Research Article

Validation of an Integrated IS Success Model in the Study of E-Government

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Received 15 April 2022; Accepted 8 June 2022; Published 31 July 2022

Academic Editor: Senthil Kumar

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Electronic government (E-government) systems are becoming an integral component of government service delivery systems. Because of the rapid growth of Internet and Information System (IS) technologies in Malaysia, E-government systems are becoming more and more necessary. This study examined user attitudes, usage intentions, and satisfaction with E-government systems using the Information System (IS) success model (IS success model) and the Technology Acceptance Model (TAM). This study deployed a questionnaire to 714 E-government users. The questionnaire results were analysed using the structural equation model (SEM). This study found that E-government perceived ease of use and perceived usefulness were strongly influenced by IS success model constructs and perceived trust. This study also found that user attitudes, usage intentions, and satisfaction were strongly influenced by TAM factors.

1. Introduction

Electronic government (E-government) is the delivery of governmental services to citizens via digital pathways such as the Internet [1–3]. Most E-government services are informational (delivery of government information) or transactional (two-way transactions). Of the two, E-government transactions are the more complicated as they may require the vertical or horizontal integration of one or more government agencies [4, 5]. E-government has multiple benefits such as decreased costs, service integration, reduced administrative overhead, unified citizen information, and increased responsiveness to users [6]. However, the implementation of E-government services, especially transactional services, faces several challenges [7, 8] that have prevented their implementation in multiple countries [5]. Models such as the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), and the Unified Theory of Acceptance and Use of Technology (UTAUT) have been used to investigate the elements that influence E-government deployment [9–11]. Previous studies on E-government adoption have considered IS concepts as a whole and not E-government factors specifically. As IS concepts are too broad to address the intricacies of E-government systems, there is a need for a precise model [12]. Multiple studies have shown that the implementation
of E-government services has been slow [7, 13, 14], and efforts have been made to identify E-government implementation barriers [11, 15]. None of these studies have, however, created a unified E-government model. Although IS system success has been widely studied [16], which constructs best measure IS success is still disputed [17]. The structural equation modeling approaches indicated that E-government practitioners with knowledge of IS success metrics are more suited to improving the efficacy of recently mandated E-government services and future mandated E-government services [18]. As a consequence of the increased development and use of E-government systems in the last decade, the study of IS success models in the context of E-government has become necessary [19]. Electronic government systems are now widely recognized as a viable strategic tool for delivering E-services. As a result, the structures that support the IS success model have a big influence on how satisfied customers are with E-government services [20]. In relation to the three quality parameters, intention to use, and user satisfaction, organizational performance and environmental sustainability are studied as the two key characteristics of E-government public value [21]. However, the research question is how to develop a model to examine user satisfaction with E-government services in Malaysia. As a result, the goal of this study was to create a hybrid of the IS success and TAM models to analyze user satisfaction with E-government services in Malaysia.

1.1. E-Government in Malaysia. Multiple industrialized nations, including the United Kingdom (UK), Australia, Canada, New Zealand, and the United States of America (USA), have deployed E-government service systems [22]. Following their lead, Malaysia began implementing E-government technologies in 1996 when the Malaysia Administrative Modernization and Management Planning Unit (MAMPU) launched the Multimedia Super Corridor (MSC) project [23]. The MSC made governmental services more convenient, accessible, and effective for citizens and businesses. The MSC also make governmental processes more effective through improvements in information sharing and coordination [23, 24]. The purpose of E-government is to make governmental services more accessible to citizens through the exploitation of digital platforms [23]. All governmental agencies and their employees are affected by E-government, as are the businesses and citizens they service. Since the implementation of Malaysia’s E-government flagship, great strides have been made in the public sector. From the first use of computers in government offices in the 1970s to the universal use of government websites, the Malaysian government has been using increasing sophisticated IS. Currently, over 10,000 E-government services are offered in Malaysia [25]. In the Tenth Malaysia Plan, which call for the “reinventing (of) government,” the further expansion of E-government services has been called for to further improve the development and enforcement of government policies [26]. Malaysian citizen satisfaction is positively related to perceived value and virtual community participation, with the former having a greater impact [27]. Furthermore, multiple regression analysis shows that the functions of E-government and social media are strongly linked to people’s willingness to engage in protective behaviour [28]. As a result, E-government services have become increasingly important as a method of making services and information more accessible, accurate, and of high quality for inhabitants. Furthermore, by effectively spreading information to citizens, the E-government system promotes direct connection with government services [29].

