JPS Journal of Policy Studies

J. Policy Stud. 2025;40(3):1-23
https://doi.org/10.52372/jps.250232
pISSN 2799-9130 eISSN 2800-0714

Article

Webqual analysis of service quality of shopping mall web sites in public institutions: case of Korea Government

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Received: March 25, 2024
Revised: March 22, 2025
Accepted: July 3, 2025

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Competing interests
No potential conflict of interest relevant to this article was reported.

Funding sources
Not applicable.

Acknowledgements
Not applicable.

Availability of data and material
Upon reasonable request, the datasets of this study can be available from the corresponding author.

Abstract

From the perspective of New Public Management (NPM), a primary responsibility of the government is to improve service delivery to ensure consumer satisfaction. This study examines user satisfaction with public online shopping malls, including shopping mall, innovation marketplace, and venture world, using the WebQual framework. Through the lens of WebQual, we aim to delineate the unique service attributes characterizing shopping mall websites within Korea public sector entities. Moreover, we endeavor to explore the impact of these service attributes, namely usability, information quality, and service interaction, on user satisfaction and reuse intention of the website. To achieve this, we conducted a survey targeting public officials and employees who possess firsthand experience with shopping mall websites which are operated by the Public Procurement Service of Korea. Our findings underscore the significant influence of online shopping mall website quality on user satisfaction within public institutions. Furthermore, our analysis reveals that user satisfaction plays a pivotal role in predicting users' intention to reuse the website. While usability and information quality did not significantly affect reuse intention, service interaction quality showed a significant positive relationship. This highlights the distinctive role of interactive features in fostering reuse intention within public online shopping malls. The implications of this study are manifold. By employing WebQual, we contribute to the empirical validation of website quality assessment in Korea public institutions. Moreover, our findings serve as a cornerstone for future research endeavors aimed at understanding and enhancing user satisfaction with online shopping mall websites within the public sector, addressing the existing research gap in this domain.

Keywords: WebQual, New Public Management (NPM), service quality, public shopping mall, user satisfaction, reuse intention

Introduction

E-government has spread globally and is primarily aimed at delivering public services through the use of web-based technologies (Torres et al., 2005). Myung (2001) stated that e-government emerged during the transition to an information society, focusing on enhancing governmental efficiency and improving administrative services. Sung (2015) argued that e-government technologies can effectively support the harmonious coordination between the market and the government. Torres et al. (2005) explained that e-government developed under the influence of New Public Management (NPM) reforms and evolved as a means to explore ways of applying private sector techniques to public institutions. Osborne & Gaebler (1992), in their influential book Reinventing Government, advocated for the adoption of various private sector tools in the public sector, with the core philosophy being that "government should serve customers just like the private sector." Sung (2015) argued that e-government functions as an effective tool for supporting the goals of NPM, such as cost reduction, performance-oriented administrative management, and collaboration with the private sector.

E-government denotes the digitalization of administrative processes and public services by governmental entities through the integration of information technology, aimed at enhancing administrative efficiency and facilitating interaction between administrative bodies and citizens. Korea's e-government initiatives have laid a robust foundation, positioning the nation prominently in global rankings of national digital governance. Notably, in the United Nations E-Government Survey, Korea's e-government services ranked second in the E-Government Development Index (EGDI) and first in the E-Participation Index (Ministry of Public Administration and Security of Korea, November 18, 2020). As a consequence of these accolades, Korea has witnessed widespread adoption and diverse applications of administrative and public services, leveraging its exemplary e-government infrastructure (Lee, 2021).

In contemporary governance, the modernization of a nation is considered theoretically and practically unfeasible without e-government. In line with this trend, public procurement has also been transformed through digitalization. Public procurement accounts for approximately 15% of global Gross Domestic Product (GDP) and plays a key role in government budget expenditures (Fazekas & Blum, 2021). If public procurement reforms are implemented effectively, even a 1% annual cost reduction could save around USD 110 billion (approximately KRW 150 trillion) in public funds. The World Bank Group (2016) also noted in its study that e-procurement enhances the efficiency and transparency of public procurement.

Korea's e-procurement system has also undergone significant reforms influenced by NPM, incorporating private sector practices into public procurement. A representative example of this is the Korean on-line e-procurement system (KONEPS) online shopping mall. While online shopping malls have become widespread in the private sector, only the United States, India and South Korea have implemented such systems in the public sector through policy initiatives. KONEPS online shopping mall has adopted purchasing methods from private online malls, enhancing user convenience by allowing users to search for products, add them to a shopping cart, and make purchases. It was also designed to categorize items, enabling public agencies to easily search for the

https://doi.org/10.52372/jps.250232

goods they need. The theory of NPM views responsiveness to consumer preferences as an effective approach to improving public services, enhancing organizational efficiency, and increasing goal attainment. By introducing a model of responsiveness similar to that found in the market into public organizations, it is believed that these organizations can produce better outputs—namely, outcomes more aligned with what citizens want—which in turn contributes to achieving the core objectives of administration within a democratic system (Pierre, 1998).

In 2023, the general shopping mall within KONEPS, operated by the South Korean government, achieved its highest-ever sales performance, recording 26 trillion KRW (approximately 21 billion USD) in procurement product transactions (Public Procurement Service, 2025). As of November 23, 2023, data from the Public Procurement Service of Korea indicate a total of 569,736 registered companies offering about 970,000 products, with SMEs comprising the majority. This marks a substantial 1.8-fold increase from the 2013 sales performance of 14 trillion KRW, underscoring the mall's significant role in expanding the procurement market and supporting the growth of small and medium-sized enterprises. Established in 2002, the online shopping mall has revolutionized public procurement by streamlining processes through unit price contracts, eliminating time-consuming bidding and contracting procedures. This efficiency enables demand institutions to swiftly acquire necessary products while also lowering barriers to market entry for procurement companies. Additionally, the service facilitated transactions between 68,946 entities, including national institutions, local governments, and other institutions (Public Procurement Service of Korea, 2024.2.1.). Purchasing through KONEPS online shopping mall is made simple for buyers, as a standardized contract between the Public Procurement Service and suppliers is pre-established. With just one click, buyers can complete their purchases easily. This system streamlines the procurement process and significantly enhances administrative efficiency.

