

# Impact of Digital Transformation on Smart Government in UAE: Empirical Paper

Barqan Ahmed Abdulla Ibrahim  
Institute of Technology Management and  
Entrepreneurship  
*Universiti Teknikal Malaysia Melaka*  
*Melaka, Malaysia*  
[barqan@gmail.com](mailto:barqan@gmail.com)

Suriati Akmal  
Institute of Technology Management and  
Entrepreneurship *Universiti Teknikal*  
*Melaka Melaka*  
*Melaka, Malaysia*  
[suriatiakmal@utem.edu.my](mailto:suriatiakmal@utem.edu.my)

Halimaton Hakimi  
School of Computing  
*Asia Pacific University*  
*Kuala Lumpur, Malaysia*  
[halimaton.saadiah@apu.edu.my](mailto:halimaton.saadiah@apu.edu.my)

Norun Najjah Ahmat line  
Institute of Technology Management and  
Entrepreneurship  
*Universiti Teknikal Malaysia Melaka*  
*Melaka, Malaysia*

**Abstract**— Digital transformation offers immense potential for creating smart governments that are more efficient, responsive, effective and citizen-centric. However, overcoming challenges and addressing concerns are crucial for maximizing its benefits and ensuring inclusivity. The United Arab Emirates (UAE) has emerged as a global leader in embracing digital transformation, particularly in the context of building a smart government. Therefore this study aims to explore the multifaceted impact of digital transformation on smart government initiatives in the UAE. The study adopted quantitative transversal survey method. The adopted sample size comprises 323 employees and citizen across United Arab Emirates. The result shows that there is a significant relationship between security-privacy and digital transformation in smart government, digital skills of public employees has significant influence on smart government. Also digital awareness has significant positive effect on smart government. The study recommended that government should offer digital skills development resources to employees engage citizens in policy formulation and promote trustworthiness through digital literacy and education. These measures will help citizens understand the benefits and risks of digital technologies, make informed choices, and ensure that governments are using them effectively.

**Keywords**— Digital transformation; Smart government; United Arab Emirates (UAE).

## I. INTRODUCTION

Smart governance is an important tool for a smart government which is a timely demand in the 21st century and technology is the key pillar of smart governance (Wang, Nguyen, Bonkalo & Grebennikov, 2021). Globally, governments have started to emphasize the provision of smart-application-based services, or "smart-government services." Assuming anytime, anywhere, and anyway, location-based services provided by smart government enhance information availability, creating new avenues for public-sector service innovation (Shtait et al., 2018). Digital transformation is crucial because, as Oliveira and Santos (2019) claim that smart government modernization will require a major change in the way government services are delivered. They also need to think about which parts of the

transformation will be best executed locally, regionally, and nationally. Nowadays nobody can deny the importance of smart governance which is the new version of the political process, governance and public administration (Lim & Yigitcanlar, 2022). Kim, Andersen and Lee (2022) explained that the rapid adoption of digital technologies is fundamentally reshaping how governments operate and interact with citizens. This digital transformation presents significant opportunities to build smart governments that are more efficient, transparent, responsive, and citizen-centric, improved service delivery, data-driven decision making, increased transparency and accountability and enhanced citizen engagement (Sakolkar, 2023). Despite the potential benefits, digital transformation also poses challenges such as digital divide, privacy concerns, cyber security threats and skill gaps and capacity building, therefore implementing new technologies requires workforce training and adaptation.

Al-Kumaim and Alshamsi (2023) confirm that in UAE increased reliance on technology exposes governments to cyber-attacks and data breaches. Robust cyber security measures, including awareness campaigns and data protection regulations, are crucial to mitigate these risks. Despite commitment of a lot of resources by UAE government on digitalization projects which has significantly increased over the years. However, there are still trials affecting the success of digital transformation full implementation on the part of the government, and the adoption and application by some stakeholders. Issues relating to skills gap, the use of traditional operating models by many firms, a kind of reluctance on the part of the government to fully implement the digital transformation agenda and the legacy system in the governance of the UAE (Abu Ghazaleh and Ahmad, 2018; Hammou, 2022). Other issues include resistance to change by citizens no matter how much it will cost them. These difficulties if not handled could degenerate every investment made by the government in the pursuit of the digitalization of government and could affect the regional and global outlook and the country's aspiration of becoming one of leaders in digital transformation (Ahmed et al., 2021; Mahesa, Yudoko and Anggoro, 2019). Overall, the power of digital transformation on smart government in

the UAE has been overwhelmingly positive, leading to enhanced efficiency, transparency, economic growth, and sustainability. However, it's important to acknowledge and address the accompanying challenges to ensure that the benefits are truly inclusive and equitable for all citizens. In view of that this study aims to determine the impact of digital transformation on smart government in UAE.

## II. LITERATURE REVIEW

### A. Digital Transformation

The integration of computer-based technology into an organization's products, processes, and strategy is known as digital transformation (Alvarenga et al., 2020). Digital transformation is used by businesses to better engage and serve their employees and consumers, and so increase their competitiveness. A digital transformation programme, which is often huge in scale, might necessitate a thorough review and reinvention of all aspects of a business, from supply chains and processes to staff skill sets and org charts, to customer interactions and value propositions to stakeholders. The digitization of society began in the late twentieth century and accelerated dramatically in the first two decades of the twenty-first century, resulting in an increased need for digital transformation across sectors. From IT modernisation to digital optimization, digital Transformation can refer to the construction of a new digital organization's management (Alvarenga et al., 2020). In general, digital technology is used to significantly improve the processes. It is the process of analysing human needs and technology in order to improve the user experience. Clients or employees are examples of end users, and many businesses must consider both perspectives. In any digital change, the fundamental goal is to improve your present practises. As the organization must evolve in order to remain competitive, digital transformation is critical.

