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Estimation and Validation of a Digital Governance Model with a Service Excellence and Public Participation Approach in Government Organizations

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Abstract

The present study is applied in nature because the findings of the dissertation are intended to be made available to policymakers in government organizations for developing an appropriate model of digital governance based on service excellence and public participation. Given that the present study seeks to estimate and validate a digital governance model with a service excellence and public participation approach in government organizations, it is applied in terms of purpose and descriptive-analytical in terms of nature. In the Interpretive Structural Modeling (ISM) section, the statistical sample consisted of 14 experts, whereas in the structural equation modeling section, a statistical sample of 210 individuals was considered. The results of the Interpretive Structural Modeling indicated that components such as chronic public dissatisfaction, lack of information transparency, persistent structural corruption, and insufficient digital justice played driving and foundational roles in the model and influenced the other variables. Furthermore, the analysis of driving power and dependence demonstrated that certain components play key roles in the sustainability of the model and should therefore be prioritized in policymaking and implementation. The descriptive statistics also indicated that chronic public dissatisfaction, with a mean of 4.172, skewness of 0.918, kurtosis of −0.044, and variance of 0.582, was of considerable importance. Moreover, policy misalignment, with a mean of 3.479, skewness of 0.273, kurtosis of −0.318, and variance of 0.465, was assessed at a moderately high level. The demographic findings further showed that the sample included 105 women, accounting for 50.11% of the participants. In terms of educational attainment, 107 participants held a master's degree, representing 51.19% of the sample; 97 held a bachelor's degree, representing 46.63%; and 6 held a doctoral degree. Overall, the findings indicate that the realization of digital governance in government organizations requires administrative structural reforms, enhanced transparency, strengthened accountability, development of digital infrastructure, improvement of human competencies, and the establishment of mechanisms facilitating public participation. Accordingly, digital governance can serve as an effective model for achieving public service excellence, increasing citizens' trust, and improving the performance of government organizations.

Keywords: digital governance, service excellence, public participation, government organizations, transparency, digital justice

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1. Introduction

The rapid diffusion of digital technologies has fundamentally altered the architecture of public administration, organizational governance, service delivery, and citizen–government interactions. Digital transformation is no longer limited to the automation of administrative routines or the conversion of paper-based processes into electronic formats; rather, it increasingly entails a broad reconfiguration of organizational structures, decision-making mechanisms, service systems, institutional relationships, and value-creation processes. Digital transformation therefore involves changes in organizational strategy, operational processes, capabilities, and stakeholder relationships that emerge through the integration of digital technologies into organizational activities (Vial, 2019). In the public sector, this transformation has gradually shifted attention from the conventional concept of e-government, which mainly emphasizes online service provision and administrative digitization, toward digital governance, which encompasses a wider set of institutional, managerial, technological, social, and participatory arrangements. The transition from digital government to digital governance reflects a movement from technology-centered modernization toward networked, participatory, and institutionally embedded forms of governance in which public organizations, citizens, private actors, and other stakeholders interact through digital infrastructures (Erkut, 2020). This broader transformation has increased the strategic importance of digital governance as a mechanism for strengthening government performance, improving public services, increasing transparency, facilitating participation, and generating public value.

Digital governance can be understood as the institutional and managerial framework through which digital technologies are coordinated, regulated, and utilized to improve governance processes and public-sector outcomes. Unlike traditional forms of government administration, digital governance places greater emphasis on interconnectedness, data-driven decision-making, cross-organizational coordination, citizen engagement, and the integration of technological capabilities with governance objectives. Research on the evolution from e-government to digital governance has shown that this transition requires more than technological investment; it also depends on institutional redesign, leadership transformation, organizational learning, and the development of new governance capacities (Tavakolirad & Sadat Miri, 2021). Similarly, studies of e-governance development indicate that successful implementation depends on a combination of organizational, technological, cultural, legal, managerial, and environmental factors rather than on isolated digital interventions (Deghati et al., 2019). Accordingly, digital governance should be viewed as a multidimensional governance paradigm in which technology functions as an enabling infrastructure for administrative reform, collaborative governance, service innovation, and institutional transformation.

The significance of digital governance has become particularly evident as public organizations face growing demands for efficiency, transparency, responsiveness, inclusiveness, and accountability. Citizens increasingly expect government organizations to provide accessible, timely, reliable, and personalized services through digital platforms while simultaneously protecting fairness, privacy, and procedural integrity. In this environment, public organizations must not only digitize services but also establish governance mechanisms capable of coordinating digital investments, managing data, reducing administrative fragmentation, and ensuring that digital transformation translates into measurable public value. Comparative assessments of digital governance practices demonstrate considerable differences among countries in their ability to institutionalize digital capabilities and convert them into socio-economic and administrative outcomes (Nevzorova et al., 2021). These differences underline the importance of organizational readiness, governance quality, digital capacity, and strategic alignment. Likewise, evidence concerning digital governance performance and best practices shows that governments achieve stronger outcomes when digital initiatives are linked to broader institutional strategies, citizen needs, performance measurement, and organizational reform (Manoharan et al., 2023).

One of the major challenges in this process is that digital transformation can fail to improve governance when technological change is not accompanied by institutional and organizational transformation. A purely technical approach may produce fragmented systems, duplicated platforms, poor interoperability, weak accountability, resistance among employees, and limited citizen acceptance. Studies of digital governance challenges have identified structural weaknesses, inadequate coordination, institutional inertia, insufficient digital capabilities, and ineffective governance arrangements as barriers to successful transformation (Tiwari, 2022). In the Iranian context, analyses of digital governance in e-government have similarly emphasized deficiencies related to organizational structures, administrative processes, policy coherence, technological

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infrastructure, and governance mechanisms (Bikzad & Jalilinejad, 2021). Research on leadership and digital governance in large organizations has also shown that digital transformation requires an organizational environment capable of supporting leadership adaptation, strategic alignment, innovation, and cross-functional coordination (Saraeian & Golabadi, 2022). Therefore, digital governance cannot be implemented effectively without addressing the structural and managerial conditions that shape the institutional use of digital technologies.

Leadership and organizational capacity represent particularly important dimensions of digital governance. Digital transformation often requires leaders to coordinate technological change with institutional objectives, manage resistance, develop human capital, and create mechanisms for collaborative decision-making. Evidence from system-level transformation in higher education indicates that digital leadership contributes to institutional change by shaping strategic direction, organizational readiness, governance coordination, and the adoption of digital systems (Aedi et al., 2026). Similarly, research on digital transformation and public value creation highlights the importance of digital competencies, institutional readiness, governance pathways, and organizational capabilities in converting digital technologies into sustainable public value (Nwaigwe et al., 2026). These findings suggest that human resource capacity, leadership quality, and organizational preparedness are not secondary implementation issues but central determinants of digital governance performance. In addition, network governance research indicates that capacity building is essential when multiple actors must coordinate resources, knowledge, responsibilities, and decision-making processes across organizational boundaries (Simaei Chafi & Memarzadeh Tehran, 2022).

The strategic importance of institutional capacity becomes even clearer in environments characterized by technological uncertainty, resource limitations, and policy instability. Digital governance initiatives frequently depend on specialized human resources, reliable communication infrastructures, organizational flexibility, political support, and access to technological resources. Where these conditions are weak, public organizations may struggle to institutionalize digital governance or sustain transformation over time. Studies of digital governance in the digital transformation of the insurance industry have shown that effective governance depends on mechanisms such as technological infrastructure, policy coordination, managerial support, organizational capabilities, and institutional arrangements (Khasm Afkan Nezam & Khalafi, 2022). Broader assessments of digital governance have similarly emphasized both opportunities and challenges, including increased efficiency and transparency on the one hand and digital exclusion, cybersecurity concerns, inadequate infrastructure, organizational resistance, and institutional weaknesses on the other (Dhaoui, 2019). These challenges imply that a valid digital governance model must account not only for enabling strategies but also for causal, contextual, and intervening conditions that may strengthen or constrain governance outcomes.

At the same time, digital governance is increasingly evaluated in terms of its contribution to public-sector performance rather than merely the extent of technology adoption. Governments are under pressure to demonstrate that digital investments generate measurable improvements in administrative efficiency, service quality, environmental outcomes, institutional effectiveness, and citizen welfare. Recent evidence from China indicates that combinations of digital transformation policies can improve government governance performance when policy instruments are coordinated and aligned with broader administrative objectives (Li & Zhang, 2026). Digital governance has also been associated with broader developmental outcomes. For example, research on digital governance and green development suggests that digitally enabled governance can support public well-being and sustainable development by improving information flows, regulatory capacity, and government responsiveness (Zou et al., 2025). These findings reinforce the view that digital governance should be assessed as a performance-oriented institutional system rather than as a narrow technology-management process.