Torres et al. (2005) explained that e-government evolved under the influence of NPM reforms, emerging as a means to apply private sector techniques to government institutions. In line with this trend, the KONEPS online shopping mall represents a model that incorporates practices from private sector e-commerce platforms. Svidronova & Mikus (2015) noted that e-procurement functions as a tool to realize key NPM principles, including the promotion of market competition, performance evaluation, cost reduction, and enhanced transparency. NPM places strong emphasis on customer satisfaction. A central tenet of this approach is the promotion of consumer sovereignty in the delivery of public services (Boston, 1996). According to Aberbach & Rockman (2000), NPM encourages public organizations to prioritize customers and to design services that align with user preferences and demands. The underlying rationale is that consumer sovereignty enables public organizations to produce better outcomes—results that are more consistent with citizens' needs and expectations. This, in turn, fulfills the democratic aim of public administration: to serve the public and support the realization of their goals. From the standpoint of public administration, measuring and enhancing user satisfaction is not merely a managerial concern but a fundamental tenet of democratic governance. As public institutions increasingly adopt digital platforms for service delivery, especially in the realm of e-procurement, understanding the determinants of user satisfaction becomes crucial. Moreover, the digital transformation of public services necessitates empirical insights into how users interact with government-operated platforms and how these

interactions translate into perceptions of service quality and trust.

In this regard, investigating satisfaction within public online shopping malls provides a dual contribution: it not only sheds light on the efficacy of digital service delivery mechanisms but also informs policy decisions aimed at enhancing user-centered governance. As public services become more market-oriented and performance-driven, user satisfaction emerges as a critical metric for evaluating the success and responsiveness of public digital initiatives (Osborne et al., 2013).

The quality of an online shopping mall operated by a public institution significantly affects user engagement and satisfaction. Therefore, it is essential to evaluate the quality of public online shopping malls. However, evaluating website quality presents inherent challenges, as it can vary considerably depending on individual user perceptions and preferences. As a result, investigating website quality requires a nuanced and comprehensive approach that can effectively capture its multifaceted nature.

Since the publication of the SERVQUAL model by Parasuraman et al. (1988), numerous studies have been actively conducted in the field of service quality assessment. The SERVQUAL model delineates service quality into five dimensions: Tangibles, Empathy, Reliability, Responsiveness, and Assurance. Tangibles pertain to the physical aspects of service delivery, encompassing factors such as the appearance of facilities, employees, equipment, and documentation. Empathy evaluates the provider's ability to understand and communicate effectively with customers. Reliability concerns the consistency and accuracy of service delivery, ensuring that promised services are performed dependably and without errors. Responsiveness refers to the promptness and efficiency with which services are provided to customers' needs. Lastly, Assurance assesses customers' confidence in the service provider's competence, reliability, and credibility. It is posited that the disparity between customers' perceptions of service performance and their expectations across these five dimensions determines overall service quality (Yi & Lee, 2014). Given the distinct characteristics of Internet consumers compared to traditional offline customers, the applicability of measuring service quality using the SERVQUAL model may be questionable. Aladwani & Palvia (2002) argue that online services, unlike their offline counterparts, lack tangible attributes, making it challenging to assess quality using traditional SERVQUAL dimensions. Consequently, employing the SERVQUAL model for website quality evaluation may yield distorted results due to the inherent differences between online and offline service environments. As such, researchers often modify the components of SERVQUAL to better align with the unique features of online services, thereby enhancing the validity of the measurement tool.

Within this study, WebQual is utilized as one of the quality measurement tools for assessing websites. WebQual is a comprehensive website quality evaluation framework developed by Barnes & Vidgen (2000), which assesses user perception across dimensions such as usability, information quality, and service interaction. Previous research has established the significant validity and reliability of WebQual in measuring service quality (Ha et al., 2018; Hasanov & Khalid, 2015; Hwang & Ha, 2023; Loiacono et al., 2002; Napitupulu, 2017; Provost et al., 2006; Sanjaya, 2012; Shin & Kim, 2012; Vinola & Sularto, 2021). WebQual has been validated across multiple sectors, including public services, which supports its applicability in the context of government-run shopping mall websites. Leveraging the WebQual framework, this study aims to identify the characteristics of

https://doi.org/10.52372/jps.250232

website services offered by shopping malls within public institutions and investigate how these service attributes influence customer satisfaction and the intention to reuse. Identifying the quality factors of public sector online shopping platforms—operated only by the United States, India and South Korea globally—is a highly compelling research topic. Although global interest in Korea's e-procurement system has been increasing, research focusing specifically on the Korean case remains limited. This study aims to address this gap by providing a partial overview of Korea's e-procurement practices.

Theoretical Analysis

The concept of WebQual

Among the methods employed to measure service quality, SERVQUAL stands out as one of the most widely utilized and generalized models. Its validity and reliability have been substantiated through numerous studies, confirming its content and construct validity (Alkhouli, 2017; Baber, 2019; Hahn et al., 2017; Nemati et al., 2002; Park & Baek, 2007; Purwandani & Syamsiah, 2021; Siadat et al., 2008; Udo et al., 2011). SERVQUAL finds extensive application across various fields within the information systems domain, serving as a valuable tool for analyzing user satisfaction models in online shopping environments such as Amazon and Bailey. One of the primary advantages of SERVQUAL lies in its ability to identify critical quality factors through systematic analysis, facilitating more efficient service quality management and enabling straightforward comparative analysis of service levels with competitors.

Cronin & Taylor (1992) introduced the SERVPERF model as an alternative to SERVQUAL, which focuses solely on perceived performance by subtracting expected service from actual service quality. In their study, data regarding service quality evaluations from two companies in each of the following four industries—banking, pest control, dry cleaning, and fast food—were collected. These industries were selected due to their familiarity to consumers in the region, and the two companies chosen within each industry were identified as the largest in terms of sales within the city. Empirical analysis revealed that the SERVPERF scale provided a more comprehensive explanation of fluctuations in service quality compared to SERVQUAL. Furthermore, the study highlighted the essential role of service quality in fostering consumer satisfaction, with consumer satisfaction exerting a stronger influence on purchase intention than service quality itself.

