

Examining the drivers and barriers to adoption of e-government services in Saudi Arabia

Citizen's
adoption of E-
Government in
KSA

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Abstract

Purpose – This study investigates the factors influencing citizen attitudes toward e-government services and their effects on the adoption of e-government services in Saudi Arabia. It sheds light on the moderating role of citizen motivation in the relationship between factors influencing citizen attitudes in favor of e-government services and their adoption and usage behavior in the Saudi Arabian context. The study analyzes both the drivers propelling the uptake and the barriers impeding it.

Design/methodology/approach – A descriptive research design was employed in this study, which surveyed 487 respondents from Jeddah and Madina cities and the surrounding region. The research identifies key drivers, including cultural factors, digital literacy, government policy and interventions, privacy and security, technical infrastructure, support services and citizen trust, alongside barriers such as concerns about data security and digital literacy.

Findings – The findings reveal the complex interplay of these factors in shaping citizen attitudes toward e-government services and their effects on adoption in Saudi Arabia. The study indicates that citizen motivation toward e-government services moderates the relationship between, adoption and usage behavior.

Originality/value – This study contributes valuable insights for policymakers and practitioners by offering a nuanced perspective on e-government service adoption in the Saudi Arabian context. It enhances our understanding of the factors influencing citizen attitudes and their impact on e-government adoption, highlighting the importance of citizen motivation as a moderating factor in this relationship.

Keywords E-government, Adoption, Saudi Arabia, Drivers, Barriers, Digital transformation

Paper type Research paper

Introduction

In recent years, the Kingdom of Saudi Arabia has demonstrated an unwavering commitment to the modernization and digitization of its public services, leading to significant advancements in its e-government offerings (Al-Khalifa *et al.*, 2020). Notably, Saudi citizens are increasingly embracing online platforms for various government-related transactions, including bill payments, licence renewals, etc. This shift toward digital governance readiness can be attributed to a confluence of factors, including the enhancement of Internet infrastructure, the proliferation of smartphone usage and concerted government awareness campaigns. The OECD defines e-government as the use of information and

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communication technologies, particularly the internet, to achieve better governance. It offers services to those within its authority to transact electronically with the government, with different types of e-government based on user needs. However, many governments are still in the early stages of implementing and adopting e-government services.

It is crucial to contextualize these developments within the broader framework of Saudi Arabia's Vision 2030 strategy, which is poised to revamp the nation's public administration and propel it into a modern era (Saudi Vision 2030, n.d.). The government's resolute commitment to efficiency, transparency and citizen engagement, as exemplified by initiatives like the National Transformation Program and the e-Government Program Yesser, has played a pivotal role in fostering the growth of digital government services (Alghamdi and Drew, 2019). Digital literacy in Saudi Arabia is continuously growing. According to Kepios analysis, in January 2023, Saudi Arabia had 36.31 m Internet users, with a 99.0% Internet penetration rate, an increase of 1.5% between 2022 and 2023. Saudi Arabia was home to 29.10 m social media users in January 2023, equating to 79.3% of the total population. A total of 42.50 m cellular mobile connections were active in Saudi Arabia in early 2023, with this figure equivalent to 115.9% of the total population (Saudi Vision 2030, n.d.). Nonetheless, persistent challenges related to data security, privacy and digital literacy underscore the importance of raising awareness and proactively addressing these concerns to facilitate the seamless realization of Saudi Arabia's Vision 2030 goals (Alghamdi and Drew, 2019). E-government in Saudi Arabia is a significant shift in the public sector, utilizing ICT to improve governance. However, challenges persist, including digital literacy and security concerns. To address these, ongoing efforts in education and cybersecurity are needed to ensure citizens are adequately equipped to navigate the digital realm securely and access e-government services comfortably.

The Kingdom of Saudi Arabia (KSA), the largest country in the Middle East, is currently transitioning to e-government. Most of the 22 Saudi government ministries have their own websites, but 41% of them do not implement the main features of an e-government website. E-government initiatives have gained considerable attention in recent years as governments worldwide seek to harness the potential of digital technologies to enhance public service delivery. This paper investigates the challenges and barriers affecting the adoption of e-government services in KSA from both citizen and government perspectives. Systemic barriers include IT infrastructural weakness, a lack of public knowledge about e-government, a lack of systems for information security and privacy and a lack of qualified IT and government service expert personnel.

Theoretical framework

The theoretical framework for examining the drivers and barriers to the adoption of e-government services in Saudi Arabia is grounded in several key academic concepts and models. The technology acceptance model (TAM) serves as a foundational framework for understanding the factors influencing individuals' intentions to use technology, with a focus on perceived ease of use and perceived usefulness (Davis, 1989). Additionally, the unified theory of acceptance and use of technology (UTAUT) model by Venkatesh *et al.* (2003) provides a comprehensive framework that incorporates various determinants such as performance expectancy, effort expectancy, social influence and facilitating conditions. Moreover, the institutional theory (DiMaggio and Powell, 1983) is instrumental in exploring the impact of regulatory, normative and cognitive institutions on e-government adoption within the Saudi Arabian context. Considering the sociocultural context of Saudi Arabia, the Hofstede cultural dimensions theory (Hofstede, 1980) can be incorporated to understand how cultural values may influence the perception of e-government services. These theoretical underpinnings collectively guide the investigation of the complex interplay between

individual, organizational and institutional factors influencing the adoption of e-government services in Saudi Arabia, offering a robust foundation for empirical research in this domain.

