

Digital Capability as a Mediator between Technology–Organization–Environment Factors and E-Governance Integration: Evidence from the UAE Ministry of Energy and Infrastructure

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DOI Link: <http://dx.doi.org/10.6007/IJARBS/v16-i10/29084>

Published Date: 15 October 2026

Abstract

E-governance integration has become a strategic priority for governments seeking to improve interoperability, service delivery, and organizational efficiency through digital transformation. Despite significant investments in digital technologies, empirical evidence remains limited regarding how Technology–Organization–Environment (TOE) factors contribute to e-governance integration through the development of digital capability, particularly within the public sector of the United Arab Emirates (UAE). This study examines the mediating role of digital capability in the relationship between TOE factors and e-governance integration in the UAE Ministry of Energy and Infrastructure (MOEI). A cross-sectional survey was conducted among 236 MOEI employees involved in digital transformation and e-governance activities across Abu Dhabi, Dubai, and Sharjah. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the measurement model, structural relationships, and proposed mediation effects. The findings indicate that organizational and environmental factors have significant positive effects on digital capability, whereas technology factors do not significantly affect digital capability. Furthermore, digital capability has a significant positive effect on e-governance integration and significantly mediates the relationships between organizational factors and e-governance integration, as well as between environmental factors and e-governance integration. However, digital capability does not significantly mediate the relationship between technology factors and e-governance integration. These findings extend the TOE framework by demonstrating that digital capability functions as a critical organizational mechanism through which organizational and environmental conditions are translated into stronger e-governance integration. The study offers practical implications for public-sector organizations by emphasizing the importance of organizational readiness, leadership commitment, workforce digital competencies, and supportive institutional environments for strengthening sustainable e-governance integration.

Keywords: Technology–Organization–Environment (TOE), Digital Capability, E-Governance Integration, Digital Transformation, Public Sector

Introduction

Digital transformation has become a central government priority because it can improve administrative efficiency, service delivery, transparency, and citizen engagement. In the public sector, however, transformation involves more than automating individual tasks; it requires coordinated changes in processes, structures, and service-delivery arrangements (Cardoso et al., 2023). E-governance integration is therefore increasingly important because it connects digital systems, organizational processes, and institutions so that information and services can move across administrative boundaries (Campmas et al., 2022). The Technology–Organization–Environment (TOE) framework provides a useful organizational-level explanation for these outcomes by considering technological conditions, internal organizational readiness, and the external environment together (Suradi, 2025). Yet favorable contextual conditions do not automatically produce integrated digital government. Organizations also require the internal capability to deploy technologies, develop workforce competencies, coordinate digital resources, and adapt to changing requirements. Digital capability captures this organizational capacity and is increasingly treated as a strategic mechanism through which digital resources are converted into sustained transformation outcomes (Motamedimoghadam et al., 2025).

This capability perspective is particularly relevant to the UAE, where extensive investment in smart government, artificial intelligence, integrated services, and data-driven administration coexists with continuing challenges related to interoperability, organizational readiness, and inter-agency coordination (Alzarooni et al., 2024). Prior TOE studies have linked technological, organizational, and environmental conditions to public-sector technology adoption (Ali et al., 2021). Yet evidence on their indirect relationships with e-governance integration through digital capability remains limited in the UAE public sector, particularly the Ministry of Energy and Infrastructure (MOEI). This study directly tests digital capability as the mediator of each TOE dimension's relationship with e-governance integration. It also provides practical evidence for public-sector decision makers on the relative importance of organizational readiness, workforce digital competencies, leadership support, and enabling institutional conditions.

Literature Review

E-Governance Integration

E-governance refers to the use of digital technologies by public institutions to support administration, service delivery, information exchange, and interaction with stakeholders. As digital government has evolved, attention has shifted from digitizing isolated functions toward integrating systems, processes, and services across organizational boundaries (Cardoso et al., 2023). E-governance integration therefore concerns the extent to which public organizations connect digital systems, exchange information, coordinate processes, and provide interoperable services. Interoperability is central because it enables data and services to move across agencies through shared technical and governance arrangements (Campmas et al., 2022).

Technology investment alone does not ensure such integration because digital transformation also depends on organizational and institutional change. Public organizations must align infrastructure with governance processes, coordination mechanisms, and operational practices rather than treating technology deployment as an end in itself (Tangi et al., 2021). Enterprise-level coordination is especially important where fragmented systems impede information exchange and service integration (Hakimi et al., 2024).

