study, the relevant data were collected and used to define research objectives, methodology, context and citizen engagement factors. The extracted data were mapped to the UTAUT-TOE framework to aid cross-study comparison and synthesis.

The final set of included studies was then combined for synthesis following quality assessment. A data extraction process was then carried out for all the included studies. The first author read each article and found the findings related to citizen roles and engagement in DGMM. The research objectives, context, methodology and reported factors for citizen engagement were examined. Each factor was first recorded as a meaning unit from the original research. If the findings of the different research were found to be similar, the researchers compared the two studies. Similarity in the information and the meaning of the three factors was considered to merge them into a single conceptual factor, based on definitional similarity, context alignment and theoretical aspects. The results were thus a final set of factors that represent a synthesis of findings (not a one-off synthesis of findings). To ensure a consistent approach, the synthesized factors were mapped onto the UTAUT-TOE framework based on the conceptual connection among individual, technological, organizational, and environmental factors.

After the extraction and synthesis were completed by the first author, the second author performed a detailed review of the elements and categorization of the factors. This review was made to assess the clarity and consistency of the classification within the UTAUT-TOE framework and the equivalence of the synthesized factors with the original source articles. In case of differences in interpretation or categorization, the authors discussed this to arrive at a consensus, and the synthesis was adjusted in order to make it more clear and to avoid subjective bias in the process. To further improve the validity of the synthesized factors and their mapping in the UTAUT-TOE framework, a formal academic proposal defense forum was held on January 7, 2026. During this session, the first author presented the research findings with the second author. Two academic examiners provided feedback on the methodology and also offered critical comments on ideas and categorization to the authors. The feedback was reviewed and discussed by the authors. Where necessary, refinements were made based on the feedback from the examiners and the review of the original literature and empirical evidence. This was an external academic validation step to ensure that the results were theoretically rigorous and empirically supported.

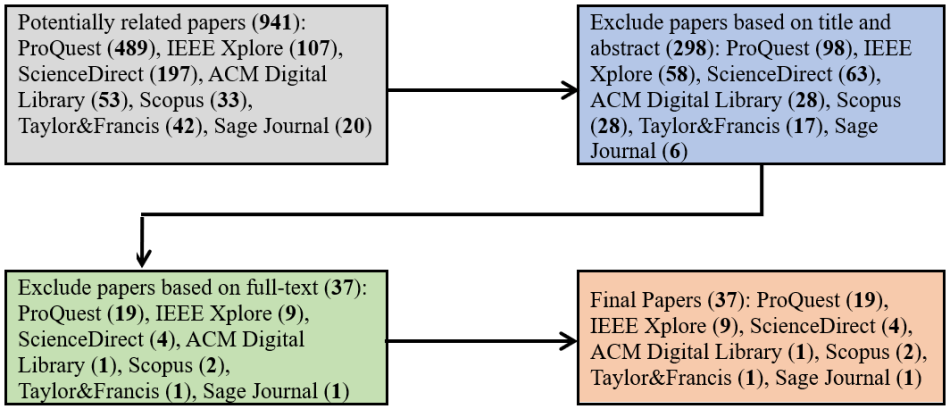


Figure 4. Selection process of final papers

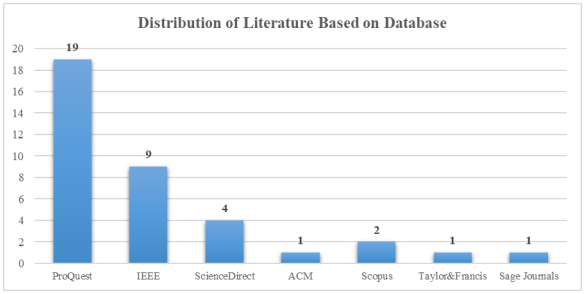
3. RESULTS AND DISCUSSION

The findings are presented in the following two parts: Literature selection and data analysis. The first part describes the screening procedure, including inclusion and exclusion criteria and the final set of selected studies, so that it can be transparent and rigorous. The second part summarizes and explains the factors that have led to citizen engagement in digital government. It categorizes them on the basis of their strength of evidential support and analyzes their interrelationships within the integrated UTAUT–TOE framework. The results are compared with existing literature, research gaps are identified and their implications for digital government and citizen engagement are discussed.

