

Systematic Insights into E-Government: Addressing Barriers, Leveraging Trends, and Bridging Gaps in Developing Countries

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This study investigates the implementation of e-government initiatives in developing countries, focusing on overcoming significant barriers, including limited ICT infrastructure, socio-cultural resistance, and weak governance

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structures. Recognising the critical importance of transparency, accountability, and citizen participation in fostering trustworthy and inclusive governance, the study addresses a notable gap in the synthesised knowledge regarding effective strategies tailored to the unique technological and socio-political contexts of developing nations. Employing a systematic literature review guided by PRISMA guidelines, 24 peer-reviewed articles published between 2013 and 2023 were analysed to identify dominant themes and challenges in e-government adoption. Key findings reveal that successful e-government implementation depends on robust ICT frameworks, digital literacy promotion, citizen engagement mechanisms, and effective privacy management, while interoperability issues and resistance to change remain persistent obstacles. The study recommends a multidimensional approach integrating technology, organisational readiness, and social factors to advance e-government efficacy, ultimately enhancing public service delivery and participatory governance within developing countries.

Keywords: e-government, implementation barriers, developing countries, ICT infrastructure, service delivery

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1. Introduction

E-government initiatives are public sector initiatives that seek to benefit from information and communication technology (ICT). This includes the use of ICT to improve service delivery, facilitate interaction with citizens and businesses, enhance public access to information, and improve government operations. E-government projects encompass various ways that ICT can be used in government to streamline government processes, improve service delivery, and strengthen interactions with citizens and businesses through greater access to information, while also enhancing operational efficiency (Olumoye & Govender, 2018). The success of e-government projects depends on a number of factors, including electronic records (Ambira, Kemoni, & Ngulube, 2019) and citizens' willingness to participate in technology-enabled government engagement activities (Alarabiat, Soares, & Estevez, 2021). Previous research has also highlighted the importance of public engagement through open data initiatives in urban contexts (Hivon & Titah, 2017). In addition, the adoption of information technology governance is important for enhancing the performance of technology auditing within the public sector (Veerankutty, Ramayah, & Ali, 2018). Furthermore, the design, development, and implementation of e-government applications aim to improve citizens' overall quality of life and facilitate mobility by reducing constraints created by artificial borders (Erdogan & Saran, 2021).

Electronic government initiatives have received increasing attention in recent years, as many countries have recognised the opportunities offered by digital technologies to enhance governance and service provision. Some scholars have recommended the development of classification and retention systems prior to the implementation of electronic records management (ERM) systems. Such initiatives include, among others, the use of software applications to monitor performance and electronically exchange information within or between government organisations which are not financially integrated, the reengineering of business functions across government agencies, the modernisation of administrative operations, and the development of common standards and protocols for the electronic delivery of services (Latupeirissa & Dewi, 2024). An in-depth examination of several factors is necessary for the successful implementation and sustainability of e-government initiatives. The need to develop an ERM framework to support e-government in Kenya and ensure the effective sharing and transfer of information through reliable and trusted electronic systems has been emphasised (Ambira, Kemoni, & Ngulube, 2019; Latupeirissa, 2022). In

addition, Latupeirissa et al., 2024 stress the importance of digital transformation in improving public services and highlight the critical role of effective IT management in enhancing the efficiency and accountability of the public sector. Veerankutty, Ramayah, and Ali (2018) further emphasise the importance of IT management for organisational efficiency and the effective use of auditing technology in the Malaysian public sector, particularly in the context of rapid technological change and substantial government investment in information systems.

The potential of e-government in the current governance context is closely linked to transparency, accountability, citizen participation, and responsive service delivery. Citizen engagement through the use of open data at the city level provides opportunities to enhance both openness and accountability in public administration (Hivon & Titah, 2017). In transition economies, the focus is also on developing standards-based e-government platforms that are citizen-centred, transparent, and of high quality (Nakakawa & Namagembe, 2019). Nevertheless, obstacles remain that hinder the effective use of public technology services as a means of mediating between administrative, social, and economic dimensions of participation, citizenship, use, and information sharing (Ferreira et al., 2015). Taken together, these studies highlight the close relationship between e-government, transparency, accountability, and citizen engagement. One of the key objectives of digitalisation is to simplify administrative processes, remove bureaucratic barriers, and streamline the functioning of government agencies. Such measures can enhance transparency, reduce corruption, increase convenience for citizens and businesses, and generate both revenue and cost savings.

E-government initiatives are crucial for improving government efficiency, as they simplify administrative processes and reduce bureaucratic red tape. Stefanou and Skouras (2015) describe how e-government applications can be used in the regulation of labour and social security, highlighting their role in enhancing citizen oversight and reducing administrative costs. In addition, Ab Aziz et al. (2020) and Stefanou and Skouras (2015) examine implementation guidelines for digital document management systems in the Malaysian public sector, with particular emphasis on providing adequate support for agency-level planning and coordination. Such measures contribute to higher levels of user acceptance and the successful implementation of e-government initiatives (Ab Aziz et al., 2020; Ferreira et al., 2015). It is essential to discuss the challenges and opportunities associated with e-government, particularly in relation to strengthening participation, citizenship, utilisation, and information sharing across administrative, social, and economic dimensions (Ferreira et al., 2015). Knowledge transfer with-

in e-government initiatives is important for their successful development and implementation. It is therefore necessary to address the lack of e-government competencies required for effective implementation. Effective electronic records management (ERM) within government ministries also supports the successful implementation of e-government initiatives (Ambira, Kemoni, & Ngulube, 2019). Nevertheless, barriers to good governance must be identified, and gaps in e-government practice need to be addressed (Waller & Genius, 2015). Furthermore, the governmental perspective on the factors that encourage e-government adoption remains important, particularly given the limited research conducted in this area in developing countries (Al-Mamari, Corbitt, & Gekara, 2013). Addressing barriers to the implementation of e-government requires overcoming practical obstacles, understanding the factors that influence citizens' adoption of e-government services, and strengthening ERM systems. These objectives can be achieved through research that identifies the challenges, opportunities, and potential pitfalls of e-government and provides recommendations for its implementation, including improvements in administrative efficiency, reductions in bureaucratic costs, and enhanced citizen participation and engagement.

Various challenges affect the implementation of e-government initiatives across different countries and regions. The most common challenges are technical, social, and economic in nature. Technical barriers may arise from inadequate infrastructure, poor connectivity, information security concerns, a lack of standards, and outdated technology. The technical aspects of implementing e-government initiatives are important considerations for effective public service delivery (Waller & Genius, 2015). Waller and Genius (2015) further note that factors such as attitudes towards ICT, privacy and security concerns, and the underutilisation of technologies may hinder the use of ICT to improve government efficiency, effectiveness, and public service delivery. Furthermore, Ambira, Kemoni, and Ngulube (2019) argue that weaknesses in the management of electronic records stored on e-government platforms expose such records to misuse, thereby creating opportunities for corrupt practices and indirectly undermining government efforts to promote transparency and accountability. In addition, the underutilisation of technology may be associated with weak governance, highlighting the importance of good governance in addressing technical challenges and improving the effectiveness of audit technology in the Malaysian public sector (Veerankutty, Ramayah, & Ali, 2018).

Overall, this study is significant because it highlights common challenges faced by developing countries in implementing e-government initiatives. These challenges include technical barriers, such as inadequate ICT infra-

structure and limited internet access, as well as social and cultural obstacles, including low levels of digital literacy and resistance to change. In doing so, the study provides policymakers and practitioners, particularly in countries at similar stages of development, with valuable insights into areas requiring greater attention. The findings generate important knowledge that can be used to shape e-government strategies that are both efficient and sensitive to local contexts. The study also emphasises the need for a multidimensional approach to addressing these challenges, arguing that successful e-government implementation requires the integration of technological, organisational, and social perspectives. Furthermore, it highlights the importance of understanding how these factors interact throughout the implementation process, with implications for improving public service delivery, citizen participation, and policymaking in developing countries.

The objective of this study is to identify the key factors that can help overcome barriers to the successful implementation of e-government initiatives in developing countries by addressing the following research questions: What strategies are most effective in addressing the challenges associated with e-government implementation? What impact does e-government have on improving public administration and service delivery, and what recommendations can be derived from these outcomes? Furthermore, what future trends and innovations in e-government initiatives that can be anticipated in developing countries, and what lessons can be drawn to inform their future implementation?