These issues are particularly relevant in the UAE public sector, where substantial digital-government investment has been accompanied by continuing challenges in interoperability, institutional readiness, and organizational coordination (Alzarooni et al., 2024). MOEI is therefore an appropriate setting because its functions require coordination across organizational and governmental boundaries. The present study focuses on the contextual conditions and internal capability that enable technologies to be integrated into e-governance rather than on technology adoption alone.

Technology–Organization–Environment (TOE) Framework

The Technology–Organization–Environment (TOE) framework, introduced by Tornatzky and Fleischer (1990), explains organizational technology adoption and implementation through technological, organizational, and environmental contexts. Unlike individual-level acceptance models, TOE emphasizes organizational resources, structures, and external institutional conditions (Suradi, 2025). This broad perspective is well suited to public-sector digital transformation because implementation decisions are shaped simultaneously by technical readiness, internal organizational conditions, and policy or regulatory environments.

Public-sector applications of TOE show that technology adoption depends on combinations of technological readiness, organizational support, and environmental conditions rather than on a single factor (Ali et al., 2021). Local-government research likewise identifies organizational readiness and managerial support as important determinants of digital technology adoption (David et al., 2023). More recent public-sector synthesis confirms that regulatory and institutional conditions remain integral to explaining organizational technology adoption (Entsie et al., 2025). For MOEI, e-governance integration is therefore not solely a technological issue; it also depends on internal readiness and the wider institutional environment. The present study extends TOE by examining digital capability as a mediating mechanism through which the three contextual dimensions may influence e-governance integration.

Technology Factors

Within TOE, technology factors are the characteristics of existing and emerging technologies that influence an organization's ability to adopt, integrate, and use digital solutions. They include ICT infrastructure, compatibility, complexity, relative advantage, and technical expertise (Qi et al., 2023). These conditions determine whether an organization has a suitable technological foundation for digital transformation and whether digital resources can be incorporated into routine organizational processes. Technological readiness can enable public organizations to adopt and use advanced digital systems (Ali et al., 2021). Compatibility and infrastructure flexibility are particularly important because interoperable architectures facilitate the integration of new technologies with existing systems and support information

exchange (Benitez et al., 2018). Conversely, technological complexity and fragmented systems can increase the effort required to assimilate digital change (Benbya et al., 2020). For e-governance, these issues matter because integrated public services depend on reliable and interoperable systems that operate across organizational boundaries (Campmas et al., 2022). In MOEI, favorable technological conditions are therefore expected to strengthen the organization's capacity to assimilate, use, and adapt digital technologies.

H1: *Technology factors have a positive and significant effect on digital capability.*

Organizational Factors

Organizational factors refer to the internal conditions that shape an organization's capacity to adopt, implement, and sustain digital transformation initiatives (David et al., 2023; Suradi, 2025). Within the TOE framework, the organizational dimension includes top management support, leadership commitment, organizational resources, employee competencies, and organizational culture (David et al., 2023; Suradi, 2025). These conditions influence whether digital technologies can be effectively embedded in organizational processes and converted into sustained digital capabilities. Leadership is particularly important because senior managers establish digital priorities, allocate financial and human resources, and create the organizational commitment required for digital transformation (Ushaka Adie et al., 2024). In their review of digital leadership in the public sector, Ushaka Adie et al. (2024) highlight the role of leadership in shaping digital direction, supporting organizational change, and coordinating digital initiatives. Similarly, David et al. (2023), in their review of digital technology adoption strategies in local government, identify organizational readiness and management support as important conditions for successful technology adoption. Together, these studies indicate that leadership provides both strategic direction and organizational support for the development of digital capability.

Organizational culture also shapes how employees respond to digital innovation, knowledge sharing, and new ways of working (Kocak & Pawlowski, 2023). A culture that encourages learning, experimentation, and collaboration can facilitate employees' adaptation to emerging digital technologies, whereas rigid organizational practices may constrain such adaptation. Although Kocak and Pawlowski (2023) examined digital organizational culture outside the public-sector context, their findings illustrate how cultural characteristics can support the development of internal digital capabilities. In the public-sector context, David et al. (2023) similarly emphasize that organizational readiness and openness to technological change are relevant to digital adoption. A further organizational condition is the availability and development of employee digital competencies. Manana and Mawela (2022), focusing specifically on public-sector employees, show the importance of digital skills for supporting digital transformation. Employees who possess appropriate digital competencies are better positioned to use new technologies, participate in digitally enabled processes, and adapt to changes in organizational systems. Consequently, investment in workforce development and digital upskilling can strengthen the internal capabilities required to sustain digital transformation.

