

CLOUD COMPUTING ADOPTION IN JORDANIAN E-GOVERNMENT: AN INTEGRATED TOE–TAM MODEL

RAGHED ALKHASAWNEH¹ *, ZAIHISMA CHE COB², ALIZA BINTI ABDUL LATIF³,
NOUR QATAWNEH⁴

^{1,2,3} College of Computing and Informatics, Universiti Tenaga Nasional (UNITEN), Malaysia.

⁴ Department of Business Intelligence and Technology, College of Business, Mutah University, Karak, Jordan.

¹PT21316@student.uniten.edu.my, ²zaihisma@uniten.edu.my, ³aliza@uniten.edu.my,

⁴Nour_qatawneh@mutah.edu.jo

ABSTRACT

Cloud computing is a key enabler of digital transformation in e-government, yet its adoption in public-sector organizations is shaped by technological, organizational, and environmental factors. This study examines the determinants of cloud computing adoption intention in the Jordanian public sector by integrating the Technology–Organization–Environment (TOE) framework with the Technology Acceptance Model (TAM) and trust theory. It investigates how relative advantage, security, top management support, and government regulations influence adoption intention through the mediating roles of perceived usefulness and trust in cloud technology. A quantitative survey was conducted among employees of the Civil Status and Passport Department in Jordan, producing 373 valid responses. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that top management support is the strongest determinant of adoption, significantly influencing both perceived usefulness and trust. Relative advantage positively affects both mediators, while security mainly strengthens trust. Government regulations enhance perceived usefulness but do not directly influence trust. Both perceived usefulness and trust significantly predict cloud adoption intention. The study contributes theoretically by integrating TOE, TAM, and trust theory to explain cloud adoption in e-government. Practically, it provides guidance for policymakers and public-sector managers to strengthen leadership support, regulatory frameworks, and trust in cloud technologies to accelerate digital transformation.

Keywords: *Cloud Computing, E-Government, Jordan, TAM-TOE, Trust, PLS-SEM.*

1. INTRODUCTION

Cloud computing has emerged as a fundamental technological infrastructure that enables organizations and governments to modernize their information systems and improve service delivery. By providing scalable computing resources, flexible storage capacity, and on-demand access to shared digital platforms, cloud computing allows institutions to enhance operational efficiency while reducing the costs associated with traditional IT infrastructure [1], [2]. In the public sector, cloud technology is playing an increasingly important role in supporting digital government initiatives by facilitating data integration, improving service availability, and enabling governments to respond more effectively to citizens' needs. Consequently, cloud computing has become a key component of contemporary e-government strategies aimed at improving transparency, efficiency, and accessibility in public service delivery [3], [4].

Governments worldwide increasingly recognize cloud computing as a strategic enabler of digital transformation. Cloud-based infrastructures allow public institutions to modernize legacy systems, improve interoperability across government departments, and scale digital services to meet the growing demands of citizens [5], [6]. Consequently, many countries have adopted cloud-first policies that prioritize the migration of government services and data to cloud environments to promote innovation, increase administrative agility, and develop citizen-centric digital services.

In Jordan, digital transformation has become a national priority within broader public sector modernization efforts. Government initiatives such as the Reach 2025 program and the National Digital Transformation Strategy emphasize the adoption of advanced digital infrastructure, including cloud computing, to enhance the efficiency and accessibility of e-government services. These

initiatives aim to strengthen the national digital economy and improve public service delivery through modern information technology. Nevertheless, despite these strategic initiatives and increasing investments in digital infrastructure, the cloud computing adoption across Jordanian government institutions remains uneven and slower than anticipated [7], [8]. This situation suggests that the availability of technological infrastructure alone does not guarantee successful adoption and highlights the importance of understanding the organizational and behavioral factors influencing cloud adoption within government institutions.

Previous studies on cloud computing adoption have primarily relied on two dominant theoretical perspectives. The Technology Organization Environment (TOE) framework explains technology adoption from an organizational perspective by examining how technological characteristics, organizational capabilities, and environmental pressures influence the adoption of innovations [5], [9], [10]. By contrast, the Technology Acceptance Model (TAM) focuses on individual level determinants of technology use and emphasizes users' perceptions of usefulness and ease of use as key factors shaping their behavioral intentions toward technology adoption [11], [12]. Although both frameworks have been widely applied in technology adoption research, they are often used independently, creating a conceptual separation between organizational readiness and individual technology acceptance [13].

This separation represents a significant limitation in the context of the government institutions responsible for managing highly sensitive citizen data [14]. In such environments, concerns related to data security, privacy protection, and institutional accountability strongly influence employees' attitudes toward cloud technologies [4], [5]. Employees may hesitate to rely on cloud infrastructure if they perceive risks associated with unauthorized data access, loss of control over information systems, or insufficient security protection [13]. Under these circumstances, trust in cloud technology becomes a critical factor influencing adoption decisions because it helps reduce the perceived uncertainty and risk associated with new technological systems [15].

Despite the growing body of research on cloud computing adoption, several important gaps remain in the Jordanian e-government context. First, a theoretical integration gap exists because many studies rely primarily on the TOE framework to

examine the structural determinants of adoption, while overlooking the cognitive processes through which employees interpret and evaluate new technologies [8], [14]. Second, a psychological mediation gap persists because limited attention has been paid to the role of trust in translating structural conditions into employees' willingness to adopt cloud technologies, even though security concerns are frequently identified as major barriers to adoption [13], [14]. Third, a contextual research gap exists regarding the high-sensitivity government institutions responsible for managing critical national data [16]. Much of the existing literature in Jordan has focused on citizens' adoption of e-government services or on broad samples drawn from multiple government agencies, leaving the internal adoption processes within specific institutions underexplored [7], [17].

To address these gaps, this study proposes an integrated theoretical framework that combines the (TOE) framework and the (TAM) model. Specifically, this study examines how technological, organizational, and environmental factors influence employees' behavioral intentions to adopt cloud computing through the mediating mechanisms of perceived usefulness and trust in cloud technology [5], [18]. By integrating these complementary perspectives, this study provides a more comprehensive explanation of how structural conditions within organizations are cognitively interpreted and psychologically internalized by employees, ultimately shaping their intentions to adopt technology.

Empirically, this study focuses on the Civil Status and Passport Department (CSPD) in Jordan, a government institution responsible for maintaining critical national records such as birth registrations, identity documentation, and passport issuance. Because of the highly sensitive nature of the data managed by this department, understanding employees' perceptions of cloud technologies is essential to ensure secure and effective digital transformation. Data were collected from 373 employees, and the proposed research model was analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), a widely applied technique for examining complex relationships in technology adoption research (Hair et al., 2019).

Accordingly, this study addresses the following research questions. (1) How do technological, organizational, and environmental factors influence employees' intentions to adopt cloud computing in government institutions? (2)

How does perceived usefulness mediate the relationship between these factors and employees' cloud adoption intentions? (3) What role does trust in cloud technology play in shaping employees' willingness to adopt cloud systems in security sensitive government environments?

This study contributes to the existing literature on cloud computing adoption in several ways. First, from a theoretical perspective, the study contributes by integrating the Technology–Organization–Environment (TOE) framework and the Technology Acceptance Model (TAM) into a unified framework that simultaneously captures organizational-level determinants and individual-level perceptions influencing cloud computing adoption [4]. Furthermore, the study extends previous technology adoption research by incorporating trust in cloud technology and perceived usefulness as mediating mechanisms, thereby providing a deeper understanding of the pathways through which contextual factors influence adoption behavior.

Second, from a methodological perspective, this study contributes by employing Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine both direct and indirect relationships among technological, organizational, environmental, and psychological variables within a comprehensive research framework. The use of mediation analysis further provides detailed insights into the mechanisms underlying cloud adoption intentions.

Third, from a contextual perspective, this study contributes empirical evidence from Jordanian e-government organizations, a context that remains relatively underexplored in cloud computing adoption literature, particularly within security-sensitive governmental institutions responsible for managing critical national information and citizen records.

Finally, from a practical perspective, the study provides policymakers and public-sector managers with actionable insights regarding the importance of leadership support, regulatory frameworks, technological benefits, and trust-building mechanisms in facilitating successful cloud computing implementation and accelerating digital transformation initiatives within government organizations.