2. Research Model Development and Hypotheses

2.1. Theoretical Background. Service quality, net benefits, and benefits at different levels of analysis were added to the IS success model as an update by Delone and McLean [30]. Petter et al. [31] concluded that service quality is the overall level of service offered by IT departments and not the effectiveness of specific IT applications as perceived by users. Pitt et al. [32], however, stated that service quality was the quality of a specific IS. According to [33], the TAM is one of the most successful models for technological uptake. The TAM in this study included perceived trust, perceived usefulness, perceived ease of use, user attitudes about utilizing E-government, and user satisfaction with E-government. Based on the proposed research model shown in Figure 1, system quality (SQ), information quality (IQ), service quality (SeQ), and perceived trust (PT) are significantly related to perceived ease of use (PEU) and perceived usefulness (PU); perceived ease of use has a significant effect on perceived usefulness, user attitudes towards (AtU) E-government, and user satisfaction (US) with E-government; perceived usefulness will have a significant effect on user attitudes towards on E-government and behaviour intentions to use (BIU) E-government; and user attitudes towards E-government will have a significant effect on behaviour intentions to use on E-government and user satisfaction with E-government. Overall, behaviour intentions to use E-government services will significantly influence user satisfaction with E-government.

2.2. Hypotheses Development. This study developed a total of 16 research hypotheses, as shown in Figure 1. These hypotheses made use of both IS success (perceived ease of use, usefulness, perceived trust, and user attitudes towards) and TAM constructs (behaviour intentions to use E-government services and user satisfaction with E-government) [7, 30, 33, 34], as shown in Table 1.

2.2.1. System Quality (SQ). System quality arises when users use system processes to complete a task [34]. The authors of [30] stated that system quality is the optimal characteristics of an IS system. System quality has been measured using five items: adaptability, availability, reliability, response time, and usability. Higher system quality increases user satisfaction [30]. Accessibility, web design, ease of navigation, and operating modules are all system quality terms that can
be used to define an IS system’s user friendliness [7, 36, 37]. When a person utilizes an E-government service, they have direct access to service providers and facilities, allowing them to assess quality on their own [38]. The effectiveness of users’/citizens’ interactions with E-government portals is influenced by the quality of E-government services, which also enhances government efficiency and responsiveness in line with users’ expectations [7, 39].

2.2.2. Information Quality (IQ). The ability of a government website to provide timely, accurate, comprehensive, concise, and relevant information is covered by information quality [40, 41]. In [7, 14] service development stages, E-government services have become more interactive over time, increasing the quality of the user experience [42]. The timeliness and correctness of the information on government websites is crucial and many nations, even developed ones, have failed to implement [43]. The ability to provide timely and relevant information is especially important as most citizens are not familiar with government processes, making explanations on how to conduct transactions extremely important [44].

2.2.3. Service Quality (SeQ). The ability of government services to fulfil the needs of citizens determines their quality.
2.2.4. Perceived Trust (PT). E-government increases the transparency of government services, increasing public trust [48]. The authors of [49] found that user’s intentions to use E-government services were significantly affected by perceived behavioural controls and trust. In a study in Taiwan, Hung et al. [50] found that trust, perceived usefulness, and perceived ease of use were significant predictors of E-government user acceptance. Horst et al. [51] identified the influence of trust on the perceived usefulness of E-government services.

2.2.5. Perceived Usefulness (PU). In TAM, the factors that influence technology acceptance are PU, perceived ease of use, and user awareness. Multiple authors have extended TAM to increase its accuracy [5, 33]. TAM has been used to model user acceptance of E-government services. According to [52], trust and information qualities had a significant effect on E-government usage. Multiple studies have found a relationship between E-government adoption usage intentions and perceived usefulness [50, 52].

2.2.6. Perceived Ease of Use (PEU). According to [50], E-government usage intentions were significantly influenced by perceived ease of use. A study on government-to-business and mobile E-government services in Taiwan by [52] found that perceived ease of use had a significant effect on E-government usage intentions. In the literature, TAM has been widely used to monitor the adoption of E-government services [42]. In the literature on adoption, both perceived usefulness and perceived ease of use have emerged as significant factors [42, 53].

