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Integrating ISSM and SCT into the TAM framework: a conceptual model and empirical study of e-government services

Beny Prasetyo*[1], Rindi Ayuningtiyas[1], Fahrobby Adnan[1]
Department of Information Systems, Faculty of Computer Science, University of Jember, East Java, Indonesia[1]

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*Corresponding author.
Beny Prasetyo
E-mail address:
beny.pssi@unej.ac.id

Abstract

Proposing and developing the right model is necessary to increase the effectiveness and success of e-government service implementation. Combining models that highlight technological aspects and psychological issues can generate satisfaction and improve service quality. This research develops and tests a combination of the Information System Success Model (ISSM), Technology Acceptance Model (TAM), and Social Cognitive Theory (SCT). This research aims to determine the results of the fit model test for the proposed model and empirically test the factors that significantly affect the success of e-government through satisfaction. To validate the conceptual model, PLS-SEM is used. The type of research conducted is quantitative. The sample used to test the model consisted of SiKeren service users in the Jember Regency Government, totaling 260 samples, determined using Hair's theory and probability sampling techniques, particularly simple random sampling. The results of this study indicate that the proposed model is suitable. The Standardized Root Mean Square Residual (SRMR) value of 0.070 or < 0.08 indicates that the model is considered to be supported by the measured data. The Goodness of Fit (GoF) value is 0.686, indicating a strong match between the observed data and the developed model. The model effectively captures the R-Square value for Perceived Ease of Use, Perceived Usefulness, and Satisfaction, which have medium criteria with values of 0.595, 0.724, and 0.606, respectively. Of the 16 hypotheses proposed, 12 were accepted, and 4 were rejected. This study found that Perceived Ease of Use and Perceived Usefulness are influenced by the constructs of the IS success model, except that the system quality variable on Perceived Usefulness is not significant. This study also found that TAM factors significantly influence computer self-efficacy and satisfaction. The anxiety variable is not significant to the TAM factor and the cognitive theory of Computer Self-Efficacy. The overall relationship between the analyzed variables has a small effect size.

1. Introduction

In the application of information technology, the government provides online facilities to deliver services and information to citizens and stakeholders [11]. E-government was developed to improve the quality of public services and increase transparency and user participation [11] [29]. E-government services include a wide variety of digital platforms and applications that can be used to access government, administrative, and service information [36]. In its implementation, increasing the number of users who utilize e-government is crucial for assessing its success [1] [23]. In the context of mandatory e-government, frequent use of services does not necessarily indicate successful e-government services; rather, satisfaction can be a better measure of the success of e-government implementation. If satisfaction is low, then e-government implementation is considered unsuccessful [1]. Therefore, a model is needed that integrates technological aspects and psychological issues to produce decisions in the form of satisfaction [2]. Models that understand the relationship between the use of e-government services and satisfaction can improve service quality [1].

Various previous studies on e-government have been conducted in different contexts. Research discussing the success of e-government is still limited, and further studies are needed to propose and validate the appropriate model for describing the success of e-government services [10]. In the literature regarding the adoption of e-government services, the development and validation of integrated models from the Information System (IS) success and the Technology Acceptance Model (TAM) have been used to analyze user satisfaction with e-government services [1] [10] [23]. Evidence from the IS literature shows that the Information System Success Model (ISSM) and the Technology Acceptance Model (TAM) are the most validated and cited models [1] [10] [11]. Some studies employ the ISSM, using three dimensions, namely system quality, service quality, and information quality, to measure the quality of e-government services [4] [27]. The structure that supports the ISSM greatly influences user satisfaction when using e-government services [10] [28]. Despite extensive research on the ISSM, there is still ongoing debate regarding the most appropriate construct for measuring IS success [10]. The Technology Acceptance Model is a widely applied theoretical framework that validates the field of information systems by proposing perceived ease of use and perceived usefulness [5]. In the context of e-government, previous studies have investigated perceived ease of use and perceived usefulness as determinants of e-government service adoption [1] [10] [23]. Moreover, the actual success of e-government development is more complex than simply assessing technology acceptance [27]. In the psychology domain, cognitive theory is the most cited in describing user satisfaction with e-government services [2] [6]. The literature suggests that views on self-efficacy, mental states, and certain behaviors related to satisfaction impact the sustainability of using the implemented technology [2] [6] [19]. Satisfaction measures psychological feelings derived from cognitive assessments of the use of e-government services [1] [2] [23].