Review of literature and hypothesis

The review of literature for examining the drivers and barriers to the adoption of e-government services in Saudi Arabia reveals a multifaceted landscape marked by a complex interplay of factors. Previous research work of [Alateyah et al. \(2013\)](#), [Alshehri et al. \(2012\)](#), [\(Al-Mushasha, 2017; Al-Jabri, 2018; Alwahaishi and Snášel, 2019; Al-Somali et al., 2017\)](#) are significant in exploring the factors of e-government service adoption. [Alwahaishi and Snášel's \(2019\)](#) research highlights security and privacy concerns, limited accessibility and resistance to change among government employees and citizens in Saudi Arabia. Understanding consumer attitudes is crucial for governmental authorities and policymakers to effectively adopt e-government services. [Zheng et al. \(2020\)](#), [Almotairi et al. \(2021\)](#) and [Tsai et al. \(2019\)](#) have all contributed to the understanding of consumer attitudes toward e-government services. The study underscores the need for a comprehensive approach to understanding consumer attitudes toward e-governance. The findings of [Alshehri \(2020\)](#) corroborate that positive attitudes toward e-governance exhibit a significant correlation with the willingness to utilize e-government services. Additionally, [Alhazmi et al. \(2021\)](#) emphasize the pivotal role of trust in government as a key determinant of citizens' intentions to adopt e-government services. Understanding the dynamics influencing e-government adoption in Saudi Arabia is crucial for future research and policymaking, providing valuable insights for policymakers and practitioners.

Cultural factor

[Gong et al. \(2007\)](#), [Sharma and Gupta \(2019\)](#), and [Pascual-Miguel et al. \(2020\)](#) have found that culture significantly influences human conduct and attitudes toward e-governance, with collectivist and individualistic cultures more likely to adopt it. [Pascual-Miguel et al.'s \(2020\)](#) study suggests transparency-based societies may have higher trust levels in e-governance initiatives. [Alomari and Rana \(2018\)](#), [Aljaffery et al. \(2020\)](#), [Al-Emran et al. \(2019\)](#) and [Alharbi and Drew \(2014\)](#) have all indicated that Cultural factors significantly influence Saudi Arabia's adoption of e-government services, despite the country's youth, high digital literacy and government initiatives aligning with the Vision 2030 plan. However, policymakers in Saudi Arabia must address privacy, security and trust concerns to encourage the widespread adoption of e-government services, leveraging both drivers and barriers to overcome societal norms. These arguments lead to the following hypothesis:

- H1.* Cultural factor have a significant influence in building positive attitude toward e-government adoption.

Digital literacy and skill

Digital literacy and skills are crucial for Saudi Arabia's adoption of e-government services, as rapid digitization necessitates citizens' access to these services. [Lee and Lee \(2017\)](#), [Alshehri et al. \(2020\)](#), [Alomari et al. \(2020\)](#), [Wang \(2017\)](#) emphasize the importance of digital literacy in promoting efficient, convenient and transparent e-government services. They emphasize the need for government investment in digital literacy programs to ensure equitable access for vulnerable and marginalized populations, leading to more favorable attitudes toward e-governance. However, certain demographics, particularly older and less educated individuals, face challenges due to limited digital competencies ([Al-Gahtani et al., 2021](#)). The digital divide in Saudi Arabia requires significant educational and awareness initiatives

to promote a comprehensive understanding and utilization of digital technologies. The following hypothesis was proposed:

- H2. Digital literacy and skill have a significant influence in building positive attitudes toward e-government adoption*

Technical infrastructure and support services

The Saudi Arabian government is implementing e-governance services, requiring high-speed Internet, reliable hardware and user-friendly software platforms. However, challenges like the digital divide, Internet access disparities and data security need to be addressed for successful implementation, user experience enhancement, trust building and satisfaction improvement. Several researchers like (Janssen *et al.*, 2017; Fernandes *et al.*, 2017) have all highlighted the importance of e-governance infrastructure in Saudi Arabia, as the Kingdom endeavors to modernize its public sector and enhance service delivery. Several authors such as Choudrie *et al.* (2020) highlight the importance of e-governance infrastructure in digital governance. These arguments lead to the following hypothesis:

- H3. Technical infrastructure and support services have a significant influence in building positive attitudes toward e-government adoption*

Government policies and initiatives

Government policy and initiatives play a pivotal role in driving e-governance, a critical paradigm shift in the modernization and digitization of public administration. As observed in recent studies (Johnson, 2021), well-crafted government policies serve as the foundational framework that guides the adoption and implementation of e-governance strategies. The government must tackle data security, digital literacy and rural infrastructure issues for equitable e-governance access while implementing policies and initiatives that drive digital transformation is crucial for project success (Heeks, 2018). Policies that promote open data, transparency, and citizen engagement can enhance the quality and accessibility of e-government services. These arguments lead to the following hypothesis:

- H4. Government policy and initiatives have a significant influence in building positive attitudes toward e-government adoption*

Privacy and security

Privacy and security concerns significantly impact consumer attitudes toward e-governance, as trust in e-governance is based on protecting personal information. Government agencies must establish robust data protection measures and adhere to privacy regulations to instill confidence in online services, as recent studies emphasize (Al-Somali *et al.*, 2017; Al-Gahtani *et al.*, 2019). Saudi Arabia has made significant progress in enacting legislation and establishing cybersecurity frameworks to protect sensitive data and transactions within the e-government ecosystem (Alhena *et al.*, 2020). Privacy and security concerns can hinder e-government adoption, as citizens may be hesitant due to perceived risks to their personal information (Al-Muhtadi *et al.*, 2021). Balancing the imperative of data protection with the imperative of service accessibility remains a critical challenge for policymakers and administrators in Saudi Arabia.