The relationship between digital governance and public trust is another critical consideration. Digital technologies can increase transparency, simplify access to public services, reduce transaction costs, and improve communication between citizens and government; however, these benefits are not automatic. If digital systems are inaccessible, nontransparent, unreliable, or perceived as unfair, they may deepen distrust and exclusion rather than improve legitimacy. Evidence from Nigeria indicates that citizen trust in digitally governed public institutions is influenced by socio-technical factors such as inclusivity, accessibility, institutional transformation, and the perceived fairness of digital systems (Egba et al., 2026). This is particularly important in societies characterized by unequal access to technology or substantial digital divides. Digital

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governance therefore requires attention to digital justice, meaning that citizens should have equitable opportunities to access digital services, benefit from digital transformation, and participate in digitally mediated governance processes. In this sense, fairness, transparency, and inclusion are not peripheral ethical concerns but central elements of sustainable digital governance.

A closely related dimension is service excellence. Government organizations are expected not only to provide services but also to deliver them in ways that are efficient, responsive, equitable, reliable, and citizen-centered. Service excellence involves continuously improving the quality and effectiveness of service processes while aligning organizational operations with users' needs and expectations. Research on public service excellence emphasizes that excellence in government requires responsiveness, ethical conduct, fairness, accountability, and an orientation toward citizens and public values (Hosseinpour et al., 2021). Empirical work in government agencies further shows that service excellence can contribute directly to improved service quality by strengthening responsiveness, reliability, and service orientation (Yusyanah, 2022). Accordingly, a digital governance model oriented toward service excellence should move beyond the availability of digital platforms and consider whether digital systems actually improve the citizen experience, increase service accessibility, reduce administrative burden, and enhance the quality of public interactions.

Customer and citizen participation also constitutes an important aspect of service performance. Service-management research demonstrates that the effectiveness of participation depends on the level and form of user involvement and that inappropriate levels of participation may create perceptual biases, inefficiencies, or misalignment between service providers and users (Damali et al., 2020). In the public sector, participation has an even broader governance significance because citizens are not merely service recipients but also stakeholders in policy formulation, planning, monitoring, and evaluation. Public participation can improve the legitimacy and responsiveness of governmental decisions by incorporating local knowledge, citizen preferences, and stakeholder concerns into governance processes. Research on performance-based budgeting has shown that public participation can strengthen accountability and improve the alignment of governmental resource allocation with public priorities (Lamidi, 2022). Similarly, a scoping review of public involvement in community health services found that participation can be incorporated into planning, development, and implementation through multiple mechanisms, although meaningful involvement requires appropriate structures, resources, and institutional commitment (Pedersen et al., 2022).

Public participation is particularly relevant to digital governance because digital technologies create new channels through which citizens can communicate with government, access information, provide feedback, and participate in decision-making. Digital platforms can potentially reduce the costs of participation, extend the geographical reach of consultation, and enable more continuous interaction between public organizations and stakeholders. Nevertheless, digital participation may remain superficial if governments use digital platforms primarily for one-way communication rather than genuine collaborative governance. Effective digital participation therefore requires mechanisms that support stakeholder engagement, transparency, responsiveness, and visible integration of citizen input into administrative decisions. The importance of participation also intersects with public–private and interorganizational collaboration. Models of public–private partnership indicate that complex public-sector objectives often require coordination across governmental and nongovernmental actors, particularly in areas involving infrastructure development, innovation, and service delivery (Sadeghi et al., 2022). Digital governance must therefore be capable of supporting collaborative arrangements that extend beyond the boundaries of individual government organizations.

The need for interorganizational coordination becomes especially pronounced in fragmented administrative systems. Government services frequently involve multiple agencies, jurisdictions, or levels of government, and digital transformation can be undermined when institutions develop isolated systems or incompatible administrative processes. Research on digital governance in inter-municipal arrangements shows that digital mechanisms can help address performance challenges by improving coordination, information exchange, and collaborative management across organizational boundaries (Leoni et al., 2023). Similarly, strategic development research emphasizes the usefulness of integrated frameworks for aligning organizational inputs, processes, outputs, and evaluation mechanisms (Choubandian et al., 2021). From this perspective, integrated information systems and interoperable digital platforms become critical governance instruments because they can reduce administrative duplication, enhance coordination, improve data quality, and facilitate unified service delivery.

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The development of integrated digital governance also has implications for organizational resilience and adaptive capacity. The COVID-19 pandemic demonstrated the extent to which public and service systems depend on rapid access to data, intelligent technologies, and coordinated digital infrastructures. Research on the use of artificial intelligence for optimizing pandemic-related supply chains illustrates how digital technologies can support decision-making under conditions of uncertainty by improving information processing, resource allocation, and operational responsiveness (Jones et al., 2020). Although such technologies offer significant opportunities, their effectiveness ultimately depends on governance arrangements capable of ensuring coordination, accountability, institutional trust, and appropriate use. Thus, technologies such as artificial intelligence, big data, and integrated information systems should be understood as components of broader governance ecosystems rather than independent solutions to organizational problems.

Another important concern is the relationship between digital governance and institutional performance across different administrative contexts. Digital governance models cannot necessarily be transferred unchanged from one organization or country to another because institutional structures, political systems, organizational cultures, technological capacities, and public expectations vary considerably. Comparative research shows that leading countries differ substantially in their digital governance practices, particularly in the ways they regulate socio-economic activity, coordinate digital transformation, and institutionalize data-driven governance (Nevzorova et al., 2021). Consequently, context-sensitive models are needed that recognize both universal governance principles and local institutional conditions. This is especially important in government organizations facing centralized administrative structures, organizational resistance, unequal digital access, infrastructure weaknesses, technological sanctions, or unstable political support.

These challenges also highlight the importance of policy coherence. Digital governance initiatives may underperform when technological policies, administrative reforms, public service strategies, and organizational objectives are poorly aligned. The coexistence of multiple digital initiatives without an integrated policy architecture can lead to duplication, fragmented investment, inconsistent standards, and weak accountability. Recent research on policy combinations indicates that governance performance improves when digital transformation policies are mutually reinforcing and implemented as coherent policy packages rather than isolated interventions (Li & Zhang, 2026). Policy alignment should therefore be treated as a central structural requirement for digital governance. This includes aligning digital strategies with public-service goals, organizational capabilities, citizen needs, regulatory frameworks, and performance indicators.

The overall literature further suggests that digital governance is best conceptualized as a system of interdependent components rather than a single organizational practice. Its effectiveness depends on the interaction among structural conditions, institutional pressures, technological capabilities, human resources, leadership, stakeholder participation, and service strategies. Research on e-governance establishment has already shown the value of integrated models for explaining these interdependencies (Deghati et al., 2019), while studies of organizational competitiveness indicate that digital governance challenges often arise from the inability to coordinate technological and organizational transformation simultaneously (Tiwari, 2022). The movement toward digital governance therefore requires models capable of distinguishing between foundational drivers, contextual constraints, intervention conditions, organizational strategies, and resulting outcomes.

Within this framework, several variables appear especially important for government organizations. Persistent structural corruption, lack of information transparency, insufficient digital justice, and policy misalignment may function as causal conditions that motivate or shape the need for digital governance reform. Centralized administrative structures, resistance-oriented organizational cultures, weak communication infrastructure, and regional digital divides may provide the contextual environment in which digital governance is implemented. Chronic public dissatisfaction, external technological sanctions, temporary political support, and limited human resource capacity may act as intervening conditions that either facilitate or constrain transformation. Meanwhile, the design of integrated systems, human resource empowerment, digitalization of administrative processes, and strengthening of stakeholder participation can be viewed as strategic responses through which organizations attempt to improve governance performance. The expected outcomes of these strategies include greater decision-making transparency, achievement of service justice, reduced administrative costs, and increased citizen satisfaction. Such a multidimensional approach is consistent with the broader literature emphasizing institutional readiness, governance capacity, service quality, participation, and organizational transformation as interconnected foundations of successful digital governance (Manoharan et al., 2023; Nwaigwe et al., 2026).