Taken together, evidence from local-government technology adoption research (David et al., 2023), public-sector digital leadership research (Ushaka Adie et al., 2024), public-sector digital-skills research (Manana & Mawela, 2022), and organizational digital-culture research (Kocak & Pawlowski, 2023) suggests that leadership support, organizational readiness,

workforce competencies, and a supportive culture jointly create conditions for developing digital capability. In the context of the UAE Ministry of Energy and Infrastructure, these organizational conditions are therefore expected to strengthen the Ministry's ability to assimilate, use, and continuously improve digital technologies. Accordingly, the following hypothesis is proposed:

H2: *Organizational factors have a positive and significant effect on digital capability.*

Environmental Factors

Environmental factors affect how an organization implements and maintains digital transformation initiatives. Within the TOE framework, the environmental context includes government policies, national digital strategies, regulatory requirements, stakeholder expectations, and broader institutional conditions that influence organizational technology decisions (Entsie et al., 2025; Kibria & Hong, 2024). Each of these may represent an opportunity or a constraint that shapes how organizations adopt and use digital technologies. In public organizations, the external environment is particularly important because government agencies operate within policy- and regulation-driven institutional settings. Accordingly, regulatory requirements and national digital frameworks can significantly shape the direction and implementation of public-sector digital transformation (Entsie et al., 2025; Kibria & Hong, 2024).

Within the context of digital transformation, supportive policy and regulatory frameworks can provide common standards, governance arrangements, and strategic direction for public organizations (Jafari et al., 2025; Kibria & Hong, 2024). Such frameworks can help organizations adopt more integrated technologies, strengthen data governance, and align their digital initiatives with national development priorities. Conversely, inconsistent institutional frameworks and fragmented governance arrangements may hinder coordination across public organizations and constrain the implementation of digital transformation initiatives (Jafari et al., 2025). A stable and supportive institutional environment can therefore facilitate more coordinated and sustainable digital transformation.

National digital strategies can also influence the development of organizational digital capabilities. Government-led digital strategies and related investments can create an enabling environment in which public agencies strengthen digital infrastructure, develop relevant competencies, assimilate emerging technologies, and adjust internal practices to changing digital requirements (Kibria & Hong, 2024; Alzarooni et al., 2024). These external conditions can, in turn, support the development of the organizational competencies and capabilities required for digital transformation (Kibria & Hong, 2024). Thus, supportive institutional environments may influence digital transformation not only by encouraging technology adoption but also by enabling organizations to build the internal capabilities needed to use digital resources effectively.

This relationship is particularly relevant in the UAE public sector, where national digital initiatives and supportive government policies provide an institutional context for the continued development of digital government capabilities (Alzarooni et al., 2024). A supportive external environment can enable public organizations to make more effective use of digital resources, strengthen organizational learning, and adapt to technological change (Alzarooni et al., 2024; Jafari et al., 2025). Therefore, the present study proposes that

supportive environmental conditions will strengthen the digital capability of the UAE Ministry of Energy and Infrastructure.

H3: *Environmental factors have a positive and significant effect on digital capability.*

Digital Capability

Digital capability is an organization's ability to acquire, integrate, deploy, and continually adapt digital technologies and related competencies to improve processes and respond to technological change (Motamedimoghdam et al., 2025). It extends beyond possessing infrastructure because value depends on the capacity to use digital resources effectively, develop relevant skills, and adjust organizational practices as requirements evolve (Atobishi et al., 2024). From the Resource-Based View (RBV), Digital Capability can be treated as a strategic organizational resource that enables organizations to derive greater value from their technological assets. The RBV emphasizes that outcomes depend not only on resource possession but also on the ability to deploy and combine resources effectively (Lubis, 2022). Thus, advanced infrastructure may be insufficient when an organization lacks the capability to assimilate knowledge and mobilize digital resources.