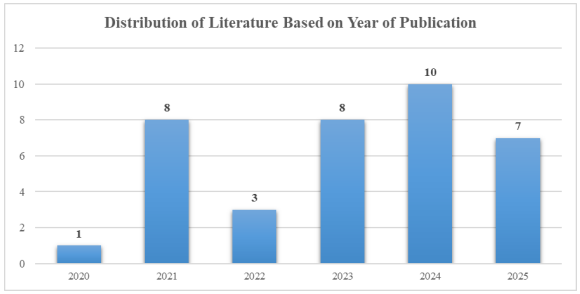
3.1. Literature Selection Results

The literature was collected from a variety of well-known scientific databases with ProQuest being the most popular source (19 articles) and IEEE Xplore (9 articles) and ScienceDirect (4 articles). ACM Digital Library, Scopus, Taylor & Francis and Sage Journals have also been used to contribute technical, social and policy views to the literature. It can be seen that the research is done in a variety of databases that explore the different effects of citizen engagement on digital government. The literature distribution is summarized in Figure 3 (a). Papers are grouped by year to illustrate the development of citizen engagement research in digital government. The number of papers was relatively small in 2020, but it has increased since 2021 and then to 2024 and is relatively stable in the next years. This indicates the growing interest in citizen engagement as a strategic issue in the digital transformation of government. The publication distribution is shown in Figure 3 (b). Next we categorize the literature according to document type to see the contribution of the sources. As shown in Figure 3 (c), journal articles are leading in the literature (30 publications) and conference proceedings are relatively small (7 publications). The

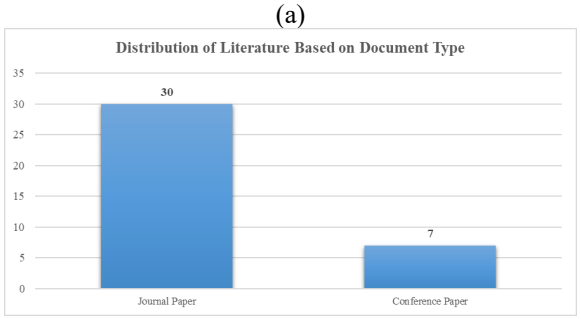
large number of journal articles shows the theory and empirical basis of citizen engagement studies in digital government and conference proceedings are used to disseminate new research ideas and trends.



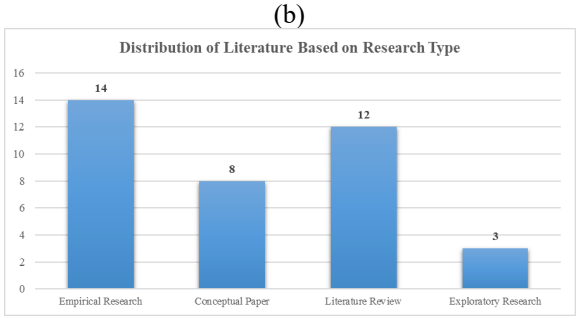
(a)



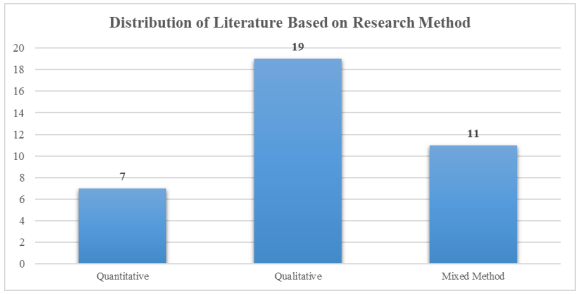
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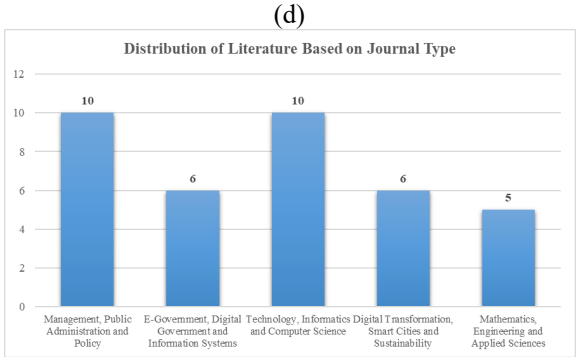
(c)