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Despite the expansion of research on digital government, digital transformation, e-governance, public participation, and service quality, an important gap remains in developing integrated and empirically validated models that simultaneously explain the relationships among digital governance, service excellence, and public participation in government organizations. Existing studies often address specific components independently, such as digital transformation (Vial, 2019), digital leadership (Aedi et al., 2026), governance performance (Manoharan et al., 2023), service excellence (Yusyanah, 2022), public involvement (Pedersen et al., 2022), network governance capacity (Simaei Chafi & Memarzadeh Tehran, 2022), or institutional challenges (Bikzad & Jalilinejad, 2021). Consequently, there is a need for a comprehensive framework that identifies the hierarchical relationships among key governance components while also statistically validating the relationships embedded within the proposed model. Combining Interpretive Structural Modeling with Partial Least Squares Structural Equation Modeling can provide such an analytical foundation by first revealing the hierarchical and driving relationships among the relevant variables and subsequently evaluating the measurement and structural properties of the model.

Therefore, the aim of the present study was to estimate and validate a digital governance model with a service excellence and public participation approach in government organizations.

2. Methods and Materials

The present study is applied in nature because the findings of the dissertation are intended to be made available to policymakers in government organizations for developing an appropriate digital governance model based on service excellence and public participation in government organizations. Given that the present study seeks to estimate and validate a digital governance model with a service excellence and public participation approach in government organizations, it is applied in terms of purpose and descriptive-analytical in terms of nature. In the Interpretive Structural Modeling section, the statistical sample consisted of 14 experts, whereas in the structural equation modeling section, a statistical sample of 210 participants was considered. Initially, the research model was developed based on the study by Dana et al. (2026), as presented below.

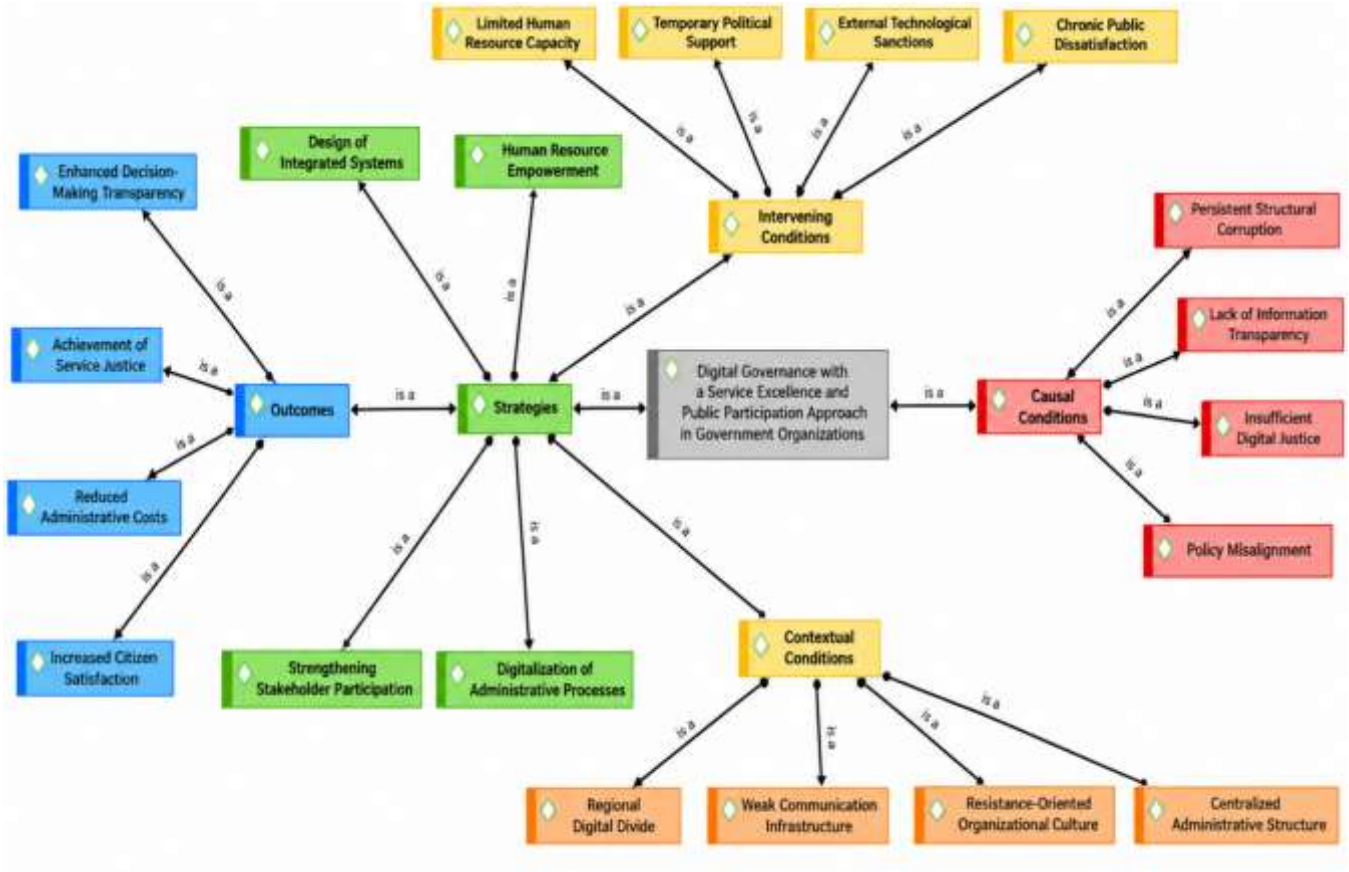


Figure 1. Conceptual Model

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Based on the above figure, it can be stated that the Strauss and Corbin model, as one of the recognized models in the development of a digital governance model with a service excellence and public participation approach in government organizations, is of considerable importance.

3. Findings and Results

The first step in Interpretive Structural Modeling is to determine the internal relationships among the indicators. Expert judgments are used to represent the internal relationships among the indicators.

Table 1. Identified and Coded Variables

SSIM	Variable
D01	Chronic public dissatisfaction
D02	Lack of information transparency
D03	Persistent structural corruption
D04	Insufficient digital justice
D05	Design of integrated systems
D06	Human resource empowerment
D07	Digitalization of administrative processes
D08	Strengthening stakeholder participation
D09	Achievement of service justice
D10	Centralized administrative structure
D11	Resistance-oriented organizational culture
D12	Weak communication infrastructure
D13	Regional digital divide
D14	External technological sanctions
D15	Temporary political support
D16	Limited human resource capacity
D17	Policy misalignment

The matrix obtained at this stage indicates which variables are influenced by a particular variable and which variables exert an influence on it. Conventionally, symbols such as those presented in Table 2 are used to identify the pattern of relationships among the elements.

Table 2. States and Symbols Used to Represent Relationships Among the Research Indicators

V	A	X	O
Variable *i* influences variable *j*	Variable *j* influences variable *i*	Bidirectional relationship	No relationship

The Structural Self-Interaction Matrix (SSIM) is developed from the study dimensions and indicators and their pairwise comparisons using four forms of conceptual relationships. The resulting information is synthesized according to the Interpretive Structural Modeling method, and the final Structural Self-Interaction Matrix is subsequently constructed (Azar & Bayat, 2008, p. 10).

The reachability matrix is obtained by converting the Structural Self-Interaction Matrix into a binary matrix consisting of zeros and ones. In the reachability matrix, the elements on the principal diagonal are assigned a value of one. Accordingly, the ISM reachability matrix is presented in Table 3.

Table 3. Reachability Matrix of the Identified Indicators

SSIM	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17
D01		1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
D02	0		0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
D03	1	1		1	1	1	1	1	1	0	0	0	0	0	0	0	0
D04	1	1	1		1	1	1	1	1	0	0	0	0	0	0	0	0
D05	0	0	0	0		0	1	0	1	0	0	0	0	0	0	0	0
D06	0	0	0	0	1		1	1	1	0	0	0	0	0	0	0	0
D07	0	0	0	0	1	0		0	1	0	0	0	0	0	0	0	0
D08	0	0	0	0	1	1	1		1	0	0	0	0	0	0	0	0
D09	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
D10	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1

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D11	1	1	1	1	1	1	1	1	1	0		0	0	1	1	1	1
D12	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1
D13	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1
D14	1	1	1	1	1	1	1	1	1	0	0	0	0		1	0	1
D15	1	1	1	1	1	1	1	1	1	0	0	0	0	1		0	1
D16	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1		1
D17	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	

After the initial reachability matrix has been developed, transitivity is incorporated into the relationships among the variables to obtain the final reachability matrix. This is a square matrix in which each element is assigned a value of one when one element is reachable from another through a path of any length; otherwise, the element is assigned a value of zero. The reachability matrix is derived using Euler's theory, according to which the identity matrix is added to the adjacency matrix.