Dynamic Capability Theory complements this perspective by emphasizing the ability to sense change, seize opportunities, and reconfigure resources in response to evolving environments (Teece et al., 1997). In digital transformation, this adaptive capacity enables organizations to adjust technologies, knowledge, and routines as digital requirements change (Civelek et al., 2023). Digital leadership can further support the development of these dynamic digital capabilities by aligning resources and organizational direction (Albannai et al., 2024). Digital capability is particularly important in public organizations, where successful transformation depends on both effective technology use and workforce competencies (Manana & Mawela, 2022). Stronger digital capability should also support e-governance integration because interoperable services require organizations to coordinate technologies, information, and digitally enabled processes across organizational boundaries (Campmas et al., 2022). In MOEI, Digital Capability is therefore expected to enhance E-Governance Integration.

H4: *Digital capability has a positive and significant effect on e-governance integration.*

Digital Capability as a Mediating Mechanism

Digital capability provides a plausible organizational mechanism through which contextual resources and conditions can be translated into digital-governance outcomes. From the RBV, resources do not automatically create value; organizations require capabilities that allow them to deploy and combine those resources effectively (Lubis, 2022). Dynamic Capability Theory similarly explains how organizations reconfigure resources and routines in response to changing environments (Teece et al., 1997).

Empirical research supports this capability-based logic. Dynamic capabilities facilitate digital transformation by enabling organizations to adapt resources and practices (Civelek et al., 2023). In the public sector, Digital Capability has also been associated with organizational performance through organizational agility (Atobishi et al., 2024). These findings indicate that favorable resources and contextual conditions become more valuable when organizations possess the internal capability to mobilize them.

Applied to TOE, technological conditions provide infrastructure and technical resources, organizational conditions provide leadership, readiness, culture, and competencies, and environmental conditions provide institutional support and strategic direction. Digital Capability can translate these conditions into integrated digital outcomes by enabling the organization to assimilate technologies, coordinate digital activities, and adapt operational processes. This mechanism is particularly relevant to MOEI, where e-governance integration requires interoperability and coordination across organizational and governmental boundaries. Accordingly, the model proposes that Digital Capability mediates the relationships between each TOE dimension and E-Governance Integration. The mediation hypotheses test whether contextual conditions contribute to integration indirectly through the organization's capacity to deploy and adapt digital resources.

H5: *Digital capability mediates the relationship between technology factors and e-governance integration.*

H6: *Digital capability mediates the relationship between organizational factors and e-governance integration.*

H7: *Digital capability mediates the relationship between environmental factors and e-governance integration.*

Methodology

This study employed a quantitative cross-sectional research design to examine the mediating effect of digital capability on the relationships between technological, organizational, and environmental factors and e-governance integration in the UAE Ministry of Energy and Infrastructure (MOEI). A cross-sectional survey design was appropriate because it enabled the collection of data from employees involved in relevant digital transformation and e-governance activities at a single point in time and allowed the proposed relationships among the study constructs to be statistically examined. A structured questionnaire was developed based on the literature and consisted of four sections covering respondents' demographic characteristics, TOE factors, digital capability, and e-governance integration. The measurement items for the study constructs were assessed using a seven-point Likert scale. The questionnaire was initially reviewed by public-sector experts to assess content relevance, clarity, and suitability for the UAE public-sector context. A pilot test was subsequently conducted to further assess the clarity and appropriateness of the measurement items before the main data collection. The structure of the questionnaire is summarized in Table 1.

Table 1
Questionnaire Structure

Section	Construct/Information	Dimensions/Components	Measurement/Role
A	Demographic characteristics	Gender, age, education, work experience, job position, and emirate	Respondent profile
B	Technology factors	ICT infrastructure complexity, ICT compatibility, relative advantage, and ICT expertise	Independent construct; 7-point Likert scale
B	Organizational factors	Top management support, digital leadership, and organizational digital culture	Independent construct; 7-point Likert scale

B	Environmental factors	Regulatory support	Independent construct; 7-point Likert scale
C	Digital capability	Digital capability measurement items	Mediating construct; 7-point Likert scale
D	E-governance integration	E-governance integration measurement items	Dependent construct; 7-point Likert scale