2.2.7. Attitude towards Use of E-Government (AtU). In TAM, attitude mediates the relationship between perceived ease of use and perceived usefulness with usage intentions [54]. The authors of [33] found that user attitudes towards a technological system predicted usage intentions. The authors of [55] found that a user’s age, gender, education, employment, and nationality were significant predictors of user attitudes towards a technology. User attitudes are influenced by a user’s peer group, which includes their family, friends, colleagues, and employer. The authors of [56, 57], using a sample of 220 Lebanese graduate students, studied the effect of cognitive, affective, and conative dimensions on E-government attitudes. Rokhman [58] examined the adoption of E-government services in Indonesia.

2.2.8. Behavioural Intentions to Use E-Government (BIU). Usage intentions are used to determine the likelihood of a user executing a behaviour [59]. Users who were more trustworthy were more likely to use E-government services, according to the study. The IS continuity model [60, 61], which has theoretical roots, has been used to investigate post-adoption behaviour in relation to several IS systems, including E-government. Previous research has demonstrated a favorable link between perceived usefulness, perceived ease of use, and E-government service consumption intentions [16].

2.2.9. User Satisfaction (US). The literature on IS system adoption has long endeavoured to explain the influence that user attitudes, US, and usage intentions have on system usage [5, 62]. Previous studies have shown support for user satisfaction being increased by information quality [12, 16, 63]. According to [9], information quality and system quality have a significant relationship with usage intentions and user satisfaction. Meta-analysis has shown that these relationships are especially strong in the literature on E-government [9]. The authors of [64, 65] examined online tax filing services in Taiwan and Japan, respectively; to discover what factors influenced US. Multiple studies have found similarities between the factors that influence user satisfaction with tax filing systems and E-government services in general [22, 66]. The authors of [63] found that, for the users of Greece’s online tax filing system, service quality had a significant relationship with US. Wang and Liao [16] found a weak relationship between service quality and user satisfaction when studying E-government system adoption.

3. Research Methodology

This study created a conceptual model using the TAM and updated IS success model to monitor user satisfaction towards E-government services in Malaysia. The conceptual model had multiple factors (system quality, information quality, service quality, trust, usefulness, perceived ease of use, user attitudes, usage intentions, and US). The conceptual model was used to create a qualitative questionnaire with a five-point scale, and it was distributed in April 2019. A study questionnaire with 42 items was administrated to 757 respondents in Universiti Teknologi Malaysia selected through simple random sampling [67]. The content of the questionnaire was validated through consultation with three topic matter experts. The collected data were evaluated using IBM SPSS and Structural Equation Modeling (SEM-Amos) to determine the convergent and discriminant validity of the study constructs as well as to investigate the structural model as suggested by [68].

3.1. Measurement Instruments and Data Collection. 757 questionnaires were administered to Universiti Teknologi Malaysia students during the April 2019 fall semester. Of the 757 administered questionnaires, 714 were returned in a complete state. The study survey was composed of three sections that acquired data on the following topics:
demographic data, the use of E-government systems, and study factors. The purpose of the questionnaire was to acquire information of respondents’ satisfaction with Malaysian E-government services. As for the number of questionnaire items for each factor, system quality, information quality, and service quality each had 4 items that were extracted from previous studies [7, 30, 32, 34]. Trust also had 4 items, which were extracted from the literature [69, 70]. Perceived ease of use and perceived usefulness each had six items that were extracted from previous works [10, 22, 33]. To measure user opinions, four items were taken from the literature [71]. To quantify the utilization of E-government services, five questions were collected from the literature [62, 73]. Finally, five items were selected for measurement from the literature [62, 73].

3.2. Sample Characteristics. Of the 714 returned questionnaires, 347 (48.6%) respondents were male and 367 (51.4%) respondents were female. 162 (22.7%) respondents were between 18 and 25 years old, 515 (72.1%) respondents were between 26 and 33 years old, and 37 (5.2%) respondents were older than 34 years. 394 (55.2%) respondents had an undergraduate degree, 250 (35.0%) respondents had a master’s degree, and 70 (9.8%) respondents had a PhD. Regarding E-government services, 234 (33.0%) respondents accessed government services using a mobile device, 264 (37.0%) respondents accessed government services using a laptop, 129 (18.1%) respondents accessed government services using a desktop PC, and 86 (12.0%) respondents accessed government services using a tablet. Of all respondents, 77 (10.8%) accessed E-government services on a daily basis, 122 (17.1%) accessed E-government services on a biweekly basis, 142 (19.9%) accessed E-government services every fortnight, and 373 (52.2%) accessed E-government services on a monthly basis.

