

Identifying the Determinants of Platform-Based E-Government Service Use

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ABSTRACT

Governments have embraced platform-based business models, increasingly used in companies, to enhance efficiency, standardize information, and deliver a broader range of information quickly and easily. The integration of platform-based e-information services is essential for innovative e-government policies, as it leads to improvements in administrative efficiency and better information quality. A theoretical review of success factors highlights the significance of service efficiency, user satisfaction, and the intention for continuous use. The authors conducted their own survey of Korean citizens using Government 24, an integrated platform for frontline e-services. Their analysis revealed that information and service quality boost user satisfaction, while system and service quality heighten perceived efficiency. Perceived efficiency and satisfaction in platform-based e-services play a crucial role in encouraging users to continue utilizing these services.

KEYWORDS

e-government success factor, Information platform, information quality, service quality, system quality, Systems Success Model, user satisfaction

IDENTIFYING THE DETERMINANTS OF PLATFORM-BASED E-GOVERNMENT SERVICE USE

In response to digital transformation, technology-advanced countries have recently begun offering information services based on data analysis (de Mello & Ter-Minassian, 2020). This transformation is an ongoing process in which traditional structures are converted into digital ones using information and communication technologies (ICTs). Policies employing ICTs across nations signal the future direction of governments (Andersen & Henriksen, 2006; Gholami et al., 2010; Tan et al., 2005). The emerging digital paradigm has led to the networking and integration of administrative information systems, increasing productivity and efficiency in the public sector.

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This study focuses on the recent e-government case of South Korea, which has gained international acclaim and recognition, particularly from the United Nations e-Government Development Index (United Nations, 2022) and the Organisation for Economic Cooperation and Development (OECD) Digital Government Index. The South Korean e-government gets keen attention to its significant improvements in administrative efficiency and citizen convenience. In the 2010s, the South Korean government proposed a paradigm shift from Government 2.0 (active interaction between citizens and government) to Government 3.0 (personalized and customized services, increased openness, and participation). More recently, digital transformation has inspired the South Korean government to transition from digital government towards digital platform government, which offers platform-based integrative services across various domains and sectors.

O'Reilly (2011), the first to propose the “government as a platform” (GaaP) concept, argued that the government acts as both a provider and participant of the platform, generating outputs through the involvement of public and private sectors within the public platform (UK Government, 2017). Currently, effective public portals’ platform functions connect stakeholders to decisions made through citizen participation (Gorwa et al., 2020) and provide bottom-up insights to policymakers (Janssen & Estevez, 2013).

Platform-based administrative services using ICTs are continually evolving, but remain in transition. Furthermore, while the quantitative participation in public portals as platforms connecting public and private sector actors has increased, qualitative progress is still lacking. As previous studies indicated (Paul et al., 2004; Reddick, 2005; Yun, 2009), both private sector users (citizens and firms) and public sector users may be unclear about their acceptance and intention to adopt and use new e-government services. These users might not experience the innovative performance of services and information provided by the government (Ma & Zheng, 2018), even though service accessibility and real-time information provision meet citizen needs (Jin et al., 2014). A crucial lesson is that the intention to adopt is vital for the success of e-government services (Wu et al., 2016; Zhang et al., 2009).

The user-centered and demand-oriented approach, including the technology acceptance model (TAM) (Davis et al., 1989; Venkatesh & Davis, 2000; Venkatesh & Moris, 2000), unified theory of acceptance and use of technology (Venkatesh et al., 2003), innovation acceptance theory (Rogers, 1983), and information systems success model (Bason, 2018; DeLone & McLean, 2003; Rana et al., 2015; Zaid, 2012), reflects innovative shifts in the administrative environment (van Dijk et al., 2008). A change in organizational structure is necessary to enable citizen-centered and multilateral governance. A system that offers flexible and prompt services tailored to user needs through a platform is driving research on its performance and process (Millard, 2018; Styrin et al., 2022). A public sector platform can be viewed as a governance structure that enhances government planning capabilities and data openness, encourages citizen participation, and generates new public values (Yildiz, 2007).

Considering the paradigm shift towards digital platform government and the importance of a user-oriented approach, this study poses the research question: What determines the use of platform-based e-government services? To identify the determinants, the authors analyze data from a survey of South Korean citizens who used Government 24¹, an integrated platform for frontline e-services. This study aims to address a gap in existing research on platform-based e-government, which exhibits a lack of interest in user-side e-government platforms and an accumulation of studies on supply-side ones (Cao et al., 2023).

The rest of this paper is organized as follows. The second section provides a review recent studies on platform-based e-government services, technology acceptance, and citizen acceptance of government services. The third section covers data and methodology, presenting a research model and hypotheses to test it, and providing operational definitions of variables. The fourth section presents the results of validity tests, reliability tests, and hypothesis tests. The fifth section offers the discussion of the results, policy implications, and research limitations. The sixth section offers concluding remarks.

THEORETICAL BACKGROUND

Platform-Based E-Government Service

The adoption of new ICTs may give an important opportunity for upgrading e-government services to many countries, who have heavily invested in using e-government to connect government networks and improve a wide range of public services (Cruz-Jesus et al., 2018). The output made by the investment is the complete digitalization of needs-based services (OECD, 2016). However, the output cannot create the outcome if citizens are not willing to adopt the e-government services. The success of e-government services depends on the willingness of citizen users to adopt the services (Belanche et al., 2012; Carter & Bélanger, 2005; Dukić et al., 2017; Hung et al., 2007). An individual's adoption of e-services is determined by usage attitude, social pressure, service, technology, and perception of the government (Mahadeo, 2009).

