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Research Article

Interoperability and Public Value Creation in Digital Government: Rethinking Institutional Design for Integrated Service Delivery

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Abstract: Interoperability has become a critical enabler of integrated service delivery in contemporary digital government. However, despite significant technological investments, many governments continue to experience fragmented service systems and limited public value outcomes. This study examines how institutional design shapes interoperability capacity and how interoperability contributes to public value creation within digital government frameworks. Employing a qualitative explanatory case study approach, data were collected through semi-structured interviews, document analysis, and institutional observations. The findings reveal that interoperability is not solely a technical function but an institutional capability embedded in governance structures, regulatory frameworks, data standards, and coordination mechanisms. While technical data exchange mechanisms exist, institutional fragmentation, regulatory ambiguity, and limited cross-agency collaboration constrain seamless integration. The study demonstrates that institutional design mediates the relationship between interoperability and public value creation by influencing the effectiveness of integrated service delivery. Public value gains are evident in operational efficiency and accessibility; however, improvements in legitimacy, trust, and service coherence remain incremental where institutional alignment is weak. The research contributes to digital governance literature by conceptualizing interoperability as an institutional construct and highlighting the necessity of governance reform for sustainable public value generation. The findings suggest that governments must prioritize institutional coherence, standardized data governance, and collaborative coordination frameworks to fully realize the transformative potential of digital government.

Keywords: Data Governance; Digital Government; Integrated Service Delivery; Interoperability; Public Value.

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1. Introduction

Digital government has emerged as a transformative paradigm in contemporary public administration, reshaping how states organize institutions, manage information, and deliver public services. Advances in digital technologies—including artificial intelligence, cloud computing, integrated databases, and real-time data analytics—have expanded governments' operational capacity. However, technological adoption alone does not guarantee improved governance performance. As Dunleavy et al. (2006) argue in the Digital-Era Governance framework, meaningful digital reform requires reintegration of fragmented governmental functions and the redesign of services around citizen needs rather than bureaucratic structures.

The transition from e-government to digital government reflects this paradigm shift. Early e-government initiatives focused on digitizing existing administrative procedures. In contrast, contemporary digital government emphasizes integration, coordination, and cross-agency collaboration (Margetts & Dunleavy, 2013). The OECD (2020) similarly highlights that digital maturity is not measured by the number of applications deployed but by the degree of system integration and data sharing capacity across institutions.

Within this transformation, interoperability has become a central concept. Interoperability refers to the ability of diverse systems, organizations, and administrative units to exchange, interpret, and use information coherently across institutional boundaries (Janssen & Estevez, 2013). It encompasses technical compatibility, semantic consistency, organizational coordination, and legal harmonization (European Commission, 2017). Gil-Garcia et al. (2016) argue that interoperability enables smart government by facilitating seamless coordination and data-driven service innovation.

Yet, empirical evidence suggests that digital government often remains fragmented. Agencies frequently develop independent platforms optimized for internal objectives without ensuring system compatibility or shared standards (Luna-Reyes & Gil-Garcia, 2014). This leads to digital silos, where citizens must navigate multiple systems and repeatedly provide the same information. Cordella and Tempini (2015) caution that digitalization without institutional alignment may increase complexity rather than simplify service delivery. Thus, interoperability challenges are deeply institutional rather than purely technical.

To synthesize the theoretical foundations linking interoperability, institutional design, and public value creation, the following table summarizes key scholarly contributions:

Table 1. Theoretical Foundations Linking Interoperability and Public Value in Digital Government.

Scholar	Key Concept	Implication for Service Quality
Heeks (2003)	Design–Reality Gap	Alignment between system and organizational capacity
Fountain (2001)	Technology Enactment	Institutional context shapes outcomes
DeLone & McLean (2003)	IS Success Model	System, information, and service quality determine satsfaction
Janssen & Estevez (2013)	Interoperability	Integrated services reduce fragmentation
Moore (1995)	Public Value	Digital reform must create societal benefit

Source: Adapted from Dunleavy et al. (2006); Fountain (2001); Scott (2014); Janssen & Estevez (2013); Moore (1995).