4. Data Analysis and Results

Cronbach’s alpha in SPSS statistical software version 20 was used to assess the homogeneity of the study instruments. The reliability coefficients of the study factors were as follows: system quality (0.821), information quality (0.911), service quality (0.897), perceived trust (0.824), perceived usefulness (0.905), perceived ease of use (0.893), user attitudes (0.809), usage intentions (0.912), and user satisfaction (0.832). The overall reliability coefficient for the study factors was 0.874, indicating internal reliability. Table 2 shows an analysis of the results of Malaysian users of E-government services. This study used three criteria to assess discriminant validity, variable index values below 0.8062, AVE values equal to or greater than 0.5, and square AVE values greater than interconstruct correlations (IC) [74]. Factors with a factor loading or Cronbach’s alpha value of 0.70 or greater were also found to be acceptable [68].

4.1. Measurement Model Analysis. The study’s findings were analysed using the SEM-Amos statistical approach (see Figure 2), which is based on AMOS 23’s confirmatory factor analysis (CFA) module. Convergent validity, unidimensionality, consistency, and discriminant validity were all examined in this model. Furthermore, Hair et al. [68] proposed that model evaluation be done using goodness-of-fit strategies such as chi-square, normed chi-square, normed fit index (NFI), relative fit index (RFI), Tucker–Lewis coefficient (TLI), comparative fit index (CFI), incremental fit index (IFI), parsimonious goodness-of-fit index (PGFI), root mean square residual (RMR), and root mean square error of approximation (RMSEA) (see Tables 3 and 4).

To examine discriminant validity in this study, three different criteria were used. One of these conditions is the correlation index between variables, which should not exceed 0.8062. The square root of AVE and the value of the average variance extracted (AVE) are the other two. The former should be equal to or more than 0.5 for each construct, while the latter should be more than the interconstruct correlations (ICs) associated with that factor 68. The factor loading in incremental factor analysis should be 0.5 or above, Cronbach’s alpha ought to be ≥0.70, and convergent validity should be ≥0.70 [68] (see Table 5).

4.2. Structural Model. Confirmatory factor analysis (CFA) was used as the second phase of the route analysis, and structural equation modeling (SEM) was used to test the structural modeling. The structural modeling is shown in Table 6. The information in this table illustrates the framework’s validity and use in assessing the study’s assumptions (see Figures 3 and 4).

Figures 3 and 4 exhibit the hypothesis between the nine primary constructions, and the results revealed that all 16
hypotheses were accepted. Table 6 illustrates the unstandardized coefficients and measurement deviation for the structural model, revealing that the model’s key statistics are significant, showing model validation and hypothesis testing results.

4.3 Results of Hypothesis Testing. These findings back up all hypotheses by demonstrating the numerous correlations between the variables in the study model. By giving the relevant values, Table 6 depicts the unstandardized coefficients as well as the standard errors of the structural framework. Table 6 shows that the system quality, information quality, service quality, and perceived trust all have a beneficial impact on the perceived usefulness and perceived ease of use. Furthermore, it reveals that the perceived

| Table 3: The goodness-of-model fit. |
|-----------------------------------|
| Adjusted goodness-of-fit index (AGFI) |
| Tucker–Lewis index (TLI) | 0.000 | .940 |
| Incremental fit index (IFI) | 0.000 | .935 |
| Comparative fit index (CFI) | 0.000 | .935 |
| Root mean square residual (RMR) | 0.000 | .034 |