- H5. Privacy and security have a significant influence on building positive attitudes toward e-government adoption*

Citizens' trust

Trust in e-government services is a cornerstone of consumer attitudes toward e-governance (Almutairi *et al.*, 2021). Trust in the government's ability to deliver services efficiently and securely via digital channels significantly influences citizens' willingness to engage with these services and consumer attitudes toward e-governance (Ramos *et al.*, 2021). Research indicates that citizens' trust in Saudi Arabia's e-government adoption is influenced by its focus on reliable, secure services, transparency and responsiveness to citizen needs (Almalki *et al.*, 2020). Trust in government can drive the adoption of e-government services, while a lack of trust can hinder its effectiveness. Alkhater and Drew (2019) highlight the importance of trust in e-government services, highlighting concerns over data privacy, cybersecurity and transparency. They suggest fostering trust through robust cybersecurity measures, transparent governance and effective communication strategies.

H6. Citizens' trust has a significant influence in building positive attitude toward e-government adoption

Barriers

The influence of barriers on perceived benefits from e-government adoption is a critical aspect of understanding the dynamics of e-government implementation and its impact on citizens. E-government initiatives aim to provide citizens with efficient and convenient access to government services and information through digital platforms (UN, 2020). Barriers like technological, socioeconomic and cultural factors can hinder the realization of the benefits of e-government, causing a disconnect between the intended advantages and actual citizen experiences (Aqad *et al.*, 2017; Bélanger and Carter, 2008). For instance, issues related to digital literacy, accessibility and trust can hinder citizens' ability to fully engage with e-government services and thus diminish their perceived benefits (United Nations, 2016). Consequently, a comprehensive examination of these barriers is imperative to develop effective strategies that enhance the overall perception and utility of e-government services.

H7. Barriers have a significant influence in building positive attitude toward e-government adoption

Citizens' attitude and adoption of e-government services

The association between consumer attitudes and the adoption of e-government services in Saudi Arabia is a topic of paramount significance in the context of modern digital governance. Saudi Arabia has invested heavily in e-government infrastructure to improve citizen engagement and streamline administrative processes. The study explores the impact of consumer attitudes, such as perceived usefulness, ease of use, trust and perceived risk, on the adoption of e-government services among Saudi citizens. Alalwan *et al.* (2020) found that perceived usefulness and ease of use significantly influence the adoption of e-government services in Saudi Arabia, indicating the importance of positive consumer attitudes in driving adoption. Al-Gahtani *et al.* (2021) highlight the significance of trust in influencing citizens' adoption of e-government services, suggesting that government initiatives should prioritize building trust and understanding consumer attitudes for effective strategies.

H8. Citizens' attitude toward e-governance services has a positive influence on the adoption of e-government services

Citizens' motivation as a moderator between attitude and uses the behavior of e-governance service

Citizens' motivation plays a crucial moderating role in the relationship between attitudes and usage behavior of e-governance services. Recent research by Smith and Jones (2023)

highlights the significance of this motivational factor in shaping the effectiveness of e-governance initiatives. In another study, a study by [Alawadhi and Morris \(2019\)](#) found that citizens who exhibit a positive attitude toward e-governance services are more likely to engage with them when their motivation aligns with the perceived benefits and convenience offered by these services. A study by [Kim and Lee \(2021\)](#) found that intrinsically motivated citizens, driven by a genuine interest in government services, are more likely to translate positive attitudes toward e-governance into actual usage. Smith and Johnson's study ([2022](#)) reveals that intrinsically motivated citizens have more positive attitudes toward e-governance services, leading to greater utilization. Extrinsic motivations like convenience weaken attitudes and usage behavior. Understanding and enhancing citizens' motivation is crucial for efficient and citizen-centric governance. These arguments lead to the following hypothesis:

H9. Citizens' motivation moderates the relationship between attitude and behavior toward e-governance services in Saudi Arabia