The main objective of this research is to develop and test a combination of IS success models namely the Information System Success Model (ISSM) [4] and the Technology Acceptance Model (TAM) [5], as well as cognitive theory [6], in the context of e-government services to improve performance, user engagement, and quality in e-government services. Researchers construct models by combining the ISSM using System Quality, Information Quality, Service Quality, and Satisfaction variables [1] [2] [4] [11]. The Technology Acceptance Model (TAM) is added with variables of Perceived Ease of Use and Perceived Usefulness [1] [5] [10] [23], and Social Cognitive Theory includes variables of Computer Self-Efficacy [2] [6] [19] [27] and Anxiety [3] [6]. This research focused on understanding the constructs that affect user satisfaction with e-government services [1] [10] [23]. This study uses user satisfaction as the dependent variable to assess the success of e-government service implementation [1] [23]. Research data were collected through questionnaires distributed to SiKeren service users in the Jember Regency Government. The data analysis process uses PLS-SEM. This research is expected to reveal the results of the fit model test of the developed model and empirically test the factors that significantly effect on the success of e-government through satisfaction factors.

2. Research Method

2.1 Previous Research

Previous research on e-government adoption relates to technology and additional factors to consider. Table 1 shows previous research on e-government adoption. Most of the concepts are taken from the TAM [5], ISSM [4], and SCT [6].

Table 1. Previous Research in E-Government

Author	Main Model	Antecedents	Mediating	Moderating	Consequence
Alkraiji (2020) [1]	ISSM, TAM, Trust	Perceived System Quality, Perceived Information Quality	Perceived Ease of Use, Perceived Usefulness, Trust E-Government	-	Perceived Citizen Satisfaction
Alruwaie et al. (2020) [2]	ISSM, SCT, ECT, E-Servqual	Information Quality, Prior Experience, Service Quality, Social Influence	Self-Efficacy, Personal Outcome Expectation, Satisfaction	-	Continuance Intention
Alrahmi et al (2022) [10]	ISSM, TAM, Perceived Trust	Service Quality, Information Quality, System Quality, Perceived Trust	Perceived Usefulness, Perceived Ease of Use, Behavior Intention to Use E-Government, Attitude Towards Use E-Government	-	User Satisfaction with E-Government
Rehman Ur Hidayat et al. (2023) [11]	ISSM, TAM, ISSM, TAM, Perceived Trust, Perceived Awareness	Information Quality, System Quality, Service Quality, Perceived Trust	Use of E-Government, Perceived Usefulness, User Satisfaction	Perceived Awareness	Perceived Net Benefits
Alkraiji (2020) [23]	ISSM, TAM	Perceived System Quality, Perceived Information Quality, Perceived Ease of Use	Perceived Usefulness	-	Citizen Satisfaction

Kaushik & Mishra (2019) [3]	ISSM, TAM, SCT, UTAUT	Perceived Information Quality, Technology Anxiety	Performance Expectancy, Effort Expectancy	-	Adoption of E-Government Websites

Several empirical and conceptual studies have focused on research regarding e-government adoption [3]. The Technology Acceptance Model (TAM) and Information System Success Model (ISSM) are the theoretical models that have been validated by previous research on the adoption of e-government services [1] [10] [23]. Most research focuses only on technological aspects, while research on user-related factors is still limited [19]. Social Cognitive Theory (SCT) has been validated as a theory that can assess personal factors in service users [2].

2.2 Information System Success Model (ISSM)

In utilizing information technology to improve work efficiency, DeLone & McLean proposed the concept and developed the Information System Success Model (ISSM), which consists of three dimensions, namely System Quality, Service Quality, and Information Quality [4]. Many previous studies have employed the ISSM to evaluate the success of e-government implementation and make further investments [10] [11]. In addition, IS success is suitable for enhancing newly implemented or frequently used e-government services [11]. The ISSM provides a more comprehensive framework for assessing the success of information system implementations by considering both users and systems [35].

2.3 Social Cognitive Theory (TAM)

This learning is about individual behavior models [2]. This theory considers behavior and social conditions [19]. There is still further scope to identify other constructs to explain the phenomenon of e-government adoption, such as anxiety, which has received less attention [3]. Computer Self-Efficacy refers to the belief in the user's ability to perform tasks using technology [2]. Studies include cognitive theories to test satisfaction, which is useful for understanding actual system users [33].

2.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is used to describe user behavior and attitudes in the acceptance and utilization of new technology [5]. This model is a straightforward framework that can trace the influence of external variables on internal variables [1] [23]. In previous research, the Perceived Ease of Use and Perceived Usefulness variables strongly influence users in adopting e-government services [1] [11]. TAM was developed to improve accuracy, with Perceived Ease of Use and Perceived Usefulness identified as factors that influence technology acceptance [10].

2.5 Conceptual Model and Hypothesis

Conceptual modeling of validated and significant variables with similar contexts is essential. System Quality variables show the strongest direct influence on building satisfaction and contribute to e-government services [1] [23]. Information Quality variables are an important factor for the success of e-government [3]. Information quality variables influence people's ability and determine their overall decisions [2]. Service quality variables play an important role because they have the most significant influence on satisfaction [2]. For user satisfaction and acceptance of e-government services, System Quality, Information Quality, and Service Quality variables are significant [11]. The anxiety variable is a key factor for understanding user attitudes towards technology [3]. The variables perceived ease of use and perceived usefulness significantly mediate the relationship between the variables that influence the Information System Success Model (ISSM) and satisfaction in the context of e-government [1] [10]. The Computer Self-Efficacy variable is a self-assessment factor that influences decisions [2]. The satisfaction variable is the appropriate dependent variable for measuring the success of e-government service studies [2]. In the context of mandatory users, satisfaction is the relevant variable [1] [23].

