



## Effects of government electronic service quality on citizen satisfaction with integrated service delivery in urban areas

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### ABSTRACT

#### Article History

Received: 9 August 2022

Revised: 6 January 2023

Accepted: 23 January 2023

Published: 15 February 2023

#### Keywords

Citizen satisfaction  
Community satisfaction  
Data integration  
Integrated services  
Public administration  
Public e-service  
Service quality  
Urban area.

In the effort to achieve good and effective public services to gain public satisfaction and trust, the use of public electronic services (e-services) is expected to improve service quality. Public e-services offer better options for processing digital data. With increasing internet access, the use of e-services as a vehicle for delivering various public services is a promising development in the public sector. By maintaining and improving service quality, especially in the public sector, the use of internet/online services or public e-services will make users feel more satisfied and increase public trust. This study aims to determine the effect of electronic service quality on citizen satisfaction with public e-services. A quantitative research methodology was adopted. Data was collected by distributing online questionnaires to users of public e-service applications, totaling 150 respondents in Bandung, Indonesia. The sampling technique used was a purposive, non-probability-based sampling method. The data analysis technique was Structural Equation Modeling (SEM) using Smart software. The test results show that information quality, data security, and data privacy have a significant effect on e-service quality, which, in turn, has implications for citizen satisfaction. Based on the results of this study, we advise public e-services institutions to maintain and improve the quality of e-services by improving information quality, data security, and data privacy to increase user trust in public e-services.

**Contribution/Originality:** This study has succeeded in uncovering empirical evidence for the positive impact of information quality, perceived security, and perception of privacy on service quality and the satisfaction of citizens who access public administration services through the internet or online (public e-services) media.

## 1. INTRODUCTION

The internet is the most exciting communication and information technology development in recent decades. Information and communication channels are developing and expanding very quickly along with the development of technology. Meanwhile, internet access enables public electronic services (e-services) activities to take place within the scope of public administration. With the increase in internet access, the use of e-services to deliver various public services has become a promising development for public sectors in various parts of the world. In simple terms, public e-services can be defined as the facilities for delivering any services online (Kotler & Keller, 2012). There are many advantages of moving public sector activities online. Chung and Shin (2009) showed that some advantages of public e-services both for users and the public sector include improved convenience, savings,

selection, personalization, and information. Public e-services also offer public administrations better options for processing digital data.

In accessing the public sector via the internet or online, according to [Flavian and Guinaliu \(2006\)](#), users still tend to lack confidence that everything will be secure and proceed normally via the internet compared to accessing services offline. Notably, citizen satisfaction is important to financial performance ([Chung & Shin, 2009](#)). In the context of public e-services, users can be lost if they cannot access the website or if their experience with public sector services is unsatisfactory. According to [Jin and Park \(2006\)](#), trust, perceptions of security, and privacy are important aspects that can affect citizen satisfaction with the online public sector.

Perceived security is usually associated with threats that create circumstances, conditions, or events that can cause economic hardship if data sources or networks should suffer data collection and modification, denial of service, and/or fraud and abuse of authority ([Armash, Salarzahi, Yaghoobi, Heydari, & Nikbin, 2010](#)). Meanwhile, according to [Roca, García, and Vega \(2009\)](#), the perception of privacy is related to users' feelings about the possibility that online agencies collect and use individuals' data inappropriately. Therefore, efforts to maintain and improve service quality, especially in the public sector using public e-services, will improve user satisfaction and increase public trust. For that reason, studying the importance of the links between the four aspects mentioned above will help the public sector develop its public e-services at this time and will contribute to the potential for long-term relationships between online entrepreneurs and their users. This study focuses on exploring the positive influence of information quality, perceived security, and perception of privacy as antecedents of e-service quality on online citizen satisfaction.

## 2. LITERATURE REVIEW

### 2.1. Information Quality, e-Service Quality, and Satisfaction

Information quality is one way to indicate the output of public organizations' or agencies' information systems in providing data on which users can base decisions ([Anggraeni, 2020](#)). An IT application must be able to provide information to support an organization's decision-making. Communication technology comprises all information technology that supports communication. According to [Yakub \(2012\)](#), information is data that is processed into a form that is more useful for the recipient. According to [Azhar \(2008\)](#), high-quality information must have the following characteristics: suitability, availability, relevance, and completion. Meanwhile, according to [Sutedjo \(2002\)](#), quality information must be accurate and can be assessed using the indicators of accuracy, timeliness, relevance, ease, and inexpensiveness. Meanwhile, according to [Tata \(2004\)](#), information quality depends on relevance, accuracy, and timeliness.