Figure 2: Measurement model.
**Table 4: Factors loading and reliability.**

| Factors          | Code | Factors loading | Composite reliability | AVE   | Cronbach’s alpha |
|------------------|------|-----------------|-----------------------|-------|------------------|
| **System quality** |      |                 |                       |       |                  |
| SQ1              | 0.822| 0.907           | 0.611                 | 0.821 |
| SQ2              | 0.841|                 |                       |       |                  |
| SQ3              | 0.864|                 |                       |       |                  |
| SQ4              | 0.823|                 |                       |       |                  |
| **Information quality** | |                 |                       |       |                  |
| IQ1              | 0.842|                 |                       |       |                  |
| IQ2              | 0.860|                 |                       |       |                  |
| IQ3              | 0.784|                 |                       |       |                  |
| IQ4              | 0.832|                 |                       |       |                  |
| **Service quality** | |                 |                       |       |                  |
| SeQ1             | 0.783|                 |                       |       |                  |
| SeQ2             | 0.821|                 |                       |       |                  |
| SeQ3             | 0.882|                 |                       |       |                  |
| SeQ4             | 0.864|                 |                       |       |                  |
| **Perceived trust** | |                 |                       |       |                  |
| PT1              | 0.844|                 |                       |       |                  |
| PT2              | 0.753|                 |                       |       |                  |
| PT3              | 0.802|                 |                       |       |                  |
| PT4              | 0.734|                 |                       |       |                  |
| **Perceived usefulness** | |                 |                       |       |                  |
| PU1              | 0.714|                 |                       |       |                  |
| PU2              | 0.732|                 |                       |       |                  |
| PU3              | 0.774|                 |                       |       |                  |
| PU4              | 0.712|                 |                       |       |                  |
| PU5              | 0.763|                 |                       |       |                  |
| PU6              | 0.774|                 |                       |       |                  |
| **Perceived ease of use** | |                 |                       |       |                  |
| PE1              | 0.771|                 |                       |       |                  |
| PE2              | 0.773|                 |                       |       |                  |
| PE3              | 0.833|                 |                       |       |                  |
| PE4              | 0.802|                 |                       |       |                  |
| PE5              | 0.812|                 |                       |       |                  |
| PE6              | 0.823|                 |                       |       |                  |
| **Attitude towards use** | |                 |                       |       |                  |
| AtU1             | 0.824|                 |                       |       |                  |
| AtU2             | 0.803|                 |                       |       |                  |
| AtU3             | 0.853|                 |                       |       |                  |
| AtU4             | 0.844|                 |                       |       |                  |
| **Behaviour intention to use** | |                 |                       |       |                  |
| BIU1             | 0.704|                 |                       |       |                  |
| BIU2             | 0.793|                 |                       |       |                  |
| BIU3             | 0.843|                 |                       |       |                  |
| BIU4             | 0.774|                 |                       |       |                  |
| BIU5             | 0.783|                 |                       |       |                  |
| **Users’ satisfaction** | |                 |                       |       |                  |
| US1              | 0.793|                 |                       |       |                  |
| US2              | 0.812|                 |                       |       |                  |
| US3              | 0.832|                 |                       |       |                  |
| US4              | 0.834|                 |                       |       |                  |
| US5              | 0.774|                 |                       |       |                  |

**Table 5: Discriminant validity.**

| Factors | SQ | IQ | SeQ | PT | PU | PE | AtU | BIU | US |
|---------|----|----|-----|----|----|----|-----|-----|----|
| SQ      | 0.907|    |     |    |    |    |     |     |    |
| IQ      | 0.435| 0.922|    |    |    |    |     |     |    |
| SeQ     | 0.456| 0.532| 0.893|    |    |    |     |     |    |
| PT      | 0.563| 0.324| 0.401| 0.879|    |    |     |     |    |
| PU      | 0.431| 0.437| 0.492| 0.407| 0.911|    |     |     |    |
| PE      | 0.543| 0.592| 0.453| 0.392| 0.459| 0.909|    |     |    |
| AtU     | 0.510| 0.430| 0.502| 0.485| 0.500| 0.548| 0.899|    |    |
| BIU     | 0.438| 0.486| 0.521| 0.398| 0.457| 0.437| 0.452| 0.927|    |
| US      | 0.604| 0.481| 0.421| 0.453| 0.394| 0.329| 0.537| 0.504| 0.912 |
usefulness and perceived ease of use have a beneficial impact on attitudes about using E-government services, behaviour intentions to use E-government, and user happiness. Furthermore, attitudes towards using E-government services have a beneficial impact on behaviour intentions to use E-government and user happiness. Table 6 shows the results.