As presented in Table 1, digital government integration is supported by multiple theoretical traditions. Digital-Era Governance emphasizes reintegration; Technology Enactment theory highlights institutional shaping of technological outcomes; Institutional Theory explains how regulative and normative structures enable coordination; Interoperability frameworks stress technical and organizational alignment; and Public Value theory links integration to societal benefits. Together, these perspectives demonstrate that interoperability functions as both a technical mechanism and an institutional capacity.

The institutional dimension is particularly significant. Fountain (2001) argues that technology in government is enacted through institutional arrangements and bureaucratic culture. Scott (2014) further explains that institutions consist of regulative, normative, and cultural-cognitive pillars that shape organizational behavior. Data sharing and integrated systems therefore require not only compatible infrastructure but also shared governance frameworks, standardized data architecture, and collaborative norms. Pollitt (2010) notes that technological reforms often underperform when institutional capacity and coordination mechanisms remain weak.

The absence of coherent institutional design frequently results in what Heeks (2003) describes as a design–reality gap. Ambitious digital architectures may not align with bureaucratic practices, regulatory frameworks, or inter-agency trust. As Janssen and van der Voort (2016) observe, fragmented digital ecosystems limit the transformative potential of digital government by preserving silo-based administrative logic.

The implications of limited interoperability extend beyond efficiency concerns; they directly affect public value creation. Moore (1995) conceptualizes public value as the generation of societal benefits through legitimate and operationally effective governance. When digital

systems are fragmented, transaction costs increase, coordination delays persist, and citizen trust may decline. DeLone and McLean (2003) similarly argue that system and information quality only translate into net benefits when services are reliable, accessible, and coherent.

Moreover, the whole-of-government approach (Christensen & Lægreid, 2007) emphasizes cross-sector coordination as a prerequisite for integrated service delivery. In citizen-centered governance models, services are designed around life events rather than administrative divisions. Interoperability therefore becomes a structural enabler of seamless public service delivery.

To clarify the relationship between institutional design, interoperability, and public value creation, this study conceptualizes institutional design as a mediating governance mechanism:

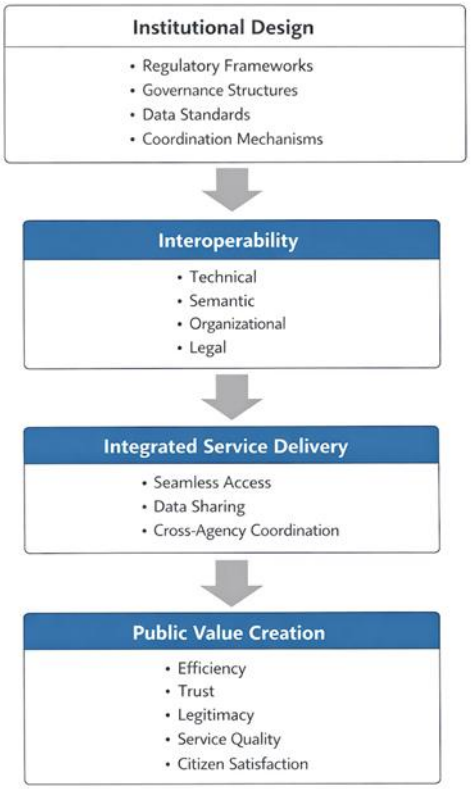

Figure 1. Institutional Design as a Mediator Between Interoperability and Public Value Creation.

Source: Conceptual framework developed by the author based on Fountain (2001); Janssen & Estevez (2013); Moore (1995); Scott (2014).

Figure 1 illustrates that institutional design—through regulatory frameworks, governance structures, coordination mechanisms, and data standards—mediates the relationship between interoperability and public value creation. Interoperability enables integrated service delivery, which in turn enhances efficiency, trust, legitimacy, service quality, and citizen satisfaction. Without institutional alignment, interoperability efforts remain partial and fail to generate sustainable public value.