This research develops a conceptual model by combining the Information System Success Model (ISSM), which consists of constructs of Service Quality, Information Quality, System Quality, and Satisfaction [1] [2] [4] [11], with the Technology Acceptance Model (TAM), which includes constructs of Perceived Ease of Use and Perceived Usefulness [1] [5] [10] [23], and Social Cognitive Theory (SCT), which comprises constructs of Computer Self-Efficacy [2] [6] [19] [27] and anxiety [3] [6]. The developed research model includes 8 variables and 26 indicators. Figure 1 shows the results of the conceptual model.

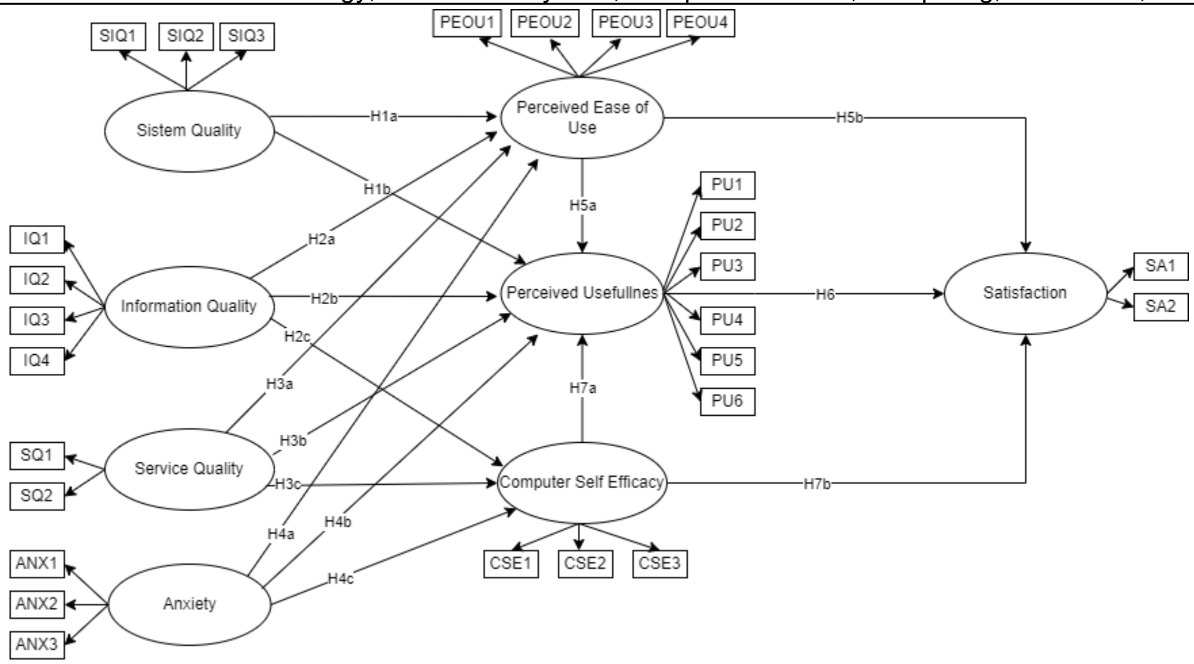

Figure 1. The Proposed Conceptual Model

2.5.1 System Quality (SIQ)

System Quality is used to measure the effectiveness of technology [4]. Previous research validates the significant correlation of System Quality variables with Perceived Ease of Use and Perceived Usefulness. The quality of the e-government system correlates with user convenience, providing fast and reliable access and positive and significant support [1] [10] [16]. When using e-government services, perceived usefulness will increase if the service provider offers a good system of quality [11] [17]. The proposed hypotheses are:

H1a: System Quality (SIQ) has a positive and significant effect on Perceived Ease of Use (PEOU)
H1b: System Quality (SIQ) has a positive and significant impact on Perceived Usefulness (PU)

2.5.2 Information Quality (IQ)

Information Quality is used to measure the success of information delivery [4]. Previous research validated the correlation of Information Quality variables with Perceived Ease of Use, Perceived Usefulness, and Computer self-efficacy, and the results were significant. E-government services become more interactive, increasing user convenience [10] [11] [18]. Information quality corresponds to the assessment of citizens regarding whether the information provided is accurate, complete, clear, and timely, thereby providing positive and significant support in task completion [1] [11] [17]. Information quality influences people's ability to access and read information and determines their overall decisions [5] [22]. The proposed hypotheses are:

H2a: Information Quality (IQ) has a positive and significant effect on Perceived Ease of Use (PEOU)
H2b: Information Quality (IQ) has a positive and significant effect on Perceived Usefulness (PU)
H2c: Information Quality (IQ) has a positive and significant effect on Computer Self-Efficacy (CSE)

2.5.3 Service Quality (SQ)

Service Quality is essential for improving the efficiency of public services [4]. Previous research has validated the correlation between Service Quality and Perceived Ease of Use, Perceived Usefulness, and Computer-Self Efficacy, with significant results. Quality services can optimize the e-government process, creating a significantly positive relationship between service quality and perceived ease of use [11] [18]. A high level of Service Quality provides users with more comfortable access, thus significantly impacting Perceived Usefulness from the perspective of e-government adoption [10] [11]. Service Quality can also act as a motivation or an external stimulus for self-efficacy [2] [24]. The proposed hypotheses are:

H3a: Service Quality (SQ) has a positive and significant effect on Perceived Ease of Use (PEOU)
H3b: Service Quality (SQ) has a positive and significant effect on Perceived Usefulness (PU)
H3c: Service Quality (SQ) has a positive and significant effect on Computer Self-Efficacy (CSE)

2.5.4 Anxiety (ANX)

Anxiety is the body's natural reaction to stress, characterized by feelings of fear or worry experienced by users when using technology [3]. Previous research has validated a significant correlation between Anxiety and Perceived Ease of Use, Perceived Usefulness, and Computer Self-Efficacy. In this study, Anxiety emerged as a major issue affecting technology use among adults, particularly the elderly, highlighting a negative relationship with perceived ease of use [12] [13]. Anxiety also has a negative relationship with perceived usefulness, as supported by the results [13] [22] [25]. Furthermore, anxiety has a negative and significant effect on computer self-efficacy [14][15]. The proposed hypotheses are:
H4a: Anxiety (ANX) has a negative and significant effect on Perceived Ease of Use (PEOU)
H4b: Anxiety (ANX) has a negative and significant effect on Perceived Usefulness (PU)
H4c: Anxiety (ANX) has a negative and significant effect on Computer Self-Efficacy (CSE)

2.5.5 Perceived Ease of Use (PEOU)

Perceived Ease of Use measures the extent to which a person believes that using a particular system does not require effort [5]. Previous research validates the significant correlation between Perceived Ease of Use (PEOU) and Perceived Usefulness (PU), and Satisfaction. In the context of e-government, the impact of PEOU on PU makes sense from a conceptual point of view because user ease results in less effort required to use online services for completing tasks [1] [16] [17] and provides positive and significant support for the relationship between PEOU and PU [16] [17]. Perceived Ease of Use has a positive relationship with Satisfaction [10]. The proposed hypotheses are:
H5a: Perceived Ease of Use (PEOU) has a positive and significant effect on Perceived Usefulness (PU)
H5b: Perceived Ease of Use (PEOU) has a positive and significant effect on Computer Self-Efficacy (CSE)

2.5.6 Perceived Usefulness (PU)

Perceived Usefulness measures the extent to which a person believes that using a particular system increases job performance [5]. Previous research has validated a significant correlation between Perceived Usefulness and Satisfaction. There is a causal relationship between Perceived Usefulness and Satisfaction factors regarding the required e-government services [1] [26]. The proposed hypothesis is:
H6: Perceived Usefulness (PU) has a positive and significant effect on Satisfaction (SA)

2.5.7 Computer Self-Efficacy (CSE)

Computer Self-Efficacy is the user's perception of their ability to perform certain computer activities [6]. Previous research validates the significant correlation of Computer Self-Efficacy variables with Perceived Usefulness and Satisfaction. Self-Efficacy positively affects Perceived Usefulness [13] [20]. Self-Efficacy has a positive and significant influence on Satisfaction [2] [19] [21]. The proposed hypotheses are:
H7a: Computer Self-Efficacy has a positive and significant effect on Perceived Usefulness (PU)
H7b: Computer Self-Efficacy has a positive and significant effect on Satisfaction (SA)

2.6 Sample

The research respondents were SiKeren service users within the Jember Regency Government. The number of samples was determined using Hair's theory [7]. To determine the sample size, it is better to have a required sample size that is 10 times the number of indicators [7]. In this study, 26 indicators were used, so the number of samples is 260. This study uses probability sampling, specifically simple random sampling [8], because the number of each category and the total population is unknown.

2.7 Research Instrument

The instrument was developed from a review of the literature and previous research that has been adapted to the object of study. The instrument used in this study consisted of 26 questions, utilizing a four-point Likert scale representing the values: strongly disagree, disagree, agree, and strongly agree. Variables with negatively keyed items, such as anxiety, were reverse-scored [32].