The remainder of this paper is organized as follows. Sections 2 and 3 review the relevant literature and develop research hypotheses. Section

4 describes the research methodology and results. Section 5 discusses the findings, and Section 6 explores the theoretical and practical implications. The final section concludes the study and outlines the directions for future research.

2. LITERATURE REVIEW

To ensure the literature sample used to justify the research problem is representative, up-to-date, and methodologically adequate, a systematic selection protocol was applied prior to the critique. Literature was sourced primarily from peer-reviewed journals indexed in the Scopus and Web of Science databases to guarantee academic rigor.

The search strategy utilized targeted keyword strings, including (“Cloud Computing Adoption” OR “E-Government Cloud”) AND (“TOE” OR “TAM” OR “Trust”). To maintain contemporary relevance and ensure the problem statement reflects current technological realities, a strict inclusion criterion prioritized empirical studies published between 2020 and 2025. Foundational theoretical literature (e.g., Davis, 1989; Tornatzky, 1990) was retained solely for establishing baseline construct definitions. Studies were excluded if they focused purely on the technical architecture of cloud computing without behavioral or organizational adoption metrics. This rigorous filtering process ensures that the subsequent literature critique is grounded in a highly relevant, comprehensive, and unbiased sample of recent adoption phenomena.

Previous research has extensively examined the determinants of cloud computing adoption using various theoretical frameworks. For instance, [5] investigated cloud computing adoption by integrating the TAM with the TOE framework. Their study, based on survey data collected from organizations in India, found that technological factors such as relative advantage and compatibility, organizational factors including top management support and organizational readiness, and environmental factors such as competitive pressure significantly influence cloud adoption intentions. However, this study mainly focuses on private sector organizations and does not examine adoption within government environments.

Similarly, [19] employed an integrated TAM–TOE framework to explore the adoption of artificial intelligence technologies in manufacturing organizations. The study highlighted the role of perceived usefulness and perceived ease of use in

mediating the relationship between contextual factors and technology adoption. In addition, leadership support was found to play an important moderating role in facilitating the implementation of advanced technologies within organizations. Nevertheless, the research focuses on AI adoption in manufacturing industries rather than cloud computing adoption in public-sector contexts.

In the public sector, [20] examined the determinants of cloud computing adoption using the TOE framework within a Saudi public health organization. The study revealed that technological factors such as relative advantage and compatibility, along with organizational readiness and management support, significantly influence cloud adoption decisions. Environmental factors, such as competitive pressure have also been found to affect adoption. Despite these insights, the study was conducted within a single public organization, which limits the generalizability of the findings.

Several studies have attempted to extend technology adoption models by integrating multiple theoretical perspectives. For example, [15] investigated the adoption of cloud-based e-government by combining TOE, Diffusion of Innovation (DOI), UTAUT, and Social Exchange Theory. Their findings indicate that technological, environmental, and individual factors significantly influence the adoption of cloud-based e-government services, where trust plays a mediating role in strengthening these relationships. However, the study focuses on the Iraqi context, which may limit its applicability to other governmental environments.

Similarly, [4] examined the adoption of cloud accounting among SMEs in Saudi Arabia using an integrated TAM–TOE framework. Their results demonstrated that technological characteristics, organizational resources, and environmental pressures significantly affect adoption intentions, highlighting the importance of combining behavioral and organizational perspectives in technology adoption studies. Nevertheless, the study focuses primarily on SMEs and cloud accounting applications rather than on cloud computing adoption within government institutions.

In addition, [21] explored the role of cloud computing adoption in improving governmental unit performance and e-participation. Their findings showed that factors such as mobility, cost efficiency, scalability, and disaster recovery capabilities

significantly influence employees' intentions to adopt cloud computing, which in turn enhances government service performance and citizen participation. However, the study emphasizes technological benefits without fully addressing the organizational and behavioral mechanisms that influence adoption.

More recently, [8] examined cloud computing adoption in e-government systems within Jordanian government organizations. Using the TOE framework and Diffusion of Innovation theory, the study found that technological factors, organizational support, and environmental pressures significantly influence adoption decisions, while decision-makers' IT knowledge also plays an important role in facilitating cloud adoption. Despite its contribution, the study focuses primarily on organizational determinants and does not explore the behavioral mediators that may explain adoption mechanisms.

2.1 Research Gaps and Research Justification

Although cloud computing adoption has received considerable attention in recent years, existing literature still presents several conceptual, contextual, and empirical limitations that justify further investigation. Previous studies have frequently employed theoretical frameworks such as the Technology–Organization–Environment (TOE) framework and the Technology Acceptance Model (TAM) to explain factors influencing technology adoption decisions. These frameworks have contributed significantly to understanding technological innovation adoption; however, their application has often been fragmented and limited in scope. Many studies have concentrated on isolated dimensions of adoption behavior rather than providing a comprehensive explanation that captures both organizational conditions and individual perceptions simultaneously.

First, a substantial proportion of prior research has focused primarily on private-sector organizations and commercial environments where organizational structures, operational priorities, and decision-making processes differ considerably from those of public-sector institutions. Private organizations generally emphasize profitability, competitiveness, and market performance, whereas governmental institutions operate under different constraints, including regulatory requirements, public accountability, security concerns, and service delivery obligations. Consequently, findings derived from private-sector contexts may not be directly transferable to governmental organizations. This

creates a significant gap in understanding how cloud computing adoption occurs within public-sector environments, particularly in institutions responsible for delivering critical public services.

Second, previous studies have often examined technological and organizational determinants independently rather than integrating structural and behavioral perspectives into a unified framework [8]. While some studies have emphasized technological characteristics such as compatibility, complexity, and relative advantage, others have focused on organizational factors including top management support, organizational readiness, and institutional capabilities. However, technology adoption decisions are inherently multidimensional and involve interactions among technological, organizational, and human factors [22]. Examining these dimensions separately may provide only a partial understanding of the adoption process and may overlook important relationships among variables that collectively influence adoption intentions and behaviors.

Third, despite increasing recognition of psychological and behavioral factors in technology adoption research, limited attention has been given to the mediating mechanisms through which organizational factors influence employees' intentions toward cloud computing adoption [15]. Specifically, constructs such as trust and perceived usefulness have often been examined as direct predictors rather than as explanatory mechanisms that clarify how organizational conditions shape users' perceptions and behavioral intentions [4], [14]. Trust is particularly important in cloud computing environments because users frequently express concerns regarding data privacy, security, reliability, and control over information systems. Similarly, perceived usefulness plays a critical role in determining whether individuals believe that adopting a technological system will improve their work performance and efficiency. Insufficient examination of these mediating relationships limits understanding of the underlying processes that influence cloud adoption decisions.

Furthermore, empirical evidence regarding cloud computing adoption within Jordanian governmental organizations remains relatively limited [8], [21]. Existing studies within developing countries have not adequately addressed the unique contextual characteristics associated with Jordanian public institutions, particularly organizations operating in highly sensitive environments involving the management of critical national information and

citizen data. Institutions such as governmental agencies responsible for identity management, civil registration, and public service administration face additional challenges related to security requirements, technological infrastructure, organizational readiness, and user trust. These contextual factors may significantly influence cloud adoption decisions and therefore require dedicated investigation.

3. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES.

To explain cloud computing adoption in e-government environments, this study integrated the TOE and TAM models. The TOE framework proposes that technological, organizational, and environmental contexts shape organizational decisions to adopt new technologies [9], [10]. By contrast, TAM explains how individual perceptions influence users' behavioral intentions toward adopting information systems, particularly through the concept of perceived [11], [12]. Integrating TOE and TAM allowed the present study to capture both organizational and individual-level perceptions that influence cloud computing adoption within the public sector [4].

Within the technological context of the TOE framework, relative advantage refers to the degree to which cloud computing is perceived as providing superior benefits compared to traditional IT systems [10], [23]. In e-government environments, these benefits may include improved operational efficiency, enhanced scalability, reduced infrastructure costs, and faster delivery of government services [1], [21]). When employees perceive that cloud computing can enhance organizational performance and support service delivery, they are more likely to view technology as useful for accomplishing their work tasks [4], [5], [19]. Furthermore, visible technological benefits can strengthen employees' confidence in the reliability and effectiveness of cloud systems, thereby increasing their trust in the technology [14], [15]. Accordingly, the relative advantage is expected to positively influence both perceived usefulness and trust in cloud technology.