Despite growing recognition of interoperability's importance, many governments prioritize digital infrastructure expansion over institutional redesign. This imbalance produces a paradox: digital platforms multiply, yet integrated service delivery remains limited. Organizational autonomy, regulatory fragmentation, data ownership disputes, and political competition frequently constrain cross-agency collaboration (Janssen & Estevez, 2013). Consequently, digital government may appear technologically advanced while remaining structurally fragmented.

This condition highlights the necessity of rethinking institutional design in digital government. Institutional design involves formal rules, accountability structures, coordination arrangements, and governance mechanisms that enable data sharing and integrated service provision (Ostrom, 2005). Effective interoperability therefore requires not only technical compatibility but also standardized protocols, shared accountability, and political commitment to collaborative governance.

Accordingly, this study examines how institutional design influences interoperability capacity and how, in turn, interoperability contributes to public value creation through integrated service delivery. By focusing on governance arrangements rather than solely technological infrastructure, this research seeks to advance theoretical and practical understanding of digital government integration. The central argument is that interoperability must be conceptualized as an institutional capability embedded within governance structures that enable sustainable public value in contemporary digital administration.

2. Research Methodology

This study employs a qualitative explanatory case study design to analyze how institutional design influences interoperability capacity and how interoperability contributes to public value creation in digital government. A qualitative approach is considered appropriate because interoperability is not merely a technical phenomenon but an institutional and governance process embedded within regulatory frameworks, organizational coordination mechanisms, and administrative culture. As emphasized by Yin (2018), case study research is particularly suitable for examining complex contemporary phenomena within real-life contexts where boundaries between institutional structures and technological systems are not clearly defined.

The study adopts an interpretivist paradigm, which assumes that digital government transformation is shaped by actors' perceptions, institutional norms, and governance arrangements (Bryman, 2016). Interoperability, therefore, is examined not only as a technical capability but also as an institutional construct involving regulatory alignment, data governance frameworks, and cross-agency collaboration mechanisms. The unit of analysis consists of a public sector institution or inter-agency digital governance initiative that has implemented integrated service delivery systems requiring cross-organizational data exchange.

Data were collected through multiple qualitative techniques to ensure triangulation and analytical rigor (Denzin, 1978). First, semi-structured interviews were conducted with key informants, including digital governance coordinators, policy makers, IT system architects, data governance officers, and frontline service managers. The interviews focused on institutional arrangements for data sharing, regulatory constraints, coordination practices, interoperability standards, and perceived impacts on service quality and public value outcomes. Second, document analysis was undertaken on relevant policy documents, digital governance strategies, interoperability frameworks, memoranda of inter-agency cooperation, and performance evaluation reports. As suggested by Bowen (2009), document analysis provides insight into formal institutional design and regulatory alignment. Third, limited non-participant observation of digital service workflows was conducted to assess the operational reality of cross-agency data integration and service coordination.

Data analysis followed a thematic analysis procedure as outlined by Braun and Clarke (2006). Interview transcripts and documents were coded inductively and deductively. Deductive coding was guided by theoretical constructs derived from Institutional Theory (Scott, 2014), Technology Enactment Framework (Fountain, 2001), interoperability dimensions (technical, semantic, organizational, and legal), and Public Value Theory (Moore, 1995). Emerging themes were then organized to examine how institutional design mediates interoperability practices and how these practices affect integrated service delivery and public value creation. Pattern matching and explanation-building techniques were applied to strengthen analytical validity (Yin, 2018).

To ensure trustworthiness, this study applies credibility, transferability, dependability, and confirmability criteria as proposed by Lincoln and Guba (1985). Data triangulation across interviews, documents, and observations enhances credibility, while thick description supports contextual transferability. Member checking was conducted by sharing synthesized interpretations with selected participants to validate findings. Ethical considerations were addressed through informed consent, confidentiality agreements, and responsible handling of institutional data.

Through this methodological approach, the study seeks to provide a comprehensive understanding of how institutional design functions as a mediating mechanism between interoperability and public value creation in digital government. By integrating institutional, technological, and governance perspectives, the research aims to generate theoretically grounded and empirically informed insights into integrated service delivery reform.