The SERVQUAL and SERVPERF models, discussed earlier, primarily focus on measuring service quality in offline settings. However, their direct application to online contexts is limited. Recognizing this challenge, DeLone & McLean (1992) proposed the use of information quality and system quality as alternative metrics for evaluating the quality of individual information systems. Subsequently, ten years later, DeLone & McLean (2002) expanded their framework by incorporating service quality alongside information quality and system quality, thereby providing a more comprehensive assessment of overall information system quality.

WebQual has emerged as a measurement methodology refined through iterative adjustments and resolutions of potential issues encountered when applying SERVQUAL—commonly employed for assessing offline service quality—to website evaluation. Within the scope of this study, the

quality of websites hosted by public institutions is scrutinized utilizing the WebQual framework proposed by Barnes & Vidgen (2000).

The WebQual framework has evolved from version 1.0 to 4.0 through a series of refinements aimed at measuring website quality in diverse contexts(Table 1). WebQual 1.0, initially developed for evaluating business school websites, assessed four dimensions: ease of use, user experience, information quality, and communication/integration (Barnes & Vidgen, 2000). WebQual 2.0 expanded its application to e-commerce by introducing "interaction quality," highlighting its significance in user engagement and drawing comparisons with the SERVQUAL model (Barnes & Vidgen, 2001). WebQual 3.0, tailored for online auctions, identified web information quality, web interaction quality, and site design quality as core dimensions. Finally, WebQual 4.0 restructured the framework into three integrated dimensions—usability, information quality, and service interaction quality—emphasizing navigation, content relevance, trust, and emotional engagement (Barnes & Vidgen, 2002; Kim, 2003).

The WebQual 4.0 questionnaire utilized by Barnes & Vidgen (2002) in their study comprised a total of 22 questions. The specific questionnaire items are outlined as follows (Table 2).

Related work

The concept of service quality has been extensively studied in marketing and information systems literature. According to Parasuraman et al. (1988), service quality can be defined as the gap between customers' expectations and their perceptions of service performance. While SERVQUAL conceptualizes service quality into five dimensions—tangibles, reliability, responsiveness, assurance, and empathy—this model has limited applicability in online contexts. As such, alternative frameworks such as WebQual have been developed to evaluate quality in web-based environments, focusing on usability, information, and interaction quality. These dimensions reflect not only the technical and content-related features of websites but also users' emotional and cognitive responses.

Numerous studies have employed WebQual 4.0 to assess website quality across various domains. Loiacono et al. (2002) conducted research focusing on the development and validation of a website quality measurement tool to predict user reuse. Their study, grounded in WebQual, involved extensive literature review and interviews with web designers and visitors. They identified

Table 1. Evolution of WebQual framework

Version	Purpose & target	Key dimensions	Description
WebQual 1.0	Evaluation of business school websites (Bath, LBS, MBS, WBS)	Ease of Use, experience, information, communication & integration	Focused on navigation, visual design, content quality, and external communication.
WebQual 2.0	Evaluation of UK online bookstores (e.g., Amazon, Blackwell's)	WebQual 1.0 dimensions+interaction quality	Added interaction quality: personalization, empathy, responsiveness, and security.
WebQual 3.0	Evaluation of online auction platforms (e.g., Amazon, eBay, QXL)	Web Information quality, web interaction quality, site design quality	Included accuracy, security, design appeal, and transaction reliability tailored to auctions.
WebQual 4.0	Evaluation of e-commerce platforms (e.g., Amazon, BOL, Internet Bookshop)	Usability, information quality, service interaction quality	Refined into usability, content relevance, and secure/empathic service interactions.

Bath, University of Bath; LBS, London Business School; MBS, Manchester Business School; WBS, Warwick Business School; QXL, QXL auction platform (a former online auction site); BOL, Bertelsmann Online / Internet Bookshop (an online bookstore).

https://doi.org/10.52372/jps.250232

Table 2. WebQual 4.0 Barnes & Vidgen (2002) questionnaire

Category	Questionnaire
Usability	1. It's easy to learn how to use it.
	2. The interaction is clear and easy to understand.
	3. It is easy to navigate the site.
	4. The site is easy to use.
	5. The design of the site is attractive.
	6. The design of the site is appropriate for the site type.
	7. It provides all the features you want.
	8. Using the site is a good experience for me.
Information quality	9. It provides accurate information.
	10. It provides reliable information.
	11. Provide timely information.
	12. Provide relevant information.
	13. It provides easy-to-understand information.
	14. It provides a detailed level of information.
	15. Express the information in the appropriate format.
Service interaction	16. Have a good reputation.
	17. I feel safe processing of information disclosure and protection.
	18. I feel like privacy is going well.
	19. It provides a personalization function.
	20. It is providing community functions.
	21. It is easy to communicate with officials.
	22. I am sure that we are providing good information and services.

12 measurement dimensions, excluding customized communication, across 14 service elements. Sanjaya (2012) utilized the WebQual approach to evaluate service quality on the Indonesian Ministry of Communications and Information website, revealing the significant impact of information quality on user satisfaction among other quality dimensions. Provost et al. (2006) aimed to comprehensively evaluate the quality of health-related websites, resulting in the development of the WebMedQual model comprising 95 items categorized into eight dimensions. Hasanov & Khalid (2015) investigated the influence of website quality on Malaysian online health food purchases using the WebQual model, revealing an indirect impact on purchase intention through customer satisfaction. Napitupulu (2017) assessed the quality of university websites using WebQual, highlighting the significant role of usability and service interaction in enhancing user satisfaction. Additionally, Nurhadi et al. (2019) employed the WebQual 4.0 method to gauge the quality of the www.baznas.go.id website in terms of user satisfaction. They classified quality into three dimensions: usability, information quality, and interaction quality, finding that information usability and quality significantly influenced website satisfaction through empirical analysis.