### B. Digital Transformation in UAE

Digital transformation requires making significant changes to an organization's use of ICT, while ICT transformation refers to significant modification to how an organisation IT functions does provide IT services (Srouji, 2020). The advancement of ICT has resulted in digital transformation. According Alajmi, Mohammadian and Talukder (2020), digital transformation is viewed from emerging technologies that are making the waves of transformation in many sectors. Alajmi et al. (2020) further argued that big data, open government data, mobile government, cloud computing platforms, social networking, blogs, sensors, smartphone applications and Really Simple Syndication (RSS) feeds, are the emergent technologies. The UAE intends to improve the ICT industry by providing logistical and technical assistance, aligning digital and sustainable development, and orchestrating inclusive economic growth (Feroz, Zo and Chiravuri, 2021). Remote real - time work, e-commerce expansion, and e-government services are among the ideas being implemented across the country. The country's plan includes 36 strategic performance metrics spanning from quality, speed, costs, infrastructure, employment, education, and innovation related to ICT operations. According to Ahmed et al., (2021), investment is

also boosting market for ICT products and services in areas such as healthcare, aerospace, aircraft, aeronautics, transportation, commerce, financial institutions, hospitality, and those linked to the UAE's socioeconomic development that necessitate digital transformation in the UAE.

Fenech et al. (2019) conducted semi-structured interviews in the areas of HR planning, reward management, performance management, training and development, health and safety, and employee relations in order to investigate the changing role of human resource management in an era of digital transformation in the UAE. Khalid and Lavilles (2019) in their survey has found that 50 percent of institutions prioritise increasing operational efficiency as a first step toward , 21.8 percent of UAE-based companies prioritise enhancing customer experience, and 14.5 percent prioritise more than one component of digital transformation. According to Azevedo and Almeida, (2021), a multidisciplinary approach is required for the digital transformation course. It is essential to incorporate not just technological themes linked to emerging i4.0 technologies, but also business and digital transformation strategy concerns. Bokayev, Davletbayeva, Amirova, Rysbekova, Torebekova and Jussupova (2021) reveals that over 90% of government services are available online, simplifying processes and enhancing citizen experience. Initiatives like Dubai's Smart City 2025 program showcase ambitious digitization efforts. Overall, the empirical evidence suggests that the UAE's digital transformation journey is bringing significant benefits across various sectors. However, addressing existing challenges and ensuring inclusive and ethical development remain critical for long-term success.

### C. Smart Government

Smart government describes a new generation of concepts for the application of information technologies (ITs) in the public sector that collect, connect, and analyses huge volumes and variety of data generated and processed in (near) real-time (Schedler, Guenduez & Frischknecht, 2019). Althunibat et al. (2021) refer smart government to the improvement service's access to information via location-based services (based on the assumption of anytime, anywhere, and anyhow), resulting in more opportunities for government service innovation. The implementation of the Smart Government program involves various stakeholders, including federal and local government entities, private sector companies, and citizens. Examining the policy frameworks and governance structures is essential to understand how collaboration and decision-making occur. Almuraqab and Jasimuddin (2017) investigates factors influencing Smart Government service adoption, identifying user awareness, perceived ease of use, and service quality as key determinants. Study by Albreiki and Bhaumik (2019) presents a conceptual framework for Smart Government services adoption in the UAE, emphasizing data security, user trust, and citizen involvement.

Rodrigues, Sarabdeen and Balasubramanian (2016) displayed that the United Arab Emirates (UAE) has been a frontrunner in implementing smart government initiatives, leveraging technology to enhance efficiency, transparency, and citizen engagement. This review delves into the empirical evidence surrounding the UAE's smart government efforts,

highlighting both successes and challenges. Hartanti, Abawajy and Chowdhury (2022) uncovered that smart government characteristics like integration, efficiency, and citizen-centricity significantly influenced performance quality in service delivery. Ameen, Al-Ali, Isaac and Mohammed (2020) institute that smart government initiatives in the UAE had a positive impact on service quality, with integration, efficiency, effectiveness, and citizen-centricity being key contributing factors. Almuraqab and Jasimuddin (2017) found that perceived ease of use and usefulness of smart government services were important factors influencing citizen adoption. However, limited awareness and digital literacy remained challenges.

A study by Albreiki and Bhaumik (2019) establish that smart government initiatives had a positive impact on transparency and accountability in the UAE, but there was still room for improvement in citizen participation and feedback mechanisms. Almuraqab and Jasimuddin (2017) reports that a significant portion of the UAE population still lacks internet access or digital skills, indicating the need for bridging the digital divide. Ahmad and Khalid (2017) highlight the influence of factors like perceived ease of use and social influence on citizens' adoption of smart government services in the UAE. Khalid Alghawi et al. (2019) suggest a positive correlation between smart government characteristics like integration, efficiency, and citizen-centricity, and performance quality of services. Overall, the empirical evidence paints a picture of a maturing but evolving smart government system in the UAE, with notable achievements in service delivery and engagement. However, addressing accessibility, digital skills, data privacy, and integration challenges remains crucial for ensuring inclusivity and long-term success.