3. Results and Discussion

The findings reveal that institutional design plays a decisive role in shaping interoperability capacity within digital government systems. Although the institution under study has implemented multiple digital platforms intended to support cross-agency coordination, interoperability remains uneven across technical, organizational, and legal dimensions. From a technical perspective, data exchange mechanisms exist, yet they operate through partial integration and manual verification processes. Several systems are connected through interface layers, but semantic inconsistencies and incompatible data standards limit seamless interoperability.

At the organizational level, coordination mechanisms between agencies are formalized through memoranda of understanding and regulatory frameworks. However, practical collaboration remains constrained by institutional autonomy, data ownership concerns, and fragmented administrative responsibilities. Informants indicated that agencies often prioritize internal performance targets over cross-sector integration. This institutional fragmentation reduces the effectiveness of interoperability initiatives and weakens the intended integration of service delivery.

From a regulatory standpoint, policies supporting digital integration are present but lack operational standardization. While national-level digital governance frameworks encourage data sharing, implementation guidelines are interpreted differently across agencies. This regulatory ambiguity contributes to inconsistent interoperability practices and varying levels of system integration.

Regarding integrated service delivery, the findings show partial improvements. Citizens benefit from reduced physical visits and improved access to digital services. However, repeated data submission and delayed cross-agency verification processes persist. Instead of experiencing fully seamless services, users often encounter transitional forms of integration in which systems are digitally connected but procedurally fragmented.

In terms of public value creation, improvements are evident in operational efficiency and accessibility. Processing times have decreased for certain services, and digital records enhance transparency. Nevertheless, public trust and perceived service coherence remain moderate rather than transformative. Citizens appreciate improved convenience but express concerns regarding data inconsistencies, unclear information flows, and limited responsiveness in cross-agency cases.

Overall, the results indicate that interoperability capacity is strongly mediated by institutional design factors, including governance structures, regulatory alignment, coordination mechanisms, and data standardization frameworks. Where institutional alignment is strong, interoperability produces measurable efficiency gains. Where institutional fragmentation persists, digital integration remains superficial.

The findings of this study demonstrate that interoperability in digital government is fundamentally an institutional rather than purely technological phenomenon. Although digital infrastructures and interface systems have been deployed to enable data exchange across agencies, the effectiveness of these mechanisms depends heavily on governance arrangements, regulatory alignment, and organizational coordination. This reinforces the argument that interoperability cannot be reduced to technical compatibility; instead, it must be understood as an institutional capability embedded within broader governance structures.

From the perspective of the Technology Enactment Framework (Fountain, 2001), the implementation of digital systems is shaped by institutional rules, administrative culture, and power dynamics. The study reveals that even when technical interfaces allow data sharing, institutional autonomy and hierarchical coordination patterns limit full integration. Agencies often prioritize internal accountability structures and performance metrics over collaborative governance objectives. As a result, interoperability remains procedural—data may be transferred, but decision-making and verification processes remain segmented. This confirms that digital government transformation is enacted through institutional practices rather than determined solely by technological capacity.

The findings also align with Institutional Theory (Scott, 2014), particularly the regulative, normative, and cultural-cognitive pillars that shape organizational behavior. Regulative elements such as policies and digital governance frameworks formally support interoperabil-

ity; however, normative elements—such as professional boundaries and sectoral specialization—often discourage cross-agency collaboration. Cultural-cognitive dimensions, including risk aversion and reluctance to share sensitive data, further constrain integration. Therefore, interoperability requires not only compatible software systems but also institutional trust, shared norms, and collaborative administrative culture.

A critical observation from the results is the persistence of semantic inconsistencies and manual validation procedures despite digital connectivity. This reflects what Heeks (2003) describes as the design–reality gap, where formal digital architectures do not fully align with administrative realities. While interoperability frameworks assume standardized data definitions and coordinated governance, actual practice reveals fragmented data classification systems and inconsistent regulatory interpretation. This misalignment weakens the ability of digital systems to deliver seamless services and undermines the promise of integrated governance.

