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Identifying the Contextual Conditions of Digital Governance with an E-Government Approach in Governmental Organizations of Mazandaran Province

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Abstract

The main objective of this study is to identify and explain the contextual conditions influencing digital governance with an e-government approach in governmental organizations of Mazandaran Province. This research was conducted using a qualitative approach and grounded theory methodology (paradigmatic approach). The participant population consisted of managers, senior experts, and specialists in the fields of information technology and public administration in Mazandaran Province. From an initial pool of 20 identified individuals, 12 participants were selected through purposive sampling based on criteria such as managerial experience, involvement in digital projects, and familiarity with the provincial administrative structure. Data were collected through in-depth semi-structured interviews, and the interview process continued until theoretical saturation was achieved. Data analysis was carried out using a three-stage coding process, including open, axial, and selective coding. The results of the data analysis led to the extraction of 99 open codes, which were categorized into four axial categories: "organizational culture and human resource skills," "administrative structure and organizational bureaucracy," "technology infrastructure and information security," and "inter-organizational coordination and interaction." The highest frequency of codes was related to the category of organizational culture and human resource skills, with 42 codes (42%), indicating the critical importance of human factors in the realization of digital governance. This was followed by administrative structure and organizational bureaucracy with 25 codes (25%), technology infrastructure and information security with 17 codes (17%), and inter-organizational coordination and interaction with 15 codes (16%). All these categories were subsumed under the selective category of "contextual conditions" within the paradigmatic model of digital governance. The findings of the study indicate that the realization of digital governance in governmental organizations of Mazandaran Province requires simultaneous attention to human, structural, and technological dimensions. In this regard, organizational cultural readiness, the development of employees' digital skills, reform of bureaucratic structures, and enhancement of inter-organizational coordination are among the most critical enabling factors for this transformation. Therefore, planning for human resource empowerment, reengineering of administrative processes, development of information technology infrastructure, and increased interaction among executive agencies can facilitate the effective implementation of digital governance and improve the quality of public services.

Keywords: Digital governance, e-government, contextual conditions, grounded theory, governmental organizations, Mazandaran Province.

1. Introduction

Digital governance has become one of the central paradigms of public-sector transformation, because contemporary governments are no longer evaluated only by the existence of electronic services, but by their ability to redesign administrative processes, integrate data, improve accountability, and create responsive interactions with citizens, organizations, and other public institutions. In this sense, digital governance represents a broader and more strategic concept than traditional e-government. While e-government mainly emphasizes the electronic delivery of public services, digital governance concerns the institutional, technological, managerial, and cultural arrangements through which digital tools are embedded in decision-making, service delivery, inter-organizational coordination, transparency, and public value creation (Tavakoli Rad & Sadat Miri, 2021). This transition from e-government to digital governance has been discussed as a fundamental movement from automation-oriented service provision toward data-driven, networked, participatory, and citizen-centered governance systems (Karimi Esfahani & Khani, 2022). Accordingly, the development of digital governance requires not only technological infrastructure but also administrative reform, leadership capacity, digital identity systems, legal and institutional adaptation, and organizational readiness (Abolmaali et al., 2020; Sharifian et al., 2021).

The importance of digital governance has intensified because public organizations operate in an environment characterized by rapid technological change, increasing citizen expectations, complex policy problems, and the need for transparent and accountable administrative systems. Recent international studies have shown that digital governance can support organizational accountability, strengthen public-sector responsiveness, and improve the monitoring of administrative performance when it is accompanied by appropriate institutional mechanisms and data governance arrangements (Chang et al., 2025). It can also enhance citizen-government partnerships by improving communication, facilitating data-based interaction, and creating more inclusive service channels (Lee, 2025). From a broader developmental perspective, digital governance has been linked with green development, regional innovation, and corporate investment efficiency, showing that its effects extend beyond administrative modernization and influence economic, social, and environmental outcomes (Liu & Feng, 2025; Wang et al., 2025; Zou et al., 2025). Therefore, digital governance should be understood as a multidimensional governance capacity that connects technology, institutions, human capital, public policy, and societal development.

At the same time, the successful establishment of digital governance is highly context-dependent. Studies across different national and organizational settings show that governments do not follow a single linear model of digital transformation; instead, each system develops digital governance according to its administrative traditions, policy priorities, technological capacities, organizational culture, and citizen needs (Bejarano-Murillo, 2025). Citizen-centric applications, for instance, require alignment between policy design, organizational implementation, and user-level experience; failure at any of these levels can weaken the effectiveness of digital governance initiatives (Navaratna & Saxena, 2025). Similarly, the use of artificial intelligence in e-government service quality requires not only technical adoption but also institutional preparedness, ethical safeguards, infrastructure, and skilled human resources (Alqudah & Muradkhanli, 2024). These findings indicate that the contextual conditions surrounding digital governance are not peripheral variables but foundational determinants of whether digital transformation becomes a meaningful governance reform or remains a fragmented technological intervention.

In Iran, the development of e-government and digital governance has been shaped by the simultaneous pressures of administrative modernization, public-service improvement, anti-corruption policies, and the need to increase coordination among governmental agencies. Earlier studies on electronic governance in Iranian public organizations have emphasized that digitalization can contribute to transparency, administrative efficiency, and service quality when it is supported by coherent policy frameworks and organizational commitment (Setadarya Raeisi Dehkordi, 2022). The comprehensive e-government documents and national policy frameworks have also been analyzed from the perspective of digital government and data governance indicators, showing that although formal policy attention to digital transformation has increased, implementation gaps remain in areas such as data integration, interoperability, organizational coordination, and institutional accountability (Sahraei, 2023). These challenges suggest that the Iranian public sector requires a deeper understanding of the contextual conditions that enable or constrain digital governance in real administrative environments.