Salamah et al. (2020) employed the WebQual 4.0 approach to assess the quality of Polly's learning management system (LMS) website. Their analysis of Polly students revealed that usability quality and information quality significantly impacted satisfaction, whereas service interaction quality did not. Andrian et al. (2020) conducted a study utilizing WebQual 4.0 to enhance service quality analysis of COVID-19 websites. Vinola & Sulato (2021) investigated website user satisfaction acceptance, employing the WebQual 4.0 method to assess online shopping malls such as Shopee

and Tokopedia. Their findings indicated that while information quality did not significantly influence satisfaction for Shopee websites, all other variables had a significant effect on satisfaction. These studies collectively underscore the utility and effectiveness of WebQual 4.0 as a robust tool for evaluating website quality and its impact on user satisfaction across diverse contexts.

Research related to WebQual 4.0 is also evident in Korea. Ha et al. (2018) employed WebQual in a study involving N portal companies, utilizing web service quality (utility, information quality, interactivity, personalization, and information security) as the measurement tool. The study operationalized usability as the convenience associated with design and infrastructure for portal site usage, while information quality pertained to the proficiency of content/information provided by portal sites. Interaction quality encompassed the user experience and recognition of site interactions, while information security focused on safeguarding personal information and search service safety. Empirical analysis revealed that all quality factors significantly influenced customer satisfaction, with interactivity exhibiting the most substantial impact. Hwang & Ha (2023) conducted a study categorizing evaluation items into four domains: usability, information, service interaction, and technology. They advocated for the inclusion of technical quality aspects such as web standards and accessibility alongside the three traditional WebQual qualities for website evaluation. The study aimed to discern website attributes impacting the website dropout rate through WebQual analysis.

Website satisfaction & reuse intention

Satisfaction derived from website usage stands as a crucial determinant of its efficacy. Park (2009) delineated customer satisfaction as a state wherein heightened satisfaction augments repurchase rates and fosters continued loyalty by exceeding customer expectations in product or service delivery. Reuse intention was defined as the likelihood of consumers persisting in repeated usage upon product purchase or service provision. Kim (2013) characterized satisfaction as the holistic evaluation of emotions or sentiments arising post-service utilization and consumption experiences. The findings of the study underscored the significant impact of aviation service quality on customer satisfaction, thereby influencing voluntary behavioral intentions. Kim (2005) conducted research to validate the effect of mobile sports content quality factors on reuse and recommendation intentions. Mobile quality factors were categorized into information quality, system quality, interaction quality, and service quality. Information quality encompassed reliability, accuracy, fidelity, and diversity of information, while system quality pertained to communication connection rate and speed. Interaction quality was defined by the menu classification system, ease of navigation, and consistent screen layout, whereas service quality encompassed security, kindness of service managers, customized service, immediate service, and prompt response. The study revealed significant impacts of information quality, interaction quality, and service quality on reuse intention. Cheon (2016) interpreted satisfaction as the consumer's assessment of the perceived value compared to the actual costs incurred, while reuse intention was construed as the propensity to repurchase a service or recommend it to others based on its excellence. Park (2017) defined satisfaction as a subjective evaluation of the service buyer experience, advocating for a comprehensive evaluation of satisfaction encompassing the entire consumption process rather than solely focusing on consumption outcomes. Koo et al. (2019) posited that reuse intention reflects consumers' behavioral tendencies to

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either continue or discontinue usage based on their satisfaction levels post-selection, as manifested in consumer behavior decision-making processes. Shin (2020) defined reuse intention as the inclination of consumers, having experienced a product or service, to utilize it again.

Ostrom & Lacobucci (1995) conceptualized consumer satisfaction as a relative assessment encompassing not only the quality and benefits derived from a purchase but also the costs and efforts expended by customers to acquire the purchase. Seddon & Kiew (1996) defined user satisfaction as a net emotional state formed by amalgamating all desired benefits derived from information systems and interactions. Investigating website satisfaction evaluation among website quality factors, Szymanski & Hise (2000) delved into the role of online convenience, product promotion (product provision and product information), site design, and consumer perception of financial safety. Their findings underscored the pivotal role of online convenience, site design, and financial safety in enhancing satisfaction. McKinney et al. (2002) employed two measurement tools, namely information quality and system quality, to gauge web customer satisfaction. Information quality was assessed in terms of relevance, timeliness, reliability, scope, and perceived usefulness, while system quality was evaluated based on accessibility, usability, navigability, and interactivity. Their study confirmed the significant impact of both measurement tools on satisfaction. Examining how information quality and system quality influence user satisfaction, Nelson et al. (2005) categorized information quality into Accuracy, Completeness, Currency, and Format. System quality was dissected into accessibility, reliability, response time, flexibility, and integration. Empirical analysis revealed that accuracy, completeness, and format were primary influencers of information quality, while reliability, accessibility, and flexibility significantly influenced system quality. Suhartanto et al. (2018) posited that when customers perceive product or service performance to exceed their expectations, satisfaction ensues, thereby reinforcing customer satisfaction and fostering loyalty. Investigating the impact of perceived quality on overall satisfaction and purchase intention of online travel agency services, Kourtesopoulou et al. (2019) identified ease of understanding, response time, and intuitive website operation (ease of use and navigation) as paramount among quality factors, with perceived quality exerting a positive influence on website satisfaction.

User satisfaction is commonly understood as a cumulative affective response that results from users' interactions with an information system (Seddon & Kiew, 1996). Within the context of e-service platforms, satisfaction involves both emotional evaluation and cognitive appraisal of website features, such as ease of use, content relevance, and perceived value (Kim, 2013). According to the expectation-confirmation model, when actual performance meets or exceeds users' prior expectations, positive satisfaction occurs, which in turn enhances the likelihood of reuse or recommendation (Bhattacherjee, 2001). Thus, satisfaction functions as a key mediating variable that links system quality to behavioral intentions, including reuse and recommendation.