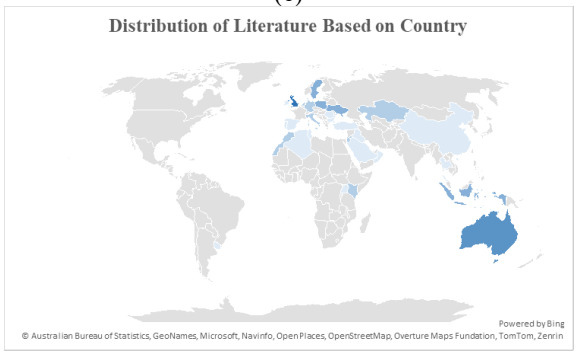
(d)



(e)



(f)



(g)



(h)

Figure 3. Distribution of Literature,
(a) Based on database, (b) Based on year of publication, (c) Based on document type, (d) Based on research type, (e) Based on research method, (f) Based on journal type, (g) Based on country, (h) Based on keyword

We then classified the literature by type to identify the approach of research in citizen engagement studies in digital government which consisted of empirical research, conceptual research, literature reviews, and exploratory research. As shown in Figure 3 (d), empirical research is most prominent (14 articles), literature reviews (12 articles) and conceptual research (8 articles), and exploratory research (3 articles) is few and far between. This can be said to be the proof of

empirical evidence and the role of conceptual studies in understanding citizen engagement. The classification according to research method shows qualitative, quantitative and mixed approaches as shown in Figure 3 (e). Qualitative methods are the most common as they are more concerned with the context of citizen engagement of the research while mixed methods show that there is an effort at qualitative and quantitative analysis. Quantitative approaches are very few in this study, and this indicates that we need further research and more research on the factors of citizen engagement as it relates to digital government.

Finally, we categorize the literature by journal type to determine which fields of science and technology have contributed to the research of citizen engagement in digital government as shown in Figure 3 (f). We see that although there is a mixed classification of research topics in the paper, the main contributions are from Management, Public Administration and Policy and Technology, Informatics and Computer Science (MSP, IT) as well as the policy and technology fields. The fields of E-Government, Digital Government, and Information Systems, Digital Transformation, Smart Cities and Sustainability all add to this and make digital government theory more relevant in practice. In general, this is a very cross-disciplinary study and would make it an important area of research and still have room for more research from other fields of studies to be done in places where there are few contributions. In the following, we grouped the literature by country to find the geographical distribution of citizen engagement research in DGMM in terms of location as shown in Figure 3 (g). The classification results show a general distribution by country with the largest contributions from the United Kingdom and Australia and the largest contributions from Europe, Asia, the Middle East, Africa and the Americas. This pattern further indicates that DGMM studies are global and cross-cultural and applicable in both the deep digitalization stage and the early stage in digital transformation in both countries. The word cloud analysis showed that digital government, maturity model and citizen engagement dominate. The new literature is more and more likely to focus on the maturity of digital government and how to engage citizens in digital government activities. The frequent mention of factors, barriers, determinants, transparency, trust and accessibility are also evidence of the increased interest in identifying factors which affect citizen engagement in the digital government projects. Moreover, the inclusion of terms related to digital transformation, policy, innovation and success factors indicates that institutional, technological and governance factors are often considered as enabling conditions. Figure 3 (h) shows the word cloud.