2.8 Validity Testing

The validity test is used to understand how well the indicator represents the measured variable. Validity is tested by checking convergent validity, specifically the outer loading value, which should be > 0.7, and the Average Variance Extracted (AVE) value, which should be > 0.5 [7]. Furthermore, discriminant validity is checked by ensuring that the Cross-Loading value for each item has a higher correlation with the variable it measures and lower correlation with other variables, with a critical value > 0.7. The square root value of the AVE must also be higher than the correlation of other constructs using Fornell-Larker [7].

2.9 Reliability Testing

A reliability test assesses the consistency of a measurement instrument. It is conducted by evaluating Composite Reliability (CR) > 0.7 and Cronbach's Alpha (CA) > 0.7 [7].

2.10 Data Analysis

2.10.1 Model Fit Test

The model fit test is used to assess the level of conformity between the developed model and the research data [7]. The model fit test evaluates the Standardized Root Mean Square (SRMR), which should be < 0.08, and the Goodness-of-fit (GoF) with value criteria (0.36 high; 0.25 medium; and 0.1 low) [7].

2.7.2 Structural Model Analysis

Structural model analysis is used to check the relationships between the variables of the proposed model [7]. Path Coefficient testing employs the bootstrapping method with a significant level of 5% (0.05). The Original Sample value (O) indicates whether the correlation between variables is positive or negative. A t-value > 1.96 and a p-value < 0.05 are required, along with R-Square criteria values (0.75 strong; 0.50 medium; and 0.25 weak) [7]. The effect size value is assessed with criterion value ($f^2 \geq 0.8$ large, $0.5 \leq f^2 \leq 0.7$ medium, and $f^2 \leq 0.2$ or 0.2 $f^2 \leq 0.4$ small) [9].

3. Results and Discussion

3.1 Data Collection

In this study, 260 respondents were SiKeren service users. Data were collected through both online and offline distribution. The demographic characteristics of the respondents are shown in Table 2.

Table 2. Demographic Characteristics of Respondents

Item	Characteristics	Frequency	Item	Characteristics	Frequency
Gender	Female	136	Education	Undergraduate	207
	Male	124		Graduate	24
Age	20 – 30	23		Ph.D.	-
	31 – 40	55	Agency of Origin	Elementary School	110
	41 – 50	92		Junior High School	26
	> 50	90		Community Health Center	29
Education	Diploma	29		Regional Government Office	95

Table 2 shows that the majority of respondents were female, with an average age range of 41 to 50. Most respondents were undergraduate graduates, and the majority of respondents' agency of origin was ASN in Public Elementary Schools in Jember Regency.

3.2 Validity Testing

3.2.1 Convergent Validity

Convergent Validity was tested by ensuring the Outer Loading value was > 0.7 and the Average Variance Extracted (AVE) value was > 0.5 [7]. The result of convergent validity test results is shown in Table 3.

Table 3. Convergent Validity Test results

Variable	Item	Outer Loading	AVE	Variable	Item	Outer Loading	AVE
System Quality	SIQ1	0.827	0.809	Computer Self-Efficacy	CSE1	0.826	0.782
	SIQ2	0.912			CSE2	0.908	
	SIQ3	0.955			CSE3	0.916	
Information Quality	IQ1	0.917	0.715	Perceived Ease of Use	PEOU1	0.883	0.782
	IQ2	0.897			PEOU2	0.892	
	IQ3	0.745			PEOU3	0.886	
	IQ4	0.811			PEOU4	0.877	
Service Quality	SQ1	0.980	0.966	Anxiety	ANX1	0.853	0.795
	SQ2	0.986			ANX2	0.929	
Perceived Usefulness	PU1	0.837	0.776	Satisfaction	SA1	0.862	0.809
	PU2	0.937			SA2	0.932	
	PU3	0.888					
	PU4	0.946					

PU5	0.923
PU6	0.738

Table 3 shows that the Outer Loading values for all indicators are > 0.7. This indicates that each latent variable has been successfully explained by its indicator. The Average Variance Extracted (AVE) value for all variables is > 0.5, indicating that each indicator strongly correlates with the latent variable. The construct explains more than 50% of the variance of its indicators, suggesting that convergent validity has been achieved.

3.2.2 Discriminant Validity

Discriminant validity is assessed by analyzing the cross-loading value with a critical value > 0.70 and the square root value of the AVE [7]. The test results of each item's cross-loading value have met the critical value of > 0.70, being higher with the variable it measures and lower with other variables. The square root of the AVE value using Fornell-Larcker is shown in Table 4.