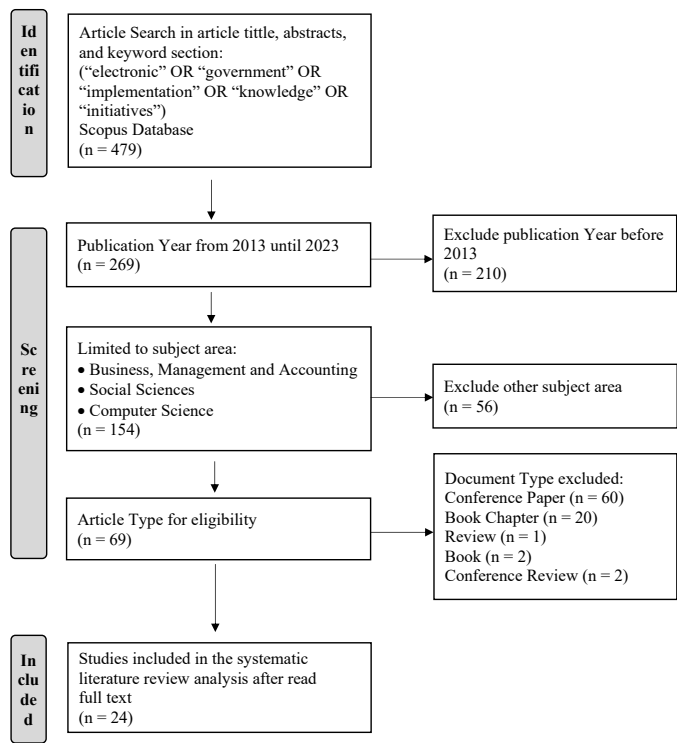
By addressing these questions, the study seeks to contribute to a better understanding of successful e-government implementation strategies, assess the ways in which e-government is transforming public service delivery, and identify good practices that may inform future developments in digital governance. In doing so, it aims to support policy-makers and practitioners working towards more inclusive and effective public governance.

2. Methodology

The study was conducted through a systematic literature review based on the PRISMA screening protocol to identify and analyse key scientific publications on e-government initiatives. A rigorous search of the peer-reviewed literature was conducted using the Scopus database. Scopus was selected because it is one of the largest multidisciplinary databases, offering extensive coverage of high-quality peer-reviewed publications and advanced search capabilities that support comprehensive and reliable

literature retrieval. The search included the terms “electronic”, “government”, “implementation”, “knowledge”, and “initiatives”, yielding 479 documents. Of these, 269 studies published between 2013 and 2023 were retained for further consideration based on their relevance and quality. Following the application of the subject area filters “Social Sciences”, “Computer Science”, and “Business Management and Accounting”, 154 studies remained. Restricting the document type to research articles further reduced the sample to 69 studies. After reviewing the abstracts and full text of the selected papers, studies containing information relevant to the research questions were retained, including evidence on e-government implementation challenges, the role of social barriers, and the significance of legislation. Ultimately, 24 articles were included in the final analysis. These article were systematically reviewed to identify common themes and patterns in e-government adoption.

Figure 1: PRISMA flowchart of the identification and screening of selected studies



Source: Authors.

Studies conducted in some countries such as Jamaica, Nigeria, Kenya, Uganda, Oman, Turkey, Jordan, Greece, Canada, and Indonesia have examined the challenges and approaches associated with the implementation of e-government initiatives through case study research. The findings of this study emphasise that the integration of e-government initiatives in developing countries is hindered by a range of barriers, including technical challenges, such as weak IT infrastructure and limited internet access, as well as social and cultural barriers, including low levels of digital literacy and resistance to change. The study recommends a number of measures to support the development of e-government services that are both effective and inclusive.

Data analysis was based on a thematic approach. The selected articles were read and re-read to ensure familiarity with the data. Relevant information relating to the research questions was then identified and extracted. The resulting codes were grouped into broader themes, which were subsequently refined and analysed to identify key insights and challenges relating to the implementation of e-government initiatives.

3. Results and Discussion

A comprehensive literature review identified several key findings and challenges relating to the implementation of e-government initiatives. The findings of the study provide a comprehensive synthesis of the evidence derived from the systematic extraction and analysis of the selected studies. The results presented in this paper offer valuable insights into a range of e-government initiatives. This review integrates existing knowledge and provides practical recommendations for improving implementation, as summarised in Table 1 in the Appendix.

3.1. Strategies for Overcoming Barriers and Challenges to E-Government Implementation

The implementation of e-government systems is often accompanied by a range of barriers and challenges that hinder successful realisation of digital government initiatives. A review of the literature indicates that these challenges can be grouped into five key categories: organisational, technical, security, socio-cultural, and inter-agency collaboration issues. At the

organisational level, a major obstacle is the lack of stakeholder ownership and resistance to change. Rachmawati and Fitriyanti (2021) note that inadequate communication during the implementation process may result in resistance to e-government initiatives, particularly when organisations transition abruptly from manual to electronic systems. In addition to a clear vision, comprehensive planning, and a well-defined implementation strategy, efforts should be made to minimise the risk, costs, and time associated with poorly managed transitions (Bakar et al., 2014). Similarly, Waller and Genius (2015) identify resistance to change as a barrier to the transformation of government processes and emphasise that support from both senior management and frontline employees is essential for the successful adoption of e-government initiatives.

Technical and interoperability challenges also need to be addressed. Nakakawa and Namagembe (2019) highlight the existence of fragmented initiatives and a lack of interoperability across government departments, resulting in isolated and incomplete e-government systems in developing countries such as Uganda. This finding is also supported by Olu-moye and Govender (2018), who empirically demonstrate that the lack of system integration and inadequate technological infrastructure hinder the development of integrated e-government initiatives. Ferreira et al. (2015) further argue that the overall performance of public electronic services and user experience may be adversely affected by technological limitations and the absence of a shared platform.

Security, privacy, and digital identity issues also represent significant challenges. Tegethoff et al. (2023) identify concerns relating to online security and data quality as factors contributing to user scepticism towards e-government platforms. Similarly, Melin, Axelsson, and Söderström (2016) highlight the challenges associated with managing electronic identification (e-ID) systems, noting that “the integration between different services is high and demands a strong organization-project management”. These issues underscore the need to maintain an appropriate balance between system security and performance, as vulnerabilities, however minor, may undermine public trust and hinder the adoption and use of e-government services.

External pressures and institutional forces may also hinder the advancement of e-government initiatives. Al-Mamari, Corbitt, and Gekara (2013) explain how external economic and policy pressures, including compliance with international standards and responses to financial crises, may force rapid change without adequate preparation for e-government im-

plementation. Similarly, Mukamurenz, Grönlund, and Islam (2019), drawing on the case of Rwanda, demonstrate that public scepticism, low levels of trust, and limited resource allocation may undermine the citizen-centred nature, inclusiveness, and democratic potential of e-government services. The broader implications of such disparities are discussed by Svård (2018), who argues that the unequal distribution of resources may create challenges for democratisation, as citizens in less developed municipalities can become increasingly disconnected from public services. Additional organisational and administrative challenges also arise in the management of records and information across bureaucratic borders. Maroye et al. (2017) confirm that inadequate ERM frameworks hinder effective coordination and limit support for e-government programmes. This issue is closely linked to the broader challenge of governance across multiple administrative level, where coordination becomes more difficult and the development of an integrated digital system is impeded.

The study provides insights into the factors that contribute to the successful implementation of e-government initiatives in developing countries despite the numerous barriers and challenges encountered.

Technical Barriers and Challenges. Insufficient ICT infrastructure is one of the most fundamental challenges to the implementation of e-government initiatives. In Jamaica, for example, empirical evidence has shown that technical problems, including inadequate ICT infrastructure, directly undermine the efficiency and effectiveness of government service delivery (Waller & Genius, 2015). Similarly, in Bandung City, Indonesia, inadequate and underdeveloped infrastructure was identified as a major barrier to the effective use of technology in the provision of electronic public services, while a substantial digital divide excluded large segments of the population from digital networks (Rachmawati & Fitriyanti, 2021). Taken together, these findings support the argument that e-government initiatives are unlikely to be sustainable without strong physical and digital infrastructure. Essential infrastructure for e-government systems, including reliable internet connectivity, adequate server capacity, and appropriate hardware, is often lacking, particularly in less developed areas. Unequal access to secure and reliable digital services is commonly referred to as the digital divide. Where infrastructure is inadequate, systems may become unreliable or operate inefficiently, leading to user frustration and reducing confidence in government initiatives.

Another important challenge is interoperability. In Uganda, e-government systems are fragmented both within and across government departments,

and strategic interventions in the form of regulatory, governance, and capacity-building programmes are therefore required to ensure meaningful system integration (Nakakawa & Namagembe, 2019). These interoperability challenges are not unique to Uganda but reflect broader difficulties associated with the adoption of standards and cross-organisational coordination in many developing countries (Nakakawa & Namagembe, 2019; Rachmawati & Fitriyanti, 2021; Waller & Genius, 2015). One of the major technical challenges is ensuring interoperability among different e-government systems. Fragmentation often occurs when government entities develop systems independently and subsequently encounter difficulties in integrating them with other systems. The lack of interoperability can result in duplication of effort, inefficient use of resources, and ineffective service delivery. It also limits the ability to provide seamless services that are easy for users to navigate and that operate across agencies and departments.