Table 4. Final Reachability Matrix of the Indicators

SSIM	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17
D01	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
D02	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
D03	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
D04	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0
D05	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
D06	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0
D07	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
D08	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0
D09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D10	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
D11	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1
D12	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
D13	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
D14	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1
D15	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	1
D16	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	1
D17	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0

To determine the relationships and hierarchical levels of the criteria, the reachability set and antecedent set for each criterion must be extracted from the reachability matrix.

The **reachability set** (row elements, outputs, or influencing elements) consists of the variables that can be reached through the respective variable.

The **antecedent set** (column elements, inputs, or influenced elements) consists of the variables through which the respective variable can be reached.

The reachability set includes the criterion itself and the criteria influenced by it. The antecedent set includes the criterion itself and the criteria that influence it. The intersection of the two sets is then determined. For variable C_i, the reachability set (outputs or influencing elements) includes the variables that can be reached through C_i. The antecedent set (inputs or influenced elements) includes the variables through which $C_i$can be reached.

Table 5. Input and Output Sets of Each Variable

Components	Row Count	Column Count
Chronic public dissatisfaction	8	10
Lack of information transparency	5	11
Persistent structural corruption	8	10
Insufficient digital justice	8	10
Design of integrated systems	2	15
Human resource empowerment	4	13
Digitalization of administrative processes	2	15
Strengthening stakeholder participation	4	13
Achievement of service justice	0	15
Centralized administrative structure	16	2

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Resistance-oriented organizational culture	13	4
Weak communication infrastructure	16	2
Regional digital divide	16	2
External technological sanctions	11	7
Temporary political support	10	7
Limited human resource capacity	13	4
Policy misalignment	11	7
Total	147	147

After determining the reachability set and antecedent set, the intersection of the two sets is calculated. The first variable for which the intersection of the two sets is equal to its reachability set is assigned to the first level. Therefore, the elements at the first level are the most dependent elements in the model. After determining a level, the criterion whose level has been identified is removed from all sets. The input and output sets are then reconstructed, and the level of the next variable is determined.

Table 6. Determination of Levels in the ISM Hierarchy

Symbol	Research Variable	Level
D01	Chronic public dissatisfaction	4
D02	Lack of information transparency	5
D03	Persistent structural corruption	4
D04	Insufficient digital justice	4
D05	Design of integrated systems	7
D06	Human resource empowerment	6
D07	Digitalization of administrative processes	7
D08	Strengthening stakeholder participation	6
D09	Achievement of service justice	8
D10	Centralized administrative structure	1
D11	Resistance-oriented organizational culture	2
D12	Weak communication infrastructure	1
D13	Regional digital divide	1
D14	External technological sanctions	3
D15	Temporary political support	3
D16	Limited human resource capacity	2
D17	Policy misalignment	3

Therefore, variable D9 is the first-level variable. After identifying the first-level variable(s), these variables are removed, and the input and output sets are recalculated without considering the first-level variables. The intersection set is then identified, and variables whose intersection corresponds to the input set are selected as second-level variables.

Variables D5 and D7 are located at the second level.

Variables D6 and D8 are third-level variables.

Variable D2 is a fourth-level variable.

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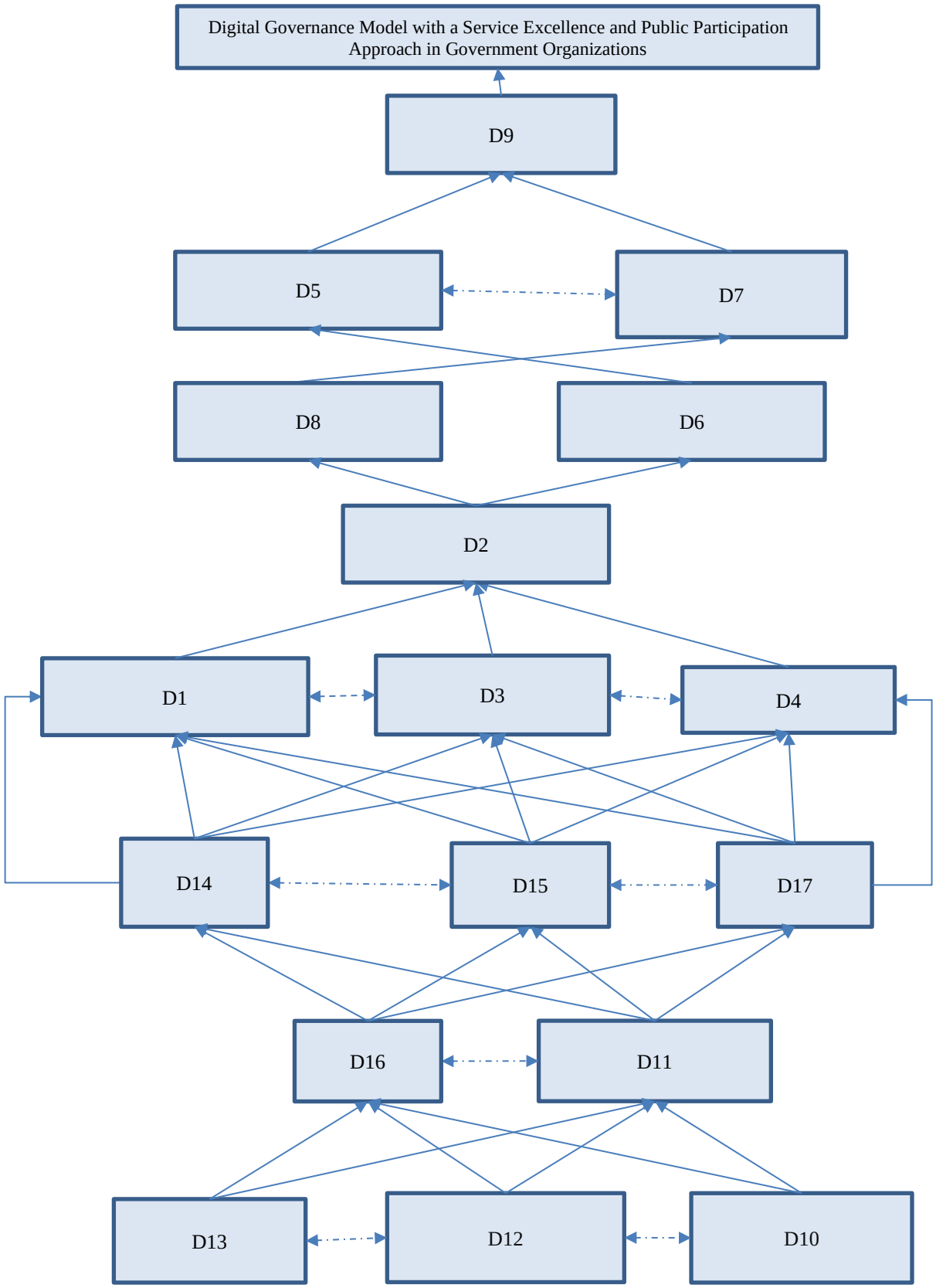


Figure 2. Final ISM Model

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The final hierarchical pattern of the identified variables is illustrated in the figure. In this diagram, only the significant relationships between the elements of each level and those of the level immediately below, as well as significant internal relationships among the elements within each row, are considered.

In general, methods used to process and summarize collected information are referred to as descriptive statistics. This type of statistical analysis is concerned solely with describing the population or sample, and its purpose is to calculate the parameters of the research population or sample. In the descriptive statistics section, data were analyzed using measures of central tendency, such as the mean, and measures of dispersion, including variance, range, minimum, and maximum.