3.2. Data Analysis Results

Based on 37 articles, the research identified 54 factors affecting citizen engagement for the DGMM and the relationship between government institutional readiness and citizen behaviour within the digital government ecosystem. The analysis was carried out using UTAUT and TOE to assess the determinants at individual and institutional levels simultaneously. UTAUT presents the factors of citizen acceptance and use of technology, and TOE describes the readiness of government technology, organization, and policy environment. Based on this integration, all factors are grouped into 7 categories.

The Performance Expectancy category includes seven factors: effectiveness, public satisfaction, service quality, perceived usefulness, performance expectations, public value and public engagement. These factors are based on citizen perception of the value and tangible benefits of using digital government services. The higher the performance expectations and perceptions of public service quality, the more people use digital systems. These findings suggest that citizen engagement is driven by expectations of increased public service effectiveness and positive social influences, e.g., bureaucratic efficiency, public satisfaction and the creation of public value through digital technology.

Table 3. Factors influencing citizen engagement in digital government

Factor Number	UTAUT–TOE Framework	Factors	Reference
1	Performance Expectancy	Effectiveness	[15], [16]
2	Performance Expectancy	Public satisfaction	[17], [18], [19]
3	Performance Expectancy	Service quality	[17], [20], [21], [22], [23]
4	Performance Expectancy	Perceived usefulness	[18], [24], [25]

5	Performance Expectancy	Performance expectations	[20]
6	Performance Expectancy	Public value	[19]
7	Performance Expectancy	Public engagement	[9], [16], [19], [22], [23], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37], [38]
8	Effort Expectancy	User experience	[10], [39], [40], [41]
9	Effort Expectancy	Service design	[27], [42]
10	Effort Expectancy	Ease of use	[18], [20], [24]
11	Social Influence	Social justice	[16], [26], [39]
12	Social Influence	Culture	[17], [27], [31], [37], [42], [43], [44]
13	Social Influence	Socio-cultural factors	[20], [36], [41], [45]
14	Social Influence	Inclusivity	[10], [16], [19], [22], [25], [26], [27], [29], [30], [31], [38], [39], [43]
15	Social Influence	Public trust	[10], [17], [20], [21], [22], [24], [25], [30], [35], [38], [39], [43]
16	Social Influence	Perceived risk	[20]
17	Social Influence	Citizen perspectives	[16], [23], [29], [31], [32], [33], [34], [36], [40]
18	Social Influence	Citizen motivations	[22], [24], [32], [37], [39]
19	Social Influence	Individual and demographic factors	[20], [24], [30], [45], [46]
20	Facilitating Conditions	Online services	[41], [47]
21	Facilitating Conditions	Adaptability	[42]
22	Facilitating Conditions	Digital competence	[22], [25], [42], [44]
23	Facilitating Conditions	Digital literacy	[16], [21], [22], [27], [30], [38]
24	Facilitating Conditions	Public services	[18], [48]
25	Facilitating Conditions	Service accessibility	[21], [22], [27], [28], [30], [31], [38], [43], [44]
26	Facilitating Conditions	Feedback and evaluation mechanisms	[21], [22], [26], [27], [29], [31], [32], [40]
27	Technological Context	Technology utilization	[17], [23], [31], [35], [36], [39], [40], [43], [47], [48]
28	Technological Context	Digital infrastructure	[17], [19], [20], [21], [22], [24], [25], [27], [30], [40], [41], [42], [45], [46], [47], [49]
29	Technological Context	Data management	[34]
30	Technological Context	Security and privacy	[22], [24], [31], [38], [39], [40], [42]
31	Technological Context	E-participation	[15], [18], [26], [36], [48]
32	Technological Context	E-democracy	[15], [31], [36], [41]
33	Technological Context	Digital maturity	[10]
34	Technological Context	Innovation	[10], [16], [22], [42], [43]
35	Organizational Context	Governance	[18], [28], [33], [35], [36], [40], [49]
36	Organizational Context	Leadership	[10], [19], [31], [35], [42], [43], [45]
37	Organizational Context	Policies and regulations	[10], [21], [23], [28], [29], [31], [38], [40], [43], [44], [46], [48]
38	Organizational Context	Laws	[16], [35], [36], [40], [49]
39	Organizational Context	Strategic direction	[10], [34], [40], [42]
40	Organizational Context	Organizational commitment	[19], [23], [25], [31], [36], [40], [44], [45], [49]
41	Organizational Context	Collaboration and synergy	[10], [16], [17], [19], [26], [30], [38], [47]
42	Organizational Context	Communication and coordination	[22], [37], [41]
43	Organizational Context	Digital HR readiness	[17], [27], [35], [40], [49]
44	Organizational Context	Human capital	[47]
45	Organizational Context	Organizational change	[32], [44]
46	Organizational Context	Transparency and openness	[10], [16], [19], [21], [22], [26], [27], [28], [29], [30], [31], [33], [34], [36], [38], [39], [41], [43], [44], [48], [49]
47	Organizational Context	Governance indicators	[10]
48	Environmental Context	Politics	[27], [31], [43]
49	Environmental Context	External barriers	[10]
50	Environmental Context	Economics	[27], [33], [45]
51	Environmental Context	Finance	[40], [45], [49]
52	Environmental Context	Environment	[25], [27], [46]
53	Environmental Context	Digital divide	[16], [25], [39]
54	Environmental Context	Global movements	[45], [46]