Many countries are reorganizing their government operations as a platform by leveraging ICTs to enhance the quality of public services (Bharosa et al., 2020; Margets et al., 2017). However, the conceptualization and operation of GaaP differs with countries. O'Reilly (2011) claimed that the GaaP would represent the next generation of government. The platform would enable more active interaction between citizens and government, innovation, and performance improvement. More recently, GaaP conceptually and empirically has encompassed the new wave of digital transformation. The paradigm shifts a focus from digitalizing government services to integrating new technological components such as artificial intelligence, big data analytics, blockchain, and cloud computing into government operations, decision-making processes, and citizen engagement. The integration is based on GaaP or platform-based e-government, which seeks to build a more efficient and effective government that better meets citizen needs in the digital age through data-driven decision-making and advanced technology use.

Presented in Table 1, previous studies addressing GaaP highlighted four sides: Communication, participation, operation, and efficiency. Effective platform functionalities can be achieved through smooth communication between citizens, developers, stakeholders, and government (Chokki et al., 2022). Integrating government operations and decision-making processes requires a communication-focused approach to mutual operation (Yli-Huumo et al., 2018). Communication functions also encourage citizen participation and transform the government digital platform into a mediator in a digital ecosystem where citizens are at the center and thereby the role of public service provider changes. This environment allows for effective combination of platform policies and systems with continuous citizen participation (Zaramenskikh & Lyubarskaya, 2020), leading to value creation, exchange among participants, and creation of innovative products and services (Lathrop & Ruma, 2010).

A focus of platform operation lies on connectivity in platform design, user experience, network effects, data management, and governance elements. There is a need to provide accessibility to potential citizens and businesses to enhance communication, participation, and effectiveness of the platform (Rohn et al., 2021; Upadhyay et al., 2022; Zaramenskikh & Lyubarskaya, 2020).

However, barriers to platform-based e-government are also recognized. Previous research stressed the importance of platform quality in creating innovative services and delivering value to citizens (Chen et al., 2015; Petter & McLean, 2009). As quality control of platforms is an issue, quality improvement can increase the acceptance of platform's acceptance (Demir et al., 2020). The demand for government services on the platform increases the need for relevant regulation. The role of government needs to change, but it does not change easily with traditional bureaucratic inertia. The government could play a role as a mediator in the digital ecosystem instead of merely providing public services.

Table 1. Categories of platform-based e-government services

Category	Related studies	Contents
Platform-based communication	Chokki et al. (2022) and Yli-Huumo et al. (2018).	<ul style="list-style-type: none"> • Encouraging interactions among open government data stakeholders (i.e., citizens, developers, and publishers). • Increasing the value of open government data (e.g., fostering an environment that enhances transparency and makes public data use easier). • Integrating digital technology into government via GaaP model with user-centered design to address transparency issues
Platform-based participation	Lathrop and Ruma (2010), and Zaramenskikh and Lyubarskaya (2020).	<ul style="list-style-type: none"> • Mediating between government and citizen needs in a digital ecosystem. • Creating value exchange and innovation through stakeholder participation. • Adopting citizen-sourcing for participatory decision-making for public service quality and interaction.
Platform-based efficient operation	Janssen and Estevez (2013), and Rohn et al. (2021).	<ul style="list-style-type: none"> • Improving operational efficiency and accessibility through lean government principles. • Identifying key factors for efficient platform performance (e.g., design, user experience, network effects, data management, governance, value creation, transfer, capture, innovation, and culture).

Determinants of E-Government Service Adoption

Davis et al.'s (1989) TAM has been employed to explain the adoption of traditional e-government (Carter & Bélanger, 2005). Technology acceptance is considered an individual's attitude, which perceived usefulness and ease-of-use determine. The TAM as a traditional model explaining user behaviors has been extended to a new model suitable for specific situations or environments (Rouibah & Hamdy, 2009; Schepers & Wetzels, 2007).

Venkatesh et al. (2003) created the unified technology acceptance and use of technology theory (UTAUT), which explains the effect of individual characteristics on technology use by combining studies on TAM and technology acceptance in general. The UTAUT includes performance expectancy and effort expectancy to unify the components of perceived usefulness and ease of use. The relationships among perceived usefulness, ease of use, and intention to use can be modulated by age, gender, experience, and degree of voluntary use. Social influence and facilitating conditions are additionally included in the model, and this augmentation increases the explanatory power of the model (Marchewka & Kostiwa, 2007). The UTAUT has been employed in various cases. Jang et al. (2021) used the UTAUT to analyze the intention to use chatbot services in the financial sector, adding the reliability of information and security of the services. Citizens' trust in e-government services is identified as an important aspect of adoption (Li, 2021; Khan et al., 2018; Warkentin et al., 2002). This change has been extended to online quality measurements.

Studies employing Delone and McLean's (2003) information systems success model examined the efficiency and success of the e-government system (Wang & Liao, 2008). As Figure 1 shows, the performance and effectiveness of all information systems domains are predicted by quality dimensions (i.e., information quality, systems, and services) or their independent influence on actual use or intended use, user satisfaction, and net benefits.