In this investigation, the website of public institutions' shopping malls is subjected to analysis utilizing WebQual. While numerous studies have employed WebQual in assessing private websites, research examining its application to public institution websites remains limited. Existing literature underscores the active exploration of WebQual across diverse domains. Consequently, this study aims to ascertain the feasibility of extending WebQual to evaluate shopping mall websites operated by public institutions. The significance of this research lies in its pioneering assessment of the quality

of public institution shopping mall websites in Korea using WebQual, a service quality measurement instrument tailored to the contemporary information system landscape, thereby validating its applicability in this context.

Methodology

The present study constructs a model to explore the association between website quality and user satisfaction, as well as the subsequent impact on reuse intention, based on the WebQual 4.0 framework. As illustrated in Fig. 1, the model posits that usability, information quality, and service interaction directly influence user satisfaction, which in turn affects reuse intention. This structure is grounded in WebQual theory and supported by prior research on e-service quality.

Hypothesis

The hypothesis for this study was derived from the WebQual framework proposed by Barnes & Vidgen (2002) and subsequently refined to align with the findings of the preceding analyses. The formulated hypotheses are as follows.

Previous research has indicated that online shopping mall users exhibit higher levels of website satisfaction when they positively evaluate the quality of the online shopping mall. This suggests that the website quality (usability, information quality, and service interaction) may have a positive impact on user satisfaction. Therefore, the following hypothesis is proposed:

- Hypothesis 1-1: Usability has a positive effect on user satisfaction.
- Hypothesis 1-2: Information quality has a positive effect on user satisfaction.
- Hypothesis 1-3: Service interaction has a positive effect on user satisfaction.

Moreover, prior studies have shown that users who positively assess the quality of an online shopping mall are more likely to have higher intentions to reuse the website. This implies that the website quality (usability, information quality, and service interaction) can positively influence the intention to reuse the website. Accordingly, the following hypothesis is proposed:

- Hypothesis 2-1: Usability has a positive effect on reuse intention.
- Hypothesis 2-2: Information quality has a positive effect on reuse intention.

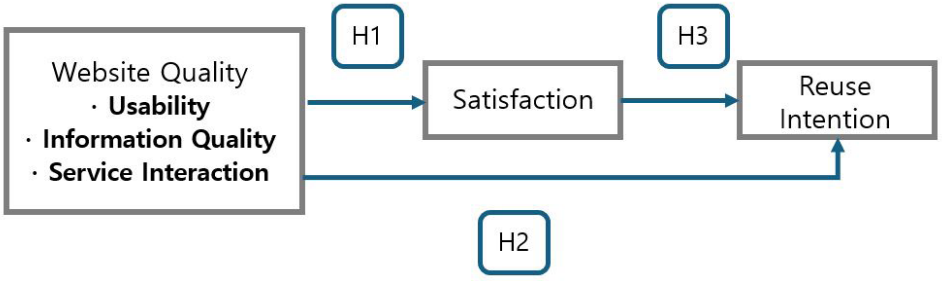

Fig. 1. Theoretical framework.

https://doi.org/10.52372/jps.250232

• Hypothesis 2-3: Service interaction quality has a positive effect on reuse intention.

Furthermore, according to previous research, online shopping mall users who positively evaluate their website satisfaction are more likely to have a higher intention to reuse the website. To investigate whether website satisfaction also has a positive impact on the reuse intention in this study, the following hypothesis is proposed:

• Hypothesis 3: consumers' satisfaction has a positive effect on reuse intention.

Operational definitions

Within the scope of our investigation, Usability was operationally defined as the aspect concerning the design and functionality of the website, tailored to suit the context of this study through reference to prior research. Information quality was operationalized as the appropriateness of information aligning with both the content quality standards of the website and the specific needs of the user. This definition was refined and tailored to suit the objectives of our study, drawing upon insights from prior literature. Service Interaction was conceptualized as the caliber of interaction experienced by users while navigating through the website, encompassing elements such as security and empathetic engagement. This definition was adapted and tailored to the context of our research, drawing insights from prior scholarly works.

User satisfaction was operationalized as the comprehensive assessment of emotional responses and overall evaluation derived from the latest service usage and consumption experiences. Reuse intention was operationalized as the likelihood of consumers to repeatedly utilize a product or service after its initial purchase or usage. The questionnaire utilized in this study was adapted from previous research to suit the specific objectives and context of our investigation.

Data collection technique

The survey aimed to evaluate the quality and user perception of the KONEPS, which includes the general shopping mall, innovation marketplace, and venture world—platforms operated by the Korea Public Procurement Service. The target population consisted of employees from various public institutions who had actual experience using one or more of these procurement platforms. Data were collected over a five-month period, from December 2023 to April 24, 2024, through an online questionnaire distributed via Google Forms. A total of 449 valid responses were obtained and used for analysis.

Responses were assessed using a 5-point Likert scale. The questionnaire design was adapted from the WebQual framework with modifications to align with the context of public institution websites. Independent variables were categorized into usability, information quality, and service interaction. Usability encompassed brevity, consistency, interest, convenience, ease of use, accessibility, while information quality included up-to-date, accuracy, reliability, appropriateness, comprehension, clarity, and contradiction. Service interaction factors comprised maintenance, system, customer support, complaints, promptness, and security. The dependent variables were user satisfaction and reuse intention. Additionally, demographic variables such as gender, age, and affiliated institution were included as control variables. The questionnaire structure is summarized in Table 3.

Table 3. The definition of variable operational

Variable	Indicator	Code
Independent		
Usability	Brevity	US1–6
	Consistency	
	Interest	
	Convenience	
	Ease of use	
	Accessibility	
Information quality	Up-to-date	IQ1–7
	Accuracy	
	Reliability	
	Appropriateness	
	Comprehension	
	Clarity	
	Contradiction	
Service interaction quality	Maintenance	SQ1–6
	System	
	Customer support	
	Complaints	
	Promptness	
	Security	
Dependent		
Satisfaction	System Satisfaction	SA1–6
Reuse intention	Intention to reuse	RE1–5
	Intention of recommendation	
Control		
Demographic	Gender, age, organization	-

The findings from the survey analysis conducted in this study reveal the demographic characteristics of respondents who have experience using online shopping malls operated by public institutions, as summarized in Table 4.