From Table 6, the links between system quality and perceived usefulness (0.315, t = 11.664); thus, hypothesis one is positive. The following direct effects (0.075, t = 2.782) are system quality and perceived ease of use, showing that hypothesis number two (H2) is accepted. The association between information quality and perceived usefulness was
accepted with finding (0.264, \(t = 8.361\)). The next direct effect (0.121, \(t = 3.980\)) is between information quality and perceived ease of use, showing that hypothesis number four is positive and significant. Furthermore, the next hypothesis shows positive and significant relationship between service quality and perceived usefulness (0.164, \(t = 4.308\)). Similarly, the link between service quality and perceived ease of use (0.292, \(t = 8.208\)) shows that hypothesis number six is accepted. Also, there is a positive relationship between perceived trust and perceived usefulness (0.172, \(t = 5.004\)). Additionally, there is a positive and significant connection between perceived trust and perceived ease of use (0.212, \(t = 6.585\)). Next, hypothesis number nine is accepted with relationship between perceived ease of use and perceived usefulness (0.287, \(t = 8.345\)). According to Figure 4 and Table 6, there is a positive relationship between perceived usefulness and ATT (0.604, \(t = 18.703\)). The following direct link between perceived ease of use and ATT (0.233, \(t = 7.268\)) shows that hypothesis number twelve is accepted. Similarly, a positive and significant relationship between perceived ease of use and user satisfaction (0.163, \(t = 5.031\)) indicates hypothesis number thirteen. The association between ATT and behaviour intentions to use was accepted with (0.519, \(t = 15.052\)), and showing that the link between user satisfaction with e-government services (0.200, \(t = 5.368\)) was accepted as hypothesis number fifteen. The final direct connection between BU and user satisfaction (0.493, \(t = 12.625\)) shows that hypothesis number sixteen is positive and significant.

5. Descriptive and Analysis of Factors

According to the data, the majority of respondents agree or strongly agree that the system quality of E-government services is simplicity of use and usefulness. “This study defines system quality of E-government services as the degree to which a user feels system quality of E-government services was easy to use and helpful,” according to the researchers. These findings support those of [34, 37], who suggested that the system quality of E-government services was simplicity of use and usefulness. The scenario is depicted in Figure 5.

Also, the majority of respondents believe or strongly agree that the information quality of E-government services was ease of use and utility. As a result, “this study defines information quality of E-government services as the degree to which a user believes that information quality of E-government services is easy to use and valuable.” These findings are in line with those of [7, 40, 43], who claimed that the information quality of E-government services was ease of use and utility (refer to Figure 6).

In addition, the majority of respondents agree or strongly agree that service quality of E-government services was easy to use and beneficial. As a result, “this study defines service quality of E-government services as the degree to which a user believes service quality of E-government services is easy to use and beneficial.” These findings are in line with those of [7, 38, 45], who claimed that the service quality of E-government services was ease of use and utility. Figure 7 illustrates this.

Furthermore, the results show that the majority of respondents agree or strongly agree that the perceived trust of E-government services was easy to use and beneficial. “This study defines perceived trust of E-government services as the degree to which a user feels that perceived trust of E-government services is simple to use and advantageous,” according to the findings. These findings are consistent with those of [49–51], who indicated that the perceived trust of E-government services was usability and usefulness. This is shown in Figure 8.

Additionally, the findings reveal that the majority of respondents agree or strongly agree that the perceived ease
of E-government services was ease of use and utility. As a result, “this study defines perceived ease of use of E-government services as the degree to which a user believes perceived ease of use of E-government services was easy to use and beneficial.” These findings are in line with those of [4, 45, 52, 53], who suggested that the perceived ease of use of E-government services was their simplicity of use and utility. Figure 9 illustrates this.

Furthermore, the majority of respondents believe or strongly agree that the perceived usefulness of E-government services was simplicity of use and utility. As a result, “this study defines perceived usefulness of E-government services as the degree to which a user believes that perceived usefulness of E-government services is easy to use and beneficial.” These findings support those of [5, 33], who suggested that the perceived usefulness of E-government services was ease of use and utility. Figure 10 illustrates this.

Furthermore, the results suggest that the majority of respondents agree or strongly agree that E-government services were easy to use and beneficial.
services are easy to use and beneficial and that they have a good attitude about using them. As a result, “this study defines attitude towards using E-government services as the degree to which a user believes that E-government services are simple to use and valuable.” These findings are in line with those of [46, 48, 54, 56], who claimed that the attitude towards using E-government services was one of ease of use and utility (see Figure 11).

Furthermore, the results suggest that the majority of respondents agree or strongly agree that behaviour

![Figure 8: Measuring perceived trust of E-government services.](image)

![Figure 9: Measuring perceived ease of use of E-government services.](image)

![Figure 10: Measuring perceived usefulness of E-government services.](image)
intentions to use E-government services are easy to use and beneficial and that they have a favourable impression of them. As a result, "this study defines behaviour intentions to use E-government services as the degree to which users perceive E-government services are simple to use and valuable." These findings are in line with those of [1, 16, 54, 59], who suggested that behaviour intentions to use E-government services were simple to use and beneficial. Figure 12 illustrates this.