#### *D. The effect of digital transformation in Smart Government implementation*

One of the key effects of digital transformation in smart government is on the reducing of operational and labour expenses in public administrations (Mergel, Edelmann & Haug, 2019). According to Ali et al. (2018), smart government's digital transformation had a strong positive effect on public service management, welfare programs, and legislation. From administrative operations to resource management, technology applications can save costs, assure speedy delivery of public goods and services, and enhance the use of available assets. (Cahyono and Susanto, 2019; Nzaramyimana and Susanto, 2019). Ziomba (2021) reveals that digital transformation has the ability to increase citizen security while minimizing vulnerability threats. Many scholars worry that when authorities adopt digital technologies, they could become even more vulnerable to these issues (Albarghathi et. al, 2018; Elsheikh et. al., 2020). Governments can assist security developers to build early threat detection programmes to avert these assaults by implementing digital infrastructure, massive data pipelines, and various digital technologies (Atreides, 2021).

The digital transformation provides governments with a plethora of new options for enhancing national security. Implementing login verification to government portals, developing and launching biometric identification efforts,

and upgrading mobile payments are just the tip of the iceberg (Khalid and Lavilles, 2019). Governments may use digital transformation to really overhaul the transportation network, develop digital literacy, implement different digital systems, and improve quality of life (Hariguna et al., 2019). Digital transformation may not only help governments embrace innovation, but it can also attract great personnel, facilitating even more innovation. According to the most recent studies, diverse teams provide superior results owing to creativity (Li and Shang, 2020). Cahyono and Susanto, (2019) stated that governments benefited from digital transformation because it allows them to establish a more responsive and dynamic work environment in which everyone may professionally grow and develop. New technologies have the potential to increase the efficacy of services for both residents and businesses. Citizens can save time by using more efficient services (Alvarenga et al., 2020). Broadly defined, AI may assist governments in predicting and implementing pre-emptive and/or personalised policies, as well as fine-tuning service delivery.

Kalra, (2019) demonstrated that the new wave of technologies has the potential to: increase participation and civic engagement; make government more responsive, transparent, and accountable; and introduce forms of democracy and smart participatory democracy. As a result, one might anticipate an increase in faith in government and election involvement. This may be accomplished through enabling real-time decision making, quickly gathering public data, and assisting in the introduction of more direct forms of democracy that can strengthen and improve representational democracy (Embarak, 2021).

### III. THEORETICAL FRAMEWORK

The Unified Theory of Acceptance and Use of Technology (UTAUT), created by Venkatesh, Morris, Davis, and Davis (2003), the Diffusion of Innovation Theory (DOI) by Rogers (2003), and the Technology Acceptance Model (TAM) put forth by Davis (1989) are the three theories and models that this study uses to explain the relationships among the variables of concern (Williams, Rana & Dwivedi, 2015). According to the UTAUT model, behavioral intention influences technological adoption, with acceptance influenced by social influence, performance expectancy, effort expectancy, and enabling circumstances. The Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers, categorizes adopters into five groups: innovators, early adopters, early majority, late majority, and laggards. Understanding these groups is crucial for effective implementation of new technologies in intelligent governance (Schedler, Guenduez & Frischknecht, 2019).

Taherdoost (2018) further explained that the Technology Acceptance Model (TAM) is a widely used tool for understanding how people and organizations adopt and use technology. It focuses on perceived ease of use and utility, which significantly influence users' willingness to use new technology. This study integrates the UTAUT, DOI Theory, and TAM agendas for better hypothetical results. Based on study theoretical background, data security in this study is crucial for smart government services, protecting IT

ecosystems like files, databases, and networks. Privacy and security are essential for reputation building. Digitalization infrastructure, including hardware, software, apps, and networking, is essential for successful deployment. Employees' digital skills are crucial for managing service rollouts, but many governments lack technical personnel, leading to a shortage of IT workers (Ray and Chaudhuri, 2021; Bilaria, 2021)

Government-citizen engagement is crucial for successful digital transformation in smart government. Citizens' expectations of government services are influenced by private sector businesses, and top-level management must support organizational reforms. Digital awareness is essential, and active participation promotes digital knowledge. Trustworthiness is crucial for citizens to accept digital transformation in smart government (Alpern, 2020; Domashova and Kripak, 2021). Therefore, the research theoretical background established shows the under listed hypothesis formulated as the study variables of measurement in Table I.

TABLE I. FORMULATED RESEARCH HYPOTHESIS

H1	H <sub>1</sub> :	There is a significant relationship between security-privacy and digital transformation in smart government
H2	H <sub>1</sub> :	There is a significant relationship between digital infrastructure and digital transformation in smart government
H3	H <sub>1</sub> :	There is a significant relationship between digital skill of public employee and digital transformation in smart government
H4	H <sub>1</sub> :	There is a significant relationship between government-citizen engagement and digital transformation in smart government
H5	H <sub>1</sub> :	There is a significant relationship between digital awareness and digital transformation in smart government
H6	H <sub>1</sub> :	There is a significant relationship between trustworthiness and digital transformation in smart government

As shown in the Table 2.1 the study has proposed six hypotheses that show a relationship between independent and dependent variables. The hypotheses were answer in the result which show how each hypothesis is supported or rejected based on the results from the data collected in this study.

