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Modeling the Development of Smart Government in Iranian Public Sector Institutions: A Qualitative Study

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A B S T R A C T

This study aims to model the development of smart government in Iranian public sector institutions through the identification of key factors, processes, and strategies that enable effective digital transformation. The research employed a qualitative methodology, using semi-structured interviews with fifteen experts in the field of smart government selected through purposive and snowball sampling. Data collection also included the review of strategic documents, governmental reports, and policy papers. Content analysis was conducted to extract themes and concepts, followed by open, axial, and selective coding. The data were categorized into five overarching domains: causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. Nvivo software was used to facilitate the systematic organization and coding of qualitative data. The findings revealed eleven major axial codes across the five selective categories. Among the causal conditions, user-centered service design and stakeholder ecosystem development were prominent. Contextual conditions highlighted digital infrastructure readiness and system integration. Intervening conditions included digital skills training and the promotion of an innovation-oriented culture. Strategic actions involved evaluating service sustainability, leveraging big data, and analyzing digital business models. Identified outcomes included improved access to accurate data and enhanced problem response cycles. The study emphasizes the need for alignment between organizational structures, cultural adaptability, technological investment, and policy frameworks to ensure the effective implementation of smart government. The transition toward smart government in Iran requires a comprehensive and integrative approach that considers not only technological advancement but also institutional reform, cultural change, and strategic coordination. A sustainable smart government model must be citizen-centric, transparent, and data-driven, supported by collaborative ecosystems and guided by inclusive governance principles.

Keywords: *Smart government, public sector transformation, digital governance, content analysis, Iran, digital transformation, qualitative research, strategic planning, citizen-centric services.*

1. Introduction

In recent years, the concept of smart government has emerged as a cornerstone of digital transformation strategies across the public sector, seeking to redefine the role of government in the age of intelligent technologies and citizen-centric services. Rooted in broader smart city frameworks, smart government embodies a paradigm shift from bureaucratic service delivery to proactive, adaptive, and integrated governance models that harness the potential of data, technology, and collaborative platforms (Anthopoulos & Reddick, 2023; Shan et al., 2021). The development of smart government is not merely about adopting advanced technologies, but about reengineering institutional capacities, fostering inter-organizational cooperation, and ensuring public value creation through transparency, efficiency, and responsiveness (Ghaffari et al., 2023; Shakouri-Moghadam, 2018). In the Iranian context, where digital transformation is increasingly recognized as a national priority, the push for smart governance has sparked interest in how public sector institutions can model their structures and strategies to effectively meet the demands of a rapidly evolving digital society (Sharifian, 2018; Sharifian et al., 2021).

Smart government initiatives worldwide are influenced by technological, organizational, and institutional determinants that shape the pace and trajectory of implementation. For instance, Alajmi et al. (2023) identified several drivers such as technological readiness, leadership support, and regulatory frameworks that significantly influence adoption levels in Saudi Arabia's public organizations (Alajmi et al., 2023). Similarly, the literature emphasizes that successful smart government implementation requires a coherent integration of digital platforms, cloud computing, artificial intelligence (AI), and the Internet of Things (IoT) within public administration processes (Kankanhalli, 2019; Wirtz et al., 2019). These technologies provide the infrastructure for real-time decision-making, automated service delivery, and enhanced citizen participation, thereby reinforcing the legitimacy and agility of government institutions (Chatfield & Reddick, 2019). However, such transformation also brings forth challenges, including concerns about data privacy, cybersecurity, organizational inertia, and the digital divide among stakeholders (Raza, 2024; Shahzad et al., 2024).

The Iranian public sector, like many developing contexts, faces structural complexities that can hinder or catalyze the transition toward smart governance. Although several government agencies have initiated e-government programs, the transition toward a fully integrated smart government system remains fragmented and uneven (Gholami et al., 2024; Raeisi et al., 2024). To address these gaps, scholars have stressed the importance of designing indigenous models that align with national policies, socio-political contexts, and organizational realities (Deandra et al., 2024; Ghaffari et al., 2023). Such models should consider not only the technical dimensions of implementation but also the organizational learning processes, citizen engagement practices, and institutional frameworks necessary for long-term sustainability. According to Popescu et al. (2024), the conceptualization of unified platforms and interoperable infrastructures plays a critical role in the operational efficiency of smart government systems (Popescu et al., 2024). This necessitates a rethinking of the governance architecture and an emphasis on collaboration between various levels of government, academia, and the private sector (Guenduez et al., 2024).