There is some evidence that information quality affects citizen satisfaction. For example, [Riza and Sutopo's \(2017\)](#) research showed that information quality positively affects citizen satisfaction. In addition, [Wijaya's \(2018\)](#) findings supported the results of [Riza and Sutopo \(2017\)](#) and proved that information quality has an effect on citizen satisfaction.

*H1: Information quality has a positive and significant impact on e-service quality in the public sector.*

*H2: Information quality has a positive and significant impact on citizen satisfaction in the public sector.*

### 2.2. Perceived Security, e-Service Quality, and Satisfaction

Perceived security is defined as the user's perception of their security when conducting public e-services ([Eid, 2011](#)). Meanwhile, [Flavian and Guinaliu \(2006\)](#) defined perceived security as the subjective belief that users have that their personal information (in civil and monetary aspects) will not be seen, stored, or manipulated by other parties while in transit and storage, meaning that it is based on their expectations of confidence. Perceived security is also defined in the context of threats that create circumstances, conditions, or events that have the potential to

cause economic hardship through corrupted data sources or networks, data collection and modification, denial of service, and/or fraud and abuse of authority (Armash et al., 2010; Roca et al., 2009).

Technically, the perception of security requires integrity, confidentiality, and authentication without recording (Flavian & Guinaliu, 2006). According to Flavian and Guinaliu (2006), the integrity of an information system refers to the impossibility that transmitted or stored data will be modified by a third party without permission. According to Roca et al. (2009), security also involves the use of technological advances that can positively influence online usage intentions, such as cryptography, digital signatures, and certificates aimed at protecting users from the risk of fraud, hacking, or “phishing.” Furthermore, Jin and Park (2006) revealed a positive effect of security on online citizen satisfaction. The results of this study are supported by empirical evidence from the studies of Chung and Shin (2009); Chung and Shin (2010).

*H3: Perceived security has a positive and significant impact on e-service quality in the public sector.*

*H4: Perceived security has a positive and significant impact on citizen satisfaction in the public sector.*

### 2.3. Perceived Privacy, e-Service Quality, and Satisfaction

Perceived privacy is an important dimension influencing user interest in adopting electronic systems (Ahmad & Al-Zu'bi, 2011). In general, privacy is defined as an individual's ability to obtain, control, and utilize personal information (Flavian & Guinaliu, 2006). Therefore, in the internet context, privacy relates to aspects such as obtaining, using, or distributing personal information. Meanwhile, the perception of privacy is related to the ability of users to control the dissemination of information or the information consumption behavior of people around them (Eid, 2011). According to Roca et al. (2009), the perception of privacy is connected to the concern that online agencies collect and use data about individuals inappropriately. Users are, therefore, reluctant to enter their personal information when a site requests it because they are concerned about the collection and misuse of information transmitted over the internet. The impact is that online users are hesitant to disclose any personal or financial information to the agent because they feel that the agent could make unauthorized use of it or leak it to other organizations.

A more positive understanding is conveyed by Armash et al. (2010). According to Armash et al. (2010), privacy in public e-services is defined as the willingness to share information via the internet that allows the service to be used. Meanwhile, Kassim and Abdullah (2010) stated that the handling of privacy needs refers to the protection of various types of data collected (with or without user knowledge) during interactions between users and online systems. Furthermore, Chung and Shin (2010) stated that privacy protection is important to increase satisfaction. This opinion is supported by the results of Jin and Park (2006). Their test results showed a positive effect of privacy perceptions on online citizen satisfaction.