This model is designed to provide a broader and deeper understanding of the efficacy of information systems by defining, describing, and systematizing the relationships among the various quality dimensions. In studies on the user's behavioral process and efficiency of e-government systems, service quality is used to predict the level of use intentions and satisfaction (Jovanovic et al., 2022; Wang & Teo, 2020). Table 2 summarizes the main findings of studies on information technology acceptance.

Abdulkareem and Ramli (2021) demonstrated that trust in e-government significantly influences the use and success of government services in the context of the information systems success model

Figure 1. Information systems success model (DeLone & McLean, 2003)

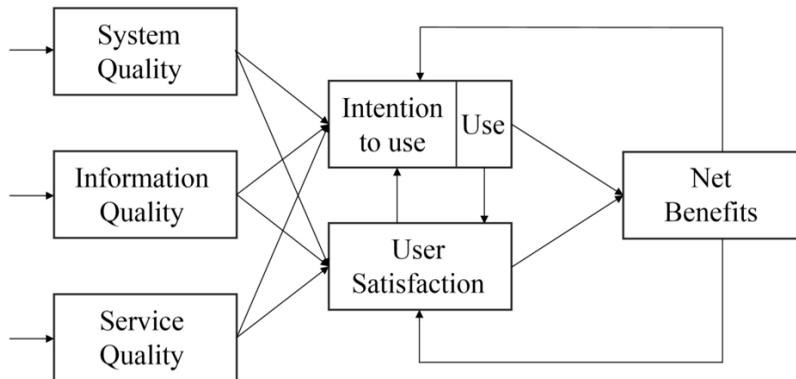


Table 2. Findings of studies on information technology acceptance

Models	Related studies	Contents
TAM	Carter and Belenger (2005), Davis et al. (1989), and Schepers and Wetzels (2007).	<ul style="list-style-type: none"> • Suggesting causal relationships between or among factors influencing technology adoption. • Understanding that innovation acceptance is key to predicting user behaviors when facing technological innovation. • Examining whether attitudinal and perceptual factors influence behavioral intentions to use e-government.
Integrated technology acceptance theory	Marchewska and Kostiwa (2007), Venkatesh et al. (2003), and Warkentin et al. (2002).	<ul style="list-style-type: none"> • Combining existing research on technology acceptance with the TAM to explain the influence of individual characteristics on technology use. • Demonstrating that the relationship between perceived usefulness, ease of use, and intention to use may change with age, gender, experience, and degree of voluntary use. • Proving a higher explanatory power of acceptance intention and behavioral intention compared to the existing TAM.
Information systems success model	Aminah et al. (2018), DeLone and McLean (2003), and Wang and Liao (2008).	<ul style="list-style-type: none"> • Exploring the behavioral process of users and the effectiveness of e-government systems to observe the use intention or satisfaction of service quality. • Measuring Web site quality by identifying the influence of various factors on perceived success. • Identifying success factors by measuring the impact on service quality and cognitive benefits.

and public value theory. Platform-related studies mostly employed the information systems success model, which helps estimate the influence of various factors on perceived success in measuring Web site quality (Petter & McLean, 2009; Schaupp et al., 2009).

Some studies on the adoption of platform-based services reported the effect of enhancing service quality and trust on users' intention to use (McKnight & Chervany, 2000). The quality of government Web sites serves as a tool to boost citizen trust in government (Khayun & Ractham, 2011). The quality of e-services experienced by citizens leads to an increase in trust in government Web sites (Chen et al., 2015).

Upadhyay et al. (2022) tried to understand the intention to accept the platform by analyzing the intention of continuous use of the platform-based governance services. Various studies on the information systems success model have demonstrated that information system quality and satisfaction positively affect users continued use (Ein-Dor et al., 1993; Wang & Teo et al., 2020; Wu & Wang, 2005).

DATA AND METHODS

Research Model and Variables

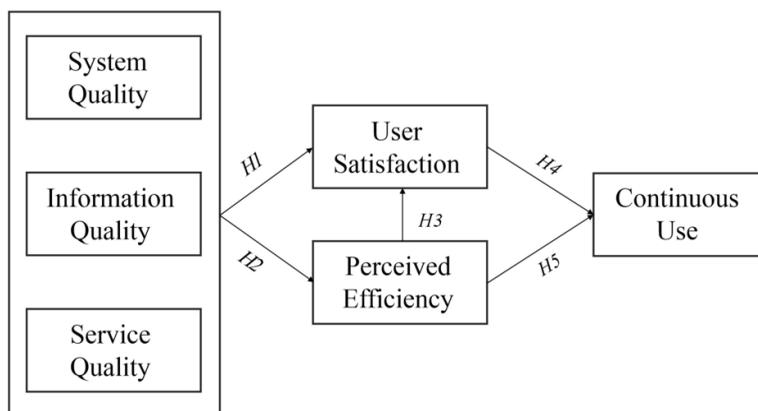
In this study, the authors employed the information systems success model to explain the relationship between crucial aspects such as information quality, system quality, service quality, usage intention, and user satisfaction (Figure 2). Information quality is defined as the degree to which the quality of storage, delivery or system generation impacts user satisfaction, their intention to continue using the system, and the benefits to the organization. System quality has an indirect effect through the components of usage intention and user satisfaction, which are the most evaluated levels. Service quality influences the net benefits generated by the system as a factor that assesses overall service provision quality and information and system qualities.