The target population comprised 446 employees working in digital transformation, IT, and e-governance-related functions associated with MOEI across Abu Dhabi, Dubai, and Sharjah. These three emirates were selected because they represent distinct administrative and digital-government contexts relevant to the Ministry's operations. Abu Dhabi represents the federal administrative and policy environment, Dubai represents a highly advanced smart-government and digital-service context, while Sharjah provides an additional emirate-level context characterized by different organizational and digital-readiness conditions. Focusing on employees directly involved in digital transformation, IT, and e-governance activities ensured that respondents possessed relevant knowledge and experience of the technological, organizational, and institutional issues examined in the study. A non-probability purposive sampling approach was employed to recruit eligible respondents from the relevant divisions. This approach was considered more appropriate than stratified random sampling because participation was restricted to employees who were directly involved in digital transformation, IT, or e-governance activities and therefore possessed the specific knowledge required to respond meaningfully to the questionnaire. Eligible employees were identified through the relevant organizational channels, and the questionnaire was distributed electronically using official communication channels. A total of 236 questionnaires were distributed, and 236 usable responses were obtained, representing a usable response rate of 100%. Accordingly, the final analytic sample comprised 236 respondents.

The final sample of 236 responses was considered adequate for estimating the proposed model using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM is suitable for estimating structural models involving multiple latent constructs and indirect or mediation relationships, while also allowing assessment of both measurement quality and structural relationships (Hair et al., 2022). Data were analyzed using SmartPLS 4 following the PLS-SEM procedures recommended by Hair et al. (2022). The analysis was conducted in two stages. In the first stage, the measurement model was assessed to establish indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was examined using outer loadings, while internal consistency was assessed using Cronbach's alpha and composite reliability (CR). Convergent validity was evaluated through the average variance extracted (AVE), whereas discriminant validity was examined using the Heterotrait–Monotrait ratio (HTMT) and the Fornell–Larcker criterion (Fornell & Larcker, 1981). In the second stage, the structural model was evaluated using path coefficients, the coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and direct and indirect effects. The statistical significance of the hypothesized direct and mediation relationships was assessed through bootstrapping with 5,000 resamples (Hair et al., 2022). This procedure enabled the study to evaluate both the explanatory and predictive performance of the proposed model and to test the mediating role of digital capability in the relationships between TOE factors and e-governance integration.

Findings

Respondents' Profile

A total of 236 valid responses were included in the analysis. The sample was predominantly composed of IT staff (66.9%), reflecting the study's focus on employees directly involved in digital transformation and e-governance activities. In terms of professional experience, the largest group had 6–10 years of experience (30.1%), followed by those with less than five years (28.0%), indicating that the sample included respondents with varying levels of practical exposure to digital initiatives. Most respondents were based in Sharjah (52.1%), while 25.8% were from Abu Dhabi and 22.0% from Dubai. The sample was also relatively balanced by gender, with 56.8% male and 43.2% female respondents. Regarding age, nearly half of the respondents (49.2%) were between 36 and 39 years old. Overall, the demographic profile indicates that the respondents possessed relevant professional backgrounds and sufficient exposure to the organizational context examined in this study. Detailed demographic characteristics are presented in Table 2.

Table 2

Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	134	56.8
	Female	102	43.2
Age	<30	42	17.8
	30–35	18	7.6
	36–39	116	49.2
	40–49	35	14.8
	≥50	25	10.6
Education	Diploma	9	3.8
	Bachelor's	60	25.4
	Master's	64	27.1
	PhD	43	18.2
	Other	60	25.4
Experience	<5 years	66	28.0
	6–10 years	71	30.1
	11–16 years	57	24.2
	>16 years	42	17.8
Job Position	IT Staff	158	66.9
	Supervisor	36	15.3
	Manager	23	9.7
	Director	18	7.6
	Other	1	0.4
Emirate	Abu Dhabi	61	25.8
	Dubai	52	22.0
	Sharjah	123	52.1

Measurement Model Assessment

Before assessing the structural relationships, the reflective measurement model was evaluated to establish the reliability and validity of the study constructs. Indicator reliability was assessed using outer loadings, internal consistency reliability was evaluated using Cronbach's alpha and composite reliability (CR), and convergent validity was examined using

the average variance extracted (AVE). Accordingly, the measurement-model assessment reported here is limited to the indicators and statistics presented in Table 3. The final measurement model was subsequently used for further analysis. Table 3 shows outer loadings ranging from 0.562 to 0.944, with several reported indicators below the commonly preferred level of approximately 0.708 (Hair et al., 2022). These lower indicator-level loadings should be interpreted together with construct-level composite reliability and AVE rather than treated as an automatic basis for indicator deletion (Hair et al., 2022). As shown in Table 3, composite reliability values ranged from 0.824 to 0.949, exceeding the recommended threshold of 0.70 (Hair et al., 2022). The AVE values ranged from 0.545 to 0.653, all exceeding the recommended minimum threshold of 0.50 (Hair et al., 2022), thereby supporting convergent validity. Cronbach's alpha values were also satisfactory for technology factors, organizational factors, environmental factors, and e-governance integration. Digital capability recorded a comparatively lower Cronbach's alpha of 0.671; however, its composite reliability value of 0.824 exceeded the recommended threshold, providing evidence of acceptable internal consistency reliability (Hair et al., 2022).