*H5: Perceived privacy has a positive and significant impact on e-security quality in the public sector.*

*H6: Perceived privacy has a positive and significant impact on citizen satisfaction in the public sector.*

### 2.4. E-Service Quality and Citizen Satisfaction

E-service quality, or the quality of electronic government services, is a way to assess citizen satisfaction with internet-based service providers, including the process and delivery of public services, by measuring a website's ability to provide effective and efficient features and facilities. Measurement is carried out by assessing how the service is received by the user and comparing it with the service the user expected based on the dimensions of service quality (Ulum & Muchtar, 2018). E-service quality includes all phases of user interaction with the agent and the extent to which electronic systems provide efficient and effective facilities in service delivery (Andriansyah, Sulastri, & Satispi, 2021; Oni, Adewoye, & Eweoya, 2016).

Citizen satisfaction is a reciprocal response produced by users by continuing to use or recommending the use of public services. In other words, users who are satisfied based on the fact that their experience exceeds their

expectations of the public service will indirectly provide encouragement by continuing to use it. According to Kotler and Keller (2012), citizen satisfaction can be defined as a person's feelings of pleasure or disappointment as a result of the comparison between the performance and the expected results. According to Daryanto (2014), citizen satisfaction is an emotional assessment of users after they use a public service of whether their expectations and needs in using it were met. The level of citizen satisfaction reflects how successful and effective the agent is in implementing its public sector activities (Hur, Ko, & Valacich, 2011). E-citizen satisfaction, similarly, refers to "citizen satisfaction with previous usage experiences" with a website (Hur et al., 2011).

Ahmad and Al-Zu'bi (2011) stated that satisfaction is traditionally defined as phenomenon-based cognition. Cognition is usually associated primarily with the expectation/confirmation/disconfirmation paradigm, which states that expectations stem from user beliefs about the level of performance that the public service will deliver. Citizen satisfaction is also related to the size and direction of disconfirmation, which indicates the difference between post-usage public service performance evaluations and the expectations held prior to usage. According to Jin and Park (2006), citizen satisfaction in online stores with e-retailers depends mainly on the evaluation of various performance attributes, including security and privacy aspects. This satisfaction is important because, in the context of public e-services, users can be lost if they cannot access the website or if their experience with public sector e-services is not satisfactory (Chung & Shin, 2009). Furthermore, Rambat and Hamdani (2006) stated that one way to create citizen satisfaction is to improve service quality because users are the main focus when talking about satisfaction. Laksana (2008) also stated that satisfaction involves a comparison between the perceived quality of the public service and the expected quality.

*H7: E-service quality has a positive and significant impact on citizen satisfaction in the public sector.*

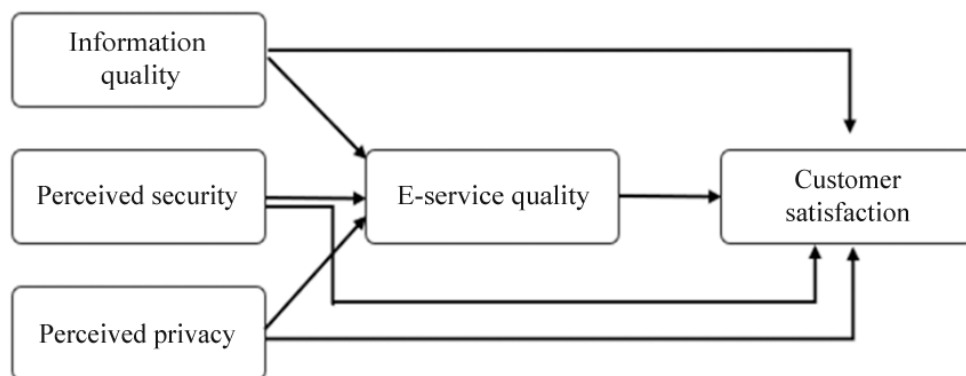


Figure 1. Research framework.

Figure 1 illustrates how information quality, perceived security, and perceived privacy are hypothesized to relate to e-service quality, as well as the hypothesized impact of all four variables on customer satisfaction.

### 3. METHOD

The research adopted a quantitative approach. The type of research used is causal descriptive, where according to Zikmund, Babin, Carr, and Griffin (2013), descriptive research describes the characteristics of objects, humans, groups, organizations, or the environment. According to Sekaran and Bougie (2013), a causal study is conducted to pinpoint the cause and effect between two or more variables. The variables used in this study were information quality, perceived security, and perceived privacy as endogenous variables, and e-service quality and citizen satisfaction as exogenous variables. Data was collected by distributing questionnaires to online users of public administration sites who had used the sites at least twice. A sample of 150 people was recruited using the nonprobability sampling method in Bandung, West Java, Indonesia. The analytical technique used was structural equation modeling (SEM).