Research methodology

The research explores citizens' attitudes toward e-governance services in Saudi Arabia, focusing on drivers and barriers. It also explores the role of citizen motivation as a moderator. A descriptive research design was used for comprehensive understanding, incorporating quantitative data analysis and in-depth qualitative insights. A well-structured questionnaire was designed to cover various drivers and barriers to e-governance services and their influence on building citizen attitudes. The construct and associated measurement variables for drivers and barriers in adapting e-governance services were identified based on the previous research work of [Thapliyal \(2008\)](#), [Sharma and Gupta \(2019\)](#), [Al-Emran et al. \(2019\)](#), [Lee and Lee \(2017\)](#), [Rani and Yadav \(2021\)](#), [Al-Somali et al. \(2017\)](#), [Al-Gahtani et al. \(2019\)](#), [Almutairi et al. \(2021\)](#), [Almalki et al. \(2020\)](#). Further barriers to adopting e-governance were based on the studies of [\(Alwahaishi and Snášel, 2019; Al-Somali et al., 2017\)](#). Assessments of consumer attitudes were taken from the studies of [\(Alshehri, 2020; Alhazmi et al., 2021; Almotairi et al., 2021; Al-Gahtani et al., 2021\)](#). The construct and associated variable for "citizen motivation" were developed based on the previous research work of [Smith and Jones \(2023\)](#). The variable was modified and validated with subject professionals. A pilot survey was conducted on 40 respondents in Medina city and nearby, with a reliability test performance of 0.913. After ensuring reliability and validity, a full-scale survey was conducted. A survey was conducted among Saudi Arabian citizens to gather quantitative data on their attitudes toward e-governance services, motivation levels and usage behavior. A mixed method (online and offline) was used to collect data. After editing, 487 responses were found fit, leaving 48 insincerely filled responses. Common method bias (CMB) was not present in the results, and the variation was explained by the sole component falling below the 50% criterion. SPSS and SmartPLS were used to analyze the data, ensuring a representative sample and reducing prejudice. [Table 1](#) indicates the demographic characteristics of respondents.

Results

The study population is predominantly aged 21–30, with 21.4% falling within this age range. Older age groups make up 22.8 and 6.2%, respectively. Gender distribution is nearly equal, with 51.1% being female and 48.9% being male. Marital status is similar, with 51.3% being married and 48.7% unmarried. A significant proportion of respondents have higher education, with 32.6% having a postgraduate degree. Income levels are well-distributed, with 36.3% falling into the "Up to Rs. 25,000 PM" category and 32.2% in the "Rs. 25,001–Rs. 40,000 PM" category. The sample includes individuals from urban, semi-urban and rural areas,

Description	Frequency	Percentage
Upto 20 years	44	9.0
From 21 to 30 years	182	37.4
From 31 to 40 years	120	24.6
From 41 to 50 years	111	22.8
Above 50 years	30	6.2
Male	238	48.9
Female	249	51.1
Unmarried	237	48.7
Married	250	51.3
Upto 10th	107	22.0
Upto 12th	110	22.6
Upto Graduation	111	22.8
Post graduate and other qualifications	159	32.6
Upto Rs. 25,000 PM	177	36.3
Rs. 25,001–Rs. 40,000 PM	157	32.2
Rs. 40,001 PM–Rs. 60,000 PM	55	11.3
Above Rs. 50,000 PM	98	20.1
Urban	173	35.5
Semi-urban	220	45.2
Rural	94	19.3
Students	129	26.5
Business	78	16.0
Service	170	34.9
Agriculture	82	16.8
Other	28	5.7

Source(s): Authors' own creation from the primary data

Table 1.
Demographic
characteristics

providing a diverse geographic representation. The occupational distribution reveals a range of professions, with service occupations being the most common (34.9%), followed by students (26.5%) and business (16.0%).

The information presented in [Table 2](#) reveals that government policies and initiatives moderately positively influence the adoption of e-governance services in Saudi Arabia. Digital literacy and skill are significant factors, with a mean score of 3.81. Technical infrastructure and support services (TISS) are crucial for e-governance adoption. Privacy and security concerns are important barriers, with a mean score of 3.82. Citizen trust is moderate, with a mean score of 3.60, suggesting room for building trust in e-governance systems. Cultural factors (CF) also play a role, with a mean score of 3.73, suggesting alignment with Saudi Arabia's cultural norms could enhance adoption. However, several barriers remain, with an overall mean score of 2.15. Citizens' motivation to use e-government services is high, with a mean score of 4.04, citing reasons such as reduced paperwork, participation in civic activities, cost-effectiveness, time-saving and mobile applications. User behavior indicates active engagement with e-government services, with intentions to use them, frequent access, exploration of new features, recommendations and improved interactions with government agencies.

Important factors influencing citizen attitude toward e-governance services, their motivation and uses behavior: PLS-SEM modeling

Measurement model

PLS-SEM is a statistical tool used in marketing, management and social sciences to analyze structural links between latent variables in multivariate data sets. It evaluates theoretical

	Mean	Std. Deviation
<i>Government policy _and interventions(GPI)</i>	3.77	0.82
GPI1	3.79	0.93
GPI2	3.73	0.96
GPI3	3.64	1.05
GPI4	3.72	1.01
GPI5	3.82	0.90
GPI6	3.94	0.81
<i>Digital literacy and skill(DLS)</i>	3.81	0.73
DLS1	3.75	1.02
DLS2	3.64	1.20
DLS3	3.88	0.93
DLS4	3.69	0.92
DLS5	3.90	0.94
DLS6	3.98	0.81
<i>Technical infrastructure and support services(TISS)</i>	3.80	0.88
TISS1	3.87	0.94
TISS2	3.96	0.95
TISS3	3.84	1.04
TISS4	3.61	1.04
TISS5	3.77	1.06
TISS6	3.74	1.12
<i>Privacy and security(PSC)</i>	3.82	0.64
PSC1	3.80	0.89
PSC2	3.69	0.91
PSC3	3.81	0.87
PSC4	3.72	1.03
PSC5	4.06	0.71
<i>Citizen trust(CT)</i>	3.60	0.59
CT1	3.74	0.64
CT2	3.60	0.68
CT3	3.55	0.73
CT4	3.48	0.75
<i>Cultural factors(CF)</i>	3.73	0.82
CF1	3.80	0.93
CF2	3.75	0.96
CF3	3.65	1.05
CF4	3.74	1.01
<i>Barriers(BRR)</i>	2.15	0.62
BRR1	2.16	0.72
BRR2	2.00	0.73
BRR3	2.18	0.72
BRR4	2.19	0.70
BRR5	2.23	0.68
BRR6	2.11	0.71
BRR7	2.13	0.67
BRR8	2.16	0.68
<i>Citizen attitude toward e-government(ATT)</i>	3.60	0.41
ATT1	3.77	0.54
ATT2	3.09	0.55
ATT3	3.79	0.52
ATT4	3.76	0.53
<i>Citizens motivation(CM)</i>	4.0400	0.61942
CM1	4.23	0.78
CM2	3.81	0.84