Data Analysis

Reliability analysis and factor analysis were performed using statistical software packages SPSS 29.0 and Amos 26.0 to assess the reliability and validity of the key constructs, including website quality, satisfaction, and intention to reuse, as defined in this study. The outcomes of the reliability analysis for the independent variables and the exploratory factor analysis are presented below (Table 5).

Cronbach's Alpha coefficient was employed to assess internal consistency. For the website quality characteristics, Cronbach's Alpha values for usability, information, and interaction were determined to be 0.944, 0.957, and 0.937, respectively. The values for satisfaction and intention to reuse, serving as independent variables, were calculated as 0.961 and 0.968. The analysis revealed that Cronbach's Alpha coefficients for usability, informativity, interaction, satisfaction, and reuse all surpassed the threshold of 0.6, indicating reliable measurement. Additionally, principal component analysis was utilized for exploratory factor analysis, employing the orthogonal rotation method. The validity of the collected data was confirmed based on satisfactory values for the Kaiser-Meyer-Olkin (KMO) criterion (≥0.7), eigenvalues (≥0.1), factor loading (≥0.5), total explained variance (≥60%), significance of the Bartlett's test ($p<0.05$), and commonality (≥0.5). Subsequently, confirmatory

https://doi.org/10.52372/jps.250232

Table 4. Profile of respondents

Characteristic	Frequency	Percent (%)
Gender		
Male	219	48.8
Female	230	51.2
Age		
20–29	55	12.2
30–39	170	37.9
40–49	156	34.7
Above 49	68	15.1
Affiliated organization		
Central government	84	18.7
Local government	176	39.2
Other institutions	189	42.1
User experience site (duplicated response)		
General shopping mall	423	75.3
Innovation market	82	14.6
Venture world	57	10.1

Table 5. Validity test & reliability test results

Component		1	2	3	Cronbach's alpha
Usability	US4	0.268633	0.805613	0.354586	0.944
	US1	0.361821	0.778066	0.193234	
	US5	0.218751	0.769771	0.353678	
	US2	0.379847	0.765941	0.280167	
	US6	0.327463	0.74336	0.358639	
	US3	0.294745	0.709001	0.394381	
Information quality	IQ3	0.839134	0.290825	0.258531	0.957
	IQ2	0.825788	0.249528	0.271604	
	IQ4	0.823389	0.354255	0.24541	
	IQ6	0.818589	0.345057	0.243968	
	IQ5	0.797743	0.387211	0.202372	
	IQ1	0.760108	0.155756	0.357082	
	IQ7	0.725733	0.234123	0.346242	
Service interaction quality	SQ4	0.326584	0.279933	0.826002	0.937
	SQ3	0.293423	0.277832	0.819608	
	SQ5	0.444434	0.331880	0.708980	
	SQ2	0.155237	0.421322	0.682964	
	SQ6	0.376003	0.396467	0.647017	
	SQ1	0.423352	0.416763	0.637688	
Eigen value		5.799	4.883	4.348	
Explanation (%)		30.523	56.224	79.108	
KMO (0.938)					

KMO, Kaiser-Meyer-Olkin.

factor analysis was conducted. Items exhibiting low or high squared multiple correlation (SMC) or high modification indices were eliminated as they required correction. Specifically, items US1, US2, US6, IQ1, IQ3, IQ7, SQ2, SQ5, SQ6, SA3, SA4, SA6, RE1, and RE5 were removed from the original questionnaire. The model fit indices for both the pre-correction and post-correction models are provided below.

The root mean square residual (RMR) represents the variance/covariance that remains unexplained by the model according to the sample data. A smaller RMR indicates a better fit, as it signifies a smaller average difference between elements. The goodness-of-fit index (GFI) measures the relative variance and covariance of the model, while the adjusted goodness-of-fit index (AGFI) adjusts the GFI value based on the model's degrees of freedom. The normed fit index (NFI) evaluates how much the proposed model has improved compared to a baseline model and is developed as a factor for assessing structural equation models. The comparative fit index (CFI) overcomes limitations in NFI by displaying population parameters and distributions. The root mean square error of approximation (RMSEA) addresses the limitation of rejecting proposed models with large sample sizes. Upon conducting the fitness test, all indices of the modified model except for AGFI met or exceeded the reference values. Although AGFI may be influenced by sample characteristics, the CFI index value, which is independent of such characteristics, was determined to be 0.968, indicating an acceptable level of model fit (Table 6).

The results of the overall confirmatory model analysis indicate satisfactory convergent validity. The values of the critical ratio (C.R.) were all equal to or greater than 1.96, while the standardization values exceeded 0.5 for all variables. Additionally, both the composite reliability and average variance extracted (AVE) values surpassed 0.5, affirming the presence of convergent validity (Table 7).

The discriminant validity results indicate that 1 was not included, and AVE values exceeded the square of the correlation coefficients. Therefore, Discriminant Validity was confirmed in this study (Table 8).

The analysis of hypothesis verification results based on the structural model analysis is detailed as follows(Fig. 2, Table 9):

Regarding H1-1: Usability's positive effect on consumer satisfaction was confirmed (β=0.322,

Table 6. Evaluation of goodness of fit criteria in modified model

Goodness of fit index	Value	Modified model value	Cut-off value	Information
CMIN	1,803.852	273.706		
PCMIN	4.567	2.912	≤3	Good
RMR	.038	.035	≤0.05	Good
GFI	.724	.904	>0.9	Good
AGFI	.676	.862	>0.9	Marginal
NFI	.858	.952	>0.9	Good
TLI	.874	.959	>0.9	Good
CFI	.885	.968	>0.9	Good
RMSEA	.108	.079	<0.08	Good

CMIN, minimum discrepancy (chi-square statistic, χ^2); PCMIN, parsimonious normed chi-square (CMIN/df); RMR, root mean square residual; GFI, goodness-of-fit index; AGFI, adjusted goodness-of-fit index; NFI, normed fit index; TLI, Tucker–Lewis index (non-normed fit index, NNFI); CFI, comparative fit index; RMSEA, root mean square error of approximation.