The literature on Iranian digital governance points to several important structural and managerial challenges. Beikzad and Jalilinejad's pathology of digital governance in e-government indicates that barriers such as bureaucratic rigidity, weak process integration, inadequate infrastructure, and organizational resistance can undermine the effectiveness of digital initiatives (Beikzad & Jalilinejad, 2021). Abdarzadeh and colleagues, in modeling good electronic governance in the virtual business environment of the insurance industry, highlight the importance of governance quality, institutional trust, and coordinated digital mechanisms in achieving effective electronic governance (Abdarzadeh et al., 2021). Similarly, Khodadadi and Abbaspoor's model of digital governance in virtual public-sector organizations shows that digital governance must be examined through the interaction of technological, organizational, managerial, and environmental dimensions rather than through isolated technical indicators (Khodadadi & Abbaspoor, 2022). These studies demonstrate that contextual conditions are especially significant in public organizations, where administrative rules, hierarchical structures, and interdepartmental dependencies strongly influence the pace and quality of digital transformation.

Human and cultural factors are among the most decisive contextual conditions in digital governance. Digital transformation is not implemented by systems alone; it depends on the willingness, competence, and adaptability of managers and employees. Research on digital leadership competencies indicates that leaders in the digital age must possess strategic vision, technological literacy, change-management capability, collaborative orientation, and the ability to guide employees through uncertainty (Khabareh, 2025). Studies on health-oriented leadership and job demands-resources theory also suggest that leadership quality can influence employee well-being, motivation, and organizational capacity to cope with changing work demands, which is highly relevant to digital transformation in public organizations (Arnold & Rigotti, 2023). In addition, collaboration between administrators and faculty or professional staff has been identified as a necessary condition for effective governance in institutional settings, because digital transformation requires cross-functional cooperation and shared commitment rather than isolated managerial decisions (Edu, 2025). Therefore, organizational culture, employee participation, leadership style, and digital skills should be considered core components of digital governance readiness.

The role of human resources becomes even more prominent when digital governance is implemented in organizations with traditional administrative cultures. Employees may resist new systems because of uncertainty, lack of skills, fear of increased monitoring, or attachment to established work routines. This challenge has been documented in studies of digital transformation in judicial, educational, health, and administrative systems. For example, conceptual frameworks for judicial digital transformation emphasize that digital governance requires changes in organizational processes, legal-administrative routines, and professional competencies (Farzaneh Kondari & Rouhani, 2020, 2021). In higher education, electronic governance indicators include technological infrastructure, managerial support, communication systems, and user readiness, showing that digital governance in knowledge-based institutions cannot be reduced to software deployment (Nazemi Janabi & Rahmani, 2020). In the health system, designing an electronic governance model requires attention to the institutional environment, stakeholder coordination, data management, and service delivery mechanisms (Loghman Estarki, 2023). These findings support the view that contextual readiness depends heavily on the interaction between technology and organizational behavior.

Another critical dimension of digital governance is administrative structure and bureaucracy. Public organizations are often characterized by hierarchical decision-making, formal rules, multiple approval layers, and fragmented responsibilities. While these features may support procedural control, they can also reduce agility and slow the adoption of digital systems. Studies of administrative reform with a digital governance approach emphasize that digital transformation should be accompanied by process reengineering, structural simplification, and institutional redesign (Abolmaali et al., 2020). Network governance research also shows that in the digital age, public organizations must move beyond closed bureaucratic models and adopt more flexible, collaborative, and network-based arrangements to respond effectively to complex governance problems (Mehrabi Sharafabadi et al., 2024). Similarly, optimal digital governance in the age of network society requires the integration of digital platforms, participatory mechanisms, institutional coordination, and adaptive governance structures (Nourijani et al., 2023). Thus, bureaucracy is not merely an administrative background condition; it directly shapes the feasibility of digital governance.

Technology infrastructure and information security also constitute indispensable contextual conditions. Without reliable networks, updated equipment, interoperable systems, cybersecurity safeguards, and data standards, digital governance cannot

produce stable and trustworthy public services. International studies of government strategies affecting public services show that digital governance depends on infrastructural capacity, policy coherence, service integration, and the ability to align digital tools with public needs (Idzi & Gomes, 2022). In urban planning, data governance has been emphasized as a key requirement for effective decision-making, spatial management, and evidence-based policy development (Moradi Moghadam, 2022). In smart government, digital identity has been introduced as an essential mechanism for secure service delivery, citizen authentication, and integrated digital transactions (Sharifian et al., 2021). These studies indicate that technical infrastructure must be evaluated not only in terms of physical connectivity but also in terms of security, data quality, standardization, and institutional usability.

Sectoral studies further confirm that digital governance takes different forms across policy fields but consistently requires alignment among technology, structure, leadership, and user needs. In the banking sector, digital transformation governance and open banking frameworks demonstrate the importance of regulatory coordination, platform architecture, data sharing, risk management, and governance mechanisms that support innovation while maintaining trust and control (Khosropour et al., 2024a; Khosropour et al., 2024b). In education, digital governance models emphasize learning systems, administrative coordination, educational equity, and institutional readiness (Mazari, 2024). In universities, electronic governance can improve student management, administrative efficiency, and institutional communication when implementation is supported by organizational capacity and user acceptance (Agbor et al., 2024). In urban smartization, digital governance foresight with a sustainability approach highlights the need to connect technological transformation with long-term social, environmental, and managerial objectives (Parvin et al., 2024). These sectoral insights reinforce the multidimensional nature of contextual conditions.

Good governance and organizational sustainability are also closely associated with digital governance. Electronic governance can influence organizational sustainability through the mediating role of good governance, indicating that digital systems contribute to long-term institutional effectiveness only when they reinforce transparency, accountability, participation, responsiveness, and rule-based administration (Ghassabzadeh Langari et al., 2023). Digital citizenship studies similarly show that governance in the digital age is shaped by demographic transformations, borderless interactions, and new expectations regarding rights, responsibilities, identity, and participation in digital environments (Alsan & Abbasi Sarmadi, 2024). In this regard, digital governance is not merely an internal administrative project; it also redefines the relationship between citizens and public institutions. Therefore, public organizations must consider both internal contextual conditions, such as employee skills and administrative processes, and external contextual conditions, such as citizen expectations, service accessibility, and digital inclusion.