Table 3

Construct Reliability and Convergent Validity

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
Digital Capability	DC1	0.879	0.671	0.824	0.618
	DC2	0.876			
	DC3	0.562			
E-Governance Integration	EGG1	0.792	0.723	0.827	0.545
	EGG2	0.739			
	EGG4	0.706			
	EGG5	0.713			
Environmental Factors	ENV1	0.843	0.896	0.917	0.585
	ENV10	0.808			
	ENV2	0.600			
	ENV3	0.863			
	ENV4	0.799			
	ENV5	0.588			
	ENV7	0.768			
	ENV9	0.799			
Organizational Factors	ORG1	0.912	0.928	0.939	0.612
	ORG10	0.839			
	ORG2	0.804			
	ORG3	0.894			
	ORG4	0.815			
	ORG5	0.639			
	ORG6	0.570			
	ORG7	0.586			
	ORG8	0.868			
	ORG9	0.805			
Technology Factors	TEC1	0.608	0.939	0.949	0.653
	TEC13	0.669			
	TEC14	0.927			
	TEC15	0.944			

	TEC16	0.843			
	TEC4	0.883			
	TEC5	0.782			
	TEC6	0.739			
	TEC7	0.926			
	TEC9	0.676			

The Heterotrait–Monotrait (HTMT) ratio was used to assess discriminant validity. As shown in Table 4, all HTMT values were below the recommended threshold of 0.90 (Hair et al., 2022). The highest HTMT value was observed between Environmental Factors and Digital Capability (0.872), followed by Technology Factors and Digital Capability (0.855). Under the adopted 0.90 criterion, the reported HTMT results support adequate discriminant validity; however, the Environmental Factors–Digital Capability and Technology Factors–Digital Capability pairs warrant comparatively cautious interpretation because their values are closer to the threshold than the other reported construct pairs (Hair et al., 2022).

Table 4

Heterotrait–Monotrait Ratio

Construct	DC	EGG	ENV	ORG	TEC
Digital Capability (DC)					
E-Governance Integration (EGG)	0.820				
Environmental Factors (ENV)	0.872	0.548			
Organizational Factors (ORG)	0.647	0.774	0.753		
Technology Factors (TEC)	0.855	0.698	0.636	0.684	

Discriminant validity was further assessed using the Fornell–Larcker criterion. As shown in Table 5, the square root of the AVE for each construct exceeded its correlations with the other constructs. Specifically, the correlation between Organizational Factors and Technology Factors was 0.632, which was lower than the square root of the AVE for Organizational Factors (0.782) and Technology Factors (0.808). Similarly, the remaining inter-construct correlations were below the corresponding diagonal values. These findings indicate that the Fornell–Larcker criterion was satisfied for all constructs, providing additional evidence of adequate discriminant validity in the final measurement model. The diagonal values (0.786, 0.738, 0.765, 0.782, and 0.808) also correspond, after rounding, to the square roots of the AVE values reported in Table 3, confirming numerical consistency between the two reported measurement-model summaries.

Table 5

Fornell–Larcker Criterion

Construct	DC	EGG	ENV	ORG	TEC
Digital Capability (DC)	0.786				
E-Governance Integration (EGG)	0.587	0.738			
Environmental Factors (ENV)	0.704	0.470	0.765		
Organizational Factors (ORG)	0.755	0.652	0.727	0.782	
Technology Factors (TEC)	0.689	0.603	0.626	0.632	0.808

Note: Diagonal values in bold represent the square roots of the AVE.

Structural Model Assessment

After confirming the measurement model, the predictive capability of the proposed model along with the relationships between the study constructs in the structural model was

evaluated. This was done using the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and the significance of the structural path coefficients, with the bootstrapping method, in SmartPLS (Hair et al., 2022). R^2 was used to assess the explanatory power of the model's endogenous constructs. As shown in Table 6, Digital Capability attained an R^2 of 0.621, meaning the model, including the technology, organizational, and environmental factors, explained 62.1% of the variance of Digital Capability. Moreover, E-Governance Integration was assigned an R^2 of 0.464, meaning the model explained 46.4% of the variance of the dependent variable. From these results, the proposed model is shown to have moderate to high explanatory power.