https://doi.org/10.52372/jps.250232

Table 7. Confirmatory factor analysis results

Component			Unstandardized coefficient	Standardized coefficient	S.E.	C.R.	p-value	Composite reliability	AVE
US5	<-	Usability	0.98	0.827	0.055	17.661	***	0.898	0.746
US4	<-		1.107	0.92	0.054	20.669	***		
US3	<-		1	0.842					
IQ6	<-	Information quality	1	0.925				0.946	0.814
IQ5	<-		1.009	0.924	0.035	28.835	***		
IQ4	<-		0.938	0.92	0.033	28.449	***		
IQ2	<-		0.809	0.835	0.037	21.88	***		
SQ4	<-	Service interaction	1	0.9				0.907	0.764
SQ3	<-		0.981	0.886	0.045	22.004	***		
SQ1	<-		0.85	0.836	0.043	19.754	***		
SA1	<-	Satisfaction	1	0.927				0.948	0.858
SA2	<-		1.012	0.934	0.033	30.303	***		
SA5	<-		0.918	0.918	0.032	28.563	***		
RE4	<-	Reuse intention	1	0.912				0.946	0.854
RE3	<-		1.072	0.922	0.039	27.288	***		
RE2	<-		1.045	0.937	0.037	28.534	***		

C.R., critical ratio; AVE, average variance extracted.

Table 8. Discriminant validity test

Factor	Usability	Information quality	Service interaction quality	Satisfaction	Reuse intention
Usability	0.864				
Information quality	0.715***	0.902			
Service interaction quality	0.785***	0.704***	0.874		
Satisfaction	0.795***	0.883***	0.716***	0.926	
Reuse intention	0.699***	0.798***	0.690***	0.897***	0.924

***p<0.01.

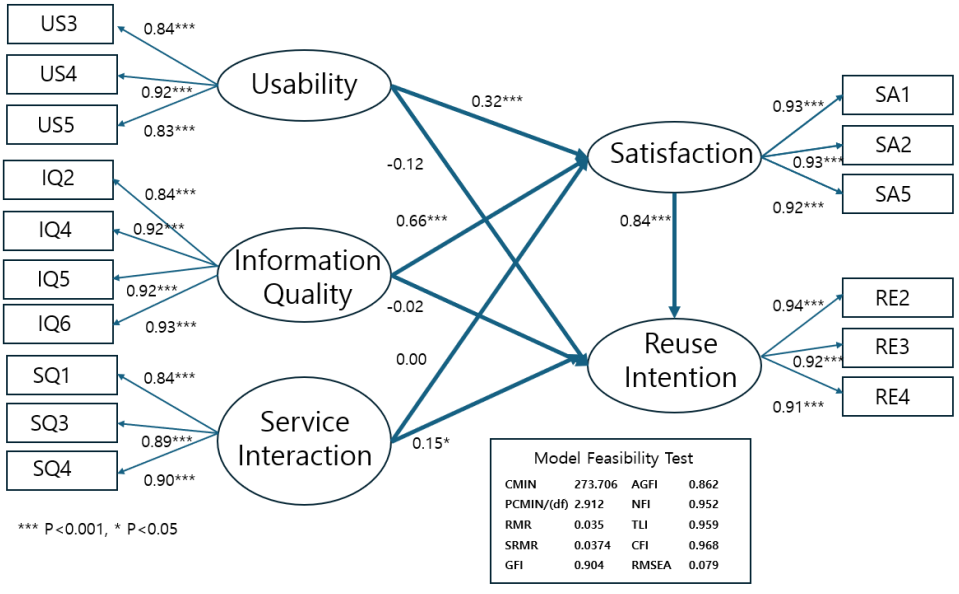

Fig. 2. Results of the WebQual 4.0 model analysis

Table 9. Hypothesis assessment result

Hypothesis				Unstandardized coefficient	Standardized coefficient	S.E.	C.R.	p-value
H1-1	Usability	→		0.322	0.336	0.058	5.515	***
H1-2	Information quality	→	Satisfaction	0.663	0.643	0.053	12.619	***
H1-3	Service interaction quality	→		0	0	0.06	–0.003	0.998
H2-1	Usability	→		–0.118	–0.133	0.065	–1.804	0.071
H2-2	Information quality	→	Reuse intention	–0.017	–0.018	0.079	–0.219	0.826
H2-3	Service interaction quality	→		0.152	0.16	0.06	2.553	*
H3	Satisfaction	→	Reuse intention	0.836	0.904	0.093	8.967	***

C.R., critical ratio.

SE=0.058, p<0.001). Therefore, hypothesis H1-1 was accepted, indicating that enhancing usability quality leads to improved satisfaction.

Regarding H1-2: Information quality's positive effect on consumer satisfaction was affirmed (β=0.663, SE=0.053, p<0.001). Thus, hypothesis H1-2 was accepted, suggesting that strengthening information quality contributes to increased satisfaction.

Concerning H1-3: It was observed that Service Interaction Quality does not influence satisfaction (p=0.998). Therefore, hypothesis H1-3 was rejected.

Regarding H2: The analysis revealed that website quality showed mixed effects on consumers' intention to reuse. Specifically, usability and information quality did not significantly affect reuse intention (p>0.05), whereas service interaction quality had a significant positive effect (p< 0.05). Hence, hypothesis H2 was partially supported.

Regarding H3: The study found a positive effect of consumer satisfaction on the intention to reuse (β=0.836, SE=0.093, p<0.001). Thus, hypothesis H3 was accepted, indicating that strengthening satisfaction leads to an enhanced intention to reuse.

In conclusion, the analysis indicates that the quality of KONEPS online shopping mall significantly impacts user satisfaction, which, in turn, affects the intention to reuse. However, service interaction quality was found to have no statistically significant direct effect on the intention to reuse, suggesting an indirect influence on reuse intention(Table 10).