This study defines quality-related variables according to the work of DeLone and McLean (2003). System quality refers to the performance level of platform-based e-government system functions and includes three components (i.e., system flexibility, error-free service, and processing and response speed) derived from Kalakota and Robinson (2001), Petter et al. (2013), and Urbach and Mueller (2012). Information quality, defined as the degree of information performance provided by platform-based e-government, is comprised of information relevance, accuracy, and completeness (Seddon, 1997; Wang & Liao, 2008). Service quality refers to the degree of service provided by platform-based e-government officials, characterized as convenience, credibility, and assurance (Parasuraman et al., 2005; Petter et al., 2009; Wang & Tang, 2003).

Dependent variables (i.e., perceived efficiency and satisfaction with use) are operationally defined as follows. Perceived efficiency as a key value pursued by platform-based e-government is evaluated based on cost, time, and effort reduction (Baraka et al., 2013; Sirsat & Sirsat, 2016). Satisfaction with use measures the level of satisfaction with overall satisfaction and satisfaction with specific quality (i.e., system, information, and service). In this study, the authors employed three items to gauge overall satisfaction with platform-based e-government, avoiding redundant measurements of each quality variable (Gable et al., 2008; Lee & Chung, 2009). Continuous use is defined in line with variables in the TAM (Davis et al., 1989), consisting of three items related to user intention to reuse the platform (Stefanovic et al., 2016).

Platform-based services operated by the South Korea government are expected to influence user satisfaction and intention in terms of information, system, and quality, and promote more effective work performance than existing administrative services. In this study, the authors further verified the effect of continuous use intention to explore its relationship with efficiency, along with the DeLone and McLean's model. Figure 1 illustrates the authors' research model. Research hypotheses are as follows:

Figure 2. The research model



Hypothesis One (H1): Platform-based e-government quality (system quality, in H1a, information quality, in H1b, and service quality, in H1c) has a positive influence on user satisfaction.

Hypothesis Two (H2): Platform-based e-government quality (system quality, in H2a, information quality, in H2b, and service quality, in H2c) has a positive influence on work efficiency.

Hypothesis Three (H3): Perceived efficiency has a positive influence on platform-based e-government service use satisfaction.

Hypothesis Four (H4): Satisfaction with platform-based e-government service use has a positive influence on intention to continuous use.

Hypothesis Five (H5): Perceived efficiency in platform-based e-government service has a positive influence on satisfaction.

Based on usual measurements related to the model, the authors developed 18 survey items in the seven-point ordinal scale. Table 3 shows descriptive statistics of those survey items. Lower scores in the responses to these survey questions (table 7) represent the negative attitude, while the higher points show the positive attitude.

Data and Analysis Method

The authors conducted a survey targeting users of Government 24, an electronic information platform service provided by the South Korean government. The authors sought a comprehensive understanding and assessment of the Government 24 platform’s use. Achieving this objective necessitated detailed insights into user experiences and responses. To this end, the authors surveyed individuals who had used Government 24. While the authors’ experience-based sample

Table 3. Survey items

Factor	Items	Cronbach’s alpha	References
System quality	System flexibility (SY1)	0.807	Kalakota and Robinson (2001), Petter et al. (2013), and Urbach and Mueller (2012).
	Failure-free service (SY2)		
	Processing and response speed (SY3)		
Information quality	Information relevance (IN1)	0.837	DeLone and McLean (2003), Seddon (1997), and Wang and Liao (2008).
	Information accuracy (IN2)		
	Information completeness (IN3)		
Service quality	Convenience of platform configuration (SE1)	0.884	Parasuraman et al. (2005), Petter et al. (2009), and Wang and Tang (2003).
	Platform service credibility (SE2)		
	Platform service professionalism (SE3)		
Perceived efficiency	Cost saving (EF1)	0.867	Baraka et al. (2013), Gilbert et al. (2004), and Sirsat and Sirsat (2016).
	Effort reduction (EF2)		
	Time saving (EF3)		
User satisfaction	Satisfaction with government services in general (US1)	0.831	Gable et al. (2008), Hsu et al. (2014), and Lee and Chung, (2009).
	Satisfaction with accessibility to platform services (US2)		
	Satisfaction with goal achievement through service use (US3)		
Continuous use	Intention to continue using platform e-government service (CO1)	0.824	Davis et al. (1989), Lim et al. (2019), and Stefanovic et al. (2016).
	Perception of benefits from using platform e-government service (CO2)		
	Willingness to recommend platform e-government service (CO3)		

might introduce some selection bias, it is pertinent to note that the primary focus of this research centered on those with firsthand experience using Government 24. As Patton (2014) and Creswell and Creswell (2017) pointed out, reactions or evaluations in experience-based research can vary widely based on an individual’s personal experience. Therefore, in studies like the authors’, emphasizing specific experiences, it is crucial to source data from participants who have had those very experiences. With this rationale, in this study the authors targeted responses solely from Government 24 users.