Moreover, smart government cannot be fully realized without paying attention to the values of transparency, participation, and accountability, which are essential to modern democratic governance. As Raeisi et al. (2024) note, transparency and anti-corruption measures must be embedded within digital governance programs to ensure legitimacy and trust among citizens (Raeisi et al., 2024). This aligns with broader frameworks proposed by international scholars that emphasize data-driven public service delivery, adaptive leadership, and citizen co-creation as core attributes of smart governance (Savić, 2022; Zhang & Mora, 2023). In practice, this implies the development of interactive platforms that allow citizens to access, monitor, and influence government activities. Yazdani and Darbani (2022) further argue that the adoption of cloud-based infrastructures enhances strategic agility and flexibility, enabling institutions to respond more effectively to emergent needs and crises (Yazdani & Darbani, 2022). These developments underscore the interconnectedness of technical innovation and organizational strategy in the smart government discourse.

Iran's public sector institutions are also increasingly aware of the need to transition from conventional bureaucratic models to more flexible, intelligent, and networked systems of governance. While there have been some successful e-government implementations in ministries and provincial administrations, the broader goal of establishing a national smart government model is still in its formative stages (Shakouri-Moghadam, 2018; Sharifian

et al., 2021). Empirical studies in the Iranian context indicate that obstacles such as centralized decision-making, fragmented data systems, lack of digital literacy, and limited stakeholder collaboration impede progress (Rahmadanita et al., 2019; Shahzad et al., 2024). Thus, a grounded understanding of how various dimensions—technological, cultural, administrative, and strategic—interact in the development process is essential. According to Gholami et al. (2024), leveraging digital tools for employee performance and organizational transparency can serve as a catalyst for broader digital governance reforms (Gholami et al., 2024).

This study aims to model the development of smart government within Iranian public institutions through a qualitative lens, using expert interviews and content analysis of government documents to uncover key dimensions, challenges, and strategic enablers. Building upon existing models and theoretical frameworks, this research seeks to contribute to the literature by contextualizing the development of smart government in a non-Western setting and by highlighting the internal dynamics that shape digital transformation efforts. The study follows the recommendations of scholars like Wirtz et al. (2019), who advocate for integrative frameworks that account for socio-technical interdependencies in smart governance systems (Wirtz et al., 2019). Moreover, the findings aim to offer actionable insights for policymakers, IT managers, and public administrators who are tasked with steering digital innovation in complex institutional settings.

In conclusion, the transition to smart government represents a multidimensional process that requires not only technological innovation but also institutional realignment, cultural adaptation, and stakeholder collaboration. Drawing on international experiences and grounded empirical inquiry, this study provides a comprehensive exploration of how Iranian public sector organizations can develop coherent, sustainable, and citizen-centric smart government models.

2. Methods and Materials

This study adopted a qualitative research design to explore the underlying patterns and critical factors influencing the development of smart government in Iranian public sector institutions. The selection of participants followed a purposive and snowball sampling strategy to ensure the inclusion of individuals with substantial expertise in smart governance. In total, fifteen experts were identified and included in the study. These participants were professionals and policymakers with direct experience or research engagement in the domain of smart government implementation across Iranian administrative systems. The purposive strategy ensured that only individuals with relevant and informed insights were included, while the snowball method facilitated the identification of additional key informants through participant recommendations, thereby enriching the diversity and depth of perspectives within the sample.

Data collection was conducted through semi-structured interviews designed to extract detailed and context-rich information regarding the institutional, technological, and policy dimensions of smart government development. The interviews were guided by a flexible protocol that allowed for probing into participant-specific experiences, thereby enabling the researchers to capture both shared and unique insights into the phenomenon. Each session was recorded with the participants' consent and transcribed verbatim for subsequent analysis. The questions explored topics such as technological infrastructure, inter-organizational coordination, policy support, barriers to implementation, and strategies for enabling digital transformation in public administration.