#### IV. METHODOLOGY

The focus of this study is to analyses relationship between independent and dependent variable, this was completed using quantitative transversal survey method. The survey method was adopted because the research problem requires an objective evaluation. Therefore, in the United Arab Emirates, the researcher employ this methodology to learn out more about citizen and public employees which involve of the factors to enhance digital transformation for positive impact of smart government in UAE. The study population comprises 9,890,400 public employees and citizen. Questionnaire survey was conducted to collect the data. The questionnaire makes it easier to quickly gather information from a big number of respondents spread out over a large area (Jose & Subbaiyan, 2020).

The questionnaire was structured and developed for determining the effect digital technology on smart government. The developed questionnaires are distributed

personally to 323 of respondents in United Arab Emirates. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to analysed the data and test the stated research hypotheses. The data gathered was exposed to techniques PLS-SEM inferential statistics. PLS-SEM was considered because it can handle both formative and reflective constructs, valuable for modeling complex relationship, it is also more flexible than traditional SEM, allowing for model adaptation and accommodating non-normal data distributions.

#### V. RESULT

##### A. Reliability and convergent validity of the measurement model

This section presents the result of reliability and convergent validity of the measurement models. For PLS-SEM, the most preferable reliability measure is the composite reliability (Memon & Rahman, 2013). Hair et al. (2014) postulated two reasons why composite reliability is considered preferable. Firstly, composite reliability precludes the Cronbach's alpha assumption of equal loading of the indicators in the population against the requirement of PLS-SEM algorithm that treats indicators according to their respective reliabilities during estimation. Secondly, composite reliability overcome the Cronbach's alpha's sensitivity to number of item in scale that lead to underestimation of internal consistency reliability due to its ability to accommodate several indicator reliabilities in PLS-SEM.

The convergent validity of the measurement models measure ability of the models to explain the variance of the manifest items (Wong, 2016). Hair et al. (2014) distinct convergent validity of reflective models as the degree to which an indicator relates to other indicators of the same phenomenon. In this study, the convergent validity was assessed by evaluating the factor loadings of the items including their significance level, the number of iterations it takes the measurement models to converge, and the Average Variance Extracted (AVE) (Wong, 2016; Hair et al., 2011, 2014; Memon & Rahman, 2013). The result of the convergent validity and reliability for first run PLS model is presented in Table II.

TABLE II. FORMULATED RESEARCH HYPOTHESIS

Constructs	Items	Factor Loadings	Cronbach's Alpha	Rho_A	Composite Reliability	AVE
Digital Awareness	DG A1	0.927	0.925	0.926	0.944	0.773
	DG A2	0.894				
	DG A3	0.909				
	DG A4	0.898				
	DG A5	0.757				
	DGI 1	0.888				
Digital Infrastructure	DGI 2	0.903				
	DGI 3	0.929				
	DGI 4	0.931				
	DGI 5	0.900				

	DGI 6	0.919				
Digital Skills of the Employees	DSE 1	0.895	<b>0.966</b>	<b>0.96</b> 6	<b>0.971</b>	<b>0.8</b> 29
	DSE 2	0.916				
	DSE 3	0.935				
	DSE 4	0.925				
	DSE 5	0.914				
	DSE 6	0.894				
	DSE 7	0.894				
Government-Citizen Engagement	GCE 1	0.883	<b>0.932</b>	<b>0.93</b> 2	<b>0.948</b>	<b>0.7</b> 86
	GCE 2	0.875				
	GCE 3	0.896				
	GCE 4	0.890				
	GCE 5	0.889				
Smart Government Outcomes	SGO 1	0.879	<b>0.976</b>	<b>0.97</b> 6	<b>0.979</b>	<b>0.8</b> 22
	SGO 10	0.892				
	SGO 2	0.898				
	SGO 3	0.924				
	SGO 4	0.917				
	SGO 5	0.920				
	SGO 6	0.925				
	SGO 7	0.911				
	SGO 8	0.905				
	SGO 9	0.891				
Security and Privacy	SPR 1	0.872	<b>0.954</b>	<b>0.95</b> 5	<b>0.963</b>	<b>0.8</b> 14
	SPR 2	0.908				
	SPR 3	0.892				
	SPR 4	0.909				
	SPR 5	0.927				
	SPR 6	0.905				
	TR W1	0.859	<b>0.944</b>	<b>0.94</b> 5	<b>0.957</b>	<b>0.8</b> 17
Trustworthiness	TR W2	0.909				
	TR W3	0.937				
	TR W4	0.925				
	TR W5	0.887				

The Table II shows the result of reliability test and discriminant validity as measured using items factor loadings, Cronbach's alpha, Rho\_A, composite reliability and Average Variance Extracted (AVE). Though composite reliability is the most preferable measure of reliability when dealing with partial least squares structural equation modelling (PLS-SEM), all the three measures of reliability are reported in this study. The result shows that the Cronbach's alpha for the study constructs range from 0.925 to 0.976. The rho\_A for the study constructs range from 0.926 to 0.976, the composite reliability of the constructs range from 0.944 to 0.979. Therefore, since

all the measures of reliability for all the constructs exceed the minimum requirement of 0.7, the constructs therefore achieve the required level of reliability (Memon & Rahman, 2014).