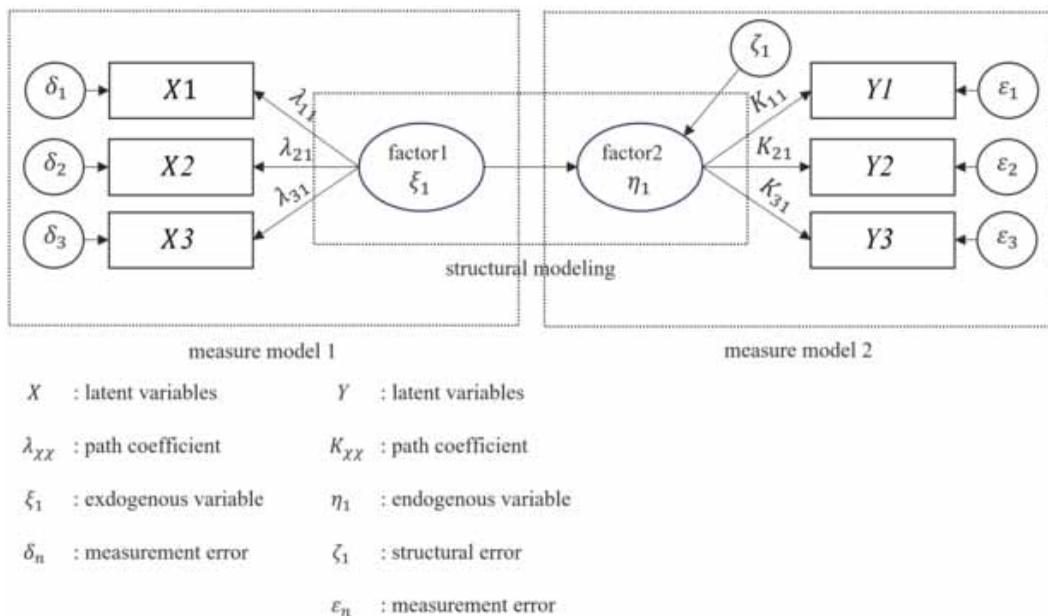
To bolster citizens’ intention to adopt the platform, it is imperative to enhance these services. This can be achieved by heightening their responsiveness to platform-centric policies and further advancing the government’s technological prowess.

The researchers conducted the configured questionnaire by entrusting a survey to an online panel agency². They recruited users with experience using the platform. The survey period spanned 91 days, from May 1 to August 1, 2022. Finally, the researchers collected 273 questionnaires and used 253 responses (excluding incomplete responses) for the statistical analysis.

In the context of platform-based government service quality, the authors determined the main variables of the information systems success model by considering their specific characteristics and context. For each variable in the research model, they established operational definitions and measurement methods, drawing upon measures other scholars had utilized in previous studies.

The authors used structural equation modeling (SEM), which can analyze the causal relationship between independent variables corresponding to service quality (i.e., information, system, and service) and dependent variables composed of usage satisfaction, efficiency, and continuous use intention (figure 3). SEM is a multivariate analysis technique that combines factor and regression analyses to explain the causal relationship between latent factors attributed to measurement variables. Many theories in social science often begin by clarifying the relationships between variables. Among these relationships, elucidating causal ones is particularly essential. However, one challenge when using regression in the SEM model is the analysis of multilayered causal relationships that span multiple stages.

Figure 3. Structural equation modeling



In essence, there is a limitation in analyzing situations where a dependent variable from one regression equation subsequently serves as a causal variable for another. Wright (1934) proposed path analysis as a solution to this challenge. This method estimates path coefficients by resolving multiple interconnected regression equations. These equations are composed of several primary cause independent variables and multiple dependent variables they influence. Thus, when employing confirmatory factor analysis, this approach proves beneficial in gauging relationships between numerous observed variables, especially when they are indirectly measured through a multitude of latent variables.

Consequently, this modeling approach is apt for analyzing the causal relationships between various observed variables and dependent variables. The authors tested the fit of the measurement model and the validity of the measurement model by assessing average variance (AVE), construct reliability, and standardized λ values.

Descriptive Statistics of the Sample

Table 4 shows the respondents' general characteristics. The respondents who had experience using platform-based e-information services were 51.4% males and 48.6% females. The distribution by age was 1.2% for those under the age of 20, 28.5% for age in 20s, 31.2% for 30s, 23.7% for 40s, and 15.4% for 50s and older.

The largest group of the annual personal income was a segment of \$25,000 to \$35,000 (30.8%), followed by \$35,000 to \$45,000 (16.6%) and \$55,000 or more (15.8%). Almost half a sample was an office worker (43.5%) and had a bachelor's degree (46.6%).

RESULTS

Validity Test of the Measurement Model

Table 5 shows the results of model fit tests. The authors calculated critical ratio to check whether the conditions required for reliability and validity verification are met. A higher critical ratio than the value of 1.96 on the $p < 0.05$ basis indicates that there is no problem in conducting intensive validity verification. Concentrated validity should have a high correlation among observed variables to measure latent variables, which are constituent concepts of the structural model. The test of concentrated validity checked the correlation coefficients among latent variables: A standardized λ value higher than 0.7, AVE higher than 0.5, and concept reliability higher than 0.7 (Bagozzi & Yi, 1988).

The authors tested the absolute suitability and incremental suitability indices to examine the degree to which the data fit the research model. The indices of the model fit are in the recommended range (Table 5).

Hypothesis Test and Findings

This study tests hypotheses showing the relationships among usage satisfaction, perceived efficiency, continuous use intention, and perceived quality of platform-based information services operated by e-government. Table 6 presents the result of the hypothesis test, which supports seven out of nine hypotheses. Both information quality ($\beta = 0.349$) and service quality ($\beta = 0.161$) have a significant influence on the satisfaction of use. Information quality has bigger magnitude in its influence on the use satisfaction than service quality.

The hypothesis that system quality influences usage satisfaction is not supported. System quality ($\beta = 0.393$) and service quality ($\beta = 0.183$) influence perceived efficiency. Information system success factors influence information and service quality. The system and service quality has a significant effect on perceived efficiency, and service quality influences use satisfaction and perceived efficiency.