Table 4. Square Roots of AVE

Variable	SIQ	IQ	SQ	PEOU	PU	CSE	ANX	SA
SIQ	0.900							
IQ	0.437	0.845						
SQ	-0,002	0.144	0.983					
PEOU	0.497	0.788	0.302	0.884				
PU	0.130	0.438	0.411	0.788	0.881			
CSE	0.448	0.446	0.495	0.630	0.292	0.884		
ANX	-0.076	-0.019	0.573	0.293	0.380	0.233	0.891	
SA	0.644	0.618	0.105	0.578	-0.001	0.408	0.098	0.898

Based on Table 4, each variable exhibits a higher correlation with itself than the correlation value with other variables.

3.3 Reliability Testing

The reliability test is conducted by assessing Composite Reliability (CR) and Cronbach's Alpha (CA) > 0.7 [7]. The results of the reliability testing for each variable used in the research instrument are shown in Table 5.

Table 5. Reliability Testing Results

Variable	Composite Reliability (CR)	Cronbach's Alpha (CA)
System Quality	0.927	0.904
Information Quality	0.909	0.865
Service Quality	0.983	0.965
Perceived Ease of Use	0.935	0.907
Perceived Usefulness	0.954	0.941
Computer Self-Efficacy	0.915	0.860
Anxiety	0.885	0.749
Satisfaction	0.892	0.765

According to Table 5, all variables have a Composite Reliability (CR) and Cronbach's Alpha (CA) value > 0.7, indicating that they are reliable. These variables will yield consistent results when repeated assessments use the same instrument.

3.4 Model Fit Test

The model fit test results are used to determine how the model is applied. Model fit can be assessed from the Standardized Root Mean Square Residual (SRMR) value, which should be < 0.08. The SRMR value obtained is 0.070 or < 0.08, indicating that the model fits the measured data well.

The Goodness of Fit (GoF) value is calculated by multiplying the average AVE root value by the average R-squared value. The formula for calculating the GoF value is shown in Equation 1.

$$GoF = \sqrt{\overline{AVE} \times \overline{R^2}} \tag{1}$$
$$= \sqrt{0.804 \times 0.586} = 0.686$$

From the calculation of the GoF value, the result is 0.686, which indicates that the model has a high match between the observed data and the developed model.

3.5 Structural Model Analysis

Structural model analysis begins by examining the R-squared value. R-squared refers to the proportion of variance in the dependent variable predicted by the independent variable [1]. The R-Square results on four variables consist of Perceived Ease of Use at 0.595 (59.5%, medium), Perceived Usefulness at 0.724 (72.4%, medium), Computer Self-Efficacy at 0.422 (42.2%, weak), and Satisfaction at 0.606 (60.6%, medium). The Perceived Ease of Use, Perceived Usefulness, and Satisfaction variables are well captured by the model, with R-Square values of 0.595, 0.724, and 0.606. This indicates that most of the variance in assessing Perceived Ease of Use, Perceived Usefulness, and Satisfaction can be explained by certain factors that act as predictors.

Furthermore, the Path Coefficient was tested using the bootstrapping method at a significant level of 5% (0.05). The hypothesis is significant if the T-statistic value > 1.96 and the P-value < 0.05. For variables that have a positive influence on other variables, the original sample value is positive; if they have a negative impact, the original sample value is negative [7]. Furthermore, in the structural model analysis, the effect size is examined. Effect size determines the magnitude of a variable's correlation or influence on another variable. The hypothesis testing and effect size values are presented in Table 6.

Table 6. Hypothesis Testing Results

Hypothesis	Path	Original Sample	T-statistics	P-value	Decision
H1a	SIQ → PEOU	0.308	3.989	0.000	Accepted
H1b	SIQ → PU	0.086	1.512	0.131	Rejected
H2a	IQ → PEOU	0.416	6.413	0.000	Accepted
H2b	IQ → PU	0.118	1.974	0.049	Accepted
H2c	IQ → CSE	0.484	7.812	0.000	Accepted
H3a	SQ → PEOU	0.156	2.243	0.025	Accepted
H3b	SQ → PU	0.297	4.810	0.000	Accepted
H3c	SQ → CSE	0.218	3.510	0.002	Accepted
H4a	ANX → PEOU	0.015	0.351	0.726	Rejected
H4b	ANX → PU	0.017	0.471	0.638	Rejected
H4c	ANX → CSE	0.049	0.967	0.334	Rejected
H5a	PEOU → PU	0.367	4.548	0.000	Accepted
H5b	PEOU → SA	0.233	2.258	0.024	Accepted
H6	PU → SA	0.403	3.510	0.002	Accepted
H7a	CSE → PU	0.128	2.180	0.030	Accepted
H7b	CSE → SA	0.217	3.057	0.002	Accepted

Based on Table 6, in testing the 16 proposed hypotheses, 12 were accepted, and 4 were rejected. As shown in Table 6, Hypothesis H1a proposed a positive and significant influence between System Quality and Perceived Ease of Use, with the results supporting this hypothesis (t-statistic = 3.989 > 1.96, p-value = 0.000 < 0.05). Empirical evidence supports these findings [1] [23], indicating that a high-quality e-government system can make it easier for users to utilize e-government services. System quality in e-government services is easy to use and useful [10]. Hypothesis H2b proposes a positive and insignificant influence of System Quality on Perceived Ease of use, with the results not supporting the hypothesis (t-statistic = 1.152 < 1.96, p-value 0.131 > 0.05). Although the system's quality is good, perceived ease of use can be determined more by other factors.