Another important technological determinant is security, which refers to the protection of data confidentiality, integrity, and availability in cloud computing environments [24]. Security considerations are particularly critical for government institutions that manage sensitive citizen data and official records [14], [25]. Effective

cybersecurity mechanisms, data protection policies, and regulatory safeguards can reduce the perceived risks associated with cloud platforms and increase employee confidence in their reliability. Employees who believe that cloud systems provide adequate protection against cyber threats and unauthorized access, are more likely to perceive the technology as useful and trustworthy [3], [26]. Consequently, strong security safeguards are expected to enhance both the perceived usefulness and trust in cloud technology.

From the organizational perspective of the TOE framework, top management support is a critical driver of technology adoption. Top management support refers to the extent to which senior leaders actively promote, allocate resources, and support the implementation of new technologies within an organization [5], [9]. In public-sector organizations, leadership commitment is essential for guiding digital transformation initiatives and ensuring that sufficient financial, technological, and training resources are available [27]. Visible leadership endorsement can strengthen employees' perceptions of the usefulness of cloud computing by demonstrating its contribution to organizational performance and service improvement. Simultaneously, leadership involvement can increase employees' trust in technology by signaling issues related to risk management, reliability, and security are being appropriately addressed [3], [19].

Within the environmental context of the TOE framework, government regulations play an important role in shaping technology-adoption decisions. Regulatory frameworks establish the legal and institutional conditions under which government organizations implement digital technologies [9], [10]. In the case of cloud computing, clear policies related to cybersecurity, data protection, and digital governance can reduce uncertainty associated with storing sensitive information in cloud environments [21]. Supportive regulatory frameworks can also enhance employee perceptions of the legitimacy and usefulness of cloud technologies by aligning digital initiatives with official government policies and compliance requirements [28]. When employees perceive that cloud adoption is supported by formal institutional guidelines and national digital strategies, they are more likely to trust the technology and recognize its value in government operations [29].

From the perspective of the Technology Acceptance Model, perceived usefulness represents one of the strongest predictors of technology

adoption. Perceived usefulness refers to the degree to which individuals believe that using a particular technology enhances their job performance [11], [12]. In the context of cloud computing, perceived usefulness reflects employees' beliefs that cloud systems can improve operational efficiency, facilitate information sharing, and enhance service delivery within government organizations [30]. Empirical studies consistently demonstrate that when employees perceive a system as beneficial for improving their work performance, they are more likely to develop positive intentions toward adopting technology [4], [5], [31].

In addition to perceived usefulness, trust in cloud technology represents a key psychological factor that influence technology adoption in e-government environments. Trust refers to employees' confidence in the reliability, security, and dependability of a cloud system. Because government employees frequently handle sensitive citizen data and rely on digital systems for critical administrative functions, trust plays an important role in reducing perceived risks associated with cloud computing [4], [14]. When employees believe that cloud technologies can securely protect data and provide reliable system performance, their perceived risks decrease and their willingness to adopt the technology increases [3], [15]. Prior research consistently demonstrates that trust significantly influences technology adoption decisions, particularly in security-sensitive environments such as public-sector organizations [18], [32], [33].

In addition to the structural determinants identified in the TOE framework, this study examines the mediating role of perceived usefulness and trust in cloud technology in shaping employees' intention to adopt cloud computing. Perceived usefulness reflects employees' evaluation of the performance benefits that cloud technology can provide, and prior research has consistently identified it as a key predictor of technology adoption across various digital contexts [11], [34]. Similarly, trust in technology reduces perceived risks and increases users' confidence in the reliability, security, and dependability of cloud systems, particularly in public-sector environments where sensitive data are involved [15], [18]. Therefore, perceived usefulness and trust serve as critical mechanisms through which technological, organizational, and environmental factors influence employees' intention to adopt cloud computing in Jordanian e-government services

Based on the theoretical arguments presented above, the proposed research model examines the relationships between TOE factors, perceived usefulness, trust in cloud technology, and intention to adopt cloud computing in Jordanian e-

government services. Figure 1 presents the conceptual research model, and Table 1 summarizes the proposed research hypotheses derived from the theoretical framework.

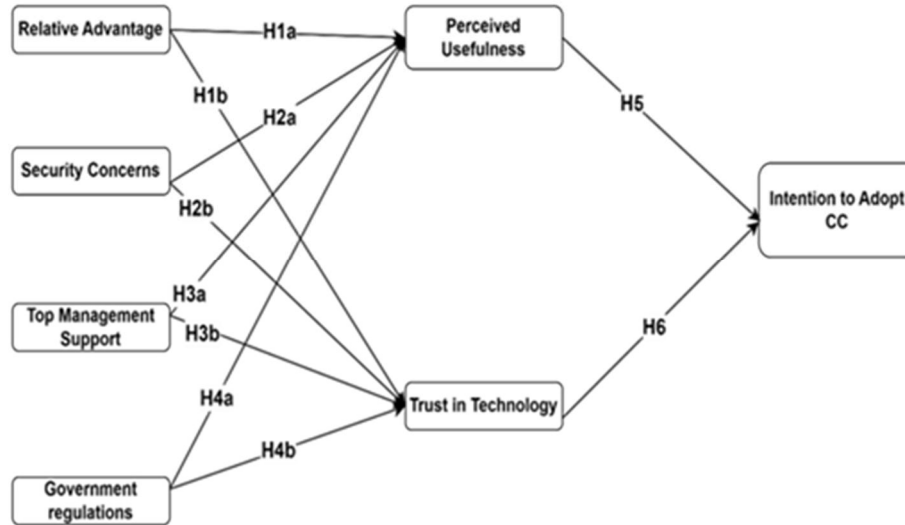


Figure 1: Proposed Research Model

Table 1 Research Hypotheses

Hypothesis	Description
H1a	Relative advantage has a significant positive influence on perceived usefulness of cloud computing in e-government services in Jordan.
H1b	Relative advantage has a significant positive influence on trust in cloud computing in e-government services in Jordan.
H2a	Security concerns have a significant influence on perceived usefulness of cloud computing in e-government services in Jordan.
H2b	Security concerns have a significant influence on trust in cloud computing in e-government services in Jordan.
H3a	Top management support has a significant positive influence on perceived usefulness of cloud computing in e-government services in Jordan.
H3b	Top management support has a significant positive influence on trust in cloud computing in e-government services in Jordan.
H4a	Government regulations have a significant positive influence on perceived usefulness of cloud computing in e-government services in Jordan.
H4b	Government regulations have a significant positive influence on trust in cloud computing in e-government services in Jordan.
H5	Perceived usefulness of cloud technology positively influences the intention to adopt cloud computing in e-government services in Jordan.
H6	Trust in cloud technology has a significant positive influence on the intention to adopt cloud computing.

4. METHODOLOGY

4.1 Research Design and Instrument Development

This study employed a quantitative cross-sectional survey design to empirically investigate the

determinants of cloud computing adoption within the Jordanian public sector. A quantitative cross-sectional design was selected because the study aims to examine relationships among multiple constructs and test hypothesized associations within the proposed framework. This design is suitable because it enables collection of data from a relatively large sample and facilitates statistical testing using PLS-

SEM. The research was conducted at the Civil Status and Passport Department in Jordan, a governmental organization selected for its high-volume data processing and the critical nature of its citizen-oriented services. Within the context of e-government, the CSPD represents an appropriate setting for examining how organizational and environmental conditions influence employees' perceptions and intentions regarding cloud computing adoption. The cross-sectional design enables this study to capture employees' perceptions and behavioral intentions at a specific stage of the organization's ongoing digital transformation.

The constructs used in this study were identified through an extensive review of prior literature and were aligned with the integrated TOE-TAM framework adopted in this research. The measurement items for each construct were adapted from previously validated instruments and were incorporated into the survey questionnaire.

In the first stage, the questionnaire was evaluated to ensure clarity, relevance, and contextual suitability. A panel of five subject-matter experts, including academic researchers and practitioners with expertise in cloud computing and digital government services, reviewed the instrument. Their feedback focused on the clarity of the wording, the relevance of the measurement items to the Jordanian public-sector context, and the overall structure of the questionnaire.

As the study was conducted in Jordan, a questionnaire was prepared in both English and Arabic. A linguistic expert reviewed the translated version to ensure semantic equivalence and linguistic accuracy between the two versions. This step helped to ensure that each item remained conceptually consistent across both languages. Based on the feedback received from the expert panel and linguistic review, several questionnaire items were refined to improve clarity, simplicity, and contextual appropriateness.