For data analysis, the study employed qualitative content analysis, a method well-suited for identifying latent patterns and interpreting contextual meaning within qualitative datasets. Content analysis was applied to both interview transcripts and relevant documentary sources, including government reports, policy documents, strategic plans, and public media releases. This dual-layer analysis allowed for triangulation between interview findings and textual data, enhancing the reliability and richness of interpretations. The content analysis approach facilitated the categorization and coding of data, enabling the researchers to uncover emerging themes related to the institutionalization of smart government, the adoption of innovative technologies, and the alignment of strategic goals with digital governance frameworks. This methodology proved particularly effective in tracing the dynamics of policy formulation and practical implementation across the Iranian administrative context.

3. Findings and Results

The analysis of qualitative data through open and axial coding revealed a comprehensive framework of components essential for the development of smart government in Iranian public institutions. These components were classified under

eleven axial codes and subsequently grouped into five selective codes: causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. Each table below presents the axial codes and related open codes that were extracted through content analysis, offering deep insight into the foundational and operational dimensions of smart governance.

The first category, Causal Conditions, encompasses the driving factors that act as the foundational triggers for the adoption of smart government initiatives. As shown in Table 1, two key axial codes were identified: User-Centered and Global Accessibility Services and Digital Ecosystem and Stakeholder Relations. The former includes open codes such as providing services based on user-specific needs, ensuring global availability, and predicting future user demands. The latter highlights collaboration and transparency, resource and technology sharing, and stakeholder coordination and privacy assurance. These elements establish a service-oriented and collaborative foundation for implementing smart government systems.

Table 1

Causal Conditions

Axial Code	Open Codes
User-Centered and Global Accessibility Services	Providing services based on user-specific needs - Ensuring global availability - Predicting future needs
Digital Ecosystem and Stakeholder Relations	Collaboration and transparency - Resource and technology sharing - Stakeholder coordination and privacy assurance

The second selective code, Contextual Conditions, outlines the environmental and organizational settings that provide a fertile ground for smart governance processes. As presented in Table 2, two axial codes were extracted: Feasibility of Process Digitalization and Integration and Governance in Digital Systems. The open codes describe the importance of analyzing the feasibility of process digitalization, its impact on efficiency, and the need for a cultural shift and digital infrastructure. The second axial code stresses alignment of systems and processes, effective infrastructure use, and managing systemic complexity—key contextual enablers of digital transformation.

Table 2

Contextual Conditions

Axial Code	Open Codes
Feasibility of Process Digitalization	Analyzing process digitization impact - Improving efficiency - Cultural change and infrastructure needs
Integration and Governance in Digital Systems	System/process alignment - Effective use of infrastructure - Managing organizational complexity

The third group, Intervening Conditions, includes those variables that influence or moderate the progression of smart governance. Table 3 details two axial codes: Digital Skills Training and Development and Fostering Innovation and Risk-Taking Culture. The related open codes stress the up-skilling of employees in digital competencies, institutionalizing digital culture, and overcoming resistance to change. Additionally, fostering innovation is linked to prioritizing creativity, accepting risk, and shifting traditional mindsets. These mediating conditions significantly affect the rate and quality of digital adaptation in governmental institutions.

Table 3

Intervening Conditions

Axial Code	Open Codes
Digital Skills Training and Development	Up-skilling workforce in digital tools - Institutionalizing digital culture - Creating motivational structures
Fostering Innovation and Risk-Taking Culture	Embedding innovation in organizational culture - Encouraging risk-taking - Overcoming traditional mindsets

The fourth selective code, Strategies, focuses on the tactical and operational measures taken to implement and stabilize smart governance. As shown in Table 4, three axial codes were categorized: Evaluation and Sustainability of Smart Systems, Analysis of Digital Business Models, and Efficient Use of Big Data Resources. The open codes reveal actions like continuous service evaluation, analysis of competitors' models and revenue streams, and leveraging big data for strategic decisions. These strategies emphasize the need for structured planning, technological foresight, and data-informed governance.