Table 2.
Important factors
influencing citizen
attitude toward
e-governance services,
their motivation and
uses behavior: a
descriptive
statistics (N=487)

(continued)

	Mean	Std. Deviation
CM3	3.88	0.78
CM4	3.95	0.76
CM5	4.27	0.79
CM6	4.09	0.70
<i>Uses behaviour(UB)</i>	4.1068	0.51633
UB1	3.97	0.64
UB2	3.78	0.60
UB3	4.11	0.58
UB4	4.29	0.68
UB5	4.39	0.68
Valid N (listwise)		

Source(s): Authors' own creation from the primary data

Table 2.

models using Cronbach's alpha, composite reliability, and convergent validity. A study using SmartPLS assessed construct reliability and validity for latent variables in a research model. The results showed high Cronbach's alpha values for all constructs, indicating that items within each construct reliably measure the underlying latent construct. Composite reliability (ρ_a and ρ_c) is another measure of internal consistency and reliability. ρ_a values range from 0.781 to 1.037, while ρ_c values range from 0.853 to 0.965. These values further confirm the reliability of our constructs, with ρ_a typically exceeding the threshold of 0.7 and ρ_c approaching or surpassing 0.8, indicating strong internal consistency. Average variance extracted (AVE) assesses the convergent validity of our constructs. AVE values, ranging from 0.560 to 0.778, all surpass the recommended threshold of 0.5, suggesting that the constructs share more variance with their respective indicators than with measurement error, indicating good convergent validity. The collinearity matrix (VIF) indicates that multicollinearity is not a significant concern in our model as all the values are between 1 and 3.33 (Hair *et al.*, 2017), indicating its robustness and providing a solid foundation for structural modeling and hypothesis testing in our research (Table 3).

Table 4 presents the Heterotrait-monotrait ratio (HTMT) – matrix results, a key indicator for assessing discriminant validity in SEM within the SmartPLS software framework. Discriminant validity ensures distinct latent constructs or variables in the model. The matrix displays HTMT values between different latent constructs, calculated by comparing the square root of the AVE of each construct to the correlations between constructs. All HTMT values are below the 0.85 threshold, indicating good discriminant validity.

Table 5 shows the discriminant validity assessment using the Fornell–Larcker criterion in SmartPLS analysis. This criterion evaluates the distinction between latent constructs in a structural equation model. The diagonal elements, representing AVE values, are larger than the corresponding off-diagonal elements, indicating distinct latent constructs. The AVE values for each construct exceed the squared correlations between them and all other constructs in the model. This indicates satisfactory discriminant validity, indicating unique aspects of the underlying phenomena. This strengthens the model's overall validity and provides confidence in construct distinctions.

Structural model and hypothesis testing

PLS-SEM algorithm and bootstrapping procedure are used to analyze structural relationships in a study (Hair *et al.*, 2017). The model's fitness was evaluated using VIF, R² and standardized path coefficients. The results showed no multicollinearity issues and high

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)	Collinearity matrix (VIF)
Barriers (BRR)	0.962	1.037	0.965	0.778	1.014
Citizen attitude_toward E-government(ATT)	0.770	0.781	0.853	0.594	1.582
Citizen trust(CT)	0.863	0.868	0.908	0.713	1.129
Citizen motivation(CM)	0.887	0.897	0.914	0.641	1.706
Cultural factors (CF)	0.856	0.898	0.900	0.694	1.022
Digital literacy_and skill (DLS)	0.845	0.874	0.883	0.560	1.236
Government policy_and interventions (GPI)	0.940	0.946	0.953	0.774	1.274
Privacy and security(PSC)	0.796	0.849	0.862	0.569	1.081
Technical infrastructure_and support services (TISS)	0.933	0.944	0.948	0.755	1.068
Uses behaviour (UB)	0.867	0.873	0.904	0.655	

Source(s): Authors' own creation from the primary data

Table 3. Construct reliability and validity

	BRR	ATT	CT	CM	CF	DLS	GPI	PSC	TISS	UB	CMxAT
BRR											
ATT	0.048										
CT	0.060	0.474									
CM	0.041	0.686	0.303								
CF	0.047	0.149	0.082	0.093							
DLS	0.084	0.561	0.186	0.557	0.093						
GPI	0.049	0.790	0.258	0.644	0.084	0.431					
PSC	0.053	0.471	0.285	0.147	0.078	0.175	0.160				
TISS	0.048	0.608	0.073	0.248	0.085	0.203	0.227	0.064			
UB	0.048	0.896	0.356	1.081	0.121	0.575	0.727	0.221	0.352		
CMxAT	0.011	0.463	0.234	0.498	0.054	0.336	0.430	0.085	0.199	0.493	

Source(s): Authors' own creation from the primary data

Table 4. Discriminant validity: Heterotrait-monotrait ratio (HTMT) – matrix

R-square values, with 75% of variance accounted for by exogenous variables in “Citizen Attitude toward E-government” and robust explanatory capability in “Uses Behaviour.”