Table 6

Coefficient of Determination (R^2)

Construct	R^2	Adjusted R^2
Digital Capability	0.621	0.616
E-Governance Integration	0.464	0.452

We also analyzed the contribution of each predictor to the endogenous constructs based on effect size (f^2). Following Hair et al. (2022), f^2 values of approximately 0.02, 0.15, and 0.35 indicate small, medium, and large effect sizes, respectively, while values below 0.02 are considered negligible. The results depicted in Table 7 demonstrated that Environmental Factors had the largest contribution to Digital Capability ($f^2 = 0.134$), followed by Organizational Factors ($f^2 = 0.064$), while Technology Factors showed a negligible contribution ($f^2 = 0.001$). Regarding E-Governance Integration, Digital Capability demonstrated a small effect size ($f^2 = 0.035$).

Table 7

Effect Size (f^2)

Relationship	f^2	Effect Size
Technology → Digital Capability	0.001	Negligible
Organizational → Digital Capability	0.064	Small
Environmental → Digital Capability	0.134	Small–Moderate
Technology → E-Governance Integration	0.003	Negligible
Organizational → E-Governance Integration	0.056	Small
Environmental → E-Governance Integration	0.019	Negligible
Digital Capability → E-Governance Integration	0.035	Small

The blindfolding procedure was used to examine the model's predictive relevance. As seen in Table 8, positive Q^2 values for both constructs showed that the model has adequate predictive relevance Hair et al. (2022). Digital Capability attained a Q^2 value of 0.592, while the value for E-Governance Integration was 0.381. Hence, The Q^2 values for Digital Capability (0.592) and E-Governance Integration (0.381) were both greater than zero, indicating that the model demonstrated predictive relevance for both endogenous constructs.

Table 8

Predictive Relevance (Q^2)

Construct	Q^2
Digital Capability	0.592
E-Governance Integration	0.381

The last notable thing concerning structural relationships is the output of the bootstrapping procedure. In Table 9, the Environmental category positively affected Digital Capability, and

both Organizational ($\beta = 0.478$, $p = 0.002$) and Environmental factors ($\beta = 0.335$, $p < 0.001$) positively affected Digital Capability. The Technology category's effect on Digital Capability was negligible, as indicated by the relatively low score of ($\beta = 0.034$) and $p = 0.847$. Enhanced Digital Capability positively impacts E-Governance Integration ($\beta = 0.352$, $p < 0.001$), strengthening the argument for integrated Digital Governance.

Table 9

Structural Path Coefficients

Path	β	t-value	p-value	Decision
Technology → Digital Capability	0.034	0.193	0.847	Rejected
Organizational → Digital Capability	0.478	3.135	0.002	Supported
Environmental → Digital Capability	0.335	4.377	<0.001	Supported
Digital Capability → E-Governance Integration	0.352	3.561	<0.001	Supported

Mediation Analysis

The mediating role of Digital Capability was evaluated through the bootstrapping procedure in SmartPLS concerning the mediation of the Technology–Organization–Environment (TOE) factors in relation to E-Governance Integration. The significance of the indirect effects was assessed based on the standardized coefficients (β) with medium to high t-values, and the p-values Hair et al. (2022). The results are presented in Table 10. The mediation analysis showed that Digital Capability strongly mediates the relations between Organizational Factors and E-Governance Integration ($\beta = 0.168$, $t = 2.491$, $p = 0.013$) and Environmental Factors and E-Governance Integration ($\beta = 0.118$, $t = 3.184$, $p = 0.001$). This shows that the integration of e-governance is further developed when supportive conditions are present in the organization and the environment for the organization's digital capability.

On the other hand, the effect of Technology Factors on E-Governance Integration Digital Capability was ($\beta = 0.012$, $t = 0.182$, $p = 0.856$) which means that digital capability does not mediate this effect within this model, and the effect is not significant. In general terms, the results support the Digital Capability mediation role in part, and the Digital Capability mediation is determined by the organization and the environment, and not the Technology Factors.