Ghozali (2008) explained that partial least squares (PLS) is an analytical method that does not require the assumption to be met that data is measured at a certain scale with a small number of samples. Besides being used to confirm a theory, PLS can also be used to explain whether or not there is a relationship between latent variables. In PLS, two model evaluations are carried out: the outer model (measurement model) and the inner model (structural model). The outer model defines how each indicator block relates to its latent variable. The outer model is evaluated with reflexive indicators using convergent validity, discriminant validity or average variance extracted (AVE), and composite reliability. Meanwhile, the inner model describes the relationship between latent variables based on substantive theory. The inner model is evaluated by looking at the R-squared for each latent dependent variable. Changes in the value of the R-squared can be used to assess the effect of certain independent latent variables on the latent dependent variable.

#### 4. RESULTS AND DISCUSSION

The results of the analysis showed convergent validity. This validity type is fulfilled if each indicator's factor loading value is  $> 0.6$ . The results of the convergent validity test through the loading factor show that the 24 items are all valid. An AVE value greater than 0.5 indicates that the items in a variable have sufficient convergent validity. The AVE value of citizen satisfaction is 0.644, e-service quality 0.901, information quality 0.681, perceived privacy 0.764, and perceived security 0.595. Table 1 shows that all variables have AVE values greater than 0.5, which means they have convergent validity.

Table 1. Loading and average variance extracted (AVE).

Variable	Indicator	Loading	Average variance extracted (AVE)
Citizen satisfaction	CS1	0.860	0.644
	CS2	0.767	
	CS3	0.820	
	CS4	0.726	
	CS5	0.834	
E-service quality	ESQ1	0.898	0.901
	ESQ2	0.990	
	ESQ3	0.987	
	ESQ4	0.918	
Information quality	IQ1	0.707	0.681
	IQ2	0.869	
	IQ3	0.889	
Perceived privacy	PP1	0.837	0.764
	PP2	0.860	
	PP3	0.860	
	PP4	0.877	
	PP5	0.917	
	PP6	0.890	
Perceived security	PS1	0.798	0.595
	PS2	0.771	
	PS3	0.752	
	PS4	0.724	
	PS5	0.813	
	PS6	0.767	

A construct or variable is declared to have discriminant validity if the construct or variable is completely different from other constructs or variables. The discriminant validity of the variables was thus examined. The simplest test for discriminant validity is to compare the root of the AVE value of the two constructs with the correlation value between the two constructs. The root of the AVE value must be greater than the root of the

correlation value. Table 2 shows that the AVE value root of each variable is greater than the correlation value root, which means that the instrument has discriminant validity.

Tale 2. Discriminant validity.

Variable	Citizen satisfaction	E-service quality	Information quality	Perceived privacy	Perceived security
Citizen satisfaction	0.803				
E-service quality	0.696	0.949			
Information quality	0.459	0.336	0.825		
Perceived privacy	0.619	0.515	0.152	0.874	
Perceived security	0.631	0.433	0.034	0.468	0.771