The final questionnaire consisted of 28 measurement items representing seven constructs: relative advantage, security concerns, top management support, government regulations, perceived usefulness, trust in cloud technology, and the intention to adopt cloud computing. Respondents evaluated each item on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Appendix A provides a detailed description

of the measurement items and their corresponding sources.

4.2 Sampling and Data Collection

The study population consisted of employees working at the Civil Status and Passport Department (CSPD) in Jordan. To capture diverse perspectives on cloud computing adoption, the sample included both IT specialists and administrative staff, representing varying levels of technical expertise and organizational responsibilities. Due to restricted access to respondents within the CSPD, a non-probability convenience sampling approach was adopted. Data were collected using a structured questionnaire, with 500 surveys distributed and 373 valid responses returned, yielding a response rate of 74.6%, which is considered satisfactory for survey-based research.

The sample size was adequate for Partial Least Squares Structural Equation Modeling (PLS-SEM). According to [35], the "10-times rule" recommends that the minimum sample size should be at least ten times the maximum number of structural paths directed at any construct in the model. Because the proposed model contains ten paths, the minimum required sample size is 100. Therefore, the 373 valid responses collected exceeded this threshold, ensuring sufficient statistical power for analysis.

Participation in the study was voluntary, and the respondents were informed of the research purpose prior to completing the questionnaire. Ethical procedures were performed to ensure anonymity and confidentiality. As indicated in **Error! Reference source not found.**, the demographic profile of respondents indicates a well-qualified and experienced workforce, with most participants aged between 26 and 45 years, and 85.3% holding at least a bachelor's degree. The sample also includes diverse organizational roles, such as IT staff, managers, supervisors, and executives, and over 70% have more than six years of service, indicating strong institutional knowledge relevant to evaluating cloud computing adoption.

Table 2: Demographic Profile Of The Respondents

Category	Characteristics	Frequency	Percentage
Gender	Male	271	72.6%
	Female	102	27.4%
Age	Less than 25 years	50	13.4%
	26-35 years	131	35.1%
	36-45 years	120	32.2%
	45 years and over	72	19.3%
Education Level	Diploma or less	55	14.7%
	Bachelor	199	53.3%
	Master	85	22.8%
	PhD	34	9.2%
Job Position	IT employee	163	43.7%
	Management employee	89	23.8%
	IT manager	52	13.9%
	Supervisor	48	12.9%
	Executive	21	5.7%
Work Experience	1-5 years	35	9.40%
	6-10 years	146	39.1%
	11-15 years	126	33.8%
	Over 15 years	66	17.7%

4.3 Common Bias Method

As the data for this study were collected using a single survey instrument from a single source, the potential presence of common method bias (CMB) was assessed. Following the recommendation of (Podsakoff et al., 2003), Harman’s single-factor test was conducted to determine whether a single factor accounted for most of the variance.

The results of the exploratory factor analysis indicated that the first factor explained 30.0% of the total variance, which was below the commonly recommended threshold of 50%. This finding suggests that a common method bias is unlikely to pose a significant threat to the validity of the study results.

Therefore, the findings indicate that common method variance does not substantially influence the relationships between the constructs examined in this study, suggesting that the results are unlikely to be biased by common method effects.

4.4 Measurement Model

The measurement model was assessed to ensure reliability and validity of the latent constructs included in the study. The constructs evaluated in the measurement model consisted of the independent variables, Relative Advantage, Security Concerns, Top Management Support, and Government Regulations, as well as the mediating variables, Perceived Usefulness and Trust in Cloud Technology, and the dependent variable Intention to

Adopt Cloud Computing. Following the guidelines for Partial Least Squares Structural Equation Modeling (PLS-SEM), the measurement model was assessed using several criteria, including indicator reliability, internal consistency reliability, convergent validity, and discriminant validity [35].

Indicator reliability was first examined by analyzing the outer loadings of each measurement item. According to [35], outer loadings should ideally exceed a threshold of 0.708, indicating that the indicator adequately represents the underlying construct. Most of the measurement items satisfied the recommended thresholds. However, several items, including RA1 (0.553), RA2 (0.554), PU1 (0.606), PU2 (0.640), and IAC4 (0.696), showed loadings below 0.708. Following established methodological guidelines, these items were retained because their loadings remained above the minimum acceptable level of 0.40 and their removal did not improve the Average Variance Extracted (AVE) or Composite Reliability (CR) values of the corresponding constructs. Retaining these indicators also helps preserve content validity by maintaining the conceptual breadth of constructs derived from previously validated measurement scales.

Internal consistency reliability was assessed using Cronbach’s Alpha and Composite Reliability (CR). The results indicated that Cronbach’s alpha values ranged from 0.748 for Perceived Usefulness to 0.944 for Trust in Cloud Technology, while Composite Reliability values ranged from 0.838 for Relative Advantage to 0.960 for Trust in Cloud Technology. All values exceeded the recommended

threshold of 0.70, indicating satisfactory internal consistency reliability for all the constructs [35].

Convergent validity was evaluated using Average Variance Extracted (AVE), which measures the extent to which a construct explains the variance of its indicators. The AVE values ranged from 0.574 for Perceived Usefulness to 0.856 for Trust in Cloud Technology, all exceeding the recommended

minimum threshold of 0.50. These results confirm that each construct explains more than half of the variance in its indicators, demonstrating adequate convergent validity. **Error! Reference source not found.** presents an assessment of the measurement model.

Table 3: Model Measurement

Construct	Items	Loadings	Alpha	Cronbach's	(CR)	(AVE)
Relative Advantage (RA)	RA1	0.553	0.790	0.838	0.578	
	RA2	0.554				
	RA3	0.923				
	RA4	0.921				
Security Concerns	SEC1	0.901	0.916	0.934	0.780	
	SEC2	0.928				
	SEC3	0.824				
	SEC4	0.878				
Top Management Support (TMS)	TMS1	0.779	0.908	0.937	0.788	
	TMS2	0.909				
	TMS3	0.932				
	TMS4	0.923				
Government Regulations (GR)	GR1	0.835	0.908	0.935	0.784	
	GR2	0.888				
	GR3	0.900				
	GR4	0.918				
Perceived Usefulness (PU)	PU1	0.606	0.748	0.840	0.574	
	PU2	0.640				
	PU3	0.865				
	PU4	0.878				
Trust in Cloud (TIC)	TIC1	0.923	0.944	0.960	0.856	
	TIC2	0.923				
	TIC3	0.925				
	TIC4	0.929				
Intention to adopt Cloud (IAC)	IAC1	0.914	0.860	0.907	0.711	
	IAC2	0.896				
	IAC3	0.851				
	IAC4	0.696				

After establishing reliability and convergent validity, discriminant validity was assessed to determine whether the constructs in the model are empirically distinct from one another. **Error! Reference source not found.** The Heterotrait–Monotrait ratio of correlations (HTMT) was used for this purpose, as it is considered a more reliable and sensitive method for evaluating discriminant validity than traditional approaches such as the Fornell–Larcker criterion [35], [36]. According to recommended guidelines, discriminant validity is established when HTMT values are below 0.85 for conceptually distinct constructs. The results indicate that all HTMT values were below this conservative threshold, confirming that the constructs used in this study represent distinct conceptual dimensions

without problematic overlap. The results of the measurement model assessment confirm that the constructs used in this study demonstrate satisfactory reliability, convergent validity, and discriminant validity, providing a solid foundation for the subsequent structural model analysis.

Table 4: Heterotrait-Monotrait (HTMT)

	AC	R	U	A	EC	MS	I C
AC							
R	.647						
U	.845	.418					
A	.376	.223	.422				
EC	.184	.055	.221	.283			
MS	.664	.418	.606	.169	.111		
IC	.730	.269	.604	.277	.275	.640	

4.5 Structural Model and Hypothesis Testing

Measurement model, the structural model was evaluated to test the proposed research hypotheses and examine the relationships between the study constructs. In accordance with the guidelines for Partial Least Squares Structural Equation Modeling (PLS-SEM), the structural model assessment involved analyzing the path coefficients, their statistical significance, the explanatory power of the model (R^2), and its predictive relevance (Q^2) (Hair et al., 2019). The significance of the hypothesized relationships was evaluated using a bootstrapping procedure with bias-corrected confidence intervals at the 95% confidence level.