### B. Assesment of structural model assessment

The Structural model depicts the interdependences and relationships that exist amongst the outer (measurement) models and the structural model. It encompasses the causal influence of the independent constructs on the dependent variable thereby enabling the test of research hypotheses and achieving the research objectives (Hair et al., 2014; Lowry & Gaskin, 2014). The aim of structural models evaluation is to determine the quality of the models based on its ability to predict the endogenous construct (Hair et al., 2014). This quality criteria involves the evaluation of the path coefficient which indicate the individual influence of each path (measurement model) on the endogenous construct; the coefficient of determination (R<sup>2</sup>) which explains the level of model variance explained by the exogenous constructs and the effect size (f<sup>2</sup>) which reveals the individual size of effect that each exogenous construct has on the endogenous construct (Hair et al., 2014; Memon & Rahman, 2013; Lowry & Gaskin, 2014; Wong, 2016). The result of the structural model is firstly graphically presented in Fig. 1 and Fig. 2.

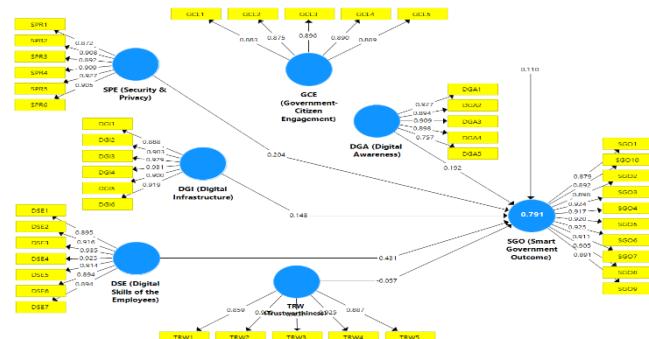


Fig. 1. Structural model

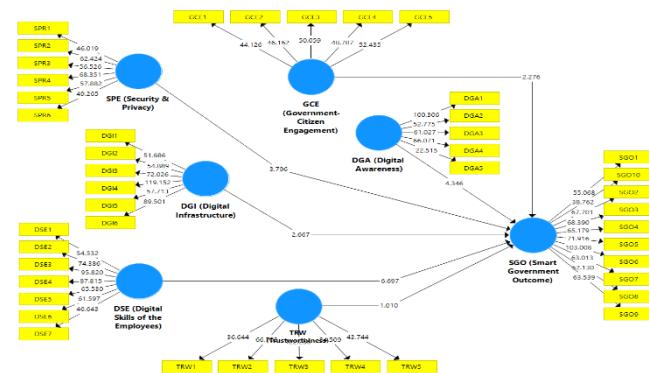


Fig. 2. Structural Model T-statistics

Figure 4.2 shows the structural model of the study depicting the model's path coefficients and the coefficient of determination (R<sup>2</sup>). The Model produced an R<sup>2</sup> of 0.791 indicating that the variation in the outcome of smart

government is explained by digital transformation factors of security and privacy, digitalisation awareness, digitalisation infrastructure, digital skills of the employees, government-citizen engagement, and trust worthiness. By implication, it means that about 79.1 percent of the changes in the outcome of smart government is caused by the digital transformation factors.

### C. Hypotheses result

The major essence of any analysis is to achieve the overall aim of the research through the research objectives and testing the hypotheses. The results obtained from the analysis provided for such. Accordingly, this section is devoted to the presentation of the analysis results based on the research hypotheses. The Table III Shows the result of each hypothesis and remark contained.

TABLE III. RESULT FOR EACH HYPOTHESIS

Path	Standard Error	T Statistics	P Values	Remark
SPE (Security & Privacy) $\rightarrow$ SGO (Smart Government Outcome)	0.204	0.054	3.796	<b>0.000</b> Accepted
DGI (Digital Infrastructure) $\rightarrow$ SGO (Smart Government Outcome)	0.148	0.055	2.667	<b>0.008</b> Accepted
DSE (Digital Skills of the Employees) $\rightarrow$ SGO (Smart Government Outcome)	0.431	0.064	6.697	<b>0.000</b> Accepted
GCE (Government-Citizen Engagement) $\rightarrow$ SGO (Smart Government Outcome)	0.110	0.048	2.276	<b>0.023</b> Accepted
DGA (Digital Awareness) $\rightarrow$ SGO (Smart Government Outcome)	0.192	0.044	4.346	<b>0.000</b> Accepted
TRW (Trustworthiness) $\rightarrow$ SGO (Smart Government Outcome)	-	0.057	1.010	<b>0.312</b> Rejected

The result from the Table III shows that security-privacy digital transformation has significant influence on smart government ( $\beta = 0.204$ ,  $t$  statistics = 3.796,  $p < .001$ ). Thus, the hypothesis that "*There is a significant relationship between security-privacy and digital transformation in smart government*" is accepted. It shows that any 1 unit change in security and privacy factor of digital transformation directly changes smart government outcome by 0.204 units. The result also shows that digital infrastructure has significant influence on smart government ( $\beta = 0.148$ ,  $t$  statistics = 2.667,  $p = .008$ ). Thus, the hypothesis that "*There is a significant relationship between digital infrastructure and digital transformation in smart government*" is accepted. It shows that any 1 unit change in digital infrastructure factor of digital

transformation directly changes smart government outcome by 0.148 units.

