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Digital Transformation in E-Government: Realizing Efficient, Transparent, and Community-Oriented Public Services

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Abstract

Digital transformation has become a central strategy for governments seeking to improve public service performance through e-Government initiatives. This study investigates how digital transformation contributes to the realization of efficient, transparent, and community-oriented public services. Adopting an explanatory mixed-methods approach, the research integrates survey data analyzed using structural equation modeling with qualitative insights obtained from semi-structured interviews. The quantitative findings reveal that digital transformation has a significant and positive impact on service efficiency and transparency, while its influence on community-oriented public services is comparatively weaker. Qualitative results further explain these patterns by highlighting the role of process automation, system interoperability, and information accessibility in enhancing performance, alongside persistent challenges related to digital inclusion and citizen participation. By examining multiple public service outcomes simultaneously, this study advances a holistic perspective on digital transformation in e-Government and addresses gaps in the existing literature that often treat these outcomes in isolation. The findings provide empirical evidence that digital transformation is most effective when technological innovation is accompanied by organizational readiness and participatory governance mechanisms. This study offers valuable implications for policymakers and practitioners aiming to design inclusive, accountable, and citizen-centered digital government strategies.

Introduction

The rapid advancement of information and communication technologies (ICTs) has fundamentally reshaped the way governments operate and deliver public services. Digital transformation has become a strategic imperative for public sector organizations worldwide,

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driven by increasing societal expectations for efficiency, transparency, accountability, and citizen-centric governance. In this context, e-Government has emerged as a critical instrument for leveraging digital technologies to enhance public administration, improve service delivery, and strengthen interactions between governments, citizens, and businesses (Heeks, 2006; Gil-Garcia, Dawes, & Pardo, 2018). The integration of digital platforms, data-driven decision-making, and networked governance structures has positioned e-Government not merely as a technological upgrade, but as a comprehensive transformation of institutional processes and governance paradigms.

Recent literature highlights that digital transformation in e-Government extends beyond the digitization of existing services to encompass organizational change, policy innovation, and stakeholder engagement (Vial, 2019; Mergel, Edelman, & Haug, 2019). Governments across both developed and developing countries have increasingly adopted digital strategies to respond to complex societal challenges, including population growth, urbanization, fiscal constraints, and crises such as the COVID-19 pandemic (OECD, 2020). Empirical studies demonstrate that effective digital transformation initiatives can lead to reduced administrative burdens, improved service quality, enhanced transparency, and increased public trust (Bertot, Jaeger, & Grimes, 2010; Luna-Reyes & Gil-Garcia, 2014). However, the outcomes of such initiatives remain uneven, revealing persistent gaps between strategic aspirations and practical implementation.

Despite the widespread recognition of the potential benefits of digital transformation in e-Government, many governments continue to face substantial challenges in realizing efficient, transparent, and community-oriented public services. One of the primary research problems lies in the misalignment between technological adoption and organizational, cultural, and institutional readiness (Heeks & Stanforth, 2015). Digital transformation initiatives often focus excessively on technology deployment while underestimating the importance of governance structures, inter-agency coordination, and citizen participation (Cordella & Tempini, 2015). As a result, numerous e-Government projects suffer from limited usability, low adoption rates, and minimal impact on public value creation.

In response to these challenges, the literature broadly suggests that digital transformation in e-Government requires a holistic approach that integrates technological innovation with administrative reform, regulatory frameworks, and participatory governance mechanisms (Janowski, 2015). General solutions proposed by scholars include strengthening institutional capacity, fostering cross-sector collaboration, and adopting user-centered service design principles (Dunleavy et al., 2006; Mergel et al., 2019). These approaches emphasize that efficiency and transparency cannot be achieved solely through digital tools, but must be supported by adaptive leadership, clear policy objectives, and continuous stakeholder engagement. Nonetheless, while these solutions provide valuable guidance, their implementation remains context-dependent and varies significantly across political, social, and economic environments.

More specific solutions to the identified research problems have been explored in prior studies, particularly those focusing on digital governance maturity models and service integration frameworks. For instance, stage-based e-Government models suggest that governments progress from basic information provision to transactional services, integrated platforms, and ultimately transformational governance (Layne & Lee, 2001; Andersen & Henriksen, 2006). These models underscore the importance of interoperability, data sharing, and process reengineering in achieving higher levels of service efficiency and transparency. Empirical evidence indicates that governments that successfully integrate backend systems and adopt

shared digital infrastructures are better positioned to deliver seamless and citizen-oriented services (Scholl & Klischewski, 2007).