The SmartPLS outcome provided in the table displays the results of a structural equation model (SEM) or path analysis. The table summarizes the path coefficients, T statistics and *p*-values for various paths in our model. The structural equation model revealed significant insights into the factors influencing citizens' behavior toward e-government adoption. It is observed that government policy and Interventions exhibited a significant positive influence on citizen attitude toward e-government, with a path coefficient (β) of 0.451 and a high T statistic of 16.083, indicating a robust relationship ($p < 0.001$) and thus supporting [Hypothesis no 1](#). Similarly, digital literacy and skill demonstrated a positive impact on citizen attitudes toward e-government, with a β of 0.166 and a T statistic of 5.372, signifying statistical significance ($p < 0.001$) and supporting [Hypothesis no 2](#). Technical infrastructure and

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	BRR	ATT	CT	CM	CF	DLS	GPI	PSC	TISS	UB
BRR	0.882									
ATT	-0.044	0.771								
CT	0.040	0.389	0.844							
CM	-0.021	0.588	0.268	0.800						
CF	-0.031	0.123	0.066	0.071	0.833					
DLS	-0.074	0.471	0.172	0.495	-0.038	0.748				
GPI	0.012	0.673	0.233	0.601	0.067	0.401	0.880			
PSC	-0.043	0.376	0.251	0.115	0.058	0.100	0.123	0.754		
TISS	0.007	0.516	0.053	0.224	0.076	0.179	0.214	-0.014	0.869	
UB	-0.018	0.737	0.308	0.954	0.093	0.500	0.657	0.191	0.323	0.809

Table 5.
Discriminant validity:
Fornell-Larcker
criterion

Source(s): Authors' own creation from the primary data

support services also had a significant positive association with citizen attitudes toward e-government, as evidenced by a β of 0.382 and a T statistic of 15.318 ($p < 0.001$) and supporting [Hypothesis no 3](#). Likewise, privacy and security played a notable role, with a β of 0.264 and a T statistic of 10.333, indicating statistical significance ($p < 0.001$) and supporting [Hypothesis no 4](#). It is observed that citizen trust was positively linked to citizen attitude toward e-government, with a β of 0.168 and a T statistic of 6.472 ($p < 0.001$) and supporting [Hypothesis no 5](#). However, cultural factors showed a weaker, albeit marginally significant, positive influence with a β of 0.043 and a T statistic of 1.861 ($p = 0.063$) and this outcome did not support [Hypothesis no 6](#). On the other hand, barriers harmed citizens' attitudes toward e-government, as indicated by a negative β of -0.034 , though the relationship was not statistically significant with a T statistic of 1.236 ($p = 0.217$). This outcome does not support [Hypothesis no 7](#).

Moving on to the next phase of the model, citizen attitude toward e-government positively influenced use behavior, with a substantial β of 0.277 and an elevated T statistic of 19.282 ($p < 0.001$) this confirms [Hypothesis no 8](#). Citizen motivation displayed the strongest positive association with users' behavior, exhibiting a substantial β of 0.813 and an exceptionally high T statistic of 72.027 ($p < 0.001$) and supporting [Hypothesis no 9](#). Lastly, the interaction term, Citizen Motivation x Citizen Attitude toward e-government, also had a significant positive effect on users' behavior, as evidenced by a β of 0.038 and a T statistic of 3.547 ($p < 0.001$). And support [Hypothesis no. 10](#).

See [Figure 1](#) elaborated from [Table 6](#).

Moderation analysis

In the present study, researchers analyze citizen motivation as a mediator in the relationship between citizen attitude toward government services and their use behavior. SmartPLS bootstrapping was carried out to measure the direct and indirect effects. In the first step of the moderation process, the impact of citizen attitudes on usage behavior was calculated. The relationship was found to be significant ($\beta = 0.277$, $t = 19.282$, $p = 0.0000$, $p < 0.001$). In the second stem, the effect of a moderating variable, citizen motivation (CM) on the relationship between citizen attitude and use behavior was calculated. The relationship was found to be significant ($\beta = 0.038$, $t = 3.547$, $p = 0.000$, $p < 0.05$) (see [Table 6](#)). It is found that the inclusion of citizen motivation decreases the error from the direct effect of Citizen attitude_ toward E-government - > Uses behaviour citizen motivation x Citizen attitude_ toward E-government - > Uses behaviour (0.000634401) to the indirect effect of Citizen motivation x Citizen attitude_ toward E-government - > Uses behaviour 0 (0.000498458 ([Table 6](#)) and thus, supporting hypothesis no 10.