The outcome further shows that digital skills of public employees has significant influence on smart government ( $\beta = 0.431$ ,  $t$  statistics = 6.697,  $p = .000$ ). Thus, the hypothesis that "*There is a significant relationship between digital skills of the employees and digital transformation in smart government*" is accepted. It shows that any 1 unit change in digital skills of the employee factor of digital transformation directly changes smart government outcome by 0.431 units. Government-citizen engagement has significant influence on smart government ( $\beta = 0.110$ ,  $t$  statistics = 2.276,  $p = .023$ ). Thus, the hypothesis that "*There is a significant relationship between government-citizen engagement and digital transformation in smart government*" is accepted. It shows that any 1 unit change in government-citizen engagement factor of digital transformation directly changes smart government outcome by 0.110 units. Digital awareness has significant positive effect on smart government ( $\beta = 0.192$ ,  $t$  statistics = 4.346,  $p < .001$ ). Thus, the hypothesis that "*There is a significant relationship between digital awareness and digital transformation in smart government*" is accepted. It shows that any 1 unit change in digital awareness directly changes smart government outcome by 0.192 units. The result finally shows that VAT trustworthiness did not have significant effect on smart government outcome ( $\beta = -0.057$ ,  $t$  statistics = 1.010,  $p < .001$ ). Thus, the hypothesis that "*There is a significant relationship between trustworthiness and digital transformation in smart government*" is rejected.

### VI. CONCLUSION AND RECOMMENDATION

The study shows high satisfaction with digital services, advanced technology adoption, user-friendly infrastructure, and employee proficiency in smart governance. However, there is a need for improvement in digital skill development. Government engagement is crucial for policy formulation and service design, and citizens are aware of the benefits of digital government. Digital infrastructure is essential for delivering digital services. Public employees with strong digital skills are better equipped to develop and implement new technologies. Government-citizen engagement is also significant, and digital technologies can facilitate it. High digital awareness leads to adoption of new technologies and innovative services. Trustworthiness is crucial for successful digital transformation, as it encourages citizens to embrace new technologies and services.

The government should offer digital skills development resources to employees, engage citizens in policy formulation, promote digital literacy, implement a comprehensive cyber security strategy, invest in broadband infrastructure, create a culture of digital innovation, develop online consultation platforms, invest in digital awareness programs, and promote trustworthiness through digital literacy and education. These measures will help citizens understand the benefits and risks of digital technologies, make informed choices, and ensure that governments are using them effectively. Broadband access is crucial for citizens and businesses to fully benefit from digital government services.

## VII. ACKNOWLEDGEMENT

The authors would like to thank to all school of computing members who involved in this study.

## REFERENCES

Abu Ghazaleh, M. and Ahmad, Z. S., 2018. Ajman Digital Government: the way forward to digest digitalization. *Emerald Emerging Markets Case Studies*, 8(2), pp.1-20.

Ahmad, S. Z., & Khalid, K. (2017). The adoption of M-government services from the user's perspectives: Empirical evidence from the United Arab Emirates. *International Journal of Information Management*, 37(5), 367-379.

Ahmed, A. et al. (2021) *Digital Transformation and Organizational Operational Decision Making: A Systematic Review, Advances in Intelligent Systems and Computing*. Springer International Publishing. doi: 10.1007/978-3-030-58669-0\_63.

Alajmi, M., Mohammadian, M. & Talukder, M. (2020). Smart Government Systems Adoption: The Case of Saudi Arabia. *International Review of Business Research Papers*, 16 (1), 16– 33.

Albarghathi, A., Saber, W. and Shaalan, K. (2018) 'Automatic Construction of E-Government Services Ontology from Arabic Webpages', *Procedia Computer Science*, 142, pp. 104–113. doi: 10.1016/j.procs.2018.10.465.

Albreiki, S., & Bhaumik, A. A. A. (2019). The influence of knowledge management on the smart government effectiveness: An empirical study in UAE. *dimension*, 11(12).

Albreiki, S., & Bhaumik, A. A. A. (2019). The influence of knowledge management on the smart government effectiveness: An empirical study in UAE. *dimension*, 11(12).

Ali, K. E., Mazen, S. A. and Hassanein, E. E. (2018) 'A proposed hybrid model for adopting cloud computing in e-government', *Future Computing and Informatics Journal*, 3(2), pp. 286–295. doi: 10.1016/j.fcij.2018.09.001.

Al-Kumaim, N. H., & Alshamsi, S. K. (2023). Determinants of Cyberattack Prevention in UAE Financial Organizations: Assessing the Mediating Role of Cybersecurity Leadership. *Applied Sciences*, 13(10), 5839.

Almuraqab, N. A. S., & Jasimuddin, S. M. (2017). Factors that Influence End-Users' Adoption of Smart Government Services in the UAE: A Conceptual Framework. *Electronic Journal of Information Systems Evaluation*, 20(1), pp11-23.