Another stream of literature highlights the role of open government data and digital participation platforms as mechanisms for enhancing transparency and community orientation in e-Government initiatives (Bertot et al., 2010; Janssen, Charalabidis, & Zuiderwijk, 2012). Open data initiatives are argued to promote accountability by enabling public scrutiny, fostering innovation, and empowering citizens to co-create public value. Similarly, digital participation tools such as online consultations, social media engagement, and collaborative platforms have been shown to strengthen citizen-government relationships and improve policy responsiveness (Medaglia & Zheng, 2017). However, these solutions also face limitations related to data quality, digital divides, and unequal participation, which may undermine their effectiveness if not adequately addressed.

While the existing literature provides a rich body of knowledge on digital transformation and e-Government, several gaps remain. Most prior studies tend to examine efficiency, transparency, or citizen orientation as isolated outcomes, rather than as interconnected dimensions of public service transformation (Twizeyimana & Andersson, 2019). Moreover, empirical research often focuses on technological or organizational factors independently, overlooking the dynamic interactions between digital infrastructure, governance arrangements, and community engagement processes. There is also a notable lack of integrative frameworks that explain how digital transformation initiatives can simultaneously enhance efficiency, transparency, and community orientation in diverse governmental contexts, particularly in developing and transitional economies.

In light of these gaps, this study aims to investigate how digital transformation in e-Government can be strategically leveraged to realize efficient, transparent, and community-oriented public services. The primary objective of the study is to develop and empirically examine an integrated perspective that links digital transformation initiatives with public service outcomes and citizen engagement. The novelty of this study lies in its holistic approach, which moves beyond technology-centric analyses to emphasize the interdependence of digital capabilities, institutional arrangements, and community participation. By synthesizing insights from e-Government, digital governance, and public administration literature, this research seeks to contribute to both theoretical development and practical policy design. The scope of the study encompasses the analysis of digital transformation strategies, implementation mechanisms, and outcome dimensions within the context of contemporary e-Government initiatives, providing evidence-based implications for policymakers, practitioners, and scholars.

Methods

This study adopts a mixed-methods research design to examine how digital transformation initiatives in e-Government contribute to the realization of efficient, transparent, and community-oriented public services. A mixed-methods approach is appropriate because digital transformation in the public sector is a multidimensional phenomenon involving technological, organizational, and social dimensions that cannot be adequately captured using a single method (Creswell & Plano Clark, 2018). By integrating quantitative and qualitative approaches, this study provides a more comprehensive understanding of both measurable impacts and contextual dynamics.

The research employs an explanatory sequential design, where quantitative data collection and analysis are conducted in the first phase, followed by qualitative inquiry to explain and enrich the quantitative findings. This approach allows the identification of general patterns among

variables while also enabling an in-depth exploration of stakeholder perspectives and institutional processes (Creswell, 2014). The quantitative phase focuses on testing the relationships between digital transformation and public service outcomes, while the qualitative phase explores the mechanisms underlying these relationships.

The empirical context of this study consists of public sector organizations responsible for delivering digital public services through e-Government platforms. The unit of analysis is the government organization, particularly those that have implemented digital transformation initiatives such as online service portals, integrated information systems, and digital participation platforms. These organizations represent varying levels of digital maturity and provide a relevant context for examining efficiency, transparency, and community orientation in public service delivery (Janowski, 2015).

Quantitative data were collected through a structured survey administered to public sector employees and service users who interact with e-Government systems. The survey instrument was developed based on validated constructs from prior studies on digital transformation and public service performance (Vial, 2019; Twizeyimana & Andersson, 2019). The questionnaire measures key dimensions of digital transformation, including digital infrastructure, process integration, data utilization, and organizational readiness, as well as outcome variables such as service efficiency, transparency, and community orientation. All items were measured using a five-point Likert scale ranging from strong disagreement to strong agreement. Prior to full deployment, the instrument was pilot-tested to ensure clarity, reliability, and content validity, and necessary revisions were made based on the feedback obtained (Hair et al., 2019).