Table 7. Descriptive Statistics of the Research Variables

Variables	Mean	Skewness	Kurtosis	Variance	Range
Chronic public dissatisfaction	4.172	0.918	−0.044	0.582	2.25
Lack of information transparency	3.576	−0.419	0.617	0.698	2.5
Persistent structural corruption	3.335	−0.301	−0.171	0.533	3
Insufficient digital justice	4.101	−0.241	−0.621	0.487	2
Design of integrated systems	3.224	−0.938	0.134	0.490	2
Human resource empowerment	3.365	0.273	−0.318	0.465	3
Digitalization of administrative processes	4.115	0.172	0.051	0.387	2
Strengthening stakeholder participation	3.478	0.281	−0.558	0.480	3
Achievement of service justice	3.809	1.310	−0.628	0.500	3
Centralized administrative structure	4.445	1.448	−0.749	0.335	1
Resistance-oriented organizational culture	3.379	1.009	0.625	0.719	1
Weak communication infrastructure	4.337	0.918	−0.044	0.582	2.25
Regional digital divide	3.115	−0.419	0.617	0.698	2.5
External technological sanctions	3.546	−0.301	−0.171	0.533	3
Temporary political support	4.110	−0.241	−0.621	0.487	2
Limited human resource capacity	3.143	−0.938	0.134	0.490	2
Policy misalignment	3.479	0.273	−0.318	0.465	3

Chronic public dissatisfaction had a mean of 4.172 and a variance of 0.582. Its range, based on the minimum and maximum values, was 3. The descriptive statistics of the remaining variables are also presented in the table.

Because Partial Least Squares (PLS) analysis is derived from linear regression, the assumptions concerning the data in regression analysis should also be examined in this approach.

In the present study, a structural equation modeling technique, namely Partial Least Squares (PLS), was used to test the measurement model and the research hypotheses. PLS is less dependent on sample size, does not require normally distributed data, and focuses on maximizing explained variance. Unlike covariance-based software packages such as LISREL and AMOS, this approach is therefore more suitable for many practical applications.

In general, relationships between variables in the Partial Least Squares technique are classified into two categories:

1. **Outer model:** The outer model is equivalent to the measurement model (confirmatory factor analysis) in structural equation modeling and represents the relationships between latent variables and their observed indicators.
2. **Inner model:** The inner model is equivalent to the structural model (path analysis) in structural equation modeling and examines the relationships among latent variables.

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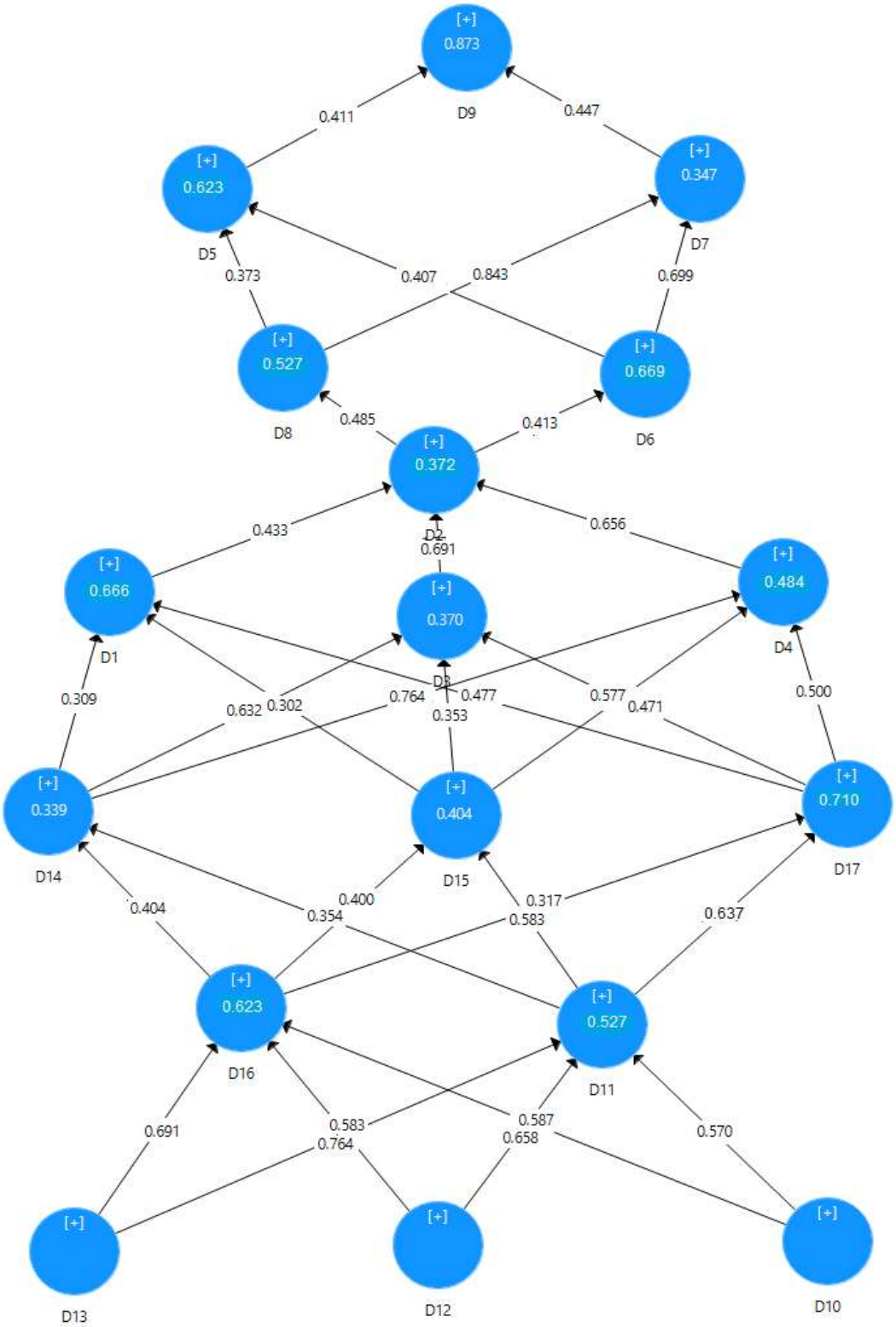


Figure 3. Factor Loadings of the Research Model (Outer Model)

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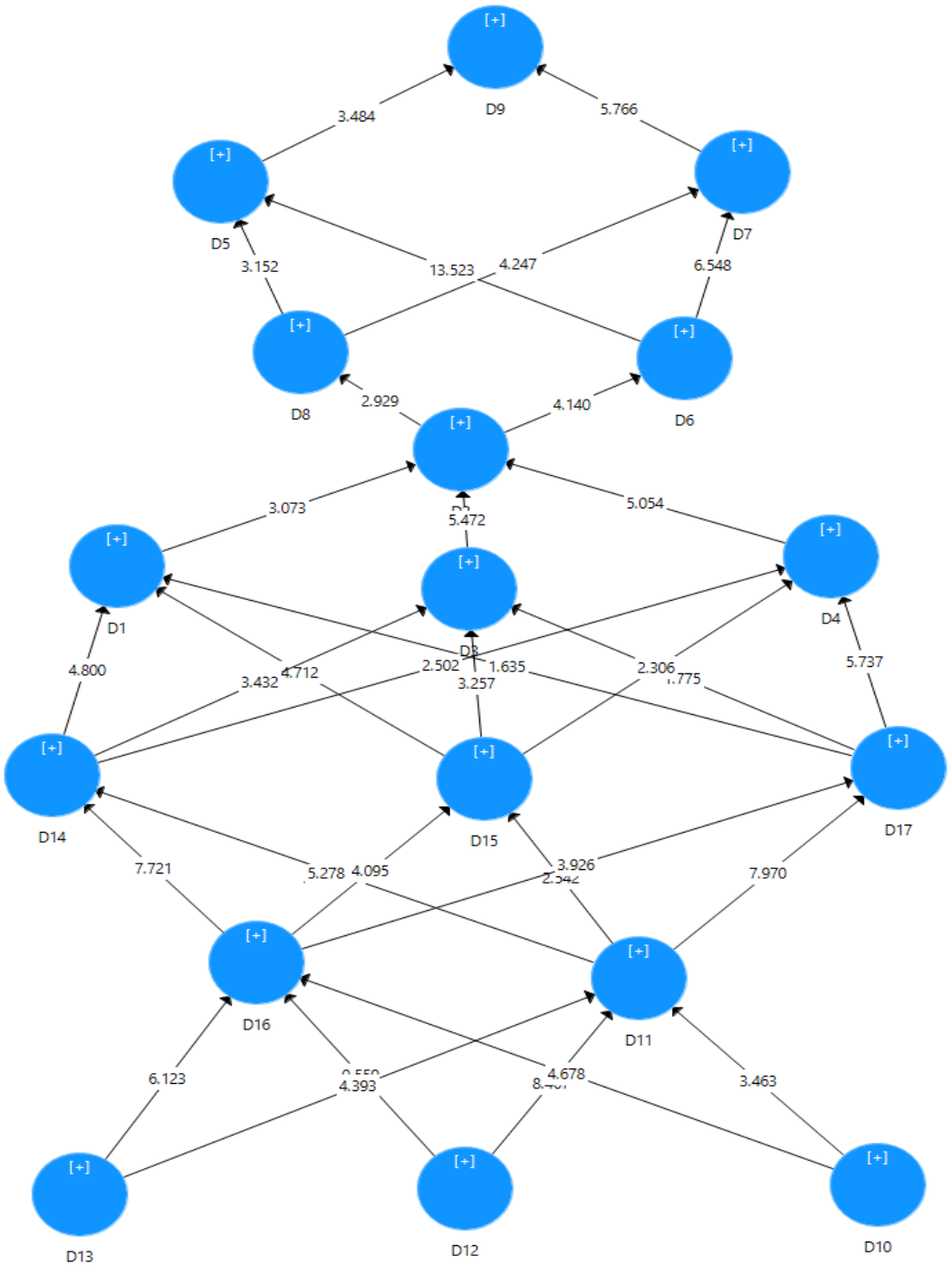