Almuraqab, N. A. S., & Jasimuddin, S. M. (2017). Factors that Influence End-Users' Adoption of Smart Government Services in the UAE: A Conceptual Framework. *Electronic Journal of Information Systems Evaluation*, 20(1), pp11-23.

Alpern, M. (2020) 'Critical Success Factors for E-Government Web Services Walden University'.

Althunibat, A. et al. (2021) 'Sustainable applications of smart-government services: A model to understand smart-government adoption', *Sustainability (Switzerland)*, 13(6), pp. 1–28. doi: 10.3390/su13063028.

Alvarenga, A. et al. (2020) 'Digital transformation and knowledge management in the public sector', *Sustainability (Switzerland)*, 12(14). doi: 10.3390/su12145824.

Ameen, A., Al-Ali, D., Isaac, O., & Mohammed, F. (2020). Examining relationship between service quality, user satisfaction, and performance impact in the context of smart government in UAE. *International Journal of Electrical and Computer Engineering (IJECE)*, 10(6), 6026-6033.

Atreides, K. (2021) 'E-governance with ethical living democracy', *Procedia Computer Science*, 190(2019), pp. 35–39. doi: 10.1016/j.procs.2021.06.004.

Azevedo, A. and Almeida, A. H. (2021) 'Grasp the challenge of digital transition in smes—a training course geared towards decision-makers', *Education Sciences*, 11(4), pp. 1–20. doi: 10.3390/educsci11040151.

Biloria, N. (2021) 'From smart to empathic cities', *Frontiers of Architectural Research*, 10(1), pp. 3–16. doi: 10.1016/j.foar.2020.10.001.

Bokayev, B., Davletbayeva, Z., Amirova, A., Rysbekova, Z., Torebekova, Z., & Jussupova, G. (2021). Transforming E-government in Kazakhstan: a citizen-centric approach.

Cahyono, T. A. and Susanto, T. D. (2019) 'Acceptance factors and user design of mobile e-government website (Study case e-government website in Indonesia)', *Procedia Computer Science*, 161, pp. 90–98. doi: 10.1016/j.procs.2019.11.103.

Domashova, J. and Kripak, E. (2021) 'Application of machine learning methods for risk analysis of unfavorable outcome of government procurement procedure in building and grounds maintenance domain', *Procedia Computer Science*, 190(2020), pp. 171–177. doi: 10.1016/j.procs.2021.06.022.

Elsheikh, Y., Alqasrawi, Y. and Azzeh, M. (2020) 'On obtaining a stable vote ranking methodology for implementing e-government strategies', *Journal of King Saud University - Computer and Information Sciences*, (xxxx). doi: 10.1016/j.jksuci.2020.11.035.

Embarak, O. (2021) 'Smart City Transition Pillars with Layered Applications Architecture', *Procedia Computer Science*, 191, pp. 57–64. doi: 10.1016/j.procs.2021.07.011.

Fenech, R., Baguant, P. and Ivanov, D. (2019) 'The changing role of human resource management in an era of digital transformation', *Journal of Management Information and Decision Sciences*, 22(2), pp. 176–180.

Feroz, A. K., Zo, H. and Chiravuri, A. (2021) 'Digital transformation and environmental sustainability: A review and research agenda', *Sustainability (Switzerland)*, 13(3), pp. 1–20. doi: 10.3390/su13031530.

Hair, J.F., Sarstedt, M., Hopkins, L. & Kuppelwieser, V.G. 2014. Partial Least Squares Structural Equation Modeling ( PLS-SEM ): An Emerging Tool for Business Research Partial least squares structural equation modeling ( PLS-SEM ) An emerging tool in business research. *European Business Review*. (26)2., pp. 106–121.

Hakimi, H., Kamalrudin, M., & Abdullah, R. S. (2023). Software Security Readiness Model for Remote Working In Malaysian Public Sectors: Conceptual Framework. *Journal Of Theoretical and Applied Information Technology*, 101(8).

Hammou, O.B., 2022. *Impact of digitalization on future and existing jobs in Emirates* (Master's thesis, İşık Üniversitesi).

Hariguna, T. et al. (2019) 'Effect of social media activities to determinants public participate intention of e-government', *Procedia Computer Science*, 161, pp. 233–241. doi: 10.1016/j.procs.2019.11.119.

Hartanti, F. T., Abawajy, J. H., & Chowdhury, M. (2022). Evaluating Public Service Delivery Smartness and Impact on Citizens' Well-Being. *IEEE Access*, 10, 69106-69124.

Jose, J., & Subbaiyan, H. (2020). Different treatment modalities followed by dental practitioners for Ellis class 2 fracture—A questionnaire-based survey. *The open dentistry journal*, 14(1).

Kalra, D. (2019) 'Impact of Digitization on Smart Living : A Case of Dubai', *International Journal of Business & Applied Sciences*, 8(3), pp. 31–36. doi: 10.1504/JIBED.2017.10005152.CITATION.

Kamalrudin, M., Hakimi, H., Abdollah, M. F., & Hardi, R. (2022, November). SSRINDEX tool: An automated tool to measure level of software security readiness index for remote working during Covid-19 pandemic. In AIP Conference Proceedings (Vol. 2658, No. 1). AIP Publishing.