The Effort Expectancy category is based on user experience, service design and ease of use. These factors emphasize the importance of ease of use and intuitive interface design for citizen participation. User-friendly system design is crucial for citizens with varying levels of digital literacy. Thus, ease of navigation, simple language and inclusive design are key factors for equal participation across different community groups. There are nine variables in Social Influence, including social justice, culture, socio-cultural factors, inclusivity, public trust, perceived risk, citizen perspectives, citizen motivations and individual and demographic factors. These results indicate that citizen engagement through digital government systems is largely influenced by the social environment and trust in government. Public trust and inclusivity are the building blocks to

digital participation. Age, education, and local culture also influence citizens' readiness to use digital services. In this context, the development of a participatory culture and a socially sensitive policy approach are crucial in digital policy development. The Facilitating Conditions category is based on seven factors: online services, adaptability, digital competence, digital literacy, public services, service accessibility and feedback and evaluation. These are environmental supports that facilitate the digital exchange between citizens and government, like the provision of services, training on digital literacy and feedback. These facilitative conditions are a link between citizens' intention to participate and the technical competence of the government in providing digital services. Increased digital literacy and the availability of effective feedback loops increase citizens' trust and ownership of government digital systems.

The Technology Context category has eight components: technology, digital infrastructure, data management, security and privacy, e-participation, e-democracy, digital maturity, and innovation. These results show that citizen participation is only possible with the necessary digital infrastructure and security systems, and ongoing innovation is essential. Digital maturity and technological innovation make the government more able to provide flexible and personalized services to citizens. Security and privacy protection are trust factors that are crucial to the sustainability of citizens' interactions with digital platforms. Organizational Context has thirteen components and is the most important category. These are governance, leadership, policies and regulations, laws, strategic direction, organizational commitment, collaboration and synergy, communication and coordination, digital HR readiness, human capital, organizational change, transparency and openness, and governance indicators. These factors are strongest, and the organizational structure and culture of government organizations shape digital citizen engagement. Visionary leadership, clear policies, and cross-agency coordination are all needed for a participatory society. In addition, transparency and openness in information have been shown to be factors that create public trust and citizen involvement. This is why organizational readiness is a key driver of inclusive and community-based digital governance. The last category, Environmental Context, is composed of politics, external barriers, economics, finance, the environment, the digital divide, and global movements. These factors underline the role of external dynamics in developing the ecosystem for digital participation and their impact on successful implementation. Political stability, economic support, and financing policies are key factors in developing the citizen participation system. On the other hand, there is still the digital divide and environmental challenges for many countries, especially in regions with less access to technology. In the world of open government relationships (Open Government Partnership), more transparent and collaborative citizen engagement practices are becoming a reality.