Figure 4. Bootstrapping *t*-Statistics of the Research Model (Outer Model)

Convergent validity was also assessed. When one or more attributes are measured through two or more measurement methods, the correlations among these measurements provide important indicators of validity. If the correlations among the scores of instruments measuring the same construct are high, the questionnaire demonstrates convergent validity. The existence of such correlations is essential for ensuring that the instrument measures the construct it is intended to measure. Average Variance Extracted (AVE) was used to assess convergent validity. The value of this coefficient ranges from 0 to 1, and values greater than 0.50 are considered acceptable (Hair et al., 2019). The following conditions should therefore be satisfied:

$$CR > 0.70$$

$$CR > AVE$$

$$AVE > 0.50$$

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Table 8. Convergent Validity and Reliability of the Research Variables

Variable	Cronbach's Alpha	AVE	CR
D01	0.858	0.586	0.869
D02	0.788	0.588	0.806
D03	0.765	0.549	0.755
D04	0.723	0.510	0.791
D05	0.755	0.555	0.777
D06	0.764	0.530	0.854
D07	0.793	0.548	0.783
D08	0.756	0.570	0.764
D09	0.768	0.514	0.758
D10	0.809	0.530	0.794
D11	0.815	0.577	0.733
D12	0.844	0.586	0.811
D13	0.836	0.540	0.756
D14	0.736	0.535	0.740
D15	0.794	0.582	0.826
D16	0.794	0.620	0.840
D17	0.730	0.585	0.736

According to the results presented in the above table, Cronbach's alpha for all variables exceeded 0.70; therefore, the reliability of all variables was confirmed. The Average Variance Extracted (AVE) was consistently greater than 0.50, thereby confirming convergent validity. Composite Reliability (CR) was also greater than both AVE and 0.70, indicating that each construct in the model demonstrated adequate reliability and convergent validity.

Effect size is another index used to assess the fit of the structural component of the model and applies to exogenous independent variables. The effect size index was introduced by Jacob Cohen (1988) and is also addressed in discussions concerning the calculation of Cohen's effect size. The f^2index for an independent variable indicates the extent to which the estimated dependent variable changes when the effect of that independent variable is removed. According to Cohen (1988), f^2values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively. The coefficient of determination is used to calculate the effect size.

$$f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$$

Coefficient of determination when the predictor variable is included:

$$R^2_{\text{included}}$$

Coefficient of determination when the predictor variable is excluded:

$$R^2_{\text{excluded}}$$

According to the above equation, the coefficient of determination should first be calculated while including the effect of the independent variable under consideration and then recalculated after excluding that effect. The resulting value is subsequently interpreted according to the thresholds proposed by Cohen.

4. Discussion and Conclusion

The present study sought to estimate and validate a digital governance model with a service excellence and public participation approach in government organizations. The findings demonstrated that digital governance is not a single technological intervention but a multilayered organizational and institutional system in which causal conditions, contextual conditions, intervening conditions, strategies, and outcomes are structurally interconnected. The Interpretive Structural Modeling results indicated that centralized administrative structure, weak communication infrastructure, and the regional digital divide occupied the most foundational levels of the model, while resistance-oriented organizational culture and limited

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human resource capacity were positioned at subsequent levels. External technological sanctions, temporary political support, and policy misalignment formed another influential layer, followed by chronic public dissatisfaction, persistent structural corruption, insufficient digital justice, and lack of information transparency. At the higher levels of the hierarchy, the model identified human resource empowerment, strengthening stakeholder participation, design of integrated systems, and digitalization of administrative processes as strategic mechanisms, ultimately leading to the achievement of service justice as one of the most dependent outcomes. These results suggest that effective digital governance in government organizations depends on the progressive transformation of deep structural and contextual conditions before desirable service-related outcomes can be fully realized.

A major finding of the study was the foundational role of centralized administrative structure. This variable demonstrated high driving power within the ISM hierarchy and was positioned among the lowest and most influential levels of the model. This finding indicates that highly centralized administrative arrangements may shape the behavior of numerous other components of digital governance, including policy coordination, organizational flexibility, technological integration, and stakeholder involvement. Digital governance requires cross-functional and often cross-organizational coordination, which can be constrained where decision-making authority is excessively concentrated and administrative discretion is limited at operational levels. This result is consistent with the broader transition from conventional e-government toward networked digital governance, which emphasizes flexible institutional arrangements, horizontal coordination, and distributed forms of governance (Tavakolirad & Sadat Miri, 2021). It also aligns with the argument that digital governance performance depends on institutional structures capable of integrating technology with organizational and governance reform (Erkut, 2020). Similarly, the need for coordinated governance structures identified by Manoharan et al. supports the present finding that structural arrangements are a prerequisite for effective digital governance performance (Manoharan et al., 2023).

Weak communication infrastructure was also located at a foundational level and exhibited substantial driving influence over the model. This suggests that digital governance cannot be institutionalized effectively where the technological and communication foundations required for information exchange, service integration, and digital participation are insufficient. Government digital services rely on stable communication networks, interoperable platforms, reliable data exchange, and organizational access to technological resources. Without these infrastructures, even well-designed governance strategies are unlikely to generate sustained effects. This finding is consistent with studies that identify technological infrastructure as one of the basic prerequisites for the development of e-governance and digital governance (Deghati et al., 2019). It is also aligned with the findings of Khasm Afkan Nezam and Khalafi, who identified infrastructural and institutional mechanisms as central to digital governance within digital transformation processes (Khasm Afkan Nezam & Khalafi, 2022). Dhaoui likewise emphasized that infrastructure limitations constitute one of the major challenges associated with electronic governance and may limit access, efficiency, and institutional effectiveness (Dhaoui, 2019).

The regional digital divide was another highly influential contextual factor. Its position in the lower level of the hierarchy shows that unequal access to digital technologies and digital services can affect multiple dimensions of governance, including citizen participation, service justice, public trust, and administrative effectiveness. The digital divide is therefore not only a technological problem but also a governance and equity issue. When citizens in different regions have unequal access to digital infrastructure, devices, skills, or connectivity, digital transformation may inadvertently reproduce or intensify existing inequalities. The significance of this finding is reinforced by recent evidence demonstrating that inclusivity and access are central determinants of citizen trust in digital governance systems (Egba et al., 2026). In addition, Nwaigwe et al. emphasized that public value creation through digital transformation depends on institutional readiness and the development of digital competencies, which indirectly supports the importance of reducing disparities in digital access and capacity (Nwaigwe et al., 2026). The present findings therefore suggest that digital justice must be addressed through both infrastructure development and equitable access strategies.

Resistance-oriented organizational culture emerged as another structurally important component. Its location near the foundational levels indicates that organizational resistance can substantially inhibit digital governance reforms. Digital transformation changes routines, authority structures, employee roles, competencies, and performance expectations, making resistance a foreseeable organizational response. If such resistance is not managed, digital initiatives may remain formally

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implemented but behaviorally underutilized. This finding is consistent with the literature on digital transformation, which emphasizes that organizational culture and institutional adaptation are central to the success of technology-enabled change (Vial, 2019). It also supports the findings of Saraeian and Golabadi concerning the challenges of leadership and digital governance in large organizations, particularly the need for leadership capable of overcoming organizational inertia and directing strategic transformation (Saraeian & Golabadi, 2022). Similarly, Aedi et al. showed that digital leadership plays an important role in system-level transformation by shaping institutional readiness and organizational change processes (Aedi et al., 2026). Thus, the findings of the present study reinforce the argument that digital governance must be accompanied by cultural and behavioral transformation rather than being treated as a purely technical project.