Khalid, S. A. and Lavilles, R. Q. (2019) 'Maturity assessment of local E-government websites in the Philippines', *Procedia Computer Science*, 161, pp. 99–106. doi: 10.1016/j.procs.2019.11.104.

Khalid, S. A. and Lavilles, R. Q. (2019) 'Maturity assessment of local E-government websites in the Philippines', *Procedia Computer Science*, 161, pp. 99–106. doi: 10.1016/j.procs.2019.11.104.

Kim, S., Andersen, K. N., & Lee, J. (2022). Platform government in the era of smart technology. *Public Administration Review*, 82(2), 362–368.

Li, Y. and Shang, H. (2020) 'Service quality, perceived value, and citizens' continuous-use intention regarding e-government: Empirical evidence from China', *Information and Management*, 57(3), p. 103197. doi: 10.1016/j.im.2019.103197.

Lim, S. B., & Yigitcanlar, T. (2022). Participatory governance of Smart cities: Insights from e-participation of Putrajaya and Petaling Jaya, Malaysia. *Smart Cities*, 5(1), 71-89.

Lowry, P.B. & Gaskin, J. 2014. Partial Least Squares ( PLS ) Structural Equation Modeling ( SEM ) for Building and Testing Behavioral Causal Theory : When to Choose It and How to Use It. In: *IEEE Transactions on Professional Communication*. 2014, pp. 123–146.

Mahesa, R., Yudoko, G. and Anggoro, Y. (2019) 'Data in brief Dataset on the sustainable smart city development in Indonesia', *Data in brief*, 25, p. 104098. doi: 10.1016/j.dib.2019.104098.

Memon, A.H. & Rahman, I.A. 2013. Analysis of Cost Overrun Factors for Small Scale Construction Projects in Malaysia Using PLS-SEM Method. *Modern Applied Science*. (7)8., pp. 78–88.

Memon, A.H. & Rahman, I.A. 2014. *SEM-PLS Analysis of Inhibiting Factors of Cost Performance for Large Construction Projects in Malaysia : Perspective of Clients and Consultants*. (2014).

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government information quarterly*, 36(4), 101385.

Nzaramyimana, L. and Susanto, T. D. (2019) 'Analysis of factors affecting behavioural intention to use e-government services in Rwanda', *Procedia Computer Science*, 161, pp. 350–358. doi: 10.1016/j.procs.2019.11.133.

Oliveira, V. A. T. and Santos, G. D. (2019) 'Information technology acceptance in public safety in smart sustainable cities: A qualitative analysis', *Procedia Manufacturing*, 39, pp. 1929–1936. doi: 10.1016/j.promfg.2020.01.239.

Ray, A. and Chaudhuri, A. K. (2021) 'Smart healthcare disease diagnosis and patient management: Innovation, improvement and skill development', *Machine Learning with Applications*, 3(November 2020), p. 100011. doi: 10.1016/j.mlwa.2020.100011.

Rodrigues, G., Sarabdeen, J., & Balasubramanian, S. (2016). Factors that influence consumer adoption of e-government services in the UAE: A UTAUT model perspective. *Journal of Internet Commerce*, 15(1), 18-39.

Sakolkar, P. C. (2023). Impact of Digital Transformation on the Indian Government Regarding Service Delivery and Citizen Engagement.

Schedler, K., Guenduez, A. A., & Frischknecht, R. (2019). How smart can government be? Exploring barriers to the adoption of smart government. *Information Polity*, 24(1), 3-20.

Shtait, R. et al. (2018) 'The Impact of Innovation and Smart Government on Happiness: Proposing Conceptual Framework', 2(2).

Srouji, J. (2020) 'Digital Payments, the Cashless Economy, and Financial Inclusion in the United Arab Emirates: Why Is Everyone Still Transacting in Cash?', *Journal of Risk and Financial Management*, 13(11), p. 260. doi: 10.3390/jrfm13110260.

Taherdoost, H. (2018). Development of an adoption model to assess user acceptance of e-service technology: E-Service Technology Acceptance Model. *Behaviour & Information Technology*, 37(2), 173-197.

Veenoth, A., Shankarvelu, L., Hakimi, H., Marlia, Z., & Octaviani, D. (2023). Food Donation Application to Improve the Distribution and Verification Process Within Selangor: Feedback. *Journal of Applied Technology and Innovation* (e-ISSN: 2600-7304), 7(3), 7.

Venkatesh, Morris, Davis, & Davis (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 273, 425.

Wang, J., Nguyen, D. Q., Bonkalo, T., & Grebennikov, O. (2021). Smart governance of urban data. In *E3S Web of Conferences* (Vol. 301, p. 05005). EDP Sciences.

Williams, M. D., Rana, N. P., & Dwivedi, Y. K. (2015). The unified theory of acceptance and use of technology (UTAUT): a literature review. *Journal of enterprise information management*, 28(3), 443-488.

Wong, K.K. 2016. Mediation analysis, categorical moderation analysis , and higher- order constructs modeling in ... Technical note: Mediation analysis , categorical moderation analysis , and higher-order constructs modeling in Partial Least Squares Stru. *The Marketing Bulletin*. (26)May,

Ziemba, E. (2021) 'Sustainability driven by ICT adoption within households, enterprises, and government units', *Procedia Computer Science*, 192, pp. 2279–2290. doi: 10.1016/j.procs.2021.09.001.