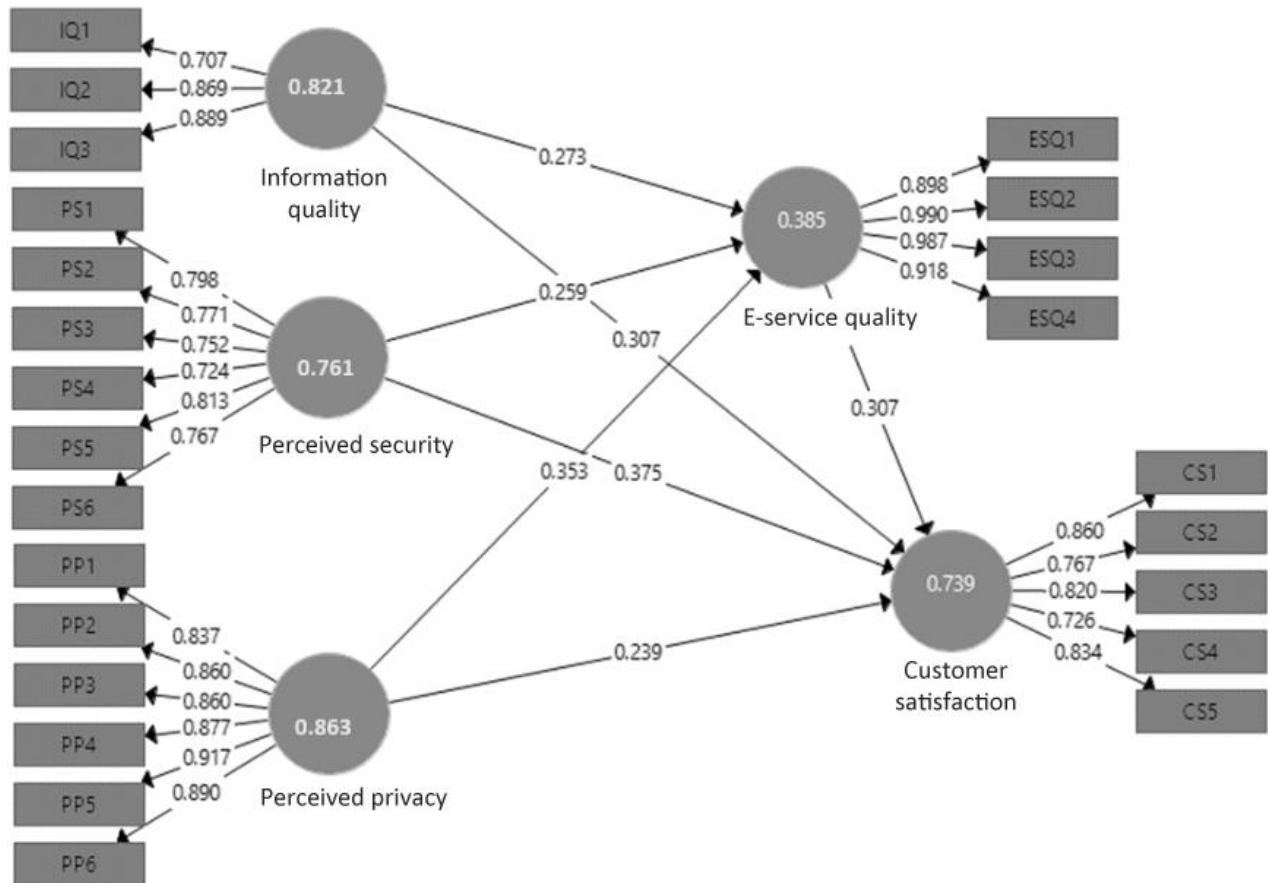


Figure 2. Outer model path diagram.

Figure 2 illustrates the outer model path diagram values obtained using SmartPLS 3.0.

In addition to the validity test, the researcher also conducted a reliability test. To determine the reliability of each construct of this study, each construct's composite reliability and Cronbach's alpha values were examined. According to Abdillah and Hartono (2015), a Cronbach's alpha coefficient of at least 0.6 indicates that the questionnaire has a fairly good level of reliability.

Table 3. Composite reliability and Cronbach's alpha values.

Variable	Cronbach's alpha	Composite reliability
Citizen satisfaction	0.861	0.900
E-service quality	0.963	0.973
Information quality	0.786	0.864
Perceived privacy	0.938	0.951
Perceived security	0.866	0.898

The results of the reliability test in Table 3 show that the research variables can be said to be reliable (Cronbach's alpha values are greater than 0.6) and can thus be used as an instrument to measure the variables specified in this study. Model accuracy in PLS is measured using R-squared ( $R^2$ ) and the path coefficient (PC). The structural model (inner model) can be analyzed with the  $R^2$  value in the endogenous latent construct and the t-value in each exogenous latent variable. An R-squared of 0.67 is considered strong, 0.333 moderate, and 0.19 weak (Indrawati, 2015). The path diagram of the inner model in this study is shown in Figure 3.