The results indicate that Relative Advantage has a statistically significant positive effect on Perceived Usefulness (PU) ($\beta = 0.266, t = 5.091, p < 0.001$), thereby supporting H1a. In contrast, Security Concerns did not significantly influence PU ($\beta = 0.032, t = 0.675, p = 0.500$), leading to the rejection of H2a. The findings further revealed that Top Management Support has a strong and significant positive influence on PU ($\beta = 0.444, t = 8.964, p < 0.001$), supporting H3a. Similarly, Government Regulations significantly affected PU ($\beta = 0.122, t = 2.653, p = 0.008$), confirming H4a.

With respect to Trust in Cloud Technology, the results show that Relative Advantage significantly influences TIC ($\beta = 0.131, t = 3.423, p = 0.001$), thus supporting H1b. Likewise, Security Concerns had a significant positive effect on TIC ($\beta = 0.222, t = 5.922, p < 0.001$), confirming H2b. The analysis also indicates that Top Management Support (TMS) has a strong and significant influence on TIC ($\beta = 0.545, t = 11.910, p < 0.001$), thereby

supporting H3b. However, Government Regulations did not demonstrate a statistically significant relationship with TIC ($\beta = 0.008, t = 0.180, p = 0.857$), leading to the rejection of H4b.

Regarding the dependent variable, both mediating constructs showed significant effects on the Intention to Adopt Cloud Computing. Specifically, Perceived Usefulness had a strong positive influence on IAC ($\beta = 0.476, t = 10.453, p < 0.001$), supporting H5. Similarly, Trust in Cloud Technology significantly influenced IAC ($\beta = 0.404, t = 8.722, p < 0.001$), confirming H6. These findings highlight the important roles of perceived usefulness and trust as key mechanisms through which structural factors influence employees' adoption intentions.

The coefficient of determination (R^2) was examined to assess the explanatory power of the structural model further. The R^2 value indicates the proportion of variance in endogenous constructs explained by their predictor variables. According to (Cohen, 1988), R^2 values of 0.20, 0.50, and 0.80 represent small, moderate, and substantial explanatory power, respectively. In this study, relative advantage, security concerns, Top Management Support, and government regulations collectively explained 38.5% of the variance in Perceived Usefulness ($R^2 = 0.385$), indicating a moderate level of explanatory power. The same predictors explained 42.7% of the variance in Trust in Cloud Technology ($R^2 = 0.427$), which also reflects a moderate explanatory level. Furthermore, Perceived Usefulness (PU) and Trust in Cloud Technology together explain 59.7% of the variance in Intention to Adopt Cloud Computing ($R^2 = 0.597$), demonstrating substantial explanatory power for the primary outcome variable.

In addition to explanatory power, the predictive relevance of the model was evaluated using the Stone-Geisser Q^2 statistic obtained through the blindfolding procedure in SmartPLS. The Q^2 statistic assesses the model's ability to predict endogenous constructs accurately [37]. A Q^2 value greater than zero indicates that the model has predictive relevance. According to [37], Q^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large predictive relevance, respectively. The results show that Perceived Usefulness (PU) demonstrates moderate predictive relevance ($Q^2 = 0.212$), whereas Trust in Cloud Technology (TIC) ($Q^2 = 0.361$) and Intention to Adopt Cloud Computing (IAC) ($Q^2 = 0.412$) exhibit large predictive relevance. These findings confirm that the proposed structural model

has strong predictive capability and effectively explains employees' intentions to adopt cloud computing within the Civil Status and Passport

Department in Jordan. **Error! Reference source not found.** illustrates the results of the hypotheses test.

Table 5: Hypotheses Test

Endogenous Construct	Path	P	β	t-value	t-value	p-value	Result	R ²	R ²	Q
PU	R		0.	5.0		<0.	Supported (H1a)	0.		0.
	A → PU	266	91		001			385	212	
	S		0.	0.6		0.5	Not Supported (H2a)			
	EC → PU	032	75		00					
TIC	T		0.	8.9		<0.	Supported (H3a)			
	MS → PU	444	64		001					
	G		0.	2.6		0.0	Supported (H4a)			
	R → PU	122	53		08					
IAC	R		0.	3.4		0.0	Supported (H1b)	0.		0.
	A → TIC	131	23		01			427	361	
	S		0.	5.9		<0.	Supported (H2b)			
	EC → TIC	222	22		001					
IAC	T		0.	11.		<0.	Supported (H3b)			
	MS → TIC	545	910		001					
	G		0.	0.1		0.8	Not Supported (H4b)			
	R → TIC	008	80		57					
IAC	P		0.	10.		<0.	Supported (H5)	0.		0.
	U → IAC	476	453		001			597	412	
IAC	T		0.	8.7		<0.	Supported (H6)			
	IC → IAC	404	22		001					

Overall, the structural model results provide empirical support for most of the proposed hypotheses and demonstrate that technological, organizational, and environmental factors influence cloud computing adoption through the mediating roles of perceived usefulness and trust in cloud technology. The model therefore offers meaningful insights into the determinants of cloud computing adoption within the Jordanian public sector.

4.6 Mediation Analysis

To further examine the mechanisms through which technological, organizational, and environmental factors influence the intention to adopt cloud computing, mediation analysis was conducted using the bootstrapping procedure in SmartPLS. Following the recommendations of (Hair et al., 2019), the significance of the indirect effects was assessed using bootstrapped t-statistics and confidence intervals based on the specific indirect effects generated from the PLS-SEM model.

The results revealed several significant mediating effects. First, Relative Advantage demonstrates significant indirect effects on Intention to Adopt Cloud Computing through both mediators.

The indirect path RA → PU → IAC was significant ($\beta = 0.127, t = 4.641, p < 0.001$), indicating that Perceived Usefulness (PU) partially mediated the relationship between relative advantage and adoption intention. Similarly, the path RA → TIC → IAC was also significant ($\beta = 0.053, t = 3.159, p = 0.002$), suggesting that Trust in Cloud Technology (TIC) further strengthens the influence of relative advantage on adoption decisions.

Second, Top Management Support (TMS) exhibits strong indirect effects on adoption intention through both mediators. The indirect relationship TMS → PU → IAC was statistically significant ($\beta = 0.211, t = 6.344, p < 0.001$), indicating that leadership support enhances adoption intention by increasing employees' perceptions of the usefulness of cloud computing. In addition, TMS → TIC → IAC was also significant ($\beta = 0.220, t = 6.943, p < 0.001$), confirming that managerial commitment strengthens trust in cloud technology, which subsequently encourages adoption.

Third, the analysis shows that security concerns indirectly influence adoption intention through trust in cloud technology. The indirect effect of SEC → TIC → IAC is statistically significant ($\beta = 0.089, t = 4.951, p < 0.001$), indicating that strong

security mechanisms contribute to higher adoption intention primarily by enhancing trust in the cloud environment. However, the mediation path SEC → PU → IAC was not significant ($\beta = 0.015, t = 0.665, p = 0.506$), suggesting that security perceptions do not directly influence employees' evaluations of the usefulness of cloud technology.

Finally, Government Regulations (GR) showed a significant indirect effect on adoption intention through perceived usefulness (GR → PU

→ IAC: $\beta = 0.058, t = 2.444, p = 0.015$), indicating that regulatory frameworks enhance adoption intention by strengthening employees' perceptions of the practical value and legitimacy of cloud computing. However, the indirect path GR → TIC → IAC was not significant ($\beta = 0.003, t = 0.178, p = 0.859$), suggesting that regulatory policies alone are insufficient to directly build trust in cloud technology. **Error! Reference source not found.** shows the results of the indirect relationships in this study.

Table 6: Indirect Relationships

Indirect Path	B	t-value	p-value	Result
RA → PU → IAC	0.127	4.641	<0.001	Supported
RA → TIC → IAC	0.053	3.159	0.002	Supported
TMS → PU → IAC	0.211	6.344	<0.001	Supported
TMS → TIC → IAC	0.220	6.943	<0.001	Supported
SEC → PU → IAC	0.015	0.665	0.506	Not Supported
SEC → TIC → IAC	0.089	4.951	<0.001	Supported
GR → PU → IAC	0.058	2.444	0.015	Supported
GR → TIC → IAC	0.003	0.178	0.859	Not Supported

5. DISCUSSION

This study examined the determinants of cloud computing adoption in Jordanian e-government by integrating the TOE framework and TAM. The findings provide empirical support for the proposed model and offer insights into how technological, organizational, and environmental factors influence employees' adoption intentions through perceived usefulness and trust in cloud technology.