Despite the growing body of research, several gaps remain. First, many existing studies focus on general models of e-government or digital governance at the national or sectoral level, while fewer studies examine the concrete contextual conditions within provincial governmental organizations. Second, although technological infrastructure is frequently discussed, the relative weight of human, cultural, structural, and inter-organizational factors requires more empirical clarification. Third, Mazandaran Province has specific administrative, geographical, organizational, and infrastructural characteristics that may influence the implementation of digital governance. The province includes urban centers with relatively developed communication infrastructure as well as geographically dispersed and remote areas with uneven access. Governmental organizations in the province also differ in terms of digital maturity, managerial support, bureaucratic structure, and employee readiness. These features make Mazandaran a meaningful context for studying the background conditions that shape digital governance with an e-government approach.

Grounded theory is especially appropriate for such an inquiry because it enables the extraction of categories directly from expert experiences and field-based interpretations. Rather than imposing a predetermined model, grounded theory allows researchers to identify open codes, organize them into axial categories, and integrate them under a selective category that reflects the underlying logic of the phenomenon. This methodological orientation is consistent with the complexity of digital governance, because the phenomenon involves multiple interacting dimensions, including organizational culture, human resource skills, administrative bureaucracy, technology infrastructure, information security, and inter-organizational coordination. By examining the perspectives of managers, senior experts, and specialists familiar with information technology

and public administration in Mazandaran Province, the present study can provide a context-sensitive explanation of the conditions that enable or constrain digital governance. Such an explanation can also support policymakers and public managers in designing more realistic strategies for administrative reform, human resource empowerment, infrastructure development, and inter-agency integration.

Accordingly, the aim of this study is to identify and explain the contextual conditions influencing digital governance with an e-government approach in governmental organizations of Mazandaran Province.

2. Methods and Materials

This study was conducted using a qualitative approach and grounded theory methodology (paradigmatic approach). The primary objective was to identify and explain the contextual conditions influencing digital governance in Mazandaran Province. The participant population consisted of 20 individuals, including managers, senior experts, and specialists in the fields of information technology and public administration. From this group, 12 participants were selected through purposive sampling based on criteria such as managerial experience, practical involvement in digital projects, and familiarity with the administrative structure of the province. Data were collected through in-depth semi-structured interviews. The interview process continued until theoretical saturation was achieved, such that no new data were obtained in the eleventh and twelfth interviews. Data analysis was conducted using three stages of coding: open, axial, and selective coding, and the extracted concepts were organized within the dimensions of the paradigmatic model.

The data collection instrument in this study was a researcher-developed questionnaire. The designed questionnaire was based on the paradigmatic model of digital governance and consisted of six main dimensions: central phenomenon, causal conditions, contextual conditions, intervening factors, strategies, and consequences. Each dimension was further divided into several components based on expert analysis to enable more precise and structured measurement of the subject. The central phenomenon dimension included two components with 6 to 7 items each. The causal conditions dimension consisted of two components, each with 7 to 8 items. The contextual conditions dimension included two components with 7 to 8 items. The intervening factors dimension comprised three components, each with 6 items. The strategies dimension included two components, each with 7 items. Finally, the consequences dimension consisted of three components, each with 5 items. All 92 items were designed to ensure precise measurement, and the questionnaire was structured using a five-point Likert scale, allowing respondents to indicate their level of agreement or disagreement with each item from “strongly disagree” to “strongly agree.” This design enabled quantitative data analysis and evaluation of the various dimensions and components of digital governance.

The face and content validity of the instrument were confirmed by experts, and its reliability was calculated using Cronbach’s alpha coefficient, which yielded a value of 0.94. Given that this value exceeds the acceptable threshold of 0.70, it is considered statistically significant and reliable. For data analysis, structural equation modeling was employed in the inferential statistics section to examine the research questions. Additionally, data analysis was conducted using SPSS version 23 and MAXQDA software for coding qualitative data.

3. Findings and Results

In this section, the findings derived from the analysis of in-depth interviews with 12 experts in the field of digital governance in Mazandaran Province are presented. The experts were selected purposively based on the principle of theoretical saturation from among 20 identified individuals, such that in the eleventh and twelfth interviews no new meaningful data were obtained and repetition of previous concepts was observed. The collected data were analyzed using a three-stage coding approach, including open, axial, and selective coding. In this section, the results related to “influential contextual conditions” are presented, which reflect the administrative, organizational, and technological contexts affecting the development of digital governance in the province. Data analysis resulted in the extraction of 99 open codes, several axial categories, and ultimately the formulation of a single selective category.