Table 4

Strategies

Axial Code	Open Codes
Evaluation and Sustainability of Smart Systems	Continuous evaluation for service efficiency - Ensuring long-term functionality - Identifying system weaknesses
Analysis of Digital Business Models	Competitor model analysis - Revenue simulation - Identifying opportunities and business boundaries
Efficient Use of Big Data Resources	Strategic decision-making via big data - Optimizing data analysis - Need for advanced analytics tools

Finally, the Outcomes selective code addresses the tangible and intangible results of implementing smart government frameworks. As depicted in Table 5, two axial codes were found: Ensuring Data Accessibility and Accuracy and Accelerated Problem Detection and Action. The corresponding open codes include ensuring reliable and up-to-date data access for smart decision-making, and the use of simulation tools to detect and respond quickly to issues. These outcomes reflect the effectiveness and responsiveness that smart government aims to achieve in dynamic administrative environments.

Table 5

Outcomes

Axial Code	Open Codes
Ensuring Data Accessibility and Accuracy	Real-time access to reliable data - Smart decision-making - Managing large volumes and data quality
Accelerated Problem Detection and Action	Quick issue identification - Responsive action - Predictive simulation tools

These thematic findings illustrate the structural, procedural, and cultural dynamics of smart government development in the Iranian public sector. By categorizing open codes under appropriate axial and selective codes, the analysis offers a multilayered understanding of how digital transformation can be designed, supported, and executed in the context of national governance.

4. Discussion and Conclusion

The findings of this qualitative study highlight the multifaceted nature of smart government development in Iranian public sector institutions. Through detailed coding and thematic analysis, eleven axial codes were identified and categorized under five selective codes: causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. Among the most prominent themes were the alignment of services with user needs and global accessibility, integration and governance of digital systems, fostering innovation and digital literacy, and leveraging big data and digital ecosystems for enhanced decision-making. These findings reveal that smart government is not a purely technological endeavor but one that requires substantial institutional, cultural, and strategic realignment across various administrative layers.

The identification of User-Centered and Global Accessibility Services and Digital Ecosystem and Stakeholder Relations as foundational causal conditions aligns with existing literature emphasizing citizen-centered design and multi-stakeholder engagement as pillars of smart governance (Anthopoulos & Reddick, 2023; Guenduez et al., 2024). These elements reflect the shift from hierarchical, top-down service provision to more inclusive and responsive governance systems. Smart governments are expected to address diverse citizen needs, accommodate rapid technological change, and build inclusive access mechanisms (Deandra et al., 2024; Zhang & Mora, 2023). As such, the Iranian public sector's move toward integrating services based on localized user demands and leveraging digital ecosystems indicates a step toward this global paradigm.

The contextual conditions identified—Feasibility of Process Digitalization and Integration and Governance in Digital Systems—further underscore the infrastructural and institutional groundwork required for smart governance. The presence of fragmented systems and inconsistent interoperability has been a recurrent barrier to digital integration in many public institutions (Popescu et al., 2024; Raza, 2024). Our findings support this observation, emphasizing that successful smart government implementation necessitates systemic alignment of processes and enhanced regulatory governance. These insights echo the views of Raeisi et al. (2024), who stress the significance of governance structures in ensuring administrative transparency and operational coherence in e-government programs (Raeisi et al., 2024).

In the domain of intervening conditions, Fostering Innovation and Risk-Taking Culture and Digital Skills Training and Development emerged as pivotal for mediating the success of smart government initiatives. These findings are consistent with those of Wirtz et al. (2019) and Yazdani and Darbani (2022), who argue that cultivating digital competencies and embracing innovation across public institutions are essential for adaptive governance and strategic agility (Wirtz et al., 2019; Yazdani & Darbani, 2022). Moreover, cultural resistance, lack of incentives, and traditional bureaucratic inertia can significantly hinder the shift toward smart government if not proactively addressed (Shahzad et al., 2024; Sharifian et al., 2021). Therefore, these intervening conditions should not be perceived as peripheral but as central components that determine the absorptive capacity of institutions.

Strategically, the emphasis on Evaluation and Sustainability of Smart Systems, Analysis of Digital Business Models, and Efficient Use of Big Data Resources reflects a growing need for data-informed governance and evidence-based decision-making. Smart government requires continuous feedback loops, predictive analytics, and the ability to rapidly adjust strategies in response to environmental cues (Chatfield & Reddick, 2019; Shan et al., 2021). Our findings resonate with Kankanhalli (2019), who asserts that the integration of AI and IoT into government systems enhances operational intelligence and improves real-time responsiveness (Kankanhalli, 2019). Similarly, Savić (2022) posits that digital transformation in the public sector must be strategically grounded in robust evaluation frameworks to ensure continuity and effectiveness (Savić, 2022).