Cloud computing is increasingly being adopted across various sectors, including the public sector, owing to its potential to improve operational efficiency, flexibility, and service delivery [38]. However, successful implementation of cloud technologies in government institutions depends on multiple contextual factors. Technological, organizational, and environmental conditions shape public organizations' readiness to adopt digital innovation [8], [9]. In this study, cloud computing adoption was examined within the Civil Status and Passport Department in Jordan using an integrated TOE-TAM model. The findings highlight the significant roles of relative advantage, security, top management support, government regulation,

perceived usefulness, and trust in cloud technology in shaping employees' adoption intention.

The results indicate that relative advantage has a significantly positive impact on both perceived usefulness and trust in cloud technology. The relative advantage reflects the degree to which cloud computing is perceived as offering superior benefits compared to traditional information systems. When employees perceive cloud technology as capable of improving operational efficiency, increasing scalability, enhancing resource utilization, and improving service delivery, they are more likely to recognize its usefulness and develop confidence in reliability. These findings align with those of previous research, which emphasizes the importance of perceived technological benefits in technology adoption decisions. Gangwar et al. (2015) demonstrated that relative advantage significantly influences cloud adoption by highlighting operational and strategic advantages. Similarly, [19] and [4] reported that the perceived technological superiority of cloud solutions strongly motivates organizations to adopt these systems. Additional research also confirms that perceived technological benefits remain one of the strongest predictors of cloud computing adoption across both public and private organizations [1], [3]. The present study

extends these findings by showing that relative advantage not only improves perceived usefulness but also contributes to building trust in cloud technologies within a government environment.

The findings also revealed that security concerns play a nuanced role in cloud computing adoption. Security was found to have an insignificant effect on perceived usefulness, suggesting that employees and IT professionals within the CSPD evaluate the usefulness of cloud computing primarily based on performance-related benefits rather than security attributes. This result differs from those of studies conducted in other contexts. For instance, [39] and [40] reported that perceived security significantly influences perceived usefulness in technology adoption. This difference may be explained by contextual factors within government organizations. In a CSPD, security may be perceived as a fundamental requirement rather than a feature that directly enhances the operational benefits of cloud computing. Consequently, employees may evaluate the usefulness of cloud technologies primarily in terms of efficiency improvements and service delivery enhancement.

Nevertheless, the results show that security significantly influences trust in the cloud technology. Strong security mechanisms, including data protection policies, privacy safeguards, encryption protocols, and secure data transmission, are essential for building user confidence in cloud systems. These findings are consistent with previous research that emphasizes the importance of security in shaping trust in digital technologies. For example, [41] found that security perceptions significantly enhance trust in mobile banking systems, while [15] and [42] reported similar relationships in e-government and digital payment environments. Additional studies also confirm that security and privacy protection are key determinants of trust in digital government platforms [43]. Concerns related to cybersecurity and privacy protection are particularly important in public sector environments, where organizations manage highly sensitive data. Consequently, strong security safeguards play a crucial role in strengthening trust and reducing the perceived risks associated with cloud computing adoption [8].

These findings further demonstrate that top management support has a strong and significant influence on both perceived usefulness and trust in cloud technology. This result highlights the critical role of organizational leadership in facilitating digital transformation initiatives within government institutions. When senior leaders actively support

cloud initiatives, allocate sufficient financial and technical resources, and communicate the strategic importance of cloud technologies, employees are more likely to perceive these systems as useful and reliable. These findings are consistent with prior research that emphasizes the role of leadership commitment in technology adoption. Gangwar et al. (2015) [5] found that top management support significantly enhanced perceived usefulness by creating a supportive organizational environment. Similarly, [4] and [44] reported that leadership engagement strengthens employees' confidence in cloud technologies and reduces their resistance to technological change. From a theoretical perspective, this result also supports innovation adoption research, which emphasizes that leadership commitment plays a decisive role in shaping organizational readiness for technological innovation [9], [10].

With respect to environmental factors, the results indicate that government regulations significantly influence perceived usefulness but do not significantly affect trust in cloud technology. The positive relationship between regulatory frameworks and perceived usefulness suggests that clear legal policies and governance structures help employees recognize the practical value of cloud computing in government operations. Regulatory frameworks that define compliance requirements, data governance standards, and cybersecurity policies may increase employees' confidence in the institutional legitimacy and operational relevance of cloud technology. These findings align with previous research emphasize the role of regulatory environments in facilitating technology adoption. Studies by [8], [3], and [4] demonstrated that supportive regulatory frameworks encourage cloud adoption by reducing uncertainty and providing governance structures for technology implementation.

However, the insignificant relationship between government regulation and trust suggests that formal policies alone may not be sufficient to build user confidence in cloud systems directly. Trust appears to be shaped more strongly by practical technological and organizational factors such as security mechanisms, system reliability, and leadership commitment. Similar contextual findings were reported by [45] and [29], who found limited direct effects of regulatory frameworks on cloud adoption in certain government settings. These findings suggest that although regulatory frameworks legitimize the use of cloud technologies, trust is primarily developed through the effective

implementation of secure and reliable technological systems.

Finally, the results confirm that both perceived usefulness and trust in cloud technology significantly influence employees' intention to adopt cloud computing. Consistent with Technology Acceptance Model, perceived usefulness emerged as one of the strongest predictors of adoption intention. This finding indicates that government employees are more likely to support the cloud computing adoption when they believe that technology can improve job performance, enhance operational efficiency, and facilitate the delivery of e-government services. Similar conclusions have been reported in previous studies, including [5][30], and [4], all of which emphasize the central role of perceived usefulness in shaping technology adoption decisions.

Trust in cloud technology also plays a significant role in influencing adoption intention. Employees who perceive cloud systems to be reliable, secure, and capable of protecting sensitive government data are more likely to support their implementation. These findings align with prior research conducted in public-sector contexts, including [14], [3], and [15], which identify trust as a critical factor enabling digital transformation initiatives. In the Jordanian public sector, trust appears to be influenced by a combination of strong security measures, organizational leadership support, and governance mechanisms that ensure the responsible management of cloud technologies.

Overall, the findings demonstrate that perceived usefulness and trust in cloud technology function as key mechanisms through which technological, organizational, and environmental factors influence cloud computing adoption in e-government environments. While perceived usefulness motivates adoption by emphasizing performance improvements and operational benefits, trust reduces the uncertainty and perceived risks associated with cloud technologies. Integrating these cognitive and trust-based mechanisms within the TOE framework provides a comprehensive explanation of cloud computing adoption behavior in Jordanian government organizations.

Importantly, this study also highlights the value of integrating organizational-level adoption frameworks with individual-level acceptance models. While the TOE framework explains the structural conditions that facilitate technological innovation [9], the TAM explains how employees

cognitively evaluate these conditions through perceptions of usefulness and trust [11], [15]. By combining these perspectives, the present study offers a more comprehensive understanding of cloud computing adoption in security-sensitive public-sector environments and contributes to the broader literature on digital transformation in government organizations [4], [5], [19].

6. THEORETICAL AND PRACTICAL CONTRIBUTION

This study offers several theoretical contributions by developing an integrated framework that combines the TOE framework and TAM model to explain cloud computing adoption within Jordanian e-government organizations. This study bridges the gap between organizational-level determinants and individual-level technology acceptance by incorporating perceived usefulness and trust in cloud technology as the mediating mechanisms. The findings demonstrate that technological, organizational, and environmental factors influence adoption intentions, primarily through employees' cognitive evaluations of usefulness and trust in the technology. In addition, this study extends the traditional TAM perspective by emphasizing the role of trust in security-sensitive public-sector environments, where concerns related to data security, privacy protection, and system reliability are particularly significant. By providing empirical evidence from the Jordanian public sector, this study also contributes to the limited body of literature examining cloud computing adoption in government institutions within developing-country contexts.