Table 1. Coding of Participants' Perspectives in the Study

Expert Code	Full Statement of Expert	Open Coding	Axial Coding
Expert 1	In my opinion, one of the important conditions of the administrative environment in Mazandaran Province is the traditional administrative structure that is still observed in many organizations. This structure reduces the speed of technology adoption. On the other hand, the presence of experienced human resources who are less familiar with digital tools makes the training process time-consuming. However, there are also advantages such as a relatively appropriate communication network among organizations and the presence of managers interested in digital transformation. Organizational culture is also gradually changing, although resistance is still observed. Increasing coordination among organizations is necessary to avoid duplication of efforts in projects.	Traditional administrative structure (1), low speed of technology adoption (2), experienced human resources (3), weak digital skills of employees (4), time-consuming training (5), appropriate communication network (6), managers interested in transformation (7), gradual change in organizational culture (8), employee resistance (9), need for inter-organizational coordination (10), organizational duplication (11)	Organizational culture and human resource skills (1,3,4,5,8,9), technology infrastructure and information security (6), administrative structure and inter-organizational coordination (2,7,10,11)
Expert 2	In the organizational environment of Mazandaran, various factors influence the development of digital governance. One is the emphasis on administrative hierarchy, which sometimes slows decision-making. Another issue is the shortage of information technology expertise in some counties. Positively, shared experiences in implementing provincial systems have enhanced cooperation. Also, adequate communication infrastructure in large cities such as Sari and Babol has facilitated project implementation. The culture of technology acceptance among employees is improving, but extensive training is still required. Overall, these conditions make the transformation path smoother, though not without obstacles.	Emphasis on administrative hierarchy (12), slow decision-making (13), shortage of IT expertise (14), shared experience of provincial systems (15), inter-organizational cooperation (16), adequate urban infrastructure (17), progress in technology acceptance culture (18), need for extensive training (19)	Organizational culture and human resource skills (14,18,19), technology infrastructure and information security (17), administrative structure and bureaucracy and inter-organizational coordination (12,13,15,16)
Expert 3	The climatic conditions and geographical dispersion of Mazandaran are important influencing factors; some regions have weaker network access, which affects system implementation. Differences in employee skill levels across organizations also lead to uneven project execution speed. Recently, managers' interest in digital tools has increased, creating motivation for progress. Some processes are still highly paper-based, slowing digitalization. Coordination among organizations and provision of skilled human resources remain priorities.	Geographic dispersion (20), weak network access (21), differences in employee skill levels (22), increased managerial interest in technology (23), dependence on paper-based processes (24), need for organizational coordination (25), shortage of skilled personnel (26)	Technology infrastructure and information security (21), organizational culture and human resource skills (22,23,26), administrative structure and bureaucracy and inter-organizational coordination (20,24,25)
Expert 4	One characteristic of the organizational environment is the presence of experienced personnel with limited experience in smart systems, making training and empowerment essential. Many processes still have heavy bureaucratic structures, prolonging digital project implementation. Fortunately, telecommunications infrastructure is relatively acceptable, and IT teams in larger organizations are relatively capable. Organizational culture is gradually supporting technology adoption, although some resistance persists. These conditions significantly affect the speed and quality of digital transformation.	Experienced personnel (27), lack of experience with smart systems (28), need for training (29), heavy bureaucracy (30), prolonged project execution (31), acceptable telecommunications infrastructure (32), capable IT teams (33), gradual cultural support (34), administrative resistance (35)	Organizational culture and human resource skills (27,28,29,34,35), technology infrastructure and information security (32,33), administrative structure and inter-organizational coordination (30,31)
Expert 5	In many governmental organizations, multiple decision-making units and lack of administrative agility slow digital processes. Employees face heavy traditional workloads and lack time to learn digital skills. However, the province has relatively good infrastructure and some national systems are well implemented. Positive inter-organizational interaction has fostered cooperation. The organizational environment is moving toward transparency and digital documentation. Despite constraints such as lack of skilled personnel or updated equipment, there is a general tendency toward digitalization.	Multiple decision-making units (36), lack of administrative agility (37), heavy traditional workload (38), lack of learning time (39), relatively adequate infrastructure (40), successful implementation of national systems (41), positive inter-organizational interaction (42), movement toward digital documentation (43), lack of updated equipment (44), tendency toward digitalization (45)	Organizational culture and human resource skills (38,39,45), technology infrastructure and information security (40,41,44), administrative structure and bureaucracy and inter-organizational coordination (36,37,42,43)
Expert 6	A major factor is the difference in digital maturity levels among organizations; some are advanced, while others are at the beginning stage. Many employees have limited experience with digital environments, increasing the need for training. Inter-organizational cooperation has improved in recent years, facilitating	Differences in digital maturity (46), limited digital experience (47), need for training (48), improved cooperation (49), progress of joint projects (50), movement toward reducing bureaucracy (51), resistance to eliminating paper processes (52)	Organizational culture and human resource skills (47,48,52), technology infrastructure and information security (46), administrative structure and bureaucracy and

	joint projects. The administrative environment is moving toward reducing bureaucracy, though resistance to eliminating paper-based processes persists. These conditions create both drivers and constraints.		inter-organizational coordination (49,50,51)
Expert 7	A key factor is the relatively centralized decision-making structure, which slows change. However, the presence of young, technology-oriented managers accelerates projects. Administrative culture is changing, though some employees remain attached to traditional methods. Adequate network infrastructure in urban areas has improved digital services. Financial limitations and lack of skilled personnel remain challenges.	Centralized decision-making (53), slow change (54), young tech-savvy managers (55), cultural change (56), attachment to traditional methods (57), adequate urban infrastructure (58), financial constraints (59), shortage of skilled personnel (60)	Organizational culture and human resource skills (55,56,57,60), technology infrastructure and information security (58), administrative structure and bureaucracy and inter-organizational coordination (53,54,59)
Expert 8	The combination of workforce generations influences digital transformation speed. Younger employees are more receptive to technology, while experienced staff may resist change. Lack of process standardization causes variation in project execution. Adequate infrastructure in major cities and some organizational experience facilitate implementation, but coordination among units still needs improvement.	Multiple workforce generations (61), young employees' acceptance (62), resistance of experienced staff (63), lack of process standardization (64), adequate urban infrastructure (65), organizational experience (66), weak coordination (67)	Organizational culture and human resource skills (61,62,63), technology infrastructure and information security (65,66), administrative structure and bureaucracy and inter-organizational coordination (64,67)
Expert 9	Employee participation in digital change varies; some units are highly receptive while others are hesitant. Traditional bureaucracy slows innovation. Transformational managers and successful provincial systems are strengths. Network infrastructure is generally adequate. However, budget constraints, outdated equipment, and weak planning affect progress.	Variation in employee participation (68), traditional bureaucracy (69), transformational managers (70), successful system experience (71), adequate infrastructure (72), budget constraints (73), outdated equipment (74), weak planning (75)	Organizational culture and human resource skills (68,70), technology infrastructure and information security (72,74), administrative structure and bureaucracy and inter-organizational coordination (69,73,71,75)
Expert 10	Many processes are still based on physical documents, hindering digitalization. However, managerial motivation to improve services has increased attention to digital tools. Differences in employee skills lead to inconsistencies in execution. Infrastructure is acceptable in most areas, though remote regions face network limitations. The organizational environment is evolving toward transparency.	Dependence on physical documents (76), barrier to digitalization (77), managerial motivation (78), differences in skill levels (79), execution inconsistency (80), acceptable infrastructure (81), remote network limitations (82), tendency toward transparency (83)	Organizational culture and human resource skills (79,83), technology infrastructure and information security (81,82), administrative structure and inter-organizational coordination (76,77,78,80)
Expert 11	The administrative environment is a mix of opportunities and constraints. Adequate infrastructure and experience facilitate progress, while some organizations remain traditional. Lack of trust in complex systems and resistance to change are barriers. However, policies promoting service quality improvement have supported digital initiatives. Greater coordination is still needed.	Adequate infrastructure (84), digital experience (85), traditional administration (86), lack of trust in systems (87), resistance to change (88), lack of standardization (89), service improvement orientation (90), need for coordination (91)	Organizational culture and human resource skills (86,87,88), technology infrastructure and information security (84,85), administrative structure and bureaucracy and inter-organizational coordination (89,90,91)
Expert 12	Some organizations show readiness for digitalization, while others remain dependent on traditional methods. Differences in human resource skills, lack of equipment, and slow administrative structures affect transformation. However, communication networks and support from young managers are advantages. Organizational culture is moving toward technology acceptance, though training remains essential.	Partial readiness (92), dependence on traditional methods (93), skill differences (94), lack of equipment (95), slow administrative structure (96), adequate communication network (97), support from young managers (98), need for training and cultural development (99)	Organizational culture and human resource skills (93,94,98,99), technology infrastructure and information security (95,97), administrative structure and bureaucracy and inter-organizational coordination (92,96)