Hypotheses H2a and H3a propose a positive and significant influence between Information Quality and Service Quality on Perceived Ease of Use, with research results supporting this hypothesis (t-statistic = 6.413 > 1.96, p-value = 0.000 < 0.05) and (t-statistic = 2.243 > 1.96, p-value = 0.025 < 0.05). H2a and H3a are consistent with the literature findings, namely that information quality and service quality make e-government services more interactive and optimized to increase user convenience [10] [18]. Service quality and information quality of e-government services determine the extent to which users find e-government services easy to use [10].

Hypotheses H2b and H3b propose a positive and significant influence between Information Quality and Service Quality on Perceived Usefulness, with research results supporting these hypotheses (t-statistic = 1.974 > 1.96, p-value = 0.049 < 0.05) and (t-statistic = 4.810 > 1.96, p-value = 0.000 < 0.05). H2b and H3b align with the literature, indicating that accurate information quality can support task completion [1] [11] [16], and high system quality provides convenient access to complete tasks [10] [11]. Service quality and information quality of e-government services influence the extent to which users find e-government services useful [10].

Hypotheses H2c and H3c propose a positive and significant influence between Information Quality and Service Quality on Computer Self-Efficacy, with results supporting these hypotheses (t-statistic = 7.812 > 1.96, p-value = 0.000 < 0.05) and (t-statistic = 3.510 > 1.96, p-value = 0.002 < 0.05). H2c and H3c are consistent with the literature, indicating that information quality affects people's ability to access e-government services and that users rely on information based on their own experience [2] [19] Additionally, system quality acts as a motivation for self-efficacy [2] [30].

Hypotheses H4a, H4b, and H4c propose a negative and significant influence of Anxiety on Perceived Ease of Use, Perceived Usefulness and Computer Self-Efficacy. However, the results do not support these hypotheses (t-statistic = 0. 351 < 1.96, p-value = 0.726 > 0.05), (t-statistic = 0.471 < 1.96, p-value = 0.638 > 0.05), and (t-statistic = 0.967 < 1.96, p-value = 0.334 > 0.05). The results show that anxiety has no impact on Perceived Ease of Use and Perceived Usefulness, as noted in [31]. This finding implies that the fear of using the application does not affect users. If some respondents are accustomed to using technology in their daily activities, their anxiety levels are low, or they do not allow anxiety to inhibit their perceptions of usability and convenience. Thus, anxiety does not affect users' perceived ease, usability, and ability.

Hypotheses H5a and H7a propose a positive and significant influence of Perceived Ease of Use and Computer Self-Efficacy on Perceived Usefulness, with results supporting these hypotheses (t-statistic = 4.548 > 1.96, p-value = 0.000 < 0.05) and (t-statistic = 2.180 > 1.96, p-value = 0.030 < 0.05). H5a and H7a are consistent with the literature findings that user-friendliness result in less effort in completing tasks [1] [16] [17], and Self-Efficacy refers to the belief in completing a specific task [12] [13] [20].

Hypotheses H5b, H6, and H7b which propose a positive and significant influence between Perceived Ease of Use, Perceived Usefulness, Computer Self-Efficacy on Satisfaction, with the results supporting these hypotheses: (t-statistic = 2. 258 > 1.96, p-value 0.024 = < 0.05), (t-statistic = 3.510 > 1.96, p-value = 0.002 < 0.05), and (t-statistic = 3.057 > 1.96, p-value 0.002 = < 0.05). H5b, H6, and H7b are consistent with previous research supporting the causality between these three variables and satisfaction. The perceived usefulness variable is a determining factor for perceived satisfaction. The ability and confidence regarding the user's capacity to perform certain tasks are related to satisfaction [1] [2] [19].

In the structural model analysis, the effect size (f^2) value is used to determine the magnitude of the effect of an exogenous variable on endogenous variables [34]. Effect Size (f^2) criteria are as follows: a value of $f^2 \geq 0.8$ is considered large, $0.5 \leq f^2 \leq 0.7$ is considered medium, and $f^2 \leq 0.2$ or 0.2 $f^2 \leq 0.4$ is considered small [9]. The following Table 7 is the Effect Size (f^2) table.