Table 4. Demographic profiles of respondents

Demographics	Categories	N	%
Sex	Male	130	51.4
	Female	123	48.6
Age	Younger than 31	75	29.7
	31–40	79	31.2
	41–50	60	23.7
	Older than 50	39	15.4
Annual personal income	Less than \$15,000	33	13.0
	\$15,000–\$25,000	28	11.1
	\$25,000–\$35,000	78	30.8
	\$35,000–\$45,000	42	16.6
	\$45,000–\$55,000	32	12.6
	More than \$55,000	40	15.8
Occupation	Office worker	110	43.5
	Civil servant	19	7.5
	Educator	7	2.8
	Self-employed	30	11.9
	Professionals	24	9.5
	Others	22	8.7
	Unemployed	41	16.2
Education	High school graduate or under	27	10.7
	Undergraduate	22	8.7
	Bachelor's degree	118	46.6
	Graduate (including dropout)	39	15.4
	Master's degree	47	18.6
<i>N</i>		253	100.0

Perceived efficiency ($\beta = 0.308$) has a positive effect on usage satisfaction, and perceived efficiency ($\beta = 0.405$) and usage satisfaction ($\beta = 0.507$) have a positive effect on sustainability, respectively. The platform-based e-information service has an efficient effect on business processing. Those who perceive a higher level of efficiency in e-government services would feel satisfied with using the services. Administrative service quality is a trigger of usage satisfaction and perceived efficiency, and these two factors reflect the intention of continuous use. Service quality contributes to improving the work processing capability and personal performance by acquisition of relevant information.

The authors found that information and service quality influence information service satisfaction, while system and service quality influences perception on efficiency. Perceived efficiency has a positive effect on usage satisfaction and the intention of continuous use, reflecting the needs for services in the demand perspective.

Table 5. Reliability and validity test

Construct		Estimate	Standard error	Critical ratio	Standardized regression weights (λ)	AVE	Construct reliability
System quality	SY1	1.000			0.703	0.643	0.843
	SY2	0.943*	0.091	10.331	0.742		
	SY3	1.134*	0.103	11.011	0.868		
Information quality	IN1	1.000			0.777	0.632	0.837
	IN2	0.954*	0.080	11.856	0.775		
	IN3	1.053*	0.085	12.440	0.838		
Service quality	SE1	1.000			0.851	0.654	0.850
	SE2	0.965*	0.060	15.996	0.863		
	SE3	1.210*	0.077	15.753	0.849		
Efficiency	EF1	1.000			0.842	0.588	0.810
	EF2	0.864*	0.069	12.459	0.763		
	EF3	0.880*	0.074	11.808	0.726		
User satisfaction	US1	1.000			0.785	0.606	0.821
	US2	0.948*	0.074	12.847	0.822		
	US3	0.779*	0.068	11.734	0.747		
Continuous use	CO1	1.000			0.802	0.615	0.827
	CO2	0.962*	0.069	13.913	0.831		
	CO3	1.072*	0.076	14.123	0.845		

Note. * $p < 0.05$.

Table 6. The result of the SEM analysis

Hypothesis				β	Result
H1a	System quality	→	User satisfaction	0.051	Not supported
H1b	Information quality	→	User satisfaction	0.349*	Supported
H1c	Service quality	→	User satisfaction	0.161*	Supported
H2a	System quality	→	Efficiency	0.393*	Supported
H2b	Information quality	→	Efficiency	0.137	Not supported
H2c	Service quality	→	Efficiency	0.183*	Supported
H3	Efficiency	→	User satisfaction	0.308*	Supported
H4	User satisfaction	→	Continuous use	0.507*	Supported
H5	Efficiency	→	Continuous use	0.405*	Supported

Note. * $p < 0.05$.

DISCUSSION

Research Implications

Efforts are being made through digital transformation, leveraging data, and new technologies. Governments generate platform-based services to address social issues more effectively and carry

out administrative services more efficiently. Platforms, especially digital ones, can be successful business models that private companies adopt competitively. Thus, capabilities are needed to enhance the administrative efficiency and usage environment of the government’s model and manage sustainable administrative operations. However, information technology-based services provided by the government face challenges such as meeting service quality requirements made by user demands, information processing issues, and information constraints. Alongside inefficient policy implementation by the government, trust in government policies may also diminish. Therefore, it is crucial to examine policy acceptance factors based on quality evaluation and efficiency. To succeed in providing highly accessible platform-based e-services using information technology, it is essential to discuss the relationships among suppliers and consumers, service quality, and acceptance intention.

In this study, the authors investigated the relationship between perceived work efficiency and usage satisfaction using a structural equation model to measure the quality of platform-based e-services. The analysis results contribute to the discussion on how the quality of government service portals is related to the intention of continuous use in terms of perceived efficiency and user satisfaction. The results confirmed that perceived information and service quality positively impacted usage satisfaction.

Figure 4 illustrates that the quality of system, information, and service leads to satisfaction, efficiency, and the intention to continue. This study builds on the findings of previous research (Buckley, 2003; Ming et al., 2018; Noori, 2022) that revealed a significant relationship between improved information quality and increased user satisfaction with electronic services.