Information security has become a critical concern in the implementation of e-government initiatives. In Jamaica, privacy and security concerns were identified as significant barriers to e-government implementation (Waller & Genius, 2015). Similarly, research conducted in Colombia found that online security was positively associated with e-government effectiveness, while high levels of security indirectly enhanced operational quality through improvements in information quality (Tegethoff et al., 2023). Taken together, these findings suggest that weaknesses in security frameworks may undermine citizens' trust in both digital technologies and public institutions, thereby compromising the long-term sustainability of e-government initiatives (Tegethoff et al., 2023). Security threats remain among the most common challenges. Cyberattacks, data breaches, and identity theft pose significant risks to government operations. Governments must therefore protect sensitive information from unauthorised access and ensure compliance with data protection and privacy regulations. Failure to do so may result in breaches that expose personal information and undermine confidence in the government's ability to safeguard citizens' data. Furthermore, data privacy concerns may discourage citizens from using digital public services, particularly when they do not perceive such systems to be secure.

Another significant challenge for the implementation of e-government initiatives is the rapid pace of technological change, as systems may become obsolete before they are fully operational. Regulator constraints can further limit ICT-driven innovation in government service delivery, as demonstrated in Uganda (Nakakawa & Namagembe, 2019). These chal-

Challenges are compounded by interoperability issues, as Uganda's e-government landscape remains fragmented both within and across government agencies, necessitating regulatory, governance, and capacity-building interventions to achieve meaningful integration (Nakakawa & Namagembe, 2019). In Nigeria, empirical evidence indicates that technological factors are major drivers of e-government implementation outcomes, while also highlighting that the deployment of technology alone is insufficient in the absence of a structured organisational strategy (Olumoye & Govender, 2018). The challenges associated with governing rapidly evolving technologies are further illustrated by the Swedish experience, where the development of electronic identification (e-ID) systems revealed path dependency effects, deficiencies in governance models, and difficulties in maintaining fully integrated system solutions in the context of ongoing rapid technological change (Melin, Axelsson, & Söderström, 2016). Technological change may also limit the range of services that organisations are able to provide. Existing systems can quickly become outdated, while the absence of common platforms and technologies may hinder effective service delivery. Organisations may also face difficulties in training staff in the skills required to operate e-government systems. Staff may be unable to utilise their skills efficiently due to poor system operations.

To overcome social barriers, greater efforts should be made to improve digital literacy among less technologically proficient members of society. Governments may use community workshops, online tutorials, and partnerships with local institutions to implement initiatives that increase citizens' familiarity and competence in the use of technology. Such training programmes can enable citizens to access e-governance platforms more effectively and participate more actively in digital governance. It is also necessary to develop change management policies that address resistance to technology. Engaging key stakeholders at an early stage of implementation, seeking feedback from users, and explaining the benefits to e-government services can facilitate acceptance of change and reduce resistance.

In addition, improving cybersecurity is essential for establishing public trust in e-government systems. Government should implement robust security measures, including data encryption and regular security audits. Developing contingency plans to respond to potential security breaches is equally important. Continuous training of governmental employees in digital technologies is also necessary to ensure that they possess the skills necessary to use e-government systems effectively. Training programmes may cover emerging technologies, cybersecurity measures, and digital

customer service, thereby enhancing the overall effectiveness of e-government initiatives.

Social Barriers and Challenges. Lack of digital literacy is a common obstacle to the use of e-government services. In Bandung City, Indonesia, the digital divide was found to include not only access to ICT but also the capacity and ability to use it effectively. A lack of skills and motivation was identified as one of the main barriers to the successful implementation of e-government initiatives (Rachmawati & Fitriyanti, 2021). Social problems, such as the digital divide in Jamaica, represented significant barriers, where social exclusion caused by poverty and a sustained lack of access to ICT resulted in e-government services being beyond the reach of many citizens (Waller & Genius, 2015). Limited end-user trust in, and resistance to, e-government services in Uganda were further exacerbated by low levels of digital preparedness among the public (Nakakawa & Namagembe, 2019). Digital literacy is very important for the effective use of e-government services. Many individuals may not know how to navigate online environments or use digital interfaces and e-services efficiently. Limited digital literacy may cause citizens to feel frustrated or alienated and may further widen the digital divide between those who are technologically proficient and those who are not. Without sufficient investment in training and digital resources to improve digital skills, governments risk leaving large sections of society behind in accessing essential public services.

Resistance to change is another significant organisational barrier. In Belgium, deeply ingrained inertia among civil servants was explicitly identified as one of the main causes of unsatisfactory e-service implementation, together with failures in horizontal coordination and interoperability (Tegethoff et al., 2023). Organisational barriers, such as attitudes of civil servants, were also empirically identified in Nigeria as factors influencing e-government implementation outcomes, and the study emphasised that a systematic organisational approach was necessary to overcome persistent behavioural inertia (Nakakawa & Namagembe, 2019). In Bandung City, the transition from manual to electronic systems encountered resistance among implementing units, where a lack of proper communication and a limited sense of ownership discouraged staff from adopting new ways of working (Waller & Genius, 2015). Established bureaucratic procedures are often difficult to change, even when digital solutions may improve the delivery of government services. Some stakeholders may be accustomed to traditional manual approaches to government services and may be apprehensive about digitalisation. This resistance may stem from scepticism

towards e-government initiatives, concerns about job losses among public servants, or simply an unwillingness to adopt new technologies. Successful implementation therefore requires strong support and measures to address resistance, together with clear communication of the benefits associated with the new system.

Cultural attitudes towards technology and government institutions represent another long-standing barrier to e-government implementation. For example, cultural factors, including the current societal norms and low levels of trust in government, have been empirically identified as social barriers that hinder the adoption of e-government initiatives (Stefanou & Skouras, 2015). National culture, societal values, and organisational practices were also found to influence e-government adoption in Greece, where cultural conservatism contributed to reluctance among organisations to adopt new ICT-based systems (Melin, Axelsson, & Söderström, 2016). Institutional factors and cultural conformity pressures also shaped the motivations for, and barriers to, e-government adoption in Oman, demonstrating that cultural context strongly influences how governments and citizens relate to digital services (Maroye et al., 2017). In other words, perceptions of technology and government can greatly influence the success of e-government initiatives. In certain cultures, there is a preference for personal interaction and a degree of scepticism towards electronic services. Societal norms and historical contexts may also influence how people engage with technology and public institutions. Consequently, awareness-raising campaigns may be required to promote the benefits of e-government and encourage a greater acceptance and use of online services.

To overcome social barriers, it is important to promote citizens' digital literacy. Community workshops, online tutorials, and partnerships with local institutions can help governments implement programmes aimed at increasing citizens' familiarity with and competence in the use of technology. Such training initiatives can help citizens use e-government platforms more effectively and participate more actively in digital governance. It is also important to adopt a change management approach that addresses resistance to new technologies. By involving key stakeholders in the implementation process from the planning stage onwards and maintaining open lines of communication, government can foster acceptance and reduce concerns associated with technological change.

In addition, the acceptance and adoption of digital transformation may be enhanced by fostering a stronger culture of innovation within government departments. To promote and share best practices, governments should showcase successful e-government initiatives, recognise employ-

ees who champion the use of digital tools, and establish forums for the exchange of ideas. Community participation in the design and development of e-government services also contributes to successful implementation. Through survey, consultations, and focus groups, governments can ensure that digital services are user-friendly and accessible to different groups within society.

Financial Barriers and Challenges. One of the most common financial obstacles to e-government adoption is insufficient and unpredictable funding. In Jamaica, funding challenges were specifically highlighted as a major barrier, and inadequate government budget support was found to discourage sustainable ICT-based public service reform (Waller & Genius, 2015). In Belgium, declining public budgets were empirically identified as a fundamental barrier to e-service adoption, as financial constraints limited the ability of public sector organisations to develop and sustain digital processes (Maroye et al., 2017). Similarly, in Sweden, a study on the implementation of the PSI directive indicated that less well-funded municipalities faced significant difficulties in investing in information management systems (Svärd, 2018), resulting in a democratic data divide whereby citizens in resource-poor areas received lower-quality digital services than those in more affluent communities. These findings suggest that funding disparities not only limit e-government development but may also exacerbate existing inequalities in access to public services (Svärd, 2018). The implementation and maintenance of e-government systems often involve substantial costs. Many governments, particularly in developing countries, face financial constraints and must prioritise sectors such as healthcare and education over long-term digital investments. Limited funding may result in incomplete projects, slower implementation, and a lack of the support systems necessary to sustain successful e-government services.