Conclusion

Table 10. Hypotheses verification

Hypothesis	Result
H1-1: Usability has a positive effect on user satisfaction	Supported
H1-2: Information quality has a positive effect on user satisfaction	Supported
H1-3: Service interaction quality has a positive effect on user satisfaction	Rejected
H2-1: Usability has a positive effect on intention of reuse	Rejected
H2-2: Information quality has a positive effect on reuse intention	Rejected
H2-3: Service Interaction quality has a positive effect on reuse intention	Supported
H3: consumers' satisfaction has a positive effect on reuse intention	Supported

https://doi.org/10.52372/jps.250232

Under the influence of NPM, the concept of customer satisfaction has become a central criterion for evaluating administrative services. Therefore, identifying the quality factors that determine customer satisfaction is of critical importance. This study validates the applicability of WebQual 4.0 as a tool for assessing the quality of shopping mall websites operated by public institutions. It establishes that usability and information quality significantly influence user satisfaction, which in turn affects reuse intention, while service interaction quality exerts a direct positive effect on reuse intention.

Specifically, the study findings can be summarized as follows: Firstly, usability and information quality were identified as significant determinants of user satisfaction, with information quality exerting the greatest influence. This underscores the importance of providing accurate, clear, and appropriately formatted information on shopping mall websites of public institutions. It emphasizes the need for regular information updates and the prevention of misinformation to directly enhance user satisfaction. Hence, website managers should focus on ensuring information accessibility and clarity for users.

Regarding Usability, the convenience of information retrieval emerged as the most influential factor in user satisfaction. This implies that strategies such as enhancing screen readability, optimizing menu structures, and improving search engines can contribute to enhancing user satisfaction with online shopping malls in public institutions. Implementing such strategies during the restructuring of these websites, such as the Nara Market Shopping Mall, is expected to enhance user satisfaction. Additionally, these research findings serve as valuable insights for policymakers tasked with devising strategies to enhance online shopping malls operated by public institutions.

Secondly, service interaction quality was not found to significantly affect user satisfaction. However, unlike usability and information quality, it demonstrated a significant direct effect on reuse intention. This finding highlights that interactive aspects such as complaint handling and user support responsiveness may not strongly shape satisfaction but can still motivate users to return. Future research is warranted to examine potential mediating variables between service interaction and satisfaction in greater detail.

Lastly, user satisfaction was found to significantly influence reuse intention, consistent with previous studies on private online shopping malls. Among the factors, convenience of information retrieval was found to be the most influential on user satisfaction.

Managerial implications

The implications of this study are manifold. Firstly, the research method employed in this study involved using WebQual, as proposed by Barnes & Vidgen (2001), to assess the service quality of shopping mall websites operated by public institutions in Korea. This validation of WebQual's applicability serves as fundamental data for future research on user satisfaction with online shopping mall websites of public institutions, especially considering the current dearth of research in this area.

Secondly, the WebQual analysis revealed the paramount importance of ensuring the accuracy, timeliness, and transparency of information presented on websites. Policy implications suggest strategies such as regular updates to maintain the latest information, managing historical data, and implementing measures to prevent false or exaggerated advertisements, thereby enhancing user

satisfaction.

Thirdly, the study underscores the significance of improving website usability to enhance user satisfaction. Strategies such as simplifying text, using neutral language, incorporating visual aids, segmenting pages appropriately, and optimizing search engine capabilities are recommended. Additionally, enhancing the search functionality by enabling product name searches, providing customized product information based on user purchase history, and displaying popular product information can further improve user experience.

Fourthly, the results revealed that service interaction quality, although not significantly affecting satisfaction, had a direct positive effect on reuse intention. This finding suggests that strengthening interactive features—such as complaint handling and user support responsiveness—can increase users' willingness to reuse the platform, even if these aspects do not strongly shape satisfaction.

Fifthly, the impending upgrade of the KONEPS online shopping mall presents an opportunity to implement the study's recommendations. The next-generation version can leverage cuttingedge technologies like artificial intelligence, big data, blockchain, and cloud to enhance user satisfaction through improved authentication systems, mobile services, and streamlined certificates. Incorporating features such as product comparison, multidimensional search, and personalized recommendations can significantly enhance usability quality.

Lastly, while acknowledging the study's limited sample representativeness, the findings can still be extended to online shopping malls across Korea public institutions. There are other online shopping malls for public institutions, such as school markets, but they are not connected to the national accounting system and are limited to use by educational public servants. By focusing on users of the Nara Market Shopping Mall, which is widely used by public officials and institutions in Korea, the study provides valuable insights applicable to similar platforms across the public sector.

In conclusion, this study not only validates the use of WebQual for assessing website quality in public institutions but also offers actionable recommendations to enhance user satisfaction and improve online shopping mall functionality. These insights have significant implications for policymakers, website managers, and researchers alike, paving the way for future advancements in the realm of public institution websites.

Limitations

In delineating the findings of this study, several limitations are evident. Firstly, the absence of emotional aspect measurement on a 5-point Likert scale hampers a comprehensive understanding of shopping mall quality. Moreover, respondents' tendency toward moderation complicates accurate measurement. Additionally, due to cost and time constraints, the survey was conducted online, potentially resulting in random responses and necessitating analysis with a modified model compared to previous studies.

Secondly, other critical characteristics beyond those examined in this study may have been overlooked. Research into the sub-concepts of online shopping mall quality in public institutions is imperative to identify additional factors enhancing satisfaction and reuse intention. Future studies could delve deeper by employing questionnaires that categorize various quality factors such as information, structure, searchability, reliability, convenience, and aesthetics.

https://doi.org/10.52372/jps.250232

Thirdly, the measurement variables of usability, information quality, service interaction, user satisfaction, and reuse intention may contain overlapping content, potentially leading to respondent confusion and erroneous interpretation of causal relationships between variables. The development of more systematic and sophisticated models through active research on online shopping malls in public institutions is warranted.

Considering the dearth of specific research on the satisfaction of shopping mall websites of public institutions in Korea, this study serves as a seminal exploration in this domain. It signifies a crucial starting point for investigating the satisfaction of shopping mall websites operated by the Korean government and provides valuable insights into the future direction for the next-generation KONEPS shopping mall.

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