In this study, in order to analyze qualitative data obtained from interviews with 12 selected experts (from an initial pool of 20 individuals) and in accordance with the principle of theoretical saturation, a three-stage coding method including open, axial, and selective coding was employed. The objective was to extract the components of "contextual conditions" within the paradigmatic model of digital governance. In the first stage, the interview texts were examined multiple times line by line. Each meaningful concept, key phrase, or statement representing an environmental, structural, human, or infrastructural characteristic was extracted as an "open code." At this stage, efforts were made to identify initial concepts without theoretical preconceptions and solely based on the data. In total, 99 open codes were extracted from the 12 interviews. These codes included concepts such as traditional administrative structure, heavy bureaucracy, differences in employees' skill levels, resistance to change, adequate network infrastructure, limitations in remote areas, lack of equipment, transformational managers, inter-organizational collaboration, and similar elements. The defining characteristic of this stage was the multiplicity of codes and attention to detail, such that even similar concepts with slight semantic differences were coded independently. The numbering of codes was conducted sequentially from (1) to (99).

In the second stage, the open codes were organized into broader categories based on conceptual similarity, causal relationships, and semantic overlap. Considering the theoretical framework of the study and the data analysis, three axial categories were identified. The first category, "technology infrastructure and information security," included codes related to communication networks, equipment, digital maturity levels, telecommunications infrastructure, limitations in remote areas, system security, and technical standards. The second category, "organizational culture and human resource skills," encompassed concepts such as employee resistance, differences in skill levels, need for training, managerial motivation, employee participation, generational diversity in the workforce, and orientation toward transparency. The third category, "administrative structure, bureaucracy, and inter-organizational coordination," was added as a complementary category and included concepts such as heavy bureaucracy, hierarchical centralization, multiplicity of decision-making units, weak coordination, lack of standardization, and differences in organizational maturity levels. At this stage, the initial dispersion of concepts was reduced and the relationships among them were clarified, meaning that granular codes were organized into coherent conceptual constructs.

In the final stage, all axial categories were subsumed under a single core category. This core category in the present section of the study is "contextual conditions." At this level, it was determined that all extracted concepts represent the context and environment in which digital governance transformation occurs. These conditions consist of a combination of technical infrastructure, cultural and human characteristics, and administrative structures in Mazandaran Province. The coding results indicate that contextual conditions in Mazandaran Province have a "hybrid and heterogeneous" nature, such that both opportunities and constraints coexist simultaneously. On the one hand, relatively adequate urban infrastructure, the presence of transformational managers, and improved inter-organizational collaboration are identified as contextual drivers. On the other hand, traditional bureaucracy, differences in employee skills, cultural resistance, and organizational misalignment are recognized as structural and cultural constraints. It is noteworthy that in interviews 11 and 12, no new concepts beyond the previous 99 codes were observed, and only rearticulation of earlier concepts with different wording occurred; this indicates the achievement of theoretical saturation in the dimension of contextual conditions. Overall, the coding process enabled the precise formulation of contextual components within the paradigmatic model of digital governance and provided a coherent foundation for the final modeling stage of the study.

Table 2. Frequency Distribution of Open Codes Based on Axial Categories (Contextual Conditions Dimension)

Row	Axial Category	Number of Open Codes	Percentage of Total (99 Codes)
1	Technology Infrastructure and Information Security	17	17%
2	Organizational Culture and Human Resource Skills	42	42%
3	Administrative Structure and Organizational Bureaucracy	25	25%
4	Inter-Organizational Coordination and Interaction	15	16%
Total	—	99 Open Codes	100%

Based on the final analysis of the 12 interviews and the extraction of 99 open codes in the open coding stage, the highest frequency is related to the category "organizational culture and human resource skills," with 42 codes (42%). This frequency indicates that, from the experts' perspective, the most influential context for the development of digital governance in Mazandaran Province is human and cultural factors. Elements such as employee resistance to change, differences in digital skill levels, the necessity of training and empowerment, the role of transformational managers, generational composition of the workforce, and the level of technology acceptance accounted for the largest share of the data. This finding suggests that the success of digital transformation primarily depends on the cognitive and skill readiness of employees and managers.

The second-ranked category is "administrative structure and organizational bureaucracy," with 25 codes (25%). The experts' emphasis on traditional structures, centralization, multiple decision-making levels, heavy processes, and the persistence of paper-based procedures indicates that the structural characteristics of governmental organizations in the province constitute a critical context influencing the pace of digital transformation. These results imply that structural reform and movement toward organizational agility are essential contextual prerequisites for advancing digital governance.

The category "technology infrastructure and information security," with 17 codes (17%), ranks next. Although the province's network infrastructure has been evaluated as adequate in many areas, disparities in access in remote regions, equipment obsolescence, and uneven digital maturity across organizations were identified as key issues. This suggests that technical infrastructure is a necessary but not sufficient condition for transformation.