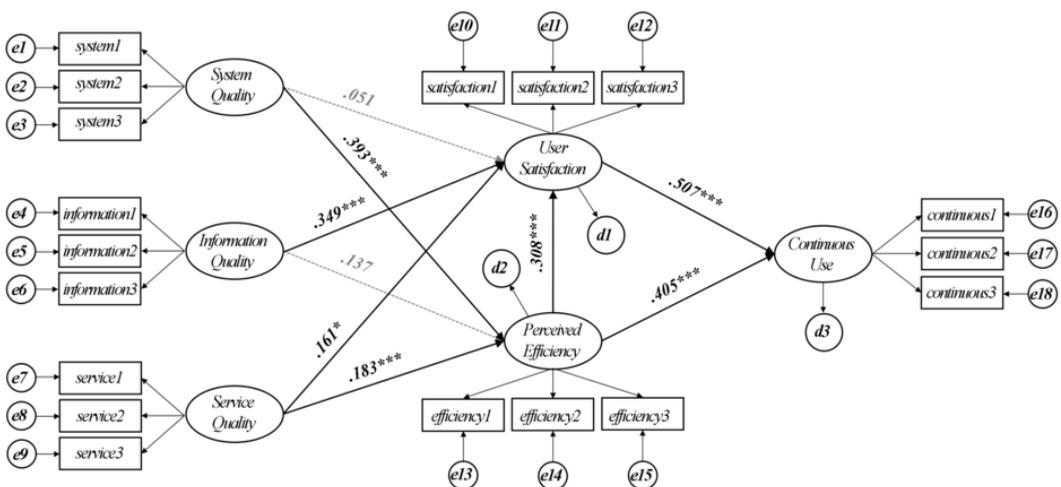
This validates the information systems success model. The results of this study indicated that the impact of information quality on user satisfaction is higher than that of service quality. While satisfaction positively affected the intention of continuous use, system quality did not have a significant effect on satisfaction. User satisfaction is directly and significantly influenced by the information and services encountered during the use of e-services.

System and service qualities had a substantial effect on efficiency. Each quality dimension positively impacts the intention for continuous use. Perceived efficiency influences relationships with acceptance and satisfaction. Such efficiency varies with satisfaction regarding the obtained information.

This study highlighted the importance of system quality, as the satisfaction and efficiency of the government’s platform-based e-service affected its relationship with acceptance intention. In previous

Figure 4. The result of the SEM

Note. Standardized estimates in the diagram.



research, scholars applied and examined the information systems success model, including the TAM and integrated acceptance model of government administrative services.

The quality factors of the information systems success model did not show a clear relationship based on satisfaction and efficiency in terms of performance. However, in this study, the authors empirically identified the existing validated research model and formed a systematic conceptual framework through key predictors. Unlike previous studies, the authors considered the intention of acceptance concerning user satisfaction and perceived efficiency. User satisfaction and perceived efficiency play a crucial role in the citizen-government (service provider-user) relationship.

Policy Implications

Previous studies on platforms advocated for quality improvement to effectively implement platform-based e-government. It is vital to understand the quality factors and interoperability from the users' point of view. The result of this study can help develop strategies for enhancing platform-based services of e-government. Information quality greatly influences satisfaction with platform-based e-government use, and system quality has the most significant impact on perceived efficiency. Despite a massive increase in scale, quality is essential for e-government, particularly platform-based e-government services. The reliability of provided information and e-service system environment is crucial for the success of platform government.

Platform-based e-government needs to offer quality information and services. The suitability and up-to-datedness of information and service are key factors in enabling use (Almuqrin et al., 2022; Kruk et al., 2019). An increase in the amount of information services through platform functions does not guarantee the success of the transition toward platform government. Halaris et al. (2007) emphasized the need to shift from a result-oriented approach to a process-oriented approach to meet users' perceptions and needs.

In the private sector, platforms address primary issues such as user interface experiences, system stability, limits of service integration, and accessibility challenges. These concerns equally warrant serious attention in the public sector. However, the distinctions between the private and public sectors in platform-based transformation gradually blur. Rather, keen attention goes to how public organizations and private enterprises can harness merits of platform-based transformation, foster platform-based cross-boundary collaboration, and elevate societal convenience and value.

Since public platform services have to underscore public values, equitable service delivery, transparency, and accountability, building a platform ecosystem does not come easy in the public sector. An increasing number of governments strive to platform-ize administrative functions, offering integrated information and standardized services, with the ultimate goal of ensuring quality services to all citizens. There is a pressing need to ensure service accessibility for marginalized segments of the population communities. Administrative efficiency and citizen satisfaction with administrative services are still important criteria of a good government. However, the criteria should be viewed in a different angle. Growing efficiency and convenience of users cannot make up alienation of nonusers (marginalized segments). In line with this issue, the quality of information and services is critical to the success of platform-based e-government.

The quality of information does not directly influence operational efficiency in the realm of public services. The critiques concerning the Government 24 service in South Korea suggest a need for enhancing information quality. User complaints point out difficult-to-understand terminologies and a long list of services irrelevant to their imminent needs in the interface, challenging information standards in the side of information use. The way of displaying information influences the perception of information quality and more seriously administrative quality (Alenezi et al., 2015). Recognizing the appropriate environmental factors to assess and measure information quality is imperative, as individuals want a certain piece of information for their needs. Government 24 can be further developed with a more advanced system for user experience, and such system can enable a sustainable competitive advantage (Byrd, 2001). However, improving perceived information quality does not always come

with high technology because e-government users are not focused on enjoying technology, but on satisfying what they need.