The analysis shows that citizen engagement in digital government is a result of the interaction of individual, technological, organizational, and environmental factors. Organizational factors are the most influential and therefore institutional readiness is important for maintaining public trust and sustained citizen participation. In addition to identifying and categorizing the factors influencing citizen engagement, the study also analyzed the strength of evidence supporting each factor to highlight the degree to which strong determinants can be distinguished from context-specific or emerging factors. The strength of evidence was qualitatively assessed based on (1) the incidence of occurrence of these factors across the studies, (2) the type of evidence (empirical vs conceptual), and (3) the consistency between different countries (developed and developing). Based on this assessment, the identified factors were grouped into three levels of evidence support: strong, moderate, and limited. Factors with strong evidential support were reported in a large number of studies, where empirical findings were most strong, and for a wide range of national or administrative contexts. They consistently have a good association with citizen engagement outcomes. The most important factors with strong evidential support are public trust, service quality, perceived usefulness, digital literacy, service accessibility, governance, leadership, policies and regulations, and transparency and openness. These factors are found in the literature of technology acceptance and government maturity, which indicates citizen engagement is linked to personal perceptions and institutional readiness in the same way.

Factors with moderate evidence were presented in a few studies but had different empirical strength, research design, and context. In most cases, the factors were supported by a mixture of

empirical and conceptual studies or were only relevant in certain administrative or cultural environments and were of interest only. Some factors with moderate evidence are user experience, service design, digital competence, organizational commitment, collaboration and synergy, communication and coordination, security and privacy, and digital infrastructure. Although these factors contribute to citizen engagement, they are often affected by other aspects of the organization or the environment. Factors with limited evidence were found in a smaller number of studies but were mainly based on conceptual discussions and not on empirical evidence. These factors are often context-dependent or emerging and are in some way related to citizen engagement. These factors could be global movements, external barriers, environmental factors, political factors, and demographic features. The current literature shows very little evidence of direct and sustained impact of these factors on citizen engagement. This distinction of evidential strength underlines the importance of the integrated UTAUT-TOE perspective. Although UTAUT-related factors account for the tendency of individual-level adoption and participation at the individual level, the most important determinants of sustained citizen engagement are organizational and environmental factors, as described in TOE. We observe that improving citizen engagement in digital government requires more than improving user interfaces or the perception of usefulness. It is institutional capacity, governance quality, regulatory clarity, and transparency which become the bedrock of trust and long-term participation in the system. The results can be considered as empirical evidence for theoretical contributions and practical implications.

4. CONCLUSION

In this study, we identified and synthesized several factors that affect citizen engagement in digital government through a systematic literature review based on the UTAUT–TOE approach and integrated. From 37 studies, 54 factors were identified and grouped into seven main categories that reflect the interaction between individual factors, organizational readiness, and the external environment. In addition to identifying factors, this study also distinguishes the strength of evidence for each factor in terms of frequency of occurrence, type of evidence, and consistency in the context. Our analysis shows that although people's technology acceptance factors are the major determinants for citizen engagement in the first place, the key and most constant factors of ongoing citizen engagement are at the organizational and environmental level: governance quality, leadership, regulatory clarity, transparency, service quality, and public trust. These findings support the analytic importance of the integrated UTAUT–TOE framework by characterizing citizen engagement for digital governance as a systemic issue and not as a single issue of individual adoption. The study has theoretical contributions by bringing UTAUT–TOE to citizen engagement research and will help policymakers and digital public service managers to design more open, trustworthy, and participatory digital government initiatives. As a conceptual approach to this study, future research is needed to verify the validity of the identified factors and their success in different administrative and socio-economic settings, for instance, in developing countries and electronic government systems implementation.

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CONFLICT OF INTEREST

The authors declare no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

AUTHOR CONTRIBUTIONS

Qurrota Ayun Majid: Conceptualization, Methodology, Data Curation, Formal Analysis, Investigation, Visualization, Writing – Original Draft. **Dana Indra Sensuse:** Conceptualization, Supervision, Validation, Writing – Review and Editing.

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