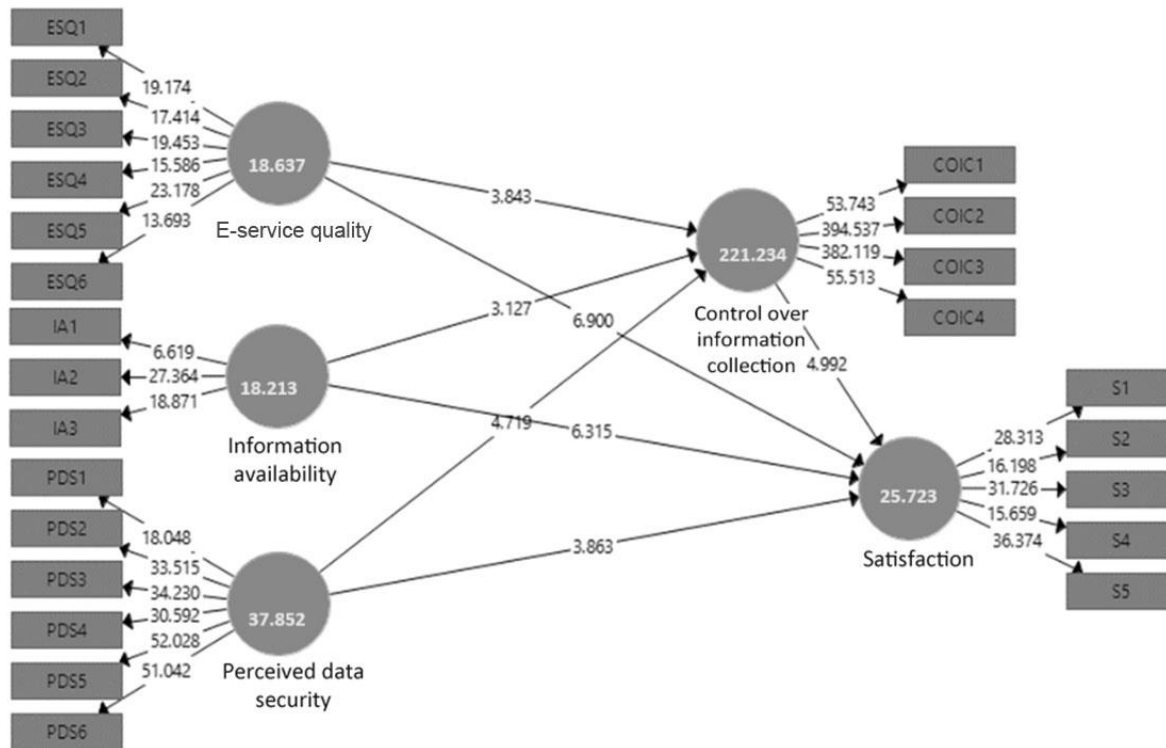


Figure 3. Inner model path diagram.

In Table 4, the results of the analysis show that the R-squared value of citizen satisfaction is 0.739 or 73.9%; this indicates that 73.9% of the variance in the variable of citizen satisfaction can be explained by the variables of information quality, data security, data privacy, and quality of e-security. The remaining 26.1% is explained by factors not examined in this study. The value of 0.739 is considered strong because it is above 0.67. Next, the results of the analysis show that the R-squared value of e-service quality is 0.385, indicating that 38.5% of the variance in the e-service quality variable can be explained by the information quality, data security, and data privacy variables, while the remaining 61.5% is due to other factors. This value is moderate because it is greater than 0.333.

Table 4. R-squared.

Variable	R-squared
Citizen satisfaction	0.739
E-service quality	0.385

According to Höck and Ringle (2010) and Indrawati (2015), to check whether the independent variable has an effect and the direction of the relationship, the T-stat must be calculated for the path coefficients. Path coefficients must have a T-stat greater than 1.96. This value is obtained from the T-table with a confidence level of 0.05.

Based on Table 5, the results of the hypothesis testing can be obtained. The effect of information quality on e-service quality was significant with a T-stat of 3.066 > 1.96 and a p-value of 0.002 < 0.50. Furthermore, the effect of information quality on citizen satisfaction was significant with a T-stat. of 6.161 > 1.96 and a p-value of 0.00 < 0.50.