Table 7. Effect Size

Hypothesis	Value	Description	Hypothesis	Value	Description
SIQ → PEOU	0.126	Small	ANX → PEOU	0.001	Small
SIQ → PU	0.012	Small	ANX → PU	0.001	Small
IQ → PEOU	0.218	Small	ANX → CSE	0.004	Small
IQ → PU	0.021	Small	PEOU → PU	0.154	Small
IQ → CSE	0.254	Small	PEOU → SA	0.042	Small
SQ → PEOU	0.034	Small	PU → SA	0.152	Small
SQ → PU	0.171	Small	CSE → PU	0.024	Small
SQ → CSE	0.051	Small	CSE → SA	0.049	Small

From the results of Table 7, there are 16 variable relationships that have a small effect. The small effect size value shows a direct correlation with a small magnitude, meaning that changes in one variable have little impact. Effect Size (f^2) can be used to identify variables that warrant further study. The selection of variables does not need to have a large or moderate effect size; they can also have a small effect size [35].

4. Conclusion

This research develops and validates the integration of the Information System Success Model (ISSM), Technology Acceptance Model (TAM), and Social Cognitive Theory (SCT). The results show the proposed model is suitable. Based on the results of the structural model analysis, the fit model test of the developed model has a Standardized Root Mean Square Residual (SRMR) value of 0.070, which is less than 0.08, indicating that the model is considered adequate by the measured data. The Goodness of Fit (GoF) value is 0.686, indicating a high match between the observed data and the developed model. In addition, Perceived Ease of Use, Perceived Usefulness, and Satisfaction are captured well by the model. The R-Square values of 0.595, 0.724, and 0.606, respectively, indicate that most of the variance in assessing Perceived Ease of Use, Perceived Usefulness, and Satisfaction can be explained by certain factors acting as predictors. Of the 16 proposed hypotheses, 12 were accepted and 4 were rejected. According to the research findings, variables with a significant effect, namely System Quality, Service Quality, Information System, Perceived Ease of Use, Perceived Usefulness, and Computer Self-Efficacy, show increased Satisfaction with e-government services. The 16 relationships between the analyzed variables have little effect, meaning that changes in one variable have little impact. Future research can be conducted using similar models developed in different mandatory e-government contexts. Additionally, future research can consider other variables and increase sample coverage.

5. Implications

5.1 Theoretical Implications

This research aims to combine the Information System Success Model (ISSM), Technology Acceptance Model (TAM), and Social Cognitive Theory (SCT) into a conceptual model of mandatory e-government service user satisfaction. The integration of Information System Success Model (ISSM), Technology Acceptance Model (TAM), and Social Cognitive Theory (SCT) expands the theoretical understanding of the factors that influence success in service implementation from technical, individual, social and psychological aspects. Empirical studies incorporating psychological concepts are still limited, and new constructs, especially anxiety constructs, have received less attention. This research extends the IS success model by integrating the main variables from the Information System Success Model (ISSM) with variables of System Quality, Service Quality Information Quality and Technology Acceptance Model (TAM) with variables of Perceived Ease of Use and Perceived Usefulness, along with variables from Social Cognitive Theory (SCT), namely Anxiety and Computer Self-Efficacy, to provide an understanding of the success of mandatory e-government services.

This research advances the theory of mandatory e-government adoption in the field of local government services, which has been little researched. The proposed model can be used to integrate other models by expanding and deepening research on the success of e-government services.

5.2 Practical Implications

Practical implications based on the results of the analysis model are derived from the significant and insignificant relationships found within the model. The system quality variable has a significant effect on Perceived Ease of use but not on Perceived Usefulness, indicating that a good money system is not necessarily considered useful directly by users. Perceived Usefulness may be more determined by the context of use. The Information quality and Service Quality variables have a significant effect on Perceived Ease of Use, Perceived Usefulness, and Computer Self-Efficacy, suggesting that a well-designed system and accurate, relevant information are easier to understand and are perceived as useful by users. The variables Perceived Ease of Use and Computer Self-Efficacy significantly affect Perceived Usefulness, indicating that the development of information systems should focus on user experience to be perceived as optimally useful. The variables Perceived Ease of Use, Perceived Usefulness, and Computer Self-Efficacy are all significant to Satisfaction. This shows that satisfaction is not only related to the system but can also be influenced by personal perceptions and user confidence. Strengthening user abilities through training for users aged 41-50 years can lead to higher levels of satisfaction. The insignificant anxiety variable concerning Perceived Ease of Use, Perceived Usefulness, and Computer Self-Efficacy shows that, within the context of this study's respondents, anxiety about technology is not the main factor influencing attitudes toward the system.

6. Limitations and future research directions

This study has several limitations. First, the research is limited to model analysis. Second, it does not provide recommendations for service providers. Third, the data was obtained from users of the SiKeren application in the Jember District Government, which means the findings may differ from those of other services.

Future research directions include conducting similar studies using models developed in different mandatory e-government contexts. Future research should also consider and develop additional variables that affect satisfaction. Furthermore, increasing the sample coverage will help obtain more representative results.

Notation

$\overline{AVE}$: Average AVE
$\overline{R^2}$: Average R-Square

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