The high cost of e-government systems represents another major barrier, often exceeding the financial capacity of public sector organisations, especially in developing countries. In Uganda, donor-supported e-government initiatives were reported to result in overly ambitious and complex system designs that became unaffordable to scale in resource-constrained settings. The use of external aid also contributed to sustainability challenges due to the unpredictability of financial support (Nakakawa & Namagembe, 2019). In Bandung City, Indonesia, inadequate financial planning was identified as an additional barrier, suggesting that without sound financial management, the costs associated with digitalisation may increase substantially (Rachmawati & Fitriyanti, 2021). Studies on the

development of e-ID systems in Sweden further highlighted insufficient funding and political support as important bottlenecks in e-government development, with economic constraints directly affecting the scope and quality of technological solutions (Melin, Axelsson, & Söderström, 2016). In Nigeria, the costs associated with establishing integrated e-government systems were identified as environmental constraints, while economic pressures were explicitly mentioned as barriers to adoption (Olumoye & Govender, 2018). The implementation of e-government systems involves costs related to technology acquisition, software development, training of civil servants and citizens in the use of ICT, and promotional campaigns. These costs may discourage decision-makers from pursuing digital innovation when there is uncertainty regarding the return on investment and the long-term sustainability of such systems. High implementation costs may also reinforce existing inequalities, as wealthier regions are often better able to invest in e-government initiatives than less affluent regions.

Funding and implementation cost issues are often exacerbated by broader macroeconomic constraints. In Oman, the need to address a projected economic crisis, namely the depletion of oil supplies, was found to be one of the main drivers for e-government adoption, demonstrating how economic pressures can both stimulate and constrain digital modernisation efforts (Al-Mamari, Corbitt, & Gekara, 2013). In Colombia, the relatively slow adoption of e-government was partially attributed to broader socio-economic factors, including high levels of labour market informality and limited organisational resources, which constrained the ability of institutions to invest in and support secure e-government solutions (Tegethoff et al., 2023). In Portugal, local digital government initiatives demonstrated limited sophistication in online service delivery, with implementation challenges linked to economic conditions that constrained the capacity of regional governments to provide more advanced digital services (Ferreira et al., 2015). Macroeconomic factors can therefore have a substantial impact on the viability of e-government initiatives. During periods of economic downturns, governments may postpone digital investments because of budgetary constraints. Competing national priorities may also divert attention and resources away from e-government initiatives, making it difficult to sustain implementation efforts. In some cases, economic instability may result in continued reliance on outdated manual systems that remain functional but inefficient.

To reduce financial barriers, governments need to identify a range of funding sources for e-government initiatives. These may include government grants, international development assistance, public-private part-

nerships, and financing from development banks that support public sector development. By conducting detailed cost-benefit analyses and clearly demonstrating the potential return on investment, it becomes easier for decision-makers to justify the necessary expenditure. A phased approach may also be beneficial, allowing e-government services to be introduced gradually. By starting with pilot projects, governments can demonstrate success, build stakeholder support, and potentially secure funding for the wider implementation of e-government programmes.

Inter-agency and inter-jurisdictional cooperation can also help to address economic barriers. The sharing of resources, knowledge, technology, and expertise can promote more efficient development while reducing duplication in e-government systems. Such collaborative initiatives may create economies of scale, making e-government projects more efficient and cost-effective.

Identifying and overcoming barriers is essential for the successful implementation of e-government initiatives. By understanding the multidimensional aspects of these challenges, including technical, social, and financial factors, governments can develop comprehensive strategies to address them. This requires investment in infrastructure development, digital literacy, financing mechanisms, change management, and the promotion of a culture of cooperation. Addressing these challenges can contribute to more effective public services, greater citizen participation, and improved governance. In conclusion, a holistic approach that combines technical improvements, social engagement, financial support mechanisms, and continuous evaluation is required to overcome barriers to the successful implementation of e-government initiatives. Such an approach can help strengthen governance and improve the citizens' quality of life.

3.2. Effects of E-Government on Public Administration and Service Delivery

The use of ICT in public administration reform and service delivery through e-government has gained considerable attention in recent years. A number of studies have shown that well-designed and appropriately implemented e-government initiatives improve administrative efficiency, transparency, accountability, and citizen satisfaction (Bakar et al., 2014; Olumoye & Govender, 2018; Stefanou & Skouras, 2015). For example, Bakar et al. (2014) emphasise that a clear vision and implementation strategy are essential for the success of e-government projects. Similarly,

Olumoye and Govender (2018) demonstrate that the effective use of ICT in public organisations requires a structured organisational approach.

E-government initiatives have multiple implications for public administration. Numerous studies suggest that the application of e-government has optimised administrative procedures through the restructuring of government activities, reduced administrative costs, and increased transparency (Bakar et al., 2014; Stefanou & Skouras, 2015). Stefanou and Skouras (2015) argue that the digitalisation of administrative procedures can reduce costs and improve citizen protection by easing bureaucratic burdens. Similarly, evidence from Oman indicates that ICT-enabled processes facilitate more effective information sharing and service delivery across government agencies (Al-Mamari, Corbitt, & Gekara, 2013). The experience of digital document management in the Malaysian public sector (Ab Aziz et al., 2020) further demonstrates the potential of e-government to improve service delivery through the effective maintenance of administrative records across organisational boundaries. Nevertheless, challenges such as resistance to change, inadequate communication, and cybersecurity concerns continue to hinder the full realisation of e-government benefits (Rachmawati & Fitriyanti, 2021; Tegethoff et al., 2023). Tegethoff et al. (2023) further identify online security as an important determinant of cost-effectiveness and service quality, while concerns regarding data quality and timeliness remain obstacles to realising these benefits fully.

On the other hand, in terms of service delivery, e-government has changed the way citizens access and interact with public services. It enables governments to use digital interfaces to improve citizens' access to government data and services, thereby enhancing accountability and promoting a more citizen-centred approach (Kwok, 2014). In addition, Kwok (2014) suggests that the effective implementation of e-government promotes transparency and strengthens the role of other actors in service delivery (Kwok, 2014). Furthermore, the transition from paper-based and physical systems to electronic systems has facilitated the collection and dissemination of public records and administrative documents, contributing to a more agile and responsive government (Bakar et al., 2014; Maroye et al., 2017). However, this transformation is not without challenges. Rachmawati and Fitriyanti (2021) demonstrate that weak ownership and sudden system changes may negatively affect citizen acceptance. They therefore emphasise the importance of capacity building, effective communication, and change management strategies to support user engagement and ensure long-term sustainability.

In addition, holistic models that encompass regulatory, technological, and adoption-related aspects are necessary to support digital transformation in the public sector. Nakakawa and Namagembe (2019) suggest that interoperability, clear regulatory frameworks, and context-adaptive approaches are critical factors in the implementation of e-government systems in developing countries. In addition to addressing the technical dimensions of e-government, such frameworks also take into account the socio-political dimensions of the public sector reform. Citizen participation is another important feature of e-government and can influence the effectiveness of public services. Open data and e-participation infrastructures can support citizen engagement in decision-making processes by providing greater access to information about government activities (Hivon & Titah, 2017). Such participatory mechanisms can enhance government legitimacy and encourage public sector reforms aimed at aligning services more closely with citizens' expectations. In this regard, the successful implementation of centralised online systems such as CORE-PDS in Chhattisgarh demonstrates how a networked governance framework involving multiple actors can improve service delivery through coordinated and timely responses to public demands (Gowd, 2022). Furthermore, Gil-Garcia and Flores-Zúñiga (2020) propose an integrative approach that combines implementation and adoption components, highlighting the importance of a comprehensive perspective on digital government success that includes technical processes, organisational practices, and policy aspects.

In conclusion, the effects of e-government on public administration and public service delivery are substantial. E-government initiatives have the potential to reduce inefficiencies, increase transparency and accountability, and improve the management of public resources. However, challenges related to implementation, security, and user engagement must be addressed in order to fully realise the benefits of digital transformation effort. To maximise the potential of e-government, a tailored approach is required that addresses both technological and organisational issues and involves all relevant stakeholders in the transformation process.

The literature review revealed several important effects of e-government initiatives on both service delivery and public administration. These effects are discussed below.

Enhanced Accessibility. E-government programmes have transformed the way citizens access public services through digital channels. The introduction of user-friendly online interfaces has made access to government services easier and more convenient for citizens. This transformation has reduced physical barriers, such as the need to travel to government of-

fices, and has shortened the time required to access services. As a result, citizens are able to obtain information and services from their homes, thereby enhancing engagement with government. In addition, older people and residents of remote or less accessible areas can access public services more easily, contributing to an improved quality of life.