Moreover, the study demonstrates that interoperability is multidimensional, encompassing technical, organizational, semantic, and legal domains, as emphasized by Janssen and Estevez (2013). Weakness in any one dimension reduces overall system integration. Although technical interoperability may exist, organizational fragmentation limits operational effectiveness. Legal ambiguity regarding data ownership and privacy further constrains cross-agency data exchange. This multidimensional perspective clarifies why partial integration often produces limited outcomes. Digital government maturity depends on balanced alignment across all interoperability dimensions.

The relationship between interoperability and public value creation is particularly significant. Public value, as conceptualized by Moore (1995), requires operational efficiency, legitimacy, and societal impact. The findings indicate that interoperability enhances operational efficiency by reducing processing time and improving information accessibility. However, improvements in legitimacy and trust remain moderate when service coherence is inconsistent. Citizens evaluate digital services not only on speed but also on reliability, transparency, and responsiveness. When systems require repeated verification or exhibit inconsistent information across agencies, perceived public value declines.

Furthermore, integrated service delivery is central to citizen-centered governance models. The whole-of-government approach suggests that public services should be organized around citizen life events rather than institutional mandates. However, the findings reveal that institutional silos persist beneath digital integration layers. While users may access services through unified portals, backend coordination remains segmented. This backend fragmentation limits the transformative potential of digital government and illustrates that surface-level integration does not necessarily equate to structural integration.

Importantly, the study confirms the mediating role of institutional design, as conceptualized in Figure 1. Institutional design—including regulatory clarity, governance structures, standardized data architecture, and accountability mechanisms—determines the depth and effectiveness of interoperability. Where institutional design is coherent and coordinated, interoperability contributes to measurable efficiency gains and service improvements. Conversely, where institutional fragmentation persists, interoperability initiatives yield incremental rather than transformative outcomes.

The findings also suggest that interoperability should be conceptualized as a dynamic governance process rather than a static technical achievement. Institutional arrangements must evolve alongside technological systems. Data governance frameworks, privacy regulations, and inter-agency coordination mechanisms must be continuously refined to adapt to emerging digital complexities. Without adaptive institutional design, interoperability may stagnate and fail to produce sustained public value.

From a strategic perspective, the study highlights the necessity of institutional reform as a precondition for effective digital government integration. Governments should move beyond platform proliferation toward systemic governance redesign. This includes establishing unified data standards, creating cross-agency accountability structures, implementing interoperable architecture frameworks, and fostering collaborative administrative culture. Investment in digital infrastructure must be complemented by investment in institutional capacity and inter-organizational trust.

In the broader context of contemporary digital governance, these findings contribute to ongoing debates about the limits of technology-driven reform. Digital transformation often promises seamless integration and improved service outcomes; however, without institutional coherence, such promises remain partially fulfilled. Interoperability becomes meaningful only when embedded within governance systems that prioritize collaboration, transparency, and citizen-centered design.

Ultimately, the study underscores that the creation of public value through digital government depends on the alignment of technology, institutions, and governance structures. Interoperability serves as a bridge between digital systems and societal outcomes, but institutional design determines whether that bridge is structurally sound. Therefore, rethinking institutional design is essential for realizing the full potential of integrated service delivery and sustainable public value creation in digital government.

4. Conclusions

This study concludes that interoperability in digital government is fundamentally shaped by institutional design and governance arrangements rather than technological infrastructure alone. While technical systems enable data exchange, the effectiveness of interoperability depends on regulatory coherence, organizational coordination, shared standards, and collaborative administrative culture. The findings demonstrate that institutional fragmentation significantly constrains the transformative potential of digital integration, resulting in incremental rather than systemic improvements in service delivery.

The analysis confirms that institutional design functions as a mediating mechanism between interoperability and public value creation. Where governance frameworks provide regulatory clarity, standardized data architecture, and cross-agency accountability, interoperability contributes to measurable gains in efficiency, service accessibility, and operational capacity. Conversely, when institutional autonomy, sectoral silos, and legal ambiguities persist, digital integration remains partial and limits the realization of seamless service delivery.