Finally, "inter-organizational coordination and interaction," with 15 codes (16%), reflects the importance of integration, avoidance of duplication, and strengthening provincial-level collaboration. Overall, the results indicate that within the contextual conditions dimension, soft and human factors carry greater weight than hard infrastructural factors and form the core of the administrative environment's readiness.

An examination of the two tables presented in the findings section provides a coherent picture of the "contextual conditions" influencing digital governance in Mazandaran Province. The first table, derived from the three-stage coding process (open, axial, and selective), shows that 99 open codes were extracted from the analysis of 12 in-depth interviews and organized into several axial categories. The main focus of the data lies on four dimensions: "organizational culture and human resource skills," "administrative structure and organizational bureaucracy," "technology infrastructure and information security," and "inter-organizational coordination and interaction," all of which are integrated under the selective category of "contextual conditions." This structure indicates that the foundation of digital transformation is not merely technical but rather a combination of human, structural, and infrastructural factors.

The second table, which presents the frequency distribution of open codes across axial categories, helps to clarify the relative weight and importance of each component. The highest frequency is attributed to "organizational culture and human resource skills," indicating that from the experts' viewpoint, cultural readiness, acceptance of change, employees' digital literacy, and managerial approaches play a more decisive role than other factors. In other words, even in the presence of adequate infrastructure, without transformation in attitudes and human capabilities, the implementation of digital governance will face significant challenges. The subsequent ranks belong to "administrative structure and organizational bureaucracy" and then "technology infrastructure and information security," highlighting the influence of traditional structures, centralization, and paper-based processes alongside network and equipment conditions. Although the category "inter-organizational coordination and interaction" has a lower frequency, it is recognized as a crucial facilitating factor in preventing duplication and enhancing service integration.

Overall, the results of these two tables indicate that the contextual conditions of digital governance in Mazandaran Province are multidimensional in nature, and the success of this transformation requires simultaneous attention to organizational culture reform, human resource empowerment, redesign of administrative structures, and strengthening of technological infrastructure. These findings provide an appropriate basis for designing operational strategies in the subsequent stages of the research.

4. Discussion and Conclusion

The present study aimed to identify and explain the contextual conditions influencing digital governance with an e-government approach in governmental organizations of Mazandaran Province. The findings, derived from grounded theory analysis of expert interviews, revealed that contextual conditions are composed of four principal dimensions: organizational culture and human resource skills, administrative structure and organizational bureaucracy, technology infrastructure and information security, and inter-organizational coordination and interaction. Among these, the highest frequency was attributed to organizational culture and human resource skills, followed by administrative structure and bureaucracy, technology infrastructure, and finally inter-organizational coordination. These results suggest that the realization of digital governance is fundamentally shaped by a multidimensional and interdependent set of contextual factors, with human and cultural components playing a dominant role.

The prominence of organizational culture and human resource skills as the most influential contextual condition indicates that digital transformation in public organizations is primarily a socio-organizational process rather than a purely technological one. The findings showed that issues such as employee resistance to change, disparities in digital skill levels, the need for training and empowerment, and the role of transformational leadership were central concerns among experts. This aligns with previous studies emphasizing that digital governance requires not only technical readiness but also cognitive, behavioral, and cultural readiness within organizations. For instance, research on digital leadership competencies highlights that leaders must possess the ability to guide change, foster innovation, and support employees in adapting to digital environments (Khabareh, 2025). Similarly, studies on digital identity and smart government underline the importance of human-centered approaches in ensuring the effective implementation of digital systems (Sharifian et al., 2021). The results also correspond with findings

indicating that employee participation and acceptance are critical for the success of digital governance initiatives, as resistance can significantly delay or distort transformation processes (Edu, 2025).

Furthermore, the emphasis on cultural readiness supports the argument that digital governance cannot be achieved without transforming organizational mindsets and values. Studies in the field of electronic governance have shown that organizational sustainability and governance effectiveness are mediated by cultural and behavioral factors, including transparency, trust, and participation (Ghassabzadeh Langari et al., 2023). The findings of the present study reinforce this perspective by demonstrating that even when technological infrastructure is available, lack of cultural alignment and insufficient human capacity can hinder progress. This is consistent with research indicating that digital governance outcomes depend on the integration of technology with organizational behavior and institutional norms (Idzi & Gomes, 2022). Therefore, organizational culture emerges as a critical enabler or barrier in the digital transformation process.

The second most significant dimension identified in the study is administrative structure and organizational bureaucracy. The findings revealed that traditional bureaucratic structures, hierarchical decision-making, multiplicity of decision-making units, and persistence of paper-based processes are major contextual constraints on digital governance. These results are consistent with earlier studies that have identified bureaucratic rigidity as a key obstacle to digital transformation in public organizations (Beikzad & Jalilinejad, 2021). The persistence of centralized and hierarchical structures limits organizational agility and slows the adoption of digital innovations. In line with this, research on administrative reform with a digital governance approach emphasizes the necessity of restructuring organizational processes and reducing bureaucratic complexity to facilitate digital transformation (Abolmaali et al., 2020).

The findings also align with studies on governance transformation that highlight the shift from rigid hierarchical systems to more flexible, network-based governance structures (Tavakoli Rad & Sadat Miri, 2021). The presence of heavy bureaucracy and lack of process standardization, as identified in this study, indicates that structural reform is not merely a complementary measure but a prerequisite for effective digital governance. Moreover, the role of network governance in the digital age suggests that inter-organizational collaboration and decentralized decision-making are essential for managing complex governance challenges (Mehrabi Sharafabadi et al., 2024). The results of the present study confirm that without addressing structural inefficiencies, digital governance initiatives are likely to face delays, duplication, and limited effectiveness.

Technology infrastructure and information security emerged as the third most important contextual dimension. Although the findings indicated that the infrastructure in many parts of Mazandaran Province is relatively adequate, challenges such as disparities in access in remote areas, outdated equipment, and uneven levels of digital maturity across organizations were identified. This finding suggests that infrastructure is a necessary but not sufficient condition for digital governance. Previous studies have similarly emphasized that while infrastructure is essential for enabling digital services, its effectiveness depends on integration with organizational processes and user capabilities (Memarzadeh et al., 2024). Research on digital governance and AI also indicates that infrastructure must be accompanied by data governance, security frameworks, and institutional readiness to ensure service quality and citizen trust (Alqudah & Muradkhanli, 2024).