Increased Transparency and Accountability. One of the most important effects of e-government is its contribution to increasing transparency in government operations. Online platforms enable citizens to access information more easily on matters such as government budget, policies, and service performance. Such transparency is essential for an atmosphere of accountability, as it allows citizens to hold governments responsible for their actions and decisions. Citizens can also monitor the status of their service requests and gain greater insight into government activities, thereby fostering trust in public institutions. For example, open data systems that make government information available in accessible formats enable citizens and civil society organisations to analyse information and hold public officials accountable for their actions.

Efficiency and Cost Reduction. E-government can generate significant gains in administrative efficiency. Bureaucratic procedures and paperwork can be reduced through the automation of routine tasks and the digitalisation of administrative processes. Increased efficiency can result in considerable time savings and lower administrative costs as fewer human resources are required for manual tasks and the likelihood of human error is reduced. The re-engineering of administrative processes can also lead to faster processing times and more timely service delivery, thereby improving citizen satisfaction. Research shows that optimised administrative processes contribute to greater efficiency and lower cost of goods or services for the public.

Improved Inter-Agency Collaboration. E-government initiatives promote greater coordination among government organisations. By developing interoperable systems that support data exchange and information sharing between agencies, public organisations are able to collaborate more effectively in the delivery of public services. Such cooperation is essential for integrated service delivery, particularly where services depend on contributions from multiple departments. Improved inter-agency communication can reduce duplication of effort and provide citizens with more seamless access to public services, without requiring them to navigate multiple government departments. This enhanced coordination contributes to improved service quality and responsiveness, which is important during times of crisis or social challenges.

Citizen Empowerment. E-government initiatives promote and support citizen empowerment by improving access to information and encouraging participation in governance processes. Open data and e-participation initiatives, based on a citizen-centred approach to service delivery, encourage citizens to participate more actively in public decision-making. For example, citizens can express their views on government policies, participate in consultative meetings, and engage in public discussions through digital platforms. Such empowerment enhances the legitimacy of government actions and helps to align public services more closely with citizens' needs and expectations. By encouraging civic engagement, governments can foster more democratic and participatory forms of governance.

Reorganisation of Processes. E-government is transforming public administration by encouraging government agencies to reorganise their processes. Conventional bureaucratic systems often require extensive documentation and involve lengthy processing times. The implementation of e-government systems can make these processes more efficient through digitalisation and optimisation. Government organisations are increasingly under pressure to transform service delivery, adopt a more citizen-centred approach, and explore more agile ways of working. This transformation leads to faster responses to citizens' needs and helps align public services more closely with public expectations. As administrative processes are reorganised through digital initiatives, public administration becomes more flexible and better able to adapt to change.

Enhanced IT Frameworks. The transition to e-government requires robust IT frameworks and infrastructure to support digital initiatives. Governments are increasingly investing in technology to develop electronic systems that provide access to public records, facilitate information sharing, and enable the delivery of online services. However, such technological investments must be accompanied by comprehensive frameworks that support the effective integration of digital tools within the public administration. Effective ERM systems are essential for maintaining the integrity of information and ensuring efficient administrative processes. As these frameworks continue to develop, public administrations are better positioned to utilise technology as a means of improving governance.

Focus on Citizen Engagement. With the growing importance of e-government, public administrations are increasingly placing citizen engagement at the centre of their strategies. Public authorities are actively seeking new ways to involve citizens, particularly through participatory mechanisms that facilitate feedback and cooperation. This shift reflects a move towards informing, consulting, and interacting more closely with the cit-

izens. Public administrators increasingly recognise the value of citizen participation in policy-making and service delivery, resulting in decisions that more closely reflect the needs, preferences, and expectations of the community.

Challenges in Culture and Resistance. Although e-government offers potential benefits, the implementation of these changes in the public sector is often met with resistance. Entrenched mindsets and a lack of enthusiasm towards the use of technology may act as cultural barriers to the successful development of e-government. To overcome such resistance, organisations require targeted change management strategies that include intensive training efforts, continuous communication, and measures to encourage stakeholder buy-in by demonstrating the value of digital transformation. Public sector leaders play a key role in enabling change by fostering a culture of innovation in which technology is embraced.

Integration of Advanced Technologies. Advanced technologies, particularly artificial intelligence (AI) and blockchain, are becoming defining elements of e-government. Public administrations are increasingly incorporating these technologies into service delivery, resulting in more secure, efficient, and effective public processes. For example, AI can be used to analyse big datasets, identify patterns, and support more efficient resource allocation. Blockchain technology can also provide transparent and secure systems for record-keeping and transactions, thereby enhancing trust in public services. This technological shift reflects a broader move towards more agile public administration, in which government institutions are better able to respond and adapt to changing circumstances.

In summary, e-government is an important driver of improvements in public administration and service delivery. It promotes more open, transparent, and efficient government while encouraging citizen engagement and collaboration both within and across government organisations. These advancements have led to some major changes in public administration, including the restructuring of processes, enhanced IT frameworks, a stronger focus on citizen participation, and the integration of advanced technologies. However, addressing resistance to change and organisational culture remains crucial for the effective adoption of e-government. Comprehensive approaches that promote a culture of innovation will be essential for sustaining improvements in public service delivery and performance. In this way, governments can create a digital governance environment that is adaptable, responsive, and capable of meeting the needs and expectations of citizens.

3.3. Emerging Trends and Innovations in E-Government Initiatives

The present landscape of e-government initiatives reflects a dynamic interplay of trends and innovations aimed at improving service delivery, enhancing transparency, and increasing citizen participation. Previous studies highlight the rapid pace of change occurring both at the local level and through national digitalisation efforts. For example, local government initiatives in Bandung City illustrate challenges related to stakeholder buy-in and coordinated communication while also reflecting a broader trend towards the decentralisation of digital governance to enhance responsiveness (Rachmawati & Fitriyanti, 2021). In addition, a more complete understanding of digital government success emphasises the importance of combining technological implementation and citizen adoption strategies to support effective public service reform (Gil-Garcia & Flores-Zúñiga, 2020).

One emerging trend is that digitalisation of public services extends beyond the implementation of advanced ICT and focuses increasingly on integration and interoperability to support more integrated public administration across service domains. Research on the implementation of integrated e-government in Nigeria (Olumoye & Govender, 2018; Nakakawa & Namagembe, 2019) indicates the need for legislation and capacity-building measures that would enable different government organisations to share data and services. This improves internal process management and can also accelerate the development of citizen-centred services (Mukamurenzi, Grönlund, & Sirajul Islam, 2019).

Another important trend is the introduction and operationalisation of secure digital identity solutions and electronic signature schemes. Studies on server-based e-ID and digital signature technologies indicate that these are important enablers of secure and trustworthy online transactions between citizens and government organisations. In this regard, Melin, Axelsson, and Söderström (2016) emphasise that sustainable digital identity solutions are emerging as fundamental building blocks in the provision of secure and user-friendly government services. These developments increase transparency and reduce administrative burdens by enabling secure and efficient service delivery.

A third development is the growing emphasis on citizen participation as a cornerstone of e-government strategies. Open data initiatives and social media platforms have created new opportunities for engaging citizens. For example, studies on citizen participation through the use of open data at the city level (Hivon & Titah, 2017) and factors influencing

engagement on Facebook (Alarabiat, Soares, & Estevez, 2021) indicate that governments are more likely to engage citizens in policy-making and public scrutiny when they effectively utilise these digital tools. However, increased participation also presents certain challenges. Some studies caution that, although e-participation may democratise access to information, it may also create risks associated with power inequalities between governments and citizens (Sundberg, 2019). Nevertheless, these developments contribute to more transparent and participatory forms of governance.

Another emerging trend is the increasing sector specialisation of e-government initiatives. In the areas of labour market and social security, e-government programmes are being used to restructure administrative processes and reorient public services in ways that support economic development (Stefanou & Skouras, 2015). At the same time, public health applications are seeing adapted electronic medical records and cost-effective digital health solutions designed for use in rural and resource-constrained settings (Or et al., 2018b; Raut et al., 2017). Similar sector-specific adaptations can also be observed in agriculture, where e-government initiatives, such as national agricultural market platforms, aim to support farmers by reducing transactional and regulatory burdens (Bandaru, 2019). In addition, factors such as compatibility with secure online solutions and the timely provision of information have been identified as important determinants of cost-effectiveness and overall service quality (Tegethoff et al., 2023).

The convergence of these trends and developments highlights how current e-government initiatives are evolving beyond simple automation towards broader, more secure, and more comprehensive forms of digital governance. This transformation is driven not only by the need to enhance administrative efficiency but also by the objective of strengthening citizen trust and participation. The combination of interoperable systems, advanced digital identity management, and new participatory platforms illustrates a holistic approach that addresses both the technological and social dimensions of e-government.