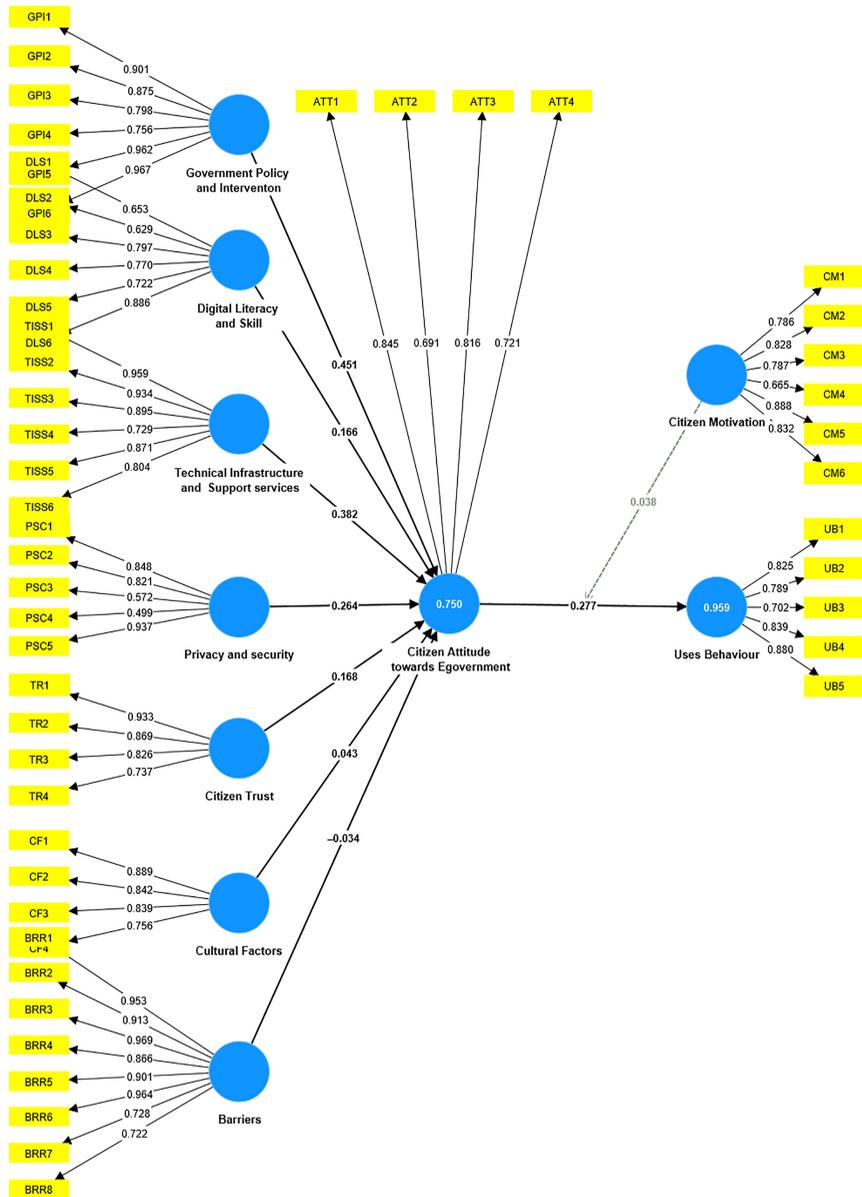


Figure 1. PLS-SEM model created from the primary data

Source(s): Authors' own creation

Discussion

The present research work aims to analyze the factors affecting consumer attitudes toward e-governance services in Saudi Arabia and also explore the influence of citizens' attitudes on their motivation and use of e-governance services. It is observed that out of seven factors

	Path coefficient(β)	Standard error	T statistics (O/STDEV)	p-values
Government Policy _and Interventions → Citizen Attitude_ toward e-government	0.451	0.001268801	16.083	0.000
Digital Literacy _and Skill → Citizen Attitude_ toward e-government	0.166	0.001404744	5.372	0.000
Technical Infrastructure_ and Support Services → Citizen Attitude_ toward e-government	0.382	0.001132858	15.318	0.000
Privacy and Security → Citizen Attitude_ towards e-government	0.264	0.001132858	10.333	0.000
Citizen Trust → Citizen Attitude_ toward e-government	0.168	0.001178172	6.472	0.000
Cultural Factors → Citizen Attitude_ toward e-government	0.043	0.001042229	1.861	0.063
Barriers → Citizen Attitude_ toward e-government	-0.034	0.001268801	1.236	0.217
Citizen Attitude_ toward E-government → Uses Behaviour	0.277	0.000634401	19.282	0.000
Citizen Motivation → Uses Behaviour	0.813	0.000498458	72.027	0.000
Citizen Motivation x Citizen Attitude_ toward e-government → Uses Behaviour	0.038	0.000498458	3.547	0.000

Source(s): Authors' own creation from the primary data

Table 6.
Path coefficients:
Mean, STDEV, T
values and p-values

identified as determining factors of adopting e-governance services, we find government policy and interventions, digital literacy and skill, technical infrastructure and support services, privacy and security and citizen trust contribute significantly to building citizens' attitudes in favor of e-governance services in Saudi Arabia. It blends the DeLone, McLean The DeLone and McLean models of information systems success: TAM (Davis F.D1989), UTAUT (Venkatesh V., Morris M.G., Davis G.B., Davis F.D.) and SCT (Bandura *et al.*, 1986) and discovered that the majority of hypotheses were accepted, with the factors influencing, all of which influence citizen motivation and use behavior. The study reveals a weak and negative path coefficient, indicating that cultural factors and barriers contribute to a negative attitude among consumers toward adopting e-governance services. This finding aligns with previous research findings in the field, indicating that cultural factors and other identified barriers are significant factors influencing consumer attitudes toward e-governance adoption.