Limited human resource capacity was also identified as a strong structural determinant. This indicates that government organizations require sufficient levels of digital competence, managerial expertise, analytical capability, and change-management capacity in order to operationalize digital governance. The strategic importance of human resource empowerment in the model further confirms this interpretation. Human resource empowerment was positioned among the strategic variables and demonstrated a direct relationship with broader governance outcomes. This result is consistent with the argument that digital competencies and institutional readiness are fundamental to public value creation in digitally transforming institutions (Nwaigwe et al., 2026). It also aligns with Aedi et al., who found that digital transformation is facilitated by leadership capability, institutional learning, and system-level coordination (Aedi et al., 2026). From a network governance perspective, capacity building enables organizations to coordinate actors, resources, and responsibilities more effectively, which supports the role identified for human resource empowerment in the present model (Simaei Chafi & Memarzadeh Tehran, 2022).

The findings also showed that external technological sanctions, temporary political support, and policy misalignment functioned as important intervening and structural factors. These variables suggest that digital governance is highly dependent on the stability and coherence of its institutional environment. Technological sanctions can restrict access to advanced technologies, software, digital infrastructure, and international knowledge exchange, while temporary political support can result in unstable priorities and discontinuous implementation. Policy misalignment can further undermine digital governance by creating inconsistency between technological initiatives, public service strategies, regulatory frameworks, and organizational objectives. This finding is particularly aligned with the recent evidence of Li and Zhang, who demonstrated that combinations of digital transformation policies can improve governance performance when policy instruments are coordinated and mutually reinforcing (Li & Zhang, 2026). The findings also support Tiwari's argument that digital governance challenges frequently arise from inadequate coordination between organizational competitiveness, technology, and governance mechanisms (Tiwari, 2022). Therefore, policy coherence and political continuity appear to be essential conditions for sustaining digital governance reform.

Among the causal conditions, persistent structural corruption, lack of information transparency, insufficient digital justice, and policy misalignment were particularly important. The descriptive findings showed relatively high levels of chronic public dissatisfaction and digital justice concerns, indicating that respondents perceived these issues as significant within government organizations. These results imply that digital governance may emerge partly as a response to weaknesses in transparency, fairness, and institutional accountability. The role of information transparency is especially important because digital systems can increase traceability, public access to information, and visibility of decision-making processes. However, these benefits can only be realized if digitalization is accompanied by appropriate governance rules and accountability mechanisms. This interpretation is consistent with the findings of Bikzad and Jalilinejad, who identified governance-related pathologies in e-government and highlighted deficiencies in organizational and policy structures (Bikzad & Jalilinejad, 2021). The relationship between transparency, inclusiveness, and institutional trust is also supported by Egba et al., whose findings indicate that citizens' perceptions of digital governance are shaped by the socio-technical quality of governance processes (Egba et al., 2026).

Chronic public dissatisfaction occupied an important position among the intervening conditions and also demonstrated a high descriptive mean. This finding indicates that citizens' dissatisfaction may operate both as a symptom of ineffective governance and as a pressure for transformation. When public services are inefficient, opaque, unequal, or inaccessible, dissatisfaction increases and may strengthen demands for digital reform. At the same time, poorly designed digital systems can

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intensify dissatisfaction if they introduce new barriers rather than improving accessibility. This result is consistent with the emphasis placed on citizen-centered governance in the digital governance literature. Manoharan et al. highlighted the importance of performance and best practices that align digital services with user needs (Manoharan et al., 2023). Similarly, Yusyanah showed that service excellence can improve the quality of services provided by government agencies through greater responsiveness and service orientation (Yusyanah, 2022). Accordingly, digital governance should be evaluated not only through internal administrative efficiency but also through its perceived effects on citizens.

Strengthening stakeholder participation emerged as one of the central strategies in the model. This finding shows that public participation is not peripheral to digital governance but one of its strategic operational mechanisms. Stakeholder participation can improve policy responsiveness, increase legitimacy, identify service deficiencies, and create feedback loops between citizens and government organizations. This finding is closely aligned with Lamidi's argument that public participation contributes to accountability and the alignment of governmental decisions with public priorities (Lamidi, 2022). It is also supported by Pedersen et al., who demonstrated that public involvement can be integrated into planning, development, and implementation through multiple participatory methods (Pedersen et al., 2022). Furthermore, Damali et al. showed that user participation in service processes should be carefully designed because the effectiveness of participation depends on congruence between service-provider expectations and participant roles (Damali et al., 2020). The present findings therefore suggest that digital participation should be structured, meaningful, and linked to actual administrative decision-making.

The design of integrated systems was another important strategic component. This reflects the need to reduce fragmentation among government information systems and create interoperable digital infrastructures capable of supporting coordinated service delivery. Integrated systems can facilitate data exchange, improve decision-making, reduce duplication, and create more seamless citizen experiences. This result is consistent with Leoni et al., who showed that digital governance can help address performance challenges across inter-municipal arrangements through improved coordination and information integration (Leoni et al., 2023). It also accords with Choubandian et al.'s broader emphasis on strategic frameworks capable of integrating organizational inputs, processes, outputs, and evaluation mechanisms (Choubandian et al., 2021). Integrated digital systems are therefore not merely technical infrastructures; they constitute governance mechanisms through which administrative coordination and institutional coherence can be improved.

Digitalization of administrative processes was also identified as a major strategy. The findings suggest that digitalization can contribute to reduced administrative costs, improved efficiency, and greater transparency when embedded within a coherent governance framework. This distinction is important because the digitalization of inefficient processes without redesign may simply reproduce existing administrative problems in electronic form. Vial emphasized that digital transformation requires changes in organizational processes, structures, and value creation rather than simple technology adoption (Vial, 2019). Similarly, Erkut argued that the movement toward digital governance represents a deeper transformation beyond digital government (Erkut, 2020). The present results therefore support process redesign and intelligent administrative transformation rather than limited automation. The relevance of intelligent technology is also reflected in the work of Jones et al., who demonstrated how artificial intelligence can improve information processing, resource allocation, and operational responsiveness under complex conditions (Jones et al., 2020).

The final outcomes identified in the model included enhanced decision-making transparency, achievement of service justice, reduced administrative costs, and increased citizen satisfaction. These findings provide evidence that the primary value of digital governance lies in its ability to improve both administrative performance and citizen-oriented outcomes. Service justice occupied the highest and most dependent level in the ISM model, indicating that its realization depends on the cumulative functioning of numerous structural and strategic variables. This is theoretically meaningful because equitable service delivery requires not only digital platforms but also infrastructure, transparency, participation, human capability, policy coherence, and organizational reform. The emphasis on service justice is compatible with the broader concept of public service excellence, which incorporates fairness, responsiveness, ethical governance, and citizen orientation (Hosseinpour et al., 2021). The result also supports Yusyanah's finding that service excellence contributes to higher service quality in government organizations (Yusyanah, 2022).

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More broadly, the model confirms that digital governance can generate public value when technological transformation is aligned with institutional capacity, service excellence, participation, and social inclusion. This interpretation is consistent with Nwaigwe et al., who emphasized governance pathways, digital competencies, and institutional readiness as foundations of public value creation (Nwaigwe et al., 2026). It is also consistent with the findings of Zou et al., who demonstrated that digital governance can support wider public and developmental outcomes when it improves information use and governance capacity (Zou et al., 2025). The contribution of digital governance to performance is similarly supported by Li and Zhang, who linked coordinated digital transformation policies with improved government governance performance (Li & Zhang, 2026). Consequently, the present study extends prior work by demonstrating that these effects are best understood as part of a hierarchical system in which foundational structural conditions shape strategic digital governance mechanisms and, ultimately, public service outcomes.

Finally, the reliability and validity assessment supported the adequacy of the measurement model. Cronbach's alpha coefficients for all constructs exceeded 0.70, AVE values were greater than 0.50, and composite reliability coefficients exceeded the accepted threshold and were higher than the corresponding AVE values. These results indicate satisfactory internal consistency, convergent validity, and composite reliability across the constructs. The measurement findings therefore provide empirical support for the proposed dimensions of the digital governance model. Taken together with the ISM results, the findings demonstrate that a service-excellence and participation-oriented digital governance framework requires simultaneous attention to structural reform, technological readiness, human capability, stakeholder involvement, transparency, and institutional alignment.