Identification of Current Trends. The delivery of public services has changed radically with the use of digital platforms such as government websites and mobile applications. These platforms serve as important channels through which citizens can access essential government services and information. Digitalisation not only increases convenience but also changes the way governments engage with citizens and conduct public administration efficiently. User-friendly design allows these platforms to contribute to more

equitable access to public services, particularly for underserved communities. At the same time, the availability of digital services reduces the need for direct contact with government institutions, leading to shorter waiting times and improved citizen satisfaction. The adoption of digital platforms therefore represents an important step towards the broader digital transformation of government, enabling public services to be delivered more efficiently while enhancing citizen engagement.

The use of big data and analytics to support government decision-making has become increasingly important in improving public service delivery and enhancing operational effectiveness. By collecting and analysing large volumes of data from multiple sources, governments can gain a better understanding of citizens' behaviours, preferences, and needs. Such information supports informed policy-making and resource allocation, helping to ensure that government programmes are responsive and targeted. Big data analytics further strengthens predictive modelling by enabling governments to anticipate future service demands and take proactive measures to address emerging issues. Overall, data-driven decision-making contributes to the transformation of public administration into a more intelligent and responsive system, ultimately improving the quality of public services provided to citizens.

Innovative Technologies. The use of artificial intelligence (AI) and machine learning is transforming public service delivery through the automation of tasks and the provision of more personalised services. AI can rapidly analyse large data sets, identify patterns, and detect preferences that can then be used to tailor services to the needs of individual citizens. AI-powered chatbots are increasingly being used to provide real-time support, helping to reduce response times and allowing public sector employees to focus on more complex issues. Predictive analytics can also help governments in delivering services more efficiently by anticipating future needs based on historical data. The long-term objective of technological transformations is to contribute to a more efficient, responsive, and citizen-centred public administration that is better able to meet citizens' needs and expectations. Blockchain technology is increasingly being recognised as a potentially transformative tool for enhancing transparency and reducing corruption in government operations. Through its decentralised and immutable ledger, blockchain ensures that transactions and activities are recorded in a manner that cannot be altered retrospectively, thereby increasing public trust. This application is particularly relevant in areas such as land registration, voting systems, and public procurement, where transparency is essential for preventing fraud and corruption. By adopting blockchain

technology, governments can provide greater assurance that records are secure and that administrative processes are fair and accountable. Moreover, the continued development of blockchain applications may contribute to cost savings, improved operational efficiency, and greater public trust in e-government services.

Future Implications for Implementation Strategies. Policymakers are facing increasing pressure to adopt innovative technologies within e-government initiatives. Public authorities need to develop comprehensive strategies for technology implementation that take into account the particular needs of citizens. This requires investment in essential technical infrastructure as well as training programmes that enable both public servants and citizens to develop the skills necessary to use and engage effectively with new digital systems. In addition, collaboration with technology providers and academia can facilitate knowledge transfer and support innovation. Policymakers should also emphasise meaningful stakeholder participation throughout the implementation process in order to gather feedback and ensure that proposed solutions are user-friendly and responsive to citizens' needs.

The long-term sustainability of the e-government depends on how flexible the system is to adapt to technological change. As technology continues to evolve rapidly, e-government system must be capable of responding to these developments while continuing to meet citizens' needs. This requires the development of scalable systems that can accommodate emerging technologies and enable governments to continuously improve service delivery. Furthermore, regularly assessing citizens' needs and experiences can provide valuable insights for the ongoing improvement of e-government services. An adaptable approach enables governments to remain responsive and relevant in an increasingly digital environment, making more effective use of time and resources for the benefit of citizens. Such a comprehensive approach to e-government can help public authorities achieve their strategic objectives while responding to evolving demands placed in the digital age.

4. Conclusion

In conclusion, the development of e-government has evolved from fragmented and often insecure standalone applications towards integrated, secure, and citizen-centred systems with significant potential to improve

public service delivery, governance, and the provision of public goods. Drawing on a systematic literature review and thematic analysis, this study identified key global trends, innovations, challenges, and opportunities associated with the implementation of e-government across different sectors. The findings indicate that successful e-government initiatives rely increasingly on advanced ICT solutions that facilitate interoperability and the integration of public services. Secure digital identity solutions and electronic signature schemes were also identified as critical components for strengthening trust in online interactions between citizens and public administrations. Furthermore, open data initiatives and digital platforms create new opportunities for citizen participation in policy-making processes, although concerns regarding power imbalances and unequal participation require continued attention.

The review also highlights the growing importance of sector-specific adaptations, demonstrating that e-government initiatives must be carefully designed to address diverse administrative needs while supporting economic development objectives. Future research could explore long-term effects of e-government initiatives on public service delivery, particularly in developing countries characterised by different socio-political contexts. Additional research on the impact of emerging technologies, such as artificial intelligence and blockchain, may provide valuable insights into the future of e-governance.

Finally, as we highlight in our discussion of the theory, longitudinal studies examining citizens' perceptions of and engagement with e-government services could help identify mechanisms for reducing power imbalances and strengthening participatory governance. Comparative studies across different jurisdictions may also contribute to the identification of good practices and lessons that can inform future e-government implementation efforts worldwide.

Overall, this study provides a useful reference point for policymakers and practitioners seeking to promote the integrated development of e-government across both technical and socio-political dimensions. By prioritising interoperability, citizen participation, and security, governments at all levels can make more effective use of digital technologies to improve service quality, enhance transparency, and strengthen citizen engagement in governance processes.

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Appendix

Table 1: Overview of the studies examined

Title, Author, Year	Study Objectives	Methodology	Main Findings
Barriers to transforming government in Jamaica: Challenges to implementing initiatives to enhance the efficiency, effectiveness, and service delivery of government through ICTs (e-Government) (Waller & Genius, 2015)	To identify the barriers to implementing e-government initiatives in Jamaica aimed at enhancing government efficiency, effectiveness, and service delivery. To provide a comprehensive overview of Jamaica's e-government implementation experiences.	Qualitative descriptive study employing the following key methods: purposive sampling of 23 experts on e-government implementation in Jamaica; in-depth interviews over a one-year period using a 50-minute interview protocol; constant comparative analysis to analyse the qualitative data and identify emerging themes.	The main barriers to e-government implementation in Jamaica were technical (ICT infrastructure, privacy, and security), social (digital divide), and financial. Unless these technical, social, and economic constraints are addressed, ICTs cannot fully increase government efficiency, effectiveness, or public service delivery in Jamaica.
Analysis of the e-government initiative at the local government level in Bandung City, Indonesia (Rachmawati & Fitriyanti, 2021)	To examine the implementation of the e-parking initiative in Bandung City. To identify the factors contributing to the success of e-parking and to provide practical insights for local governments regarding barriers to and facilitators of e-parking adoption.	Qualitative study employing an interpretative approach. Primary data were collected through interviews with 100 parking users, 2 TIU officers, and 4 parking attendants, as well as through observations of parking machines and public behaviour. Secondary data were obtained from official sources, social media, and local news reports.	The implementation of the e-parking initiative in Bandung City was hindered by a large digital divide, insufficient workforce capacity, the absence of adequate regulations, and inadequate infrastructure. A lack of strategic investment, leadership, education, and marketing also contributed to the initiative's inability to achieve its intended objectives.
An empirical investigation of factors influencing integrated e-government implementation in Nigeria: A case of housing and urban development agency (Olumoye & Govender, 2018)	To examine factors influencing successful e-government implementation in Nigeria's housing and urban development sector (HUDA). To identify key considerations for establishing integrated e-government within HUDA in Lagos State, Nigeria. To examine how these factors influence the adoption of integrated e-government in HUDA.	Quantitative research approach. Conceptual framework based on the TOE framework and the drivers-barriers model. Questionnaires administered to officials from five public sector organisations. Data analysed using SPSS software.	Technology, organisation, environment, perceived benefits, and perceived impediments explain 23.1% of the variance in the adoption of integrated e-government in Lagos, Nigeria's housing and urban development agency (HUDA) sector. Environmental factors and perceived obstacles were found to influence the integration of e-government in the HUDA sector.