From a public value perspective, interoperability enhances operational performance but does not automatically generate legitimacy and citizen trust. Public value is strengthened when integrated service delivery produces coherent, reliable, and responsive experiences for citizens. The findings therefore underscore that digital government transformation must move beyond platform proliferation toward structural institutional reform that prioritizes collaboration and citizen-centered design.

This study contributes theoretically by conceptualizing interoperability as an institutional capability embedded within governance systems, rather than as a purely technical function. It advances understanding of how institutional design shapes the relationship between digital integration and public value outcomes. Practically, the study suggests that governments seeking to improve integrated service delivery should invest not only in digital infrastructure but also in institutional redesign, data governance frameworks, standardized protocols, and cross-agency coordination mechanisms.

Ultimately, sustainable public value creation in digital government depends on alignment among technological systems, institutional structures, and governance processes. Rethinking institutional design is therefore essential for achieving integrated service delivery and realizing the full transformative promise of digital government.

References

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27–40. https://doi.org/10.3316/QRJ0902027

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.

Christensen, T., & Lægreid, P. (2007). The whole-of-government approach to public sector reform. *Public Administration Review, 67*(6), 1059–1066. https://doi.org/10.1111/j.1540-6210.2007.00797.x

Cordella, A., & Tempini, N. (2015). E-government and organizational change: Reappraising the role of ICT and bureaucracy in public service delivery. *Government Information Quarterly, 32*(3), 279–286. https://doi.org/10.1016/j.giq.2015.03.005

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods* (2nd ed.). McGraw-Hill.

Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead—Long live digital-era governance. *Journal of Public Administration Research and Theory, 16*(3), 467–494. https://doi.org/10.1093/jopart/mui057

European Commission. (2017). *European interoperability framework: Implementation strategy*. Publications Office of the European Union.

Fountain, J. E. (2001). *Building the virtual state: Information technology and institutional change*. Brookings Institution Press.
Gil-Garcia, J. R., Zhang, J., & Puron-Cid, G. (2016). Conceptualizing smartness in government: An integrative and multi-dimensional view. *Government Information Quarterly, 33*(3), 524–534. https://doi.org/10.1016/j.giq.2016.03.002
Heeks, R. (2003). *Most e-government-for-development projects fail: How can risks be reduced?* iGovernment Working Paper Series. University of Manchester.
Janssen, M., & Estevez, E. (2013). Lean government and platform-based governance—Doing more with less. *Government Information Quarterly, 30*(Suppl. 1), S1–S8. https://doi.org/10.1016/j.giq.2012.11.003
Janssen, M., & van der Voort, H. (2016). Adaptive governance: Towards a stable, accountable, and responsive government. *Government Information Quarterly, 33*(1), 1–5. https://doi.org/10.1016/j.giq.2016.02.003
Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.
Luna-Reyes, L. F., & Gil-Garcia, J. R. (2014). Digital government transformation and internet portals: The co-evolution of technology, organizations, and institutions. *Government Information Quarterly, 31*(4), 545–555. https://doi.org/10.1016/j.giq.2014.08.001
Margetts, H., & Dunleavy, P. (2013). The second wave of digital-era governance: A quasi-paradigm for government on the web. *Philosophical Transactions of the Royal Society A, 371*(1987). https://doi.org/10.1098/rsta.2012.0382
Moore, M. H. (1995). *Creating public value: Strategic management in government*. Harvard University Press.
OECD. (2020). *Digital government index: 2019 results*. OECD Publishing.
Ostrom, E. (2005). *Understanding institutional diversity*. Princeton University Press. https://doi.org/10.1515/9781400831739
Pollitt, C. (2010). Technological change: A central yet neglected feature of public administration. *Public Administration Review, 70*(5), 629–639. https://doi.org/10.1111/j.1540-6210.2010.02196.x
Scott, W. R. (2014). *Institutions and organizations: Ideas, interests, and identities* (4th ed.). Sage Publications.
Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.