Another critical issue of platform-based e-government services is personal data protection. Private sector platforms, given their extensive personal data handling, harbor concerns regarding data breaches and security issues. If e-governments come to resemble platforms, the concerns would be also considered serious in the public sector. Emphasizing transparency, stability, fairness, responsibility, and legality, governments are obligated to rigorously manage personal information that they hold. If e-government platforms in near future play as a hub of open data (government data and nongovernmental data), security technologies (e.g., blockchain) would be essential for trustworthiness of platform-based e-government services. A robust security environment is pivotal to government innovation through platform-ing e-government. There is a call for frameworks dedicated to information security governance (Posthumus & von Solms, 2004). Swindle and Conner (2004) advocate governance structures for responsibility, risk management, and accountability.

Countries with high-ranked e-government have continuously enlarged and deepened communication channels to increase data accessibility and encourage citizen participation. Platform-ing e-government should entail a mechanism for collecting, analyzing, and reflecting civic inputs and feedback. Platform-based e-government can contribute to trust in government by substantially increasing citizens' positive perceptions and satisfaction with user experience (Bouckaert & Van de Walle, 2003). This highlights the importance of need-based services that assist citizens in completing complex tasks in a more integrated and interoperable manner, beyond merely being satisfied with the provided administrative services.

Research Limitations

Despite significant findings and meaningful practical implications, this study has two limitations that further research needs to address. The first is a restriction in quality measurements, whereas, in previous studies, scholars utilized various models for measuring quality. While the authors restructured the research model of this study based on the information systems model, it is possible to use diverse observed factors to interpret results in conjunction with the acceptance model. For private enterprises, relational quality might be of importance. The platform model public institutions adopt requires other essential components of public services, such as legal regulations, transparency, and accountability. Nonetheless, the outcomes of the platform government could ultimately be influenced by the quality of relationships. The structural equation model of this study already includes many factors, which may threaten parsimony of model specification. Instead, the authors interpreted the statistical findings with a theoretical review of the relationships with various concepts, such as trust in the government, user-side interoperability, and task experience.

The second limitation of this study is generalizability of perception-based findings. The research results are based on a specific sample and conditions, which may constrict their generalizability. As the authors conducted this research with current platform service users in South Korea, directly generalizing the findings to potential users (current nonusers) and to citizens in other countries requires caution. However, they built the specification modeling perception of e-government upon global empirical evidence. Future studies should figure out the extent to which the finding of extant research focusing on e-government is different with that of research on platform-based e-government quality.

CONCLUSION

Governments around the world are increasingly witnessing the rise of platforms and the transition from e-government to digital platform government. This fast-paced trend inevitably creates a research gap in user-side platform-based government services. This study aimed to fill that gap. A theoretical review of e-government users' adoption and acceptance revealed the relationships among

key factors such as information quality, service quality, perceived efficiency, user satisfaction, and the intention of continuous use. The authors analyzed data from a survey of South Korean citizens who used an integrative platform for frontline e-services. The analysis evidenced that information and service quality increase user satisfaction, while system and service quality enhance perceived efficiency. Perceived efficiency and satisfaction of platform-based e-services are crucial for their continuous use.

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ENDNOTES

- ¹ Government 24 represents South Korea’s integrated electronic information platform service. By centralizing administrative data and civil complaint procedures, which were previously scattered across multiple departments, the platform offers a streamlined conduit for services encompassing governmental, municipal, and public administrative domains. It caters to a myriad of needs, including the issuance of various civil documents and information access, accommodating approximately 1,000 different service requests. Overall, Government 24 provides around 90,000 services, with 85,000 stemming from governmental functions and 5,000 from civil services. This holistic approach not only centralizes key updates and policy information from diverse government entities, such as central administrative agencies and local autonomous bodies, but also champions the government’s commitment to standardization, accessibility, and pioneering next-generation administrative services.
- ² In South Korea, the general field of social science does not typically require a distinct ethical review for survey-based research. Nonetheless, the authors stringently adhered to all pertinent regulations and guidelines to ensure the anonymity and confidentiality of every participant throughout the data collection and processing stages. The survey was entrusted to an online panel agency, which is an external private entity known for its compliance with these standards. This agency consistently followed protocols that ensured ethical considerations for all participants during the data collection process.

APPENDIX

Table 7. Survey questions

Category	Survey questions
System quality	How flexible is the system of platform service? (SY1)
	How stable is the platform service? Did you encounter any failure? (SY2)
	How speedy is the processing and response of the platform service? (SY3)
Information quality	How relevant to your needs is the provided information? (IN1)
	How accurate is the information service quality? (IN2)
	How complete is the information provided? (IN3)
Service quality	How convenient is the interface (screen layout) of the platform service? (SE1)
	How credible is the platform service? (SE2)
	How professional is the platform service? (SE3)
Perceived efficiency	Did you experience any cost saving effect from using the service? (EF1)
	Did you experience any effort reduction effect while using the service? (EF2)
	Did you experience any time saving effect while using the service? (EF3)
User satisfaction	How satisfied are you with the government-provided service in general? (US1)
	How satisfied are you with accessibility to the platform service? (US2)
	How satisfied are you with goal achievement by using the service? (US3)
Continuous use	Do you intend to continue using the platform service? (CO1)
	Would you reuse the service owing to perceived benefits from service use? (CO2)
	Are you willing to recommend others to use the service? (CO3)

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