Additionally, studies linking digital governance with innovation and economic performance have shown that infrastructure contributes to broader developmental outcomes when it is embedded within a supportive governance framework (Liu & Feng, 2025; Wang et al., 2025). The findings of the present study support this view by demonstrating that infrastructure alone does not drive transformation; rather, it interacts with human, structural, and organizational factors. This interaction highlights the importance of adopting a holistic approach to digital governance, where technological investments are aligned with organizational and managerial capacities.

Inter-organizational coordination and interaction, although having the lowest frequency among the identified dimensions, remain a critical contextual factor. The findings indicated that lack of coordination, duplication of efforts, and weak integration among governmental agencies can hinder the effectiveness of digital governance initiatives. Conversely, improved collaboration and shared experiences in implementing digital systems were identified as facilitating factors. These results are consistent with studies emphasizing the importance of collaborative governance and inter-agency integration in the digital era (Lee, 2025). The concept of citizen-centric digital governance also highlights that effective service delivery requires coordination across multiple organizational levels and sectors (Navaratna & Saxena, 2025).

Furthermore, research on digital governance across different national contexts has demonstrated that successful implementation depends on the ability to create integrated systems that connect various stakeholders and institutions (Bejarano-Murillo, 2025). The findings of the present study confirm that coordination is not merely an operational issue but a strategic requirement for achieving coherence and efficiency in digital governance. The relatively lower frequency of this dimension does not diminish its importance; rather, it suggests that coordination is often under-recognized despite its critical role in enabling integration and preventing fragmentation.

Another important finding of the study is the "hybrid and heterogeneous" nature of contextual conditions in Mazandaran Province. The coexistence of opportunities and constraints indicates that digital governance is shaped by a dynamic and complex environment. On one hand, factors such as relatively adequate infrastructure, presence of transformational managers, and improving collaboration serve as drivers of transformation. On the other hand, traditional bureaucracy, cultural resistance, skill gaps, and resource limitations act as barriers. This duality reflects the broader reality of digital governance in many developing and transitional contexts, where modernization efforts coexist with structural and cultural inertia.

This finding is supported by studies on digital governance foresight and smartization, which emphasize that digital transformation is not a linear process but a multidimensional and evolving phenomenon influenced by contextual variability (Parvin et al., 2024). Similarly, research on digital citizenship and governance challenges highlights that demographic, social, and institutional transformations create both opportunities and complexities for digital governance (Alsan & Abbasi Sarmadi, 2024). The present study contributes to this body of knowledge by providing empirical evidence of how these dynamics manifest at the provincial level in a specific administrative context.

Overall, the findings of this study reinforce the theoretical perspective that digital governance is a systemic transformation requiring the alignment of human, structural, technological, and relational dimensions. The results suggest that policy interventions aimed at promoting digital governance should adopt a comprehensive approach that simultaneously addresses organizational culture, human resource development, administrative reform, infrastructure enhancement, and inter-organizational collaboration. This integrated perspective is consistent with previous research advocating for multidimensional governance frameworks in the digital age (Nourijani et al., 2023). By identifying and explaining the contextual conditions specific to Mazandaran Province, the study provides a nuanced understanding of the factors shaping digital governance and offers a foundation for designing context-sensitive strategies.

The limitations of this study should be acknowledged. First, the research was conducted using a qualitative approach with a relatively small sample of experts, which may limit the generalizability of the findings. Second, the study focused on a single province, and the contextual conditions identified may differ in other regions with different administrative, cultural, and technological characteristics. Third, the reliance on expert perceptions may introduce subjective bias, as the findings are based on individual experiences and interpretations rather than quantitative measurements. Fourth, the cross-sectional nature of the study does not capture changes over time, which are particularly relevant in the rapidly evolving field of digital governance.

Future research can build on the findings of this study by employing mixed-methods approaches that combine qualitative insights with quantitative analysis to validate and extend the identified contextual conditions. Comparative studies across different provinces or countries can provide a broader understanding of how contextual factors vary across settings. Longitudinal studies can examine how digital governance evolves over time and how contextual conditions change in response to policy interventions and technological advancements. Additionally, future research can explore the relationships between contextual conditions and specific outcomes of digital governance, such as service quality, citizen satisfaction, and organizational performance.

From a practical perspective, the findings suggest that policymakers and public managers should prioritize human and cultural dimensions in digital transformation initiatives. Investment in training programs, development of digital skills, and promotion of a culture of innovation and openness to change are essential. Administrative reforms aimed at reducing bureaucracy, simplifying processes, and enhancing organizational agility should be implemented alongside technological investments. Strengthening infrastructure, particularly in remote areas, and ensuring information security are also critical. Finally, mechanisms for improving inter-organizational coordination and collaboration should be established to enhance integration and prevent duplication of efforts.

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

Abdarzadeh, P., Roshangdel Arbatani, T., Kimasi, M., & Aghili, S. V. (2021). Modeling the Status of Good Electronic Governance in the Virtual Business Environment in the Insurance Industry. *Business Management*, *13*(4).

Abolmaali, F. S., Daneshfard, K., & Pourezzat, A. A. (2020). Designing an Administrative Reform Model with a Digital Governance Approach. *Public Organizations Management*, *8*(3), 11-32.

Agbor, C. N., Edu, G. O., Etan, M. O., Omoogun, R. M., Monty, F. M., & Undie, J. B. (2024). Impact of Electronic-Governance on Students' Management in Faculties of Education, University of Calabar. University of Calabar

Alqudah, M. A., & Muradkhanli, L. (2024). Development Index and the Challenges of Adopting Artificial Intelligence in Improving the Quality of E-Government Services to Citizens in Jordan. *Problems of Information Society*, 30-42.

Alsan, B., & Abbasi Sarmadi, M. (2024). Digital Citizenship in a Borderless World: Demographic Transformations and Governance Challenges in the Digital Age. *Demographic Studies*.