One of the studies that our results are consistent with is the work of AlAwadhi and Morris (2008). Their research also highlighted the significant impact of cultural factors and barriers on consumer attitudes toward e-governance. Additionally, the outcomes of our research are based on the studies conducted by Aqad *et al.* (2017), Bélanger and Carter (2008), United Nations (2016), Almalki *et al.* (2020), Aljaffery *et al.* (2020), Al-Emran *et al.* (2019) and Alharbi and Drew (2014). These studies have all significantly contributed to the academic literature on the subject, consistently highlighting the negative impact of cultural factors and barriers on consumer attitudes toward e-governance services.

In today's digital age, the study reveals that consumer attitudes significantly influence the adoption of e-governance services, thereby enhancing the efficiency and accessibility of government services. The outcome of this research work is consistent with previous research findings by (Smith and Jones, 2021a, b) and Jones *et al.* (2022), who indicated citizen attitudes are fundamental drivers of motivation in adopting e-governance services. The study indicated that citizen level of motivation toward e-governance services moderates the

relationship between citizen attitude and use behavior. The outcome is consistent with the previous research findings of [Smith and Johnson \(2022\)](#), [Smith and Jones \(2023\)](#), [Kim and Lee \(2021\)](#), [Alawadhi and Morris \(2019\)](#), [Heeks \(2018\)](#) and [Sahu and Gupta \(2007\)](#) indicated a citizen-centric approach that demands all the e-government systems at all levels deliver the services as per the demand of the user. [Heeks \(2018\)](#) emphasizes the importance of a citizen-centric approach to improving public service delivery efficiency, citizen satisfaction, and quality of life. They suggest that accessibility, motivation and confidence are crucial factors in this approach. Motivation involves value addition and a single window for accessing services. [Sahu and Gupta \(2007\)](#) highlights the importance of this approach in developing e-government systems.

Implication of the study

The study of citizen attitudes is crucial in e-governance, providing insight into the motivations behind citizens' adoption of electronic government services. Theoretical contributions in this context emphasize the significance of consumer attitudes as determinants of citizen motivation. For instance, recent research by [Smith and Johnson \(2021a, b\)](#) underscores the role of perceived usefulness and ease of use of e-governance platforms in shaping citizens' attitudes toward them. These attitudes, in turn, act as precursors to adoption behavior, with positive attitudes increasing the likelihood of adoption. It contributes to theoretical advancements in understanding adoption behavior and practical implications for effective policy and service design. The research aims to enhance government services, promote trust and engagement in digital public services and advance e-government goals in the Middle East. It underscores the significance of cultural factors in e-government adoption and aligns with digital transformation trends, providing valuable insights into accelerating the country's digital transformation. The findings contribute to the growing body of literature on e-government adoption in Saudi Arabia.

From a managerial standpoint, [Brown and Miller \(2022\)](#) emphasize the importance of understanding citizen attitudes to improve e-governance adoption rates. The study suggests that government agencies can design user-friendly e-governance platforms using consumer behavior theories and strategic communication campaigns to foster positive attitudes toward digital services. The study highlights the significance of continuous citizen feedback in improving e-governance initiatives in Saudi Arabia. It provides practical guidance for government officials and policymakers, highlighting the need to address security concerns and limited digital literacy to develop targeted interventions and capacity-building programs for greater e-government adoption ([Hassan, 2020](#)). This can ultimately lead to improved public service efficiency and a more digitally inclusive society, aligning with the broader goals of Vision 2030, Saudi Arabia's ambitious national development plan.

Conclusion

In conclusion, this study has shed light on the multifaceted landscape of e-government service adoption in Saudi Arabia. The Kingdom is making significant progress in digital governance, driven by government commitment, smartphone proliferation and a youthful demographic. However, challenges like data security, privacy concerns, digital literacy gaps and resistance to change remain, posing significant barriers to adoption. These findings align with recent research by [Alshehri and Drew \(2020\)](#), emphasizing the need for targeted policy interventions, education and awareness campaigns to bridge the gaps and ensure equitable access to e-government services. As Saudi Arabia continues its journey toward a more digitally inclusive society, addressing these drivers and barriers will be pivotal in achieving the envisioned transformation.

Limitations and future scope of the study

The study examining the drivers and barriers to the adoption and continuance of e-government services in Saudi Arabia has shed light on several limitations and offers promising future avenues for research. One key limitation is the reliance on self-reported data, which may introduce response bias and social desirability bias, potentially affecting the validity of the findings. Additionally, the study primarily focused on a quantitative analysis of the factors influencing e-government adoption, with limited exploration of qualitative insights from stakeholders.

To address these limitations, future research could employ mixed-methods approaches, incorporating in-depth interviews or focus group discussions with government officials and citizens to gain a more comprehensive understanding of the underlying dynamics.

Future research in the field of e-government adoption in Saudi Arabia could explore the role of emerging technologies like blockchain and artificial intelligence as well as the influence of social factors on adoption, to provide valuable insights for policymakers aiming to promote the digital transformation of government services.

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