From a practical perspective, the findings provide valuable insights for policymakers and public -sector managers responsible for implementing cloud computing initiatives. The results identified top management support as a critical driver of cloud adoption, highlighting the importance of strong leadership commitment, resource allocation, and strategic guidance in facilitating digital transformation initiatives. The findings also emphasize the role of government regulations in shaping employees' perceptions of the usefulness and legitimacy of cloud technologies, suggesting that clear regulatory frameworks and data governance policies are essential for supporting cloud adoption in public sector environments. In addition, this study underscores the importance of robust cybersecurity measures in strengthening employees' trust in cloud platforms, particularly in

organizations responsible for managing sensitive citizen data. Finally, the significant influence of relative advantage suggests that government institutions should actively communicate the operational benefits of cloud computing through training programs, pilot projects, and awareness initiatives such as improved efficiency, scalability, and service delivery. Together, these measures can support more effective and secure cloud adoption within Jordanian e-government organizations and facilitate the broader digital transformation of public services.

7. CONCLUSION, LIMITATIONS, AND FUTURE WORK RECOMMENDATIONS

This study examined the key determinants influencing the intention to adopt cloud computing within Jordanian e-government services by integrating the TOE framework and the TAM. Specifically, the study investigated the roles of relative advantage, security concerns, top management support, and government regulations while also examining the mediating effects of perceived usefulness and trust in cloud technology.

The conclusions of this study regarding the research problem were established using strict criteria derived from Partial Least Squares Structural Equation Modeling (PLS-SEM). First, the reliability and conceptual distinctness of the proposed relational-cognitive framework were validated. Specifically, discriminant validity was confirmed using the robust Heterotrait-Monotrait (HTMT) ratio, with all values falling below the conservative 0.85 threshold, proving that trust in cloud technology functions as a distinct, independent mechanism from other organizational factors. Final conclusions regarding the adoption determinants were then reached based on three structural criteria: (1) the statistical significance of the path coefficients ($p < 0.05$) derived via bootstrapping, (2) the substantial explanatory power of the integrated model ($R^2 = 0.597$ for adoption intention), and (3) the confirmed strong predictive relevance ($Q^2 = 0.412$) of the framework.

The findings highlight several important insights into cloud adoption in the Jordanian public sector. First, top management support has emerged as the most influential determinant of cloud adoption intention. Strong leadership commitment, strategic guidance, and allocation of appropriate resources significantly enhance employees' perceptions of the usefulness of cloud technologies and strengthen their trust in cloud systems. Second, relative advantage

positively influences both perceived usefulness and trust, indicating that when cloud computing clearly demonstrates operational and strategic benefits, such as improved efficiency, scalability, and service delivery, employees are more likely to support its adoption. Third, the results show that security mechanisms primarily influence adoption indirectly by strengthening trust in cloud technology, rather than directly affecting perceived usefulness. This finding underscores the critical importance of robust cybersecurity frameworks and data protection mechanisms for cloud initiatives in security-sensitive public -sector environments. In addition, government regulations were found to significantly enhance perceived usefulness, but not trust in cloud technology, suggesting that regulatory frameworks mainly contribute to legitimizing cloud adoption through governance structures, compliance requirements, and institutional support. Finally, both perceived usefulness and trust in cloud technology were identified as significant predictors of cloud adoption intention, acting as key mechanisms through which technological, organizational, and environmental factors influence adoption decisions.

Despite these contributions, this study has several limitations. First, it was conducted within a single governmental organization, the Civil Status and Passport Department in Jordan. While CSPD represents a large and security-sensitive public-sector institution that manages critical national identity data, the findings may not be fully generalizable to other government agencies or national contexts that operate under different regulatory frameworks, technological infrastructure, and organizational cultures. Second, this study adopted a cross-sectional survey design, capturing respondents' perceptions at a single point in time. Although this approach is appropriate for examining the relationships among variables, it limits the ability to establish causal relationships or observe how employees' perceptions evolve throughout the implementation of cloud technologies. Third, the study relied primarily on responses from employees and IT professionals, which may not fully capture the perspectives of senior policymakers and strategic decision makers who play a critical role in shaping digital transformation initiatives within government institutions.

Future research could address these limitations in several ways. Longitudinal research designs can examine how employees' perceptions of trust, usefulness, and organizational readiness evolve during different stages of cloud implementation. Additionally, mixed-method

approaches that combine quantitative surveys with qualitative interviews involving policymakers, IT managers, and senior government leaders could provide deeper insights into the strategic and organizational dynamics that influence cloud adoption. Future studies may also extend the proposed framework by incorporating additional variables, such as organizational culture, technological readiness, digital literacy, and perceived risk, as potential mediators or moderators influencing adoption behavior. Furthermore, comparative studies across multiple government organizations or across different national contexts are valuable for validating and refining the proposed model. Finally, future research could integrate complementary theoretical perspectives, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or institutional theory, to provide a broader understanding of cloud adoption dynamics in security-sensitive public-sector environments.

REFERENCES:

- [1] S. Marston, Z. Li, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, "Cloud computing — The business perspective," *Decis. Support Syst.*, vol. 51, no. 1, pp. 176–189, Apr. 2011, doi: 10.1016/j.dss.2010.12.006.
- [2] P. M. Mell and T. Grance, "The NIST definition of cloud computing," Gaithersburg, MD, 2011. doi: 10.6028/NIST.SP.800-145.
- [3] N. Al Mudawi, N. Beloff, and M. White, "Developing a Framework of Critical Factors Affecting the Adoption of Cloud Computing in Government Systems (ACCE-GOV)," *Lecture Notes in Networks and Systems*, vol. 283, pp. 520–538, 2022, doi: 10.1007/978-3-030-80119-9_32.
- [4] A. Mujalli, M. J. G. Wani, A. Almgrashi, T. Khormi, and M. Qahtani, "Investigating the factors affecting the adoption of cloud accounting in Saudi Arabia's small and medium-sized enterprises (SMEs)," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 10, no. 2, p. 100314, 2024, doi: 10.1016/j.joitmc.2024.100314.
- [5] H. Gangwar, H. Date, and R. Ramaswamy, "Understanding determinants of cloud computing adoption using an integrated TAM-TOE model," *Journal of Enterprise Information Management*, vol. 28, no. 1, pp. 107–130, 2015, doi: 10.1108/JEIM-08-2013-0065.
- [6] I. A. T. Hashem, I. Yaqoob, N. B. Anuar, S. Mokhtar, A. Gani, and S. Ullah Khan, "The rise of 'big data' on cloud computing: Review and open research issues," *Inf. Syst.*, vol. 47, pp. 98–115, Jan. 2015, doi: 10.1016/j.is.2014.07.006.
- [7] M. A. Almaiah and Y. Nasereddin, "Factors influencing the adoption of e-government services among Jordanian citizens," *Electronic Government*, vol. 16, no. 3, pp. 236–259, 2020, doi: 10.1504/EG.2020.108453.
- [8] N. Qatawneh, "Building a framework to drive government systems' adoption of cloud computing through IT knowledge," *Discover Sustainability*, vol. 5, no. 1, 2024, doi: 10.1007/s43621-024-00427-8.
- [9] L. G. F. M. Tornatzky, *The Processes of Technological Innovation*. Lexington, MA: Lexington Books, 1990.
- [10] T. Oliveira, M. Thomas, and M. Espadanal, "Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors," *Information and Management*, vol. 51, no. 5, pp. 497–510, 2014, doi: 10.1016/j.im.2014.03.006.
- [11] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, Sep. 1989, doi: 10.2307/249008.
- [12] V. Venkatesh and F. D. Davis, "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Manage. Sci.*, vol. 46, no. 2, pp. 186–204, Feb. 2000, doi: 10.1287/mnsc.46.2.186.11926.
- [13] O. Abied, O. Ibrahim, and S. N.-I. Mat Kamal, "Adoption of Cloud Computing in E-Government: A Systematic Literature Review," *Pertanika J. Sci. Technol.*, vol. 30, no. 1, pp. 655–689, Jan. 2022, doi: 10.47836/pjst.30.1.36.
- [14] Y. Liang, W. Wang, K. Dong, G. Zhang, and G. Qi, "Adoption of mobile government cloud from the perspective of public sector," *Mobile Information Systems*, vol. 2021, Jan. 2021, doi: 10.1155/2021/8884594.
- [15] W. H. S. Alkhalani, R. B. Atan, S. B. Abdullah, and Y. Y. B. Jusoh, "the Effect of Technological, Environmental, and Individual Contexts on CBEG: The Role of Trust as a Mediator," *J. Theor. Appl. Inf. Technol.*, vol. 102, no. 6, pp. 2693–2708, 2024.
- [16] M. M. Mousa *et al.*, "Factors Influencing Intention to Adopt AI Chatbot in Civil Status and Passport Department in Jordan: The Moderating Role of Trust in Technology,"