CROATIAN AND COMPARATIVE PUBLIC ADMINISTRATION

Title, Author, Year	Study Objectives	Methodology	Main Findings
Conceptualizing citizen participation in open data use at the city level (Hivon & Titah, 2017)	To develop a conceptual understanding of how citizens engage in using open data at the local government level To examine the impact of citizen participation on the use of open data	Case study methodology, combining data from semi-structured interviews and observations. The data were transcribed and analysed using ATLAS.ti qualitative data analysis software and a coding framework designed to link the conceptual model to the interview data and verbatim quotes.	Open data utilisation promotes citizen participation across four dimensions: hands-on engagement, increased accountability, better communication, and connection with public sector staff. Participants engaged in activities such as locating, formatting, cleaning, scripting, and promoting open data applications. Open data enables citizens to develop new apps, websites, and other digital artefacts through 'emergent use'.
Requirements for developing interoperable e-government systems in developing countries: A case of Uganda (Nakakawa & Namagembe, 2019)	To investigate the underlying causes of the persistent challenges associated with e-government integration.	Qualitative study based on exploratory interviews. Purposive sampling was used to select 12 of the 20 agencies operating e-government systems. Data were collected through face-to-face interviews using an open-ended interview guide. Interviews lasted between 45 and 90 minutes. Conventional content analysis to study the data and categorise responses into themes.	None of the 12 government agencies have achieved full integration of e-government services; isolated systems and limited information sharing were identified as major challenges. Uganda faces social and cultural, legal, and political/policy barriers to e-government interoperability. Proposed solutions include system customisation, capacity building, the adoption of appropriate methodologies, situation analysis, standards development, stakeholder involvement, and risk and cost-benefit assessments.

Title, Author, Year	Study Objectives	Methodology	Main Findings
Towards e-government: End-user satisfaction with IT implementation at Royal Malaysian Customs (Bakar et al., 2014)	To assess end-user satisfaction with the service delivery at the Royal Malaysian Customs (RMC) following the implementation of e-government initiatives. To evaluate the use of the CIS C8 system among internal users (RMC officer) and external users (business entities). To assess the satisfaction levels of both internal and external users with the CIS C8 process.	Quantitative research approach. Self-administered questionnaires were distributed to internal users (RMC officers) and external users (business entities). The questionnaire consisted of two sections: (1) demographic and psychographic information, and (2) items measuring satisfaction across various dimensions. Data were analysed using descriptive statistics, including means and standard deviations.	Both RMC officers and external business users expressed uncertainty regarding the Customs Information System (CIS). External users reported higher levels of satisfaction with the CIS than internal RMC officers. Successful e-government initiatives require a clear vision, thorough planning, and practical implementation strategies.
Determinants of citizens' intention to engage in government-led electronic participation initiatives through Facebook (Alarabiat, Soares, & Estevez, 2021)	To identify the factors influencing citizens' intention to engage in government-led e-participation initiatives through Facebook and to develop a citizen-centred acceptance model to enhance understanding of, and support for, effective e-participation initiatives.	Quantitative study based on data collected from 400 Facebook users in Jordan. Factor analysis and multiple linear regression were used to examine the factors influencing citizens' intention to engage in government-led e-participation initiatives through Facebook and to test the proposed citizen-centred acceptance model.	Citizens' attitudes, perceived behavioural control, and participation efficacy significantly influence their intention to participate in government-led e-participation activities on Facebook. No significant relationship was found between citizens' intentions and social norms or perceived value. Citizen's attitudes are primarily influenced by perceived usefulness, compatibility, and value of Facebook, as well as by involvement efficacy.

CROATIAN AND COMPARATIVE PUBLIC ADMINISTRATION

Title, Author, Year	Study Objectives	Methodology	Main Findings
E-government adoption in Oman: Motivating factors from a government perspective (Al-Mamari, Corbitt, & Gekara, 2013)	To critically examine and highlight the key motivations underlying the implementation of e-government initiatives in Oman. To develop a comprehensive and systematic framework for accurately describing and analysing the motivations driving e-government implementation at the national policy-making level.	Qualitative case study approach using semi-structured interviews as the primary data collection method. Data analysis using a hermeneutic approach. Twenty-two participants were selected through purposeful sampling (maximum variation and snowball sampling). Interviews were conducted with policy-makers and implementation-level stakeholders, including senior officials from 10 federal agencies. Data analysis was guided by the study's theoretical framework.	To conform to global standards, the Omani government launched e-government programmes in response to coercive, mimetic, and normative pressures. The government was inspired by the worldwide debate on e-government, the knowledge-based economy, and the need to respond to the anticipated depletion of oil resources. Improving the quality of information and public service delivery was a major driver of e-government implementation.
A survey on server-based electronic identification and signature schemes to improve eIDAS: with a new proposal for Turkey (Erdogan & Saran, 2021)	To examine previous research on electronic identification (eID) credential technologies and projects in Europe. To focus primarily on server-based e-signing methods. To assess the suitability of a server-based mobile electronic signature mechanism in the context of local initiatives through a case study approach.	Review of server-based signature technologies used in European eID schemes Analysis of English-language computer science publications using Google Scholar, excluding applications, cryptography, legislation, law, strategy, and justice. Researchers used EU, Turkish, and regulatory authority websites to establish the regulatory framework.	A server-based eID system offers a more flexible and user-friendly approach to identity management. Server-based signature techniques can facilitate compliance with international standards for cross-border online identification. However, significant efforts are still needed to achieve widespread adoption of server-based eID systems.
E-government: Applications in the labour and social security regulatory area (Stefanou & Skouras, 2015)	To examine e-government projects pertaining to labour and social security legislation in Greece, determine the readiness of private sector enterprises to adopt these initiatives, and minimise the risk of failure of the proposed e-government application caused by companies' unwillingness or lack of trust.	Survey of companies in Heraklion, Crete, using a questionnaire. Use of the Delphi technique with a panel of labour inspectors.	Most companies believe that employing an additional person will cost at least €20, and half estimate €30. Smaller enterprises are more likely to adopt the government's cloud-based Payroll Information System (PIS). Labour inspectors believe that adopting the PIS would strengthen state controls and change inspection methods, with on-site inspections focussing on undeclared work.

Title, Author, Year	Study Objectives	Methodology	Main Findings
Online security in e-government as an antecedent of cost-effectiveness and quality in business operations (Tegethoff et al., 2023)	To evaluate whether the level of online security affects usage and influences the cost-effectiveness and quality of operations and, consequently, the operational effectiveness of organisations using e-government systems.	The study uses structural equation modelling to analyse the antecedents and outcomes of operational effectiveness. It includes collecting 440 usable questionnaires from managers and personnel of Colombian organisations using e-government systems.	There is a positive relationship between online security and the effectiveness of e-government systems. Online security and e-government effectiveness do not affect operational costs, but the quality of information positively affects the quality of operations. Online security has an indirect positive impact on the quality of operations through information quality.
Managing electronic records across organizational boundaries (Maroye et al., 2017)	This study examines the reasons behind underperforming e-services, specifically the implementation of digital workflows and cross-organisational interactions in records management.	The article employs an interdisciplinary mixed-method approach using standardised surveys to collect quantitative data from managers and in-depth interviews to obtain qualitative insights from field workers, to analyse hybrid records management practices.	The study finds that financial constraints, resistance to change, and complex inter-organisational legal and technical barriers impede effective e-service implementation.
Exploring factors affecting voluntary adoption of electronic medical records among physicians and clinical assistants of small or solo private general practice clinics (Or et al., 2018a)	The study aims to examine the multifaceted factors that influence the adoption of electronic medical records (EMRs) in healthcare settings.	The study employs a qualitative approach, collecting interview transcripts from physicians and clinical assistants and applying content analysis to identify key factors influencing EMR adoption.	The study finds that EMR adoption in small or solo private general practice clinics is primarily influenced by interrelated factors such as system design, reliability, cost, workflow integration, and organisational support.
The implementation guidelines of digital document management system for Malaysia public sector: Expert review (Ab Aziz et al., 2020)	The study provides a detailed framework for implementing a digital document management system. The article outlines systematic guidelines that can inform the development of a DDMS implementation policy.	The study employs a qualitative approach, collecting data through expert reviews, engaging specialised informants, and analysing the responses thematically to inform the DDMS implementation guidelines.	The study finds that the guidelines provide a practical framework for developing a detailed DDMS implementation policy for Malaysia's public sector.