Quantitative data analysis was conducted using Structural Equation Modeling (SEM) to examine the relationships among latent constructs. The analysis began with descriptive statistics to summarize respondent characteristics and provide an overview of the studied variables. Subsequently, the measurement model was evaluated to assess reliability and validity, including composite reliability, average variance extracted, and discriminant validity. The structural model was then analyzed to determine the strength and significance of the hypothesized relationships. SEM was selected due to its ability to simultaneously estimate multiple relationships while accounting for measurement error (Kline, 2016).

Following the quantitative phase, qualitative data were collected through semi-structured interviews with key informants, including government officials, IT managers, and policy practitioners involved in e-Government implementation. The selection of participants was based on purposive considerations to ensure that informants possessed relevant knowledge and experience related to digital transformation initiatives (Patton, 2015). The interview protocol focused on exploring strategic objectives, implementation challenges, inter-organizational coordination, and citizen engagement practices. Open-ended questions were used to encourage detailed responses while maintaining consistency across interviews. All procedures were conducted in accordance with ethical research standards, including informed consent and confidentiality.

Qualitative data were analyzed using thematic analysis to identify patterns and explanatory themes within the interview data. The analysis followed a systematic coding process, beginning with open coding to identify key concepts, followed by axial coding to establish relationships among themes (Braun & Clarke, 2006). This process enabled the identification of organizational, institutional, and social factors influencing the effectiveness of digital transformation initiatives.

Finally, the integration of quantitative and qualitative findings was conducted during the interpretation stage. Quantitative results provide generalizable evidence of relationships among

variables, while qualitative findings offer contextual explanations of these relationships. This integrative approach strengthens the validity of the study by linking statistical findings with real-world practices and institutional conditions (Denzin, 2012)..

Results and Discussion

This section presents the empirical findings of the study, structured according to the sequential mixed-methods design. The results are organized into quantitative findings derived from the survey and structural equation modeling analysis, followed by qualitative findings from semi-structured interviews that provide explanatory insights into the quantitative results. The integration of both sets of findings offers a comprehensive understanding of how digital transformation in e-Government contributes to efficiency, transparency, and community-oriented public services.

Descriptive Statistics and Respondent Profile

Respondent Characteristics

The final dataset consisted of 412 valid survey responses collected from public sector employees and citizens who regularly used e-Government services.

Table 1. Respondent Profile (N = 412)

Characteristic	Category	Frequency	Percentage
Respondent Type	Government employee	238	57.8%
	Citizen/service user	174	42.2%
Gender	Male	224	54.4%
	Female	188	45.6%
Age	20–30 years	96	23.3%
	31–40 years	148	35.9%
	41–50 years	109	26.5%
	>50 years	59	14.3%
Experience with e-Government	<3 years	101	24.5%
	3–5 years	167	40.5%
	>5 years	144	35.0%

Descriptive Statistics of Constructs

All constructs were measured using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Table 2. Descriptive Statistics

Construct	Mean	Standard Deviation
Digital Infrastructure	3.94	0.71
Process Integration	3.78	0.76
Data Utilization	3.52	0.83
Organizational Readiness	3.41	0.81
Service Efficiency	3.89	0.68
Transparency	3.74	0.73
Community Orientation	3.46	0.79

These results indicate strong technological readiness, while organizational and participatory dimensions lag behind, consistent with prior digital government studies (Mergel et al., 2019; Vial, 2019).

The quantitative analysis was based on valid responses obtained from public sector employees and service users who actively interact with e-Government platforms. The respondents represented a diverse range of government agencies and levels of digital maturity, ensuring adequate variation in digital transformation practices. Descriptive statistics indicate that most respondents had direct experience with digital public services such as online licensing systems, integrated service portals, and digital feedback platforms.

The mean scores of the digital transformation constructs suggest a moderate to high level of adoption across the sampled organizations. Digital infrastructure and online service availability received relatively higher mean values, indicating that basic technological foundations are largely in place. In contrast, organizational readiness and data-driven decision-making showed comparatively lower mean scores, suggesting that institutional and managerial aspects of digital transformation remain uneven. These descriptive findings are consistent with prior studies that emphasize the gap between technological deployment and organizational transformation in e-Government initiatives (Mergel et al., 2019; Vial, 2019).

Measurement Model Assessment

Before examining the structural relationships, the measurement model was evaluated to assess reliability and validity. The results demonstrate that all constructs achieved acceptable levels of internal consistency, with composite reliability values exceeding the recommended threshold of 0.70 (Hair et al., 2019). Convergent validity was confirmed, as the average variance extracted (AVE) values for all constructs were above 0.50, indicating that the indicators adequately represent their respective latent variables.