The outcomes identified—Ensuring Data Accessibility and Accuracy and Accelerated Problem Detection and Action—demonstrate the tangible benefits of smart governance when systems are effectively implemented. These outcomes reflect the fundamental promise of smart government: better data leads to better decisions. The ability to make timely, data-driven decisions is crucial, especially in crisis scenarios where governments must respond swiftly and decisively (Gholami et al., 2024; Raza, 2024). The recognition of data as a strategic asset aligns with findings from Alajmi et al. (2023), who emphasize the importance of data availability, system integration, and user privacy in driving smart government adoption (Alajmi et al., 2023). Furthermore, the facilitation of predictive tools and real-time monitoring reflects the evolution of government from reactive to proactive problem-solving agents (Wirtz et al., 2019).

An important insight from this study is the interplay between strategy and structure. While many public institutions in Iran have begun formulating strategic plans for smart government, they often lack the organizational structures and culture necessary to support such transformation. This is echoed by Ghaffari et al. (2023), who argue that smart governance in Iran requires both strategic vision and structural redesign to accommodate technological and societal shifts (Ghaffari et al., 2023). Similarly, Sharifian (2018) and Shakouri-Moghadam (2018) note that structural rigidity and centralized hierarchies are among the most significant inhibitors to smart governance in Iran (Shakouri-Moghadam, 2018; Sharifian, 2018). Therefore, aligning technological investments with organizational reforms is vital.

The findings also demonstrate the necessity of regulatory oversight and digital identity frameworks to support integrated smart governance. As proposed by Sharifian et al. (2021), digital identity and transformation leadership are crucial to institutionalize smart governance within public administration systems (Sharifian et al., 2021). Without mechanisms to verify identity, manage data rights, and enforce interoperability standards, the potential of smart systems remains underutilized. This aligns with Guenduez et al. (2024), who identify regulatory harmonization and stakeholder alignment as key enablers of smart city and government collaborations (Guenduez et al., 2024). Hence, policy development should go hand in hand with technological advancement.

Lastly, the emphasis on participatory governance and service personalization supports the argument that smart

government is ultimately about enhancing democratic engagement and public service quality. As demonstrated by Rahmadanita et al. (2019) and Deandra et al. (2024), smart government initiatives that prioritize citizen participation and service responsiveness tend to perform better in terms of public satisfaction and service quality (Deandra et al., 2024; Rahmadanita et al., 2019). In this regard, Iranian public institutions must not only adopt digital platforms but also embed participatory mechanisms and feedback systems into service design and delivery.

Despite the in-depth nature of this study, several limitations must be acknowledged. First, the research relied on qualitative interviews with a limited sample of fifteen experts, which may constrain the generalizability of the findings across all public sector institutions in Iran. Second, while the content analysis included documents and reports, the study did not incorporate a longitudinal perspective that could track the evolution of smart government initiatives over time. Third, some institutional stakeholders, such as IT contractors, civil society actors, or citizen users, were not included in the data collection phase, thereby limiting the diversity of perspectives.

Future studies could expand upon this research by conducting mixed-method analyses that integrate survey data, case studies, and policy evaluations. Including a broader range of stakeholders such as municipal leaders, service users, and technology vendors could provide a more holistic view of the smart government ecosystem. Additionally, longitudinal studies tracking the implementation and outcomes of specific smart government initiatives over time would offer valuable insights into their sustainability and impact. Comparative studies between Iran and other countries with similar institutional frameworks could also help identify transferable models and best practices.

For policymakers and practitioners, the study suggests the need for a holistic, multi-level approach to smart government development. Institutions should prioritize investments in digital infrastructure, enhance inter-agency data integration, and promote organizational learning around digital competencies. Establishing digital identity systems, enforcing data privacy regulations, and fostering public-private collaborations will be crucial. Moreover, designing user-centric platforms that prioritize inclusivity, responsiveness, and transparency will ensure that smart government efforts are aligned with public needs and democratic values. Strategic planning should be supported by agile governance structures capable of navigating technological and societal change.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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