Table 10

Results of Mediation Analysis

Indirect Path	β	t-value	p-value	Decision
Technology → Digital Capability → E-Governance Integration	0.012	0.182	0.856	Rejected
Organizational → Digital Capability → E-Governance Integration	0.168	2.491	0.013	Supported
Environmental → Digital Capability → E-Governance Integration	0.118	3.184	0.001	Supported

Discussion

The findings show that Organizational and Environmental Factors significantly strengthened Digital Capability, whereas Technology Factors did not. Digital Capability, in turn, significantly enhanced E-Governance Integration and mediated the effects of Organizational and Environmental Factors, but not the effect of Technology Factors. This pattern indicates that

the development and mobilization of internal capability is more important than technological conditions alone for translating favorable organizational and institutional contexts into integrated digital-governance outcomes. H1 was not supported because Technology Factors had no significant effect on Digital Capability. One plausible interpretation is that technological infrastructure may already be relatively established in the examined setting, reducing the incremental contribution of technology availability alone. This differs from evidence that technological readiness can facilitate digital transformation, suggesting that its influence may vary with organizational context and digital maturity (Qi et al., 2023).

H2 was supported, indicating that Organizational Factors contribute to Digital Capability. Leadership commitment, organizational readiness, resource support, culture, and employee competencies can create the internal conditions needed to use and adapt digital technologies effectively. This interpretation is consistent with public-sector research emphasizing the role of digital leadership in transformation (Ushaka Adie et al., 2024). It also reinforces the view that technology investment requires complementary organizational capacity. H3 was also supported, showing that Environmental Factors strengthen Digital Capability. In the UAE context, regulatory frameworks, national digital strategies, and institutional support can provide direction and enabling conditions for public-sector transformation (Alzarooni et al., 2024). The result suggests that external support is most valuable when organizations are able to internalize institutional opportunities and convert them into operational digital capabilities.

H4 and the mediation results further clarify the role of Digital Capability. Stronger capability enables organizations to deploy digital resources, coordinate systems, and support interoperability across organizational boundaries, which is central to integrated digital government (Campmas et al., 2022). The significant indirect effects for Organizational and Environmental Factors show that these contextual conditions contribute to E-Governance Integration partly through capability development. The nonsignificant Technology indirect effect indicates that technological conditions alone did not operate through Digital Capability in the current model. Overall, the study extends TOE by identifying Digital Capability as an organizational mechanism that selectively transmits organizational and environmental influences into e-governance integration. Practically, public-sector decision makers should complement technology investment with digital leadership, employee capability development, organizational readiness, and supportive institutional arrangements.

Overall, the study extends the TOE framework by showing that Organizational and Environmental Factors influence E-Governance Integration partly through Digital Capability rather than only through direct contextual effects. This clarifies Digital Capability as an internal mechanism that converts favorable organizational and institutional conditions into integrated digital-governance outcomes. Practically, the findings suggest that public-sector organizations should complement technology investment with digital leadership, employee capability development, organizational readiness, and supportive institutional arrangements so that technological and policy resources can be translated into coordinated and interoperable e-governance services.

Conclusion

This study examined how technological, organizational, and environmental conditions shape e-governance integration through digital capability in the UAE Ministry of Energy and Infrastructure. Drawing on the TOE framework, the Resource-Based View, and Dynamic Capability Theory, the study shows that e-governance integration depends not only on the availability of digital technologies but also on an organization's ability to mobilize and use them effectively. The findings show that Organizational and Environmental Factors significantly strengthen Digital Capability, which in turn enhances E-Governance Integration. Technology Factors, however, did not significantly influence Digital Capability in the current model. The mediation results further demonstrate that Digital Capability partly explains how favorable organizational and environmental conditions are translated into stronger e-governance integration, whereas the corresponding indirect effect of Technology Factors was not supported.

The study contributes theoretically by extending the TOE framework beyond direct contextual effects and positioning Digital Capability as an organizational mechanism linking contextual conditions to e-governance integration. It also reinforces the Resource-Based View and Dynamic Capability Theory by showing that technological resources generate greater value when organizations possess the capabilities required to deploy, coordinate, and adapt them. Practically, the findings suggest that public-sector organizations should complement technology investment with strong digital leadership, employee capability development, organizational readiness, and supportive institutional conditions. The study is limited by its cross-sectional design and its focus on a specific UAE public-sector context, which may restrict the broader generalizability of the findings. Future research could test the proposed relationships across additional public-sector organizations and national settings, adopt longitudinal designs, and examine other organizational capabilities or contextual conditions that may influence e-governance integration.

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