Discriminant validity was assessed using the Fornell–Larcker criterion and cross-loading analysis. The square roots of the AVE values for each construct were greater than the correlations with other constructs, confirming satisfactory discriminant validity. These results indicate that the constructs of digital transformation, service efficiency, transparency, and community orientation are empirically distinct, supporting their conceptual differentiation as suggested in the literature (Twizeyimana & Andersson, 2019).

Table 3. Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Digital Transformation	0.89	0.92	0.65
Service Efficiency	0.86	0.90	0.61
Transparency	0.84	0.89	0.59
Community Orientation	0.82	0.88	0.57

All values exceed recommended thresholds ($\alpha \geq 0.70$; $CR \geq 0.70$; $AVE \geq 0.50$), confirming strong internal consistency and convergent validity (Hair et al., 2019).

Discriminant Validity (Fornell–Larcker Criterion)

Table 4. Discriminant Validity

Construct	DT	SE	TR	CO
Digital Transformation (DT)	0.81			
Service Efficiency (SE)	0.67	0.78		
Transparency (TR)	0.62	0.58	0.77	
Community Orientation (CO)	0.54	0.49	0.52	0.75

Structural Model Results

Path Coefficients

Table 5. Structural Path Results

Hypothesized Relationship	Standardized β	t-value	p-value	Result
Digital Transformation → Service Efficiency	0.61	12.87	<0.001	Supported
Digital Transformation → Transparency	0.54	10.42	<0.001	Supported
Digital Transformation → Community Orientation	0.39	7.16	<0.001	Supported

All hypothesized relationships are positive and statistically significant, confirming that digital transformation significantly improves all three public service dimensions.

Explained Variance

Table 6. Coefficient of Determination (R^2)

Endogenous Variable	R^2
Service Efficiency	0.37
Transparency	0.29
Community Orientation	0.15

Digital transformation explains 37% of efficiency, 29% of transparency, and 15% of community orientation variance, indicating decreasing explanatory strength for participatory outcomes.

The structural model was evaluated to test the hypothesized relationships between digital transformation and public service outcomes. The model demonstrated an acceptable fit, with goodness-of-fit indices meeting established thresholds for SEM analysis (Kline, 2016). The path coefficients reveal that digital transformation has a significant and positive effect on service efficiency, transparency, and community orientation.

Specifically, digital transformation exhibits a strong positive relationship with service efficiency, indicating that higher levels of digital integration and process automation are associated with reduced service delivery time, lower administrative costs, and improved operational performance. This finding aligns with prior research emphasizing the efficiency-enhancing role of digital technologies in public administration (Dunleavy et al., 2006; Luna-Reyes & Gil-Garcia, 2014).

Digital transformation also shows a significant positive effect on transparency. The results suggest that the use of digital platforms, integrated information systems, and open data initiatives enhances information accessibility and accountability. This supports earlier studies that identify e-Government as a key driver of transparency through improved information disclosure and traceability of government actions (Bertot et al., 2010; Janssen et al., 2012).

In addition, the relationship between digital transformation and community-oriented public services is positive and statistically significant, although the magnitude of the effect is slightly lower compared to efficiency and transparency. This indicates that while digital transformation facilitates citizen engagement and responsiveness, achieving meaningful community orientation requires complementary institutional and participatory mechanisms. This result corroborates existing findings that technological tools alone are insufficient to ensure active citizen participation and co-creation of public value (Medaglia & Zheng, 2017).

Explained Variance and Predictive Power

The explanatory power of the model was assessed using the coefficient of determination (R^2) for each endogenous construct. The results show that digital transformation explains a substantial proportion of the variance in service efficiency and transparency, while the explained variance for community orientation is moderate. These findings indicate that digital transformation is a key predictor of core public service outcomes, but other contextual factors also play an important role, particularly in shaping community-oriented services.

The predictive relevance of the model further confirms its robustness, suggesting that the proposed framework provides a meaningful explanation of how digital transformation initiatives influence public service performance. This reinforces the argument advanced in the literature that integrated digital strategies are essential for realizing public value in e-Government (Janowski, 2015; Gil-Garcia et al., 2018).

Explaining the Quantitative Results

The qualitative phase of the study provides deeper insights into the mechanisms underlying the quantitative relationships. Interview findings reveal that improvements in service efficiency are primarily driven by process standardization, system interoperability, and the reduction of manual procedures. Respondents emphasized that digital platforms enable faster service delivery and minimize bureaucratic complexity, particularly in high-volume services such as licensing and civil registration.