CROATIAN AND COMPARATIVE PUBLIC ADMINISTRATION

Title, Author, Year		Study Objectives	Methodology	Main Findings
Design and implementation of an affordable, public-sector electronic medical record in rural Nepal (Raut et al., 2017)		To develop an integrated public sector electronic medical record in rural Nepal and to examine system integration across multiple healthcare domains, robust data extraction for performance evaluation, patient tracking for longitudinal care, and support for quality improvement.	The study employs an iterative mixed-methods approach. It includes collecting qualitative feedback from government officials and clinical users alongside quantitative performance data and then analysing this information iteratively to refine the EMR system.	The study demonstrates that an integrated, affordable EMR system can be rapidly deployed and expanded in rural public-sector healthcare settings.
Implementing successful G2B initiatives in the HKSAR (Kwok, 2014)		The study aims to assess the implementation of G2B initiatives for SMEs in Hong Kong, focusing on their importance, benefits, and challenges. It details a structured approach by comparing G2B with B2B initiatives and employing theoretical frameworks (EWAM, the three-ring model, and DeLone and McLean's IS success model) to develop the study design.	The study employs a positivist quantitative approach, collecting data from SMEs using an online survey instrument and analysing the data using multiple regression to assess G2B success factors.	The study finds that prevalent G2B initiatives in Hong Kong for SMEs rely on conservative paradigms, prompting a strategic shift towards enhancing transparency and value creation in public services.
Managing the development of e-ID in a public e-service context (Melin, Axelsson, & Söderström, 2016)		The study objective is to analyse and understand contemporary electronic identification (e-ID) development management by combining an e-government lifecycle perspective with project challenges and critical success factors.	The study employs a qualitative case study approach, collecting data from face-to-face interviews, official documents, forums, and meetings with coordinating agencies and practitioners and analysing these empirical sources to elucidate challenges in e-ID development.	The study's key finding is that managing e-ID development entails significant challenges due to its integrated e-government context and path dependency issues.
Public Information Directive (PSI) implementation in two Swedish municipalities (Svård, 2018)		The study objective is to examine how the Public Sector Information Directive is implemented in the context of evolving e-government practices, with a focus on public information management and the utilisation of government data.	The study employs a qualitative case study approach, collecting data through document analyses and interviews with municipal officials from two Swedish municipalities and analysing the data thematically.	The study finds that implementing the PSI directive in two Swedish municipalities enhanced access to government information, thereby facilitating the development of new electronic services.

Title, Author, Year	Study Objectives	Methodology	Main Findings
Challenges in the implementation of public electronic services: Lessons from a regional-based study (Ferreira et al., 2015)	The study demonstrates the importance of public electronic service initiatives by analysing the ALO Digital Project in Portuguese counties.	The study employs a mixed-method approach involving qualitative interviews with regional informants and quantitative surveys, with data analysed through thematic content analysis.	The study shows that significant organisational, political, and technical challenges impede the regional implementation of public electronic services.
Network governance, food security, and public service delivery: Functioning of Chhattisgarh's Centralized Online Real-time Electronic Public Distribution System (CORE-PDS) (Gowd, 2022)	The study aims to identify key success factors and elucidate the roles of state and non-state actors in public service delivery and agricultural policy implementation.	The study employs a qualitative network governance framework, collecting data through policy document reviews and stakeholder interviews to thematically analyse the roles of state and non-state actors in CORE-PDS implementation.	The study finds that the effective implementation of Chhattisgarh's CORE-PDS results from a robust network governance framework that successfully integrates state and non-state actors.
e-National Agriculture Market in India: An effective implementation and farmers' attraction path model (Bandaru, 2019)	The study provides a framework that clearly outlines the objectives behind implementing a digital agricultural marketplace, specifically targeting effective implementation and farmer engagement.	The study employs a mixed-method approach, collecting quantitative survey data and qualitative insights from farmers and applying statistical and thematic analyses to the data.	The study found that the e-National Agriculture Market effectively streamlines market transactions, thereby increasing accessibility and engagement among farmers.
Towards a comprehensive understanding of digital government success: Integrating implementation and adoption factors (Gil-García & Flores-Zúñiga, 2020)	The study provides a comprehensive framework that integrates implementation and adoption factors in digital government. This framework directly informs digital transformation by clarifying the critical dimensions necessary for its success.	The study employs a quantitative approach. Survey questionnaires are administered to government stakeholders, and data are analysed using statistical techniques, such as structural equation modelling.	The study finds that integrating implementation and adoption factors is crucial for achieving success in digital government.

CROATIAN AND COMPARATIVE PUBLIC ADMINISTRATION

Title, Author, Year	Study Objectives	Methodology	Main Findings
Challenges in implementing citizen-centric e-government services in Rwanda (Mukamurenzi, Grönlund, & Sirajul Islam, 2019)	The study provides insight into the objectives related to assessing and addressing challenges in implementing citizen-centric e-government services. It elucidates how the study identifies policy, technical, and societal barriers in the digital government context.	The study employs a mixed-method approach, collecting quantitative survey data and qualitative interview insights from citizens and analysing them using statistical techniques and thematic coding.	The study finds that fragmented technological infrastructure, limited digital literacy, and bureaucratic resistance impede the implementation of citizen-centric e-government services in Rwanda.
Electronic government: Towards e-democracy or democracy at risk? (Sundberg, 2019)	This study addresses the core challenges of electronic government by assessing how digital transformation strategies may either strengthen or undermine democratic processes. It explores transparency, accountability, and citizen engagement.	The study employs a qualitative methodology, collecting secondary data from literature and expert sources and analysing them through thematic content analysis to examine the risks electronic government poses to democracy.	The study finds that, while e-government initiatives aim to enhance citizen participation, they pose significant risks to traditional democratic safeguards, particularly transparency and accountability.

Source: Authors.

SYSTEMATIC INSIGHTS INTO E-GOVERNMENT: ADDRESSING
BARRIERS, LEVERAGING TRENDS, AND BRIDGING GAPS IN
DEVELOPING COUNTRIES

Summary

E-government projects utilise information and communication technology (ICT) to improve public administration, service delivery, and citizen participation. However, developing countries face significant implementation barriers that limit the effectiveness of these initiatives. Transparency, accountability, and citizens participation are the most important results of e-government, contributing to greater public trust and empowerment. Despite the growing body of literature, important gaps remain in understanding the key strategies required for successful e-government implementation in developing countries, particularly in relation to sociocultural challenges and technological limitations. This study examines implementation strategies adopted across developing countries, identifies major challenges, and suggests ways to improve public service delivery. A systematic search of the Scopus database was conducted to identify peer-reviewed original research articles published between 2013 and 2023. A total of 24 studies were included in the analysis to identify and synthesise the dominant themes in the e-government implementation literature. The findings indicate that effective e-government programmes require robust ICT infrastructure, the promotion of digital literacy, active citizen engagement, and appropriate management of privacy concerns. Key barriers include inadequate IT infrastructure, cultural inertia, and weak governance structures. The study highlights the importance of a multidimensional approach to e-government in terms of technology, organisation, and public participation. By addressing these challenges, developing countries can better realise the potential of e-government initiatives to transform public service delivery, enable wider citizen participation, and promote inclusive governance.

Keywords: *e-government, implementation barriers, developing countries, ICT infrastructure, service delivery*

SUSTAVNI UVIDI U E-UPRAVU: RJEŠAVANJE PREPREKA, ISKORIŠTAVANJE TRENDOVA I PREMOŠĆIVANJE JAZA U ZEMLJAMA U RAZVOJU

Sažetak

Ova sveobuhvatna studija istražuje različite inicijative e-uprave u zemljama u razvoju, naglašavajući transformativni potencijal informacijskih i komunikacijskih tehnologija (IKT) za poboljšanje javne uprave i pružanja usluga uz poticanje sudjelovanja građana. S obzirom na značajne izazove s kojima se te zemlje suočavaju, uključujući sociokulturne prepreke, neadekvatnu tehnološku infrastrukturu i neadekvatne okvire upravljanja, cilj je ove studije rasvijetliti strategije potrebne za uspješnu implementaciju e-uprave. Sustavni pregled literature proveden je analizom 24 recenzirana članka objavljenih od 2013. do 2023. godine čime je omogućena integrativna sinteza postojećeg znanja i temeljito ispitivanje uobičajenih tema u praksi e-uprave. Ovi nalazi naglašavaju kritične komponente koje pridonose učinkovitim inicijativama e-uprave, posebno uspostavljanje snažne IKT infrastrukture koja olakšava pouzdano povezivanje i promicanje digitalne pismenosti među građanima kako bi ih se osnažilo da učinkovito surađuju s državnim tijelima. Osim toga, studija naglašava potrebu za snažnim politikama zaštite podataka kako bi se osiguralo povjerenje i sigurnost korisnika što je ključno za poticanje sudjelovanja građana u digitalnom upravljanju. Prepoznavanjem i rješavanjem prepreka kao što su ograničeni pristup tehnologiji, kulturni otpor promjenama i financijska ograničenja s kojima se suočavaju vlade, ova studija zagovara holistički pristup koji kombinira tehnološke, organizacijske i participativne dimenzije u strategijama e-uprave. Cilj je rada pružiti odgovarajuće preporuke za kreatore javnih politika te za praktičare kako bi unaprijedili pružanje usluga, povećali sudjelovanje građana i potaknuli uključivo upravljanje u zemljama u razvoju.

Ključne riječi: e-uprava, implementacijska ograničenja, zemlje u razvoju, IKT infrastruktura, pružanje usluga