- Journal of Posthumanism*, vol. 5, no. 3, pp. 1444–1466, 2025.
- [17] I. Alhadid *et al.*, “Predictors for E-Government Adoption of SANAD App Services Integrating UTAUT, TPB, TAM, Trust, and Perceived Risk,” *Int. J. Environ. Res. Public Health*, vol. 19, no. 14, Jul. 2022, doi: 10.3390/ijerph19148281.
- [18] D. Dhagarra, M. Goswami, and G. Kumar, “Impact of Trust and Privacy Concerns on Technology Acceptance in Healthcare: An Indian Perspective,” *Int. J. Med. Inform.*, vol. 141, no. April, p. 104164, 2020, doi: 10.1016/j.ijmedinf.2020.104164.
- [19] S. Chatterjee, N. P. Rana, Y. K. Dwivedi, and A. M. Baabdullah, “Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model,” *Technol. Forecast. Soc. Change*, vol. 170, no. May, p. 120880, Sep. 2021, doi: 10.1016/j.techfore.2021.120880.
- [20] I. Alkandi, “Technological, Organizational, and Environmental Factors Influencing the Adopting of Cloud Computing: a Quantitative Study,” *12th International Scientific Conference “Business and Management 2022,”* no. June, 2022, doi: 10.3846/bm.2022.692.
- [21] R. Al-Dwairi and W. Jditawi, “The Role of Cloud Computing on the Governmental Units Performance and E-Participation (Empirical Study),” *International Journal of Advances in Soft Computing and its Applications*, vol. 14, no. 3, pp. 78–93, 2022, doi: 10.15849/IJASCA.221128.06.
- [22] O. Abied *et al.*, “Probing Determinants Affecting Intention to Adopt Cloud Technology in E-Government Systems,” *Sustainability (Switzerland)*, vol. 14, no. 23, Dec. 2022, doi: 10.3390/su142315590.
- [23] E. M. Rogers, *Diffusion of Innovations*, 5th ed. Free Press, 2003.
- [24] O. Ali, A. Shrestha, A. Chatfield, and P. Murray, “Assessing information security risks in the cloud: A case study of Australian local government authorities,” *Gov. Inf. Q.*, vol. 37, no. 1, p. 101419, Jan. 2020, doi: 10.1016/j.giq.2019.101419.
- [25] A. Hooda, P. Gupta, A. Jeyaraj, M. Giannakis, and Y. K. Dwivedi, “The effects of trust on behavioral intention and use behavior within e-government contexts,” *Int. J. Inf. Manage.*, vol. 67, Dec. 2022, doi: 10.1016/j.ijinfomgt.2022.102553.
- [26] J. Zheng, J. Z. Zhang, K. M. Au, V. C. Storey, H. Wang, and Y. Yang, “Shaping innovation pathways: Metaverse application configurations in high-technology small- and medium-sized enterprises,” *Decis. Support Syst.*, vol. 187, no. August, p. 114336, 2024, doi: 10.1016/j.dss.2024.114336.
- [27] B. Koc, U. Sener, and P. Erhan Eren, “Determinative Factors of Cloud Computing Adoption in Government Organizations,” *3rd International Informatics and Software Engineering Conference, IISEC 2022*, 2022, doi: 10.1109/IISEC56263.2022.9998286.
- [28] O. Ali and V. Osmanaj, “The role of government regulations in the adoption of cloud computing: A case study of local government,” *Computer Law and Security Review*, vol. 36, Apr. 2020, doi: 10.1016/j.clsr.2020.105396.
- [29] O. Ali, A. Shrestha, V. Osmanaj, and S. Muhammed, “Cloud computing technology adoption: an evaluation of key factors in local governments,” *Information Technology and People*, vol. 34, no. 2, pp. 666–703, Mar. 2021, doi: 10.1108/ITP-03-2019-0119.
- [30] M. Alarefi, “Cloud computing usage by governmental organizations in Saudi Arabia based on Vision 2030,” *Uncertain Supply Chain. Manag.*, vol. 11, pp. 169–178, 2023.
- [31] E. M. Abu-Taieh *et al.*, “An empirical study of factors influencing the perceived usefulness and effectiveness of integrating e-learning systems during the COVID-19 pandemic using SEM and ML: A case study in Jordan.,” *Sustainability*, vol. 14, no. 20, p. 13432, 2022, doi: 10.3390/su142013432.
- [32] M.-I. Riad Jaradat *et al.*, “Exploring Cloud Computing Adoption in Higher Educational Environment: An Extension of the UTAUT Model with Trust,” *International Journal of Advanced Science and Technology*, vol. 29, no. 5, pp. 8282–8306, 2020, [Online]. Available: <https://www.researchgate.net/publication/341775850>
- [33] S. H. Hashim and Z. A. Al-Sul, “Cloud computing based e-government in Iraq using partial least square algorithm,” *Indonesian Journal of Electrical Engineering and Computer Science*, vol. 22, no. 2, p. 953, May 2021, doi: 10.11591/ijeecs.v22.i2.pp953-960.
- [34] A. Al-Momani and T. Ramayah, “Predicting the behavioural intention of Jordanian healthcare professionals to use blockchain-based EHR systems: an empirical study,” *Journal of System and Management Sciences*,

- vol. 13, no. 4, pp. 107–139, 2023, doi: 10.33168/JSMS.2023.0407.
- [35] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, “When to use and how to report the results of PLS-SEM,” *European Business Review*, vol. 31, no. 1, pp. 2–24, 2019, doi: 10.1108/EBR-11-2018-0203.
- [36] J. Henseler, G. Hubona, and P. A. Ray, “Using PLS path modeling in new technology research: Updated guidelines,” *Industrial Management and Data Systems*, vol. 116, no. 1, pp. 2–20, 2016, doi: 10.1108/IMDS-09-2015-0382.
- [37] J. F. Hair, L. M. Matthews, R. L. Matthews, and M. Sarstedt, “Updated guidelines on which method to use,” *International Journal of Multivariate Data Analysis*, vol. 1, no. 2, p. 107, 2017.
- [38] B. R. Piduru, “Cloud Computing and Public Sector Transformation: Revolutionizing Governmental Services and Operations,” *Journal of Artificial Intelligence & Cloud Computing*, pp. 1–4, Sep. 2022, doi: 10.47363/JAICC/2022(1)192.
- [39] A. Hassan, S. H. Bhatti, S. Shujaat, and Y. Hwang, “To adopt or not to adopt? The determinants of cloud computing adoption in information technology sector,” *Decision Analytics Journal*, vol. 5, no. June, p. 100138, Dec. 2022, doi: 10.1016/j.dajour.2022.100138.
- [40] B. Haryanto, A. Gandhi, and Y. Giri Sucahyo, “The Determinant Factors in Utilizing Electronic Signature Using the TAM and TOE Framework,” *2020 5th International Conference on Informatics and Computing, ICIC 2020*, 2020, doi: 10.1109/ICIC50835.2020.9288623.
- [41] H. Ben Abdennebi, “M-banking adoption from the developing countries perspective: A mediated model,” *Digital Business*, vol. 3, no. 2, p. 100065, 2023, doi: 10.1016/j.digbus.2023.100065.
- [42] Imaduddin, I. Butar, R. Purwanto, A. Putranto, and W. F. Afrianto, “Trust and the intent to use on-demand charging services of electric vehicles in Indonesia: The moderating effect of perceived charging risk and environmental concern,” *Energy*, vol. 323, no. May 2024, p. 135713, 2025, doi: 10.1016/j.energy.2025.135713.
- [43] M. Chen, Y. Cao, and Y. Liang, “Determinants of open government data usage: Integrating trust theory and social cognitive theory,” *Gov. Inf. Q.*, vol. 40, no. 4, p. 101857, 2023, doi: 10.1016/j.giq.2023.101857.
- [44] S. Zebua and R. Widuri, “Analysis of Factors Affecting Adoption of Cloud Accounting in Indonesia,” *J. Theor. Appl. Inf. Technol.*, vol. 101, no. 1, pp. 86–105, 2023.
- [45] H. J. Hadi, M. A. Omar, and W. R. S. Osman, “Investigating the role of trust dimension as a mediator on cc-saas adoption,” *Intelligent Automation and Soft Computing*, vol. 29, no. 2, pp. 373–386, 2021, doi: 10.32604/iasc.2021.018207.