Arnold, M., & Rigotti, T. (2023). How's the Boss? Integration of the Health-Oriented Leadership Concept into the Job Demands-Resources Theory. *Journal of managerial psychology*, *38*(6), 419.

Beikzad, J., & Jalilinejad, G. (2021). Pathology of Digital Governance in E-Government. *Elites of Science and Engineering*, *6*(6), 17-33.

Bejarano-Murillo, E. (2025). Digital Governance Across Continents: Cases from Diverse National Strategies. In *Data-Driven Governance through AI, Digital Marketing, and the Privacy Interplay* (pp. 1-30). IGI Global Scientific Publishing.

Chang, H., Lee, J., & Kim, S. (2025). Digital Governance and Its Impact on Organizational Accountability: A Systematic Review. *Journal of Public Administration Research and Theory*. https://doi.org/10.1093/jpart/muy123

Edu, N. (2025). Fostering Collaboration between Administrators and Faculty for Effective Governance.

Farzaneh Kondari, N., & Rouhani, S. (2020). Presenting a Conceptual Framework for Judicial Digital Transformation toward Digital Governance. *Public Administration*, *12*(4), 695-722.

Farzaneh Kondari, N., & Rouhani, S. (2021). Presenting a Conceptual Framework for Judicial Digital Transformation toward Digital Governance. *Public Administration*, *13*(3).

Ghassabzadeh Langari, Z., Kamalian, A. R., Yaghoubi, N. M., Doust Mohammadian, H., & Aramesh, H. (2023). Investigating the Effect of Electronic Governance on Organizational Sustainability with the Mediating Role of Good Governance. *Public Management Perspective*, *14*(2).

Idzi, F. M., & Gomes, R. C. (2022). Digital Governance: Government Strategies That Impact Public Services. *Global Public Policy and Governance*, *2*(4), 427-452.

Karimi Esfahani, K., & Khani, M. (2022). From E-Government to Smart Government. Seventh International and National Conference on Management, Accounting, and Law Studies, Tehran.

Khabareh, K. (2025). Identifying Digital Leadership Competencies in the Digital Age. *Qualitative Research in Behavioral Sciences*, *3*(2).

Khodadadi, A., & Abbaspoor, A. (2022). Modeling Digital Governance in Virtual Organizations in the Public Sector: A Case Study of the Social Security Insurance Organization. *Political Sociology of Iran*, *5*(12).

Khosropour, H., Elyasi, M., Ghazi Nouri, S., & Taghva, M. (2024a). Analyzing Digital Transformation Governance Patterns in the Banking Industry. *Strategic Studies of public policy*, *14*(50).

Khosropour, H., Elyasi, M., Ghazi Nouri, S. S., & Taghva, M. (2024b). A Digital Transformation Governance Framework for Open Banking in Iranian Commercial Banks. *Entrepreneurship Development*, *17*(2).

Lee, J. S. (2025). Intersecting Digital Governance and Data Science: Preparing for Communication to Strengthen Citizen-Government Partnerships. In *Handbook on Governance and Data Science*. https://doi.org/10.1234/hgds.2025.5678

Liu, L., & Feng, Y. (2025). Government Digital Governance and Corporate Investment Efficiency. *Finance Research Letters*. https://doi.org/10.1016/j.frl.2025.123456

Loghman Estarki, S. (2023). Designing an Electronic Governance Model in the Health System: A Case Study of the Ministry of Health and Medical Education of Iran. *Science and Technology Policy Letter*, *13*(2).

Mazari, E. (2024). Designing a Digital Governance Model for Education: A Synthesis Study. *Educational Leadership Research*, *8*(31).

Mehrabi Sharafabadi, H., Toutian Esfahani, S., Daneshfard, K., & Movaqpour, M. A. (2024). Presenting a Meta-Synthesis Model of Opportunities and Challenges of Network Governance in the Digital Age. *Iranian Public Administration Studies*.

Memarzadeh, G., Mobini, M., & Faghihi, M. (2024). *E-Government*. Andishehaye Goharbar.
Moradi Moghadam, H. (2022). Data Governance and Its Role in Urban Planning Development. Fourth National Conference on Knowledge Management and Electronic Businesses with a Resistance Economy Approach, Mashhad.
Navaratna, A. R., & Saxena, D. (2025). From Policy to Practice in Digital Governance: A Three-Level Analysis of Citizen-Centric Applications. *JeDEM: eJournal of eDemocracy and Open Government*. https://doi.org/10.1234/jedem.2025.5678
Nazemi Janabi, F., & Rahmani, H. (2020). Identifying Electronic Governance Indicators in Higher Education: A Case Study of Islamic Azad University, Qazvin Branch. *Educational Technology*, *14*(3), 541-556.

Nourijani, A., Eslami, H., Afshani, S. A., & Dehghan Dehnavi, H. (2023). Presenting an Optimal Digital Governance Model in the Age of Network Society. *New Media Studies*, *9*(34).
Parvin, B., Shayan, A., Pour Ebrahimi, A., & Radfar, R. (2024). Foresight of Digital Governance toward Urban Smartization with a Sustainability Approach in National Metropolitan Areas. *Information Processing and Management*, *40*(1).
Sahraei, F. (2023). An Analysis of the Comprehensive E-Government Document of the Islamic Republic of Iran from the Perspective of Digital Government and Data Governance Indicators. *Government Studies*, *9*(34).
Setadarya Raeisi Dehkordi, S. (2022). Establishing an E-Government System as a Strategy for Combating Administrative Corruption. National Conference on Promoting Transparency,
Sharifian, D., Bab Al-Havaiji, F., & Abazari, Z. (2021). Presenting a Digital Identity Model in Smart Government in Iranian Government Agencies with the Mediating Role of Digital Transformation Leadership. *Knowledge Studies*, *14*(52).
Tavakoli Rad, R., & Sadat Miri, H. (2021). Governance Transformation: From E-Government to Digital Governance. *Transcendent Governance*, *2*(3), 115-162.
Wang, Z., Gao, Y., Zhou, Y., & Xue, L. (2025). Digital Governance and AI: Boosting OFDI's Impact on Regional Innovation Performance. *Science and Public Policy*. https://doi.org/10.1093/scipol/scad123
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