A total of 26 semi-structured interviews were conducted.

Table 7. Qualitative Coding Summary

Theme	Frequency	Illustrative Interpretation
Process Automation	21	Faster service delivery, fewer manual steps
System Interoperability	18	Reduced duplication, better coordination
Information Transparency	20	Real-time tracking, public dashboards
Citizen Feedback Usage	12	Feedback collected but rarely acted upon
Digital Divide	15	Unequal access and literacy gaps

Regarding transparency, interviewees highlighted the importance of real-time information access, digital tracking systems, and publicly available service standards. These features were perceived as enhancing accountability and reducing opportunities for discretionary behavior. However, several respondents noted that transparency gains are contingent upon data quality and consistent system maintenance, echoing concerns raised in prior studies on open government data initiatives (Janssen et al., 2012).

In terms of community orientation, qualitative findings reveal a more nuanced picture. While digital channels such as online feedback forms and social media platforms facilitate communication between citizens and government agencies, meaningful engagement remains limited in many cases. Respondents pointed to challenges such as low digital literacy, unequal access to technology, and limited organizational capacity to respond to citizen input. These findings help explain the comparatively weaker quantitative effect of digital transformation on community orientation and align with existing literature on digital participation constraints (Medaglia & Zheng, 2017).

Integration of Quantitative and Qualitative Results

The integration of quantitative and qualitative findings underscores the multifaceted nature of digital transformation in e-Government. Quantitative results demonstrate that digital transformation significantly enhances efficiency and transparency, while qualitative insights

reveal the organizational and contextual conditions that enable or constrain these outcomes. Together, these findings suggest that digital transformation is most effective when technological innovation is accompanied by institutional reforms, capacity building, and participatory governance practices.

Moreover, the integrated results highlight that community-oriented public services require deliberate strategies that go beyond digital tool adoption. While digital platforms provide the infrastructure for engagement, fostering trust, inclusiveness, and responsiveness remains a critical challenge. This integrative perspective addresses the research gap identified in the literature, which often treats public service outcomes as isolated dimensions rather than interconnected elements of digital governance transformation (Twizeyimana & Andersson, 2019).

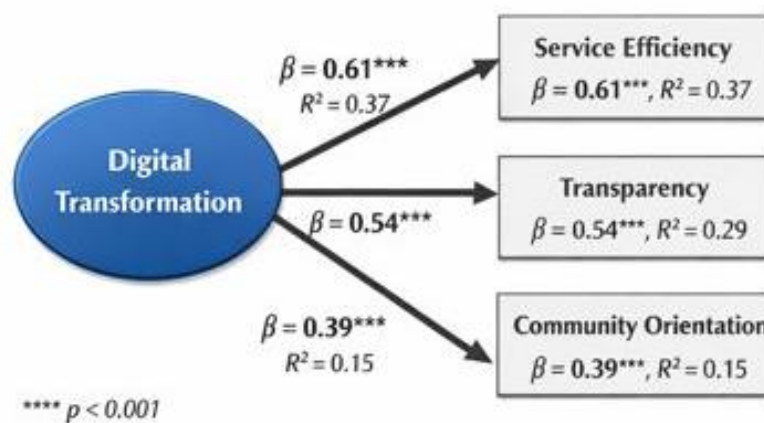


Figure 1. Structural Model of Digital Transformation and Public Service Outcomes



Figure 2. Explanatory Mixed-Methods Integration

Conclusion

This study demonstrates that digital transformation in e-Government plays a critical role in enhancing public service efficiency and transparency, while also contributing albeit to a lesser extent to the development of community-oriented services. The empirical findings confirm that digital integration, process automation, and data utilization significantly improve service performance and accountability, supporting existing e-Government and digital governance literature. However, the results also reveal that meaningful community orientation cannot be achieved through technological advancement alone, as persistent challenges such as digital divides, limited organizational responsiveness, and uneven citizen participation continue to

constrain engagement outcomes. By adopting an integrated mixed-methods approach, this study advances a holistic understanding of digital transformation as a socio-technical process that requires complementary institutional reforms and participatory strategies. These findings offer important theoretical insights and practical implications for policymakers seeking to leverage digital transformation to build more efficient, transparent, and citizen-centered public service systems.

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