Thus, H1, stating that information quality affects e-service quality, and H2, stating that information quality affects citizen satisfaction, are accepted. These findings are supported by research conducted by [Riza and Sutopo \(2017\)](#) and [Wijaya \(2018\)](#), which showed that information quality positively affects citizen satisfaction.

**Table 5.** Direct, indirect, and total effects.

Variable	Direct		Indirect		Total	
	Tvalue	Pvalue	Tvalue	Pvalue	Tvalue	Pvalue
E-service quality -> Citizen satisfaction	5.035	0.000			5.035	0.000
Information quality -> Citizen satisfaction	6.161	0.000	2.295	0.022	10.295	0.000
Information quality -> E-service quality	3.066	0.002			3.066	0.002
Perceived privacy -> Citizen satisfaction	4.083	0.000	3.401	0.001	6.664	0.000
Perceived privacy -> E-service quality	4.526	0.000			4.526	0.000
Perceived security -> Citizen satisfaction	6.934	0.000	2.869	0.004	8.505	0.000
Perceived security -> E-service quality	3.915	0.000			3.915	0.000

The effect of perceived security on e-service quality was significant with a T-stat of  $3.915 > 1.96$  and a  $p$ -value of  $0.000 < 0.50$ . Furthermore, the effect of perceived security on citizen satisfaction was significant with a T-stat of  $6.934 > 1.96$  and a  $p$ -value of  $0.000 < 0.50$ . Thus, H3, stating that perceived security affects e-service quality, and H4, stating that perceived security affects citizen satisfaction, are accepted. The results of this study are supported by empirical evidence from the research of [Jin and Park \(2006\)](#) and [Chung and Shin \(2009\)](#), who found a positive effect of security on online citizen satisfaction.

The effect of perceived privacy on e-service quality was significant with a T-stat of  $4.526 > 1.96$  and a  $p$ -value of  $0.000 < 0.50$ . Also, the effect of perceived privacy on citizen satisfaction was significant with a T-stat of  $4.083 > 1.96$  and a  $p$ -value of  $0.000 < 0.50$ . Thus, H5, stating that perceived privacy affects e-service quality, and H6, stating that perceived privacy affects citizen satisfaction, are accepted. The results of this study align with the empirical evidence obtained by [Jin and Park \(2006\)](#) and [Ahmad and Al-Zu'bi \(2011\)](#). This means that the better the perception of online user privacy, the higher the satisfaction that the user will experience.

The effect of e-service quality on e-citizen satisfaction was significant with a T-stat of  $5.035 > 1.96$  and a  $p$ -value of  $0.00 < 0.50$ . Thus H7, which states that e-service quality affects e-citizen satisfaction, is accepted. The direction of the positive relationship indicates that an increase in e-service quality will result in an increase in citizen satisfaction. As the relationship was significant, the e-service quality and citizen satisfaction variables apply to the entire population where the sample in this study was taken. The findings are supported by [Tjiptono \(2012\)](#), who noted that services that are managed properly will contribute positively to citizen satisfaction. Similarly, [Heskett, Jones, Loveman, Sasser, and Schlesinger \(1994\)](#) said that internal and external service quality affect citizen satisfaction. Furthermore, based on the results of testing the indirect effect, e-service quality mediates the effects of information quality, perceived security, and perceived privacy on citizen satisfaction. This indicates that information quality and perceived security and privacy affect the perceived quality of public e-services, which in turn has implications for citizen satisfaction.

## 5. CONCLUSION

This study has succeeded in confirming previous suppositions on the positive impact of information quality, perceived security, and perceived privacy on e-service quality and the satisfaction of citizens who access public administration services via the internet. Though the study involved survey research into various variables of public e-services, it still has certain limitations. First, in terms of its research subjects, it only examined users of public e-services in Bandung who had previously made use of online services, and it used a relatively small sample. In the future, it may be possible to conduct research using a larger number of subjects with more diverse backgrounds to further test the research model. Furthermore, this study used the variables of information quality, perceived



security, and perceived privacy; however, it is possible that several other important variables affect e-service quality and online citizen satisfaction. Therefore, in future research, other variables should be included in the research model, such as the website's design and ease of access and the reputation of public e-services providers.

**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** Both authors contributed equally to the conception and design of the study.

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