The present study has several limitations that should be considered when interpreting its findings. First, the expert-based component of the research relied on a relatively small group of specialists, and although this is common in Interpretive Structural Modeling, the identified relationships may still reflect context-specific judgments. Second, the quantitative phase was conducted with a sample of 210 participants, which may limit the generalizability of the findings to all government organizations, particularly organizations operating in different administrative, geographical, or technological environments. Third, the cross-sectional nature of the study prevented examination of how digital governance relationships evolve over time. Fourth, some constructs, including public dissatisfaction, political support, digital justice, and organizational resistance, may be influenced by temporary institutional conditions and subjective perceptions. Finally, because the study focused on government organizations, the proposed model may not be directly transferable to private, nonprofit, or hybrid organizations without further validation.

Future studies should validate the proposed model in different types of government organizations, administrative sectors, and geographical regions to assess its stability across institutional contexts. Longitudinal studies are recommended to examine how causal and contextual variables change during different stages of digital transformation and whether the hierarchical relationships identified in this study remain stable over time. Future research could also use multigroup analysis to compare digital governance across demographic, organizational, or regional categories. Additional studies may integrate qualitative interviews with citizens, frontline employees, policymakers, and technology managers to provide a more comprehensive understanding of participation, service justice, and public dissatisfaction. Researchers could also investigate moderating and mediating relationships among variables, particularly the effects of organizational culture, digital literacy, leadership, political support, and institutional trust on digital governance outcomes. Comparative international studies may further determine whether the model operates differently under centralized and decentralized public administration systems.

Government organizations should approach digital governance as an integrated institutional reform rather than as a series of isolated information technology projects. Priority should be given to strengthening communication infrastructure, reducing regional digital inequalities, developing interoperable systems, and improving human resource capabilities before expecting advanced digital services to generate sustained outcomes. Administrative leaders should reduce unnecessary centralization, establish cross-functional coordination mechanisms, and create organizational incentives that support digital learning and innovation. Government agencies should also institutionalize stakeholder participation through digital consultation, feedback, and co-design mechanisms and ensure that citizen input is visibly incorporated into service and policy decisions. Greater emphasis should be placed on transparency, accountability, and equitable access to digital services, particularly for underserved

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regions and vulnerable groups. Finally, digital governance strategies should be linked to stable policy frameworks, measurable service-performance indicators, continuous employee development, and long-term political and managerial commitment.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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References

Aedi, N., Luxfiati, B. A., Amaliyah, N., & Wei, L. B. (2026). Digital Leadership and System-Level Transformation in Indonesian Higher Education: A Mixed-Methods Study of Institutional Change and Governance.

Bikzad, J., & Jalilinejad, G. (2021). Pathology of Digital Governance in E-Government. *Elite Journal of Science and Engineering*, *6*(6).

Choubandian, R., Khanlari, A., Yazdani, H., & Abedi, E. (2021). Presenting a Framework for Strategic Development of the Branding Process Based on the CIPP Model Using a Meta-Synthesis Approach. *Business Management Quarterly*, *13*(2).

Damali, U., Nandialath, A. M., & Stapleton, A. M. (2020). Determining Optimum Customer Participation Level in Services: Perceptual Biases and Congruence. *International Journal of Productivity and Quality Management*, 313-351.

Deghati, A., Yaghoubi, N., Kamalian, A. R., Dehghani, M., & Moradi, E. (2019). Presenting a Model for the Establishment and Development of E-Governance Using a Meta-Synthesis Approach. *Public Administration Perspective*, *10*(4), 89-120.

Dhaoui, I. (2019). *Electronic Governance: An Overview of Opportunities and Challenges*.

Egba, V. N., Ukeje, I. O., Ayanwale, M. A., Robinson, D. F., Ejem, E. N., Nwaigwe, H. C., & Osuebi, K. T. (2026). Digital Governance and Citizen Trust in Nigeria's Public Sector: Urban and Semi-Urban Residents' Perceptions of Socio-Technical Dynamics of Inclusivity and Institutional Transformation. *Sn Social Sciences*, *6*(3), 101. https://doi.org/10.1007/s43545-026-01372-1

Erkut, B. (2020). From Digital Government to Digital Governance: Are We There Yet? *Sustainability*, *12*(3), 860. https://doi.org/10.3390/su12030860

Hosseinpour, D., Rasoulzadeh Darbandi Ghadim, M. A., Pour Ezzat, A. A., & Ghorbanizadeh, V. (2021). Public Service Excellence Based on Islamic Values. *Management and Development Process*, *34*(4), 3-25.

Jones, E., Azeem, G., Jones Ii, E. C., & Jefferson, F. (2020). Impacting at Risk Communities Using AI to Optimize the COVID-19 Pandemic Therapeutics Supply Chain. *International Supply Chain Technology Journal*, *6*(9), 1-12. https://doi.org/10.20545/isctj.v06.i09.03

Khasm Afkan Nezam, A., & Khalafi, M. (2022). Mechanisms Affecting Digital Governance in the Digital Transformation of the Insurance Industry in Iran: A Case Study of Alborz Province Insurance. Tehran.

Lamidi, L. (2022). The Importance of Public Participation in Performance-Based Budgeting in Indonesia. *Policy and Social Review*, *2*(1), 37-43.

Leoni, G., Maione, G., & Mazzara, L. (2023). Digital Governance for Addressing Performance Challenges within Inter-Municipalities. In (pp. 27-42). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-551-920231003

Li, J., & Zhang, J. (2026). Digital Transformation Policy Combination and Government Governance Performance Improvement: Evidence from China. *International Journal of Public Administration*, *49*(7), 472-490. https://doi.org/10.1080/01900692.2025.2499693

Manoharan, A. P., Melitski, J., & Holzer, M. (2023). Digital Governance: An Assessment of Performance and Best Practices. *Public Organization Review*, *23*(1), 265-283. https://doi.org/10.1007/s11115-021-00584-8

Nevzorova, A., Volodin, A., & Ivanov, M. (2021). Comparative Analysis of Digital Governance Practices of the Leading Countries in the Field of Socio-Economic Regulation. https://doi.org/10.2991/aebmr.k.210318.042

Nwaigwe, H. C., Ayanwale, M. A., Ukeje, I. O., Aja, N. I., Ekwunife, R. A., Atukpa, E. I., & Egba, V. N. (2026). Digital Transformation and Public Value Creation in Higher Education: A PRISMA-ScR Review and Evidence-Synthesized Framework of Digital Competencies, Institutional Readiness, and Governance Pathways. *Sustainability*. https://doi.org/10.3390/su18105125

Pedersen, J. F., Egilstrød, B., Overgaard, C., & Petersen, K. S. (2022). Public Involvement in the Planning, Development and Implementation of Community Health Services: A Scoping Review of Public Involvement Methods. *Health & Social Care in the Community*, *30*(3), 809-835. https://doi.org/10.1111/hsc.13528

Sadeghi, M., Rahmati, T., & Athari, A. (2022). Public-Private Partnership Models in Urban Development. Tehran.

Saraeian, R., & Golabadi, F. (2022). Challenges of Leadership and Digital Governance in Large Companies and the Presentation of an Applied Model. Isfahan.

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Simaei Chafi, H., & Memarzadeh Tehran, G. (2022). Designing a Capacity-Building Model for Network Governance. *Management and Development Process*, *35*(1), 27-62.

Tavakolirad, R., & Sadat Miri, H. (2021). Transformationalism in Governance: From E-Government to Digital Governance. *2*(3).

Tiwari, S. P. (2022). Organizational Competitiveness and Digital Governance Challenges. *Archives of Business Research*, *10*(3). https://doi.org/10.22541/au.164848892.29442802/v1

Vial, G. (2019). Understanding Digital Transformation: A Review and a Research Agenda. *The Journal of Strategic Information Systems*, *28*(2), 118-144. https://doi.org/10.1016/j.jsis.2019.01.003

Yusyanah. (2022). The Role of Service Excellence in Improving Service Quality in a Government Agency: A Case Study of Sub-District Office in Bogor. *Technium Social Sciences Journal*, *30*, 30.

Zou, X., Min, J., Meng, S., Dai, W., & Li, X. (2025). Can Digital Governance Stimulate Green Development? Evidence from the Program of Pilot Cities regarding Information for Public Well-Being in China. *Frontiers in Public Health*. https://doi.org/10.3389/fpubh.2025.123456

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