Finally, the results demonstrate that the majority of respondents agree or strongly agree that E-government services are easy to use and beneficial and that they are content with them. As a result, "this study defines users' satisfaction with E-government services as the degree to which a user believes and is happy that E-government services are simple to use and valuable." These findings are in line with those of [9, 63], who claimed that consumers' satisfaction with E-government services is low. Figure 13 illustrates this.

5.1. Discussion and Theoretical and Practical Contributions. The desire and willingness of the citizens of the country have a large impact on whether the E-government services can be adopted nationwide. One of the major concerns of using E-government services is related to the citizens being more wary of their trust to the external entities that are in charge of the services. There are also several issues that relate to the lack of user satisfaction when using these services. Thus, in order to address these issues, the current research aims at proposing a new model that utilizes TAM model factors as well as the IS success model. Sixteen hypotheses were tested to determine the relationship between users’ satisfaction with E-government service usage and the following factors: information quality, system quality, service quality, trust, usefulness, perceived ease of use, attitude towards use, behaviour intention to use E-government services, and users’ satisfaction with E-government service usage (see Figure 1). The results indicated a certain trust in the Internet and trust in government, and perceived ease of the use, usefulness, information systems background, and social power were all significant predictors of citizens’ intention to adopt E-services, which is consistent with [75, 76]. Based on the explored concepts discovered from the aforementioned hypotheses, in Malaysia, the E-government users reported that their satisfaction would be directly correlated with the quality of system, information, and services. This means that they evaluated these factors and considered them to be of higher priority than the rest. The perceived usefulness and ease of use of these systems are reported to be observed to be directly correlated with the IS success model’s core constructs. On the other hand, the behaviour and usage attitude are influenced by TAM factors core constructs. Ultimately, both of these factors also impact the users’ satisfaction of the E-government services. The empirical results demonstrate that there is a positive correlation between the perceived usefulness and ease of use, versus quality of system, information and system, as well as perceived trust.

These factors have shown to have a direct influence of the E-government services perceived usefulness and ease of use, which in turn have a direct influence on the usage attitude and behaviour, which ultimately impacts the users' satisfaction. Other factors that have a positive impact on users’ satisfaction were the usage and effectiveness of the E-government services. The empirical results from this research are in a strong agreement with previously established literature on the IS success model, which states that the IS success model has a direct and positive impact on the users' satisfaction of the E-government services [2, 7, 41, 51, 77]. This finding, paired with the other discovery that the TAM model factors also have a direct and strong influence on the perceived trust of the aforementioned services, can indicate that both the TAM model factors and the IS success model strongly affect the usage and effectiveness of the E-government services. Comparing these results with other established research studies that use the acceptance model based on the TAM modeling, we can see that perceived trust, ease of use, and usefulness had a positive impact on the acceptance of the E-government services [22, 51].

Some of the key factors studied in this research are in accordance with the findings of existing research that also used the factors as a prediction model for usage of E-government services. These factors are system quality 15,
amount of information quality [7, 78], and perceived trust [51, 59]. Therefore, the system is better reflected when a combination of said factors is used in order to increase the acceptance factor of the E-government services. Even though the reported results indicate that there is still a perceived negative view due to privacy, security, and risk concerns, there is still a significantly positive effect on the acceptance of E-government services. This indication is stronger among users that are more competent when compared to the average users on using the E-government services. This correlation between competency and acceptance of usage is in accordance with an empirical study performed by [79]. The reason behind this phenomenon is that as the users become more competent in using such system, they would be less wary of privacy and security risks, as they believe they are less susceptible than the average user to such threats. Cybersecurity threats have also shown to be reduced among users that gain expertise in the IT field [80], so much so that in cases in which the users are professional IT users, they consider to know all the details regarding possible cybersecurity threats and risks, and thus they would be able to better shield them in an event of a mishap.

Thus, a higher competency level has a direct correlation with the E-government services acceptance and continued usage. With substantial advancements in Internet technology impacting practically every part of people’s lives, it is critical that government websites and the E-government services available via them are used effectively, efficiently, and pleasantly [81]. The findings of this study examined three theoretical implications, which each relate to the effect of IS success model and TAM model various inner factors on user satisfaction factors on E-government services in Malaysia. The findings showed that these factors have a strong influence on the perceived ease of use and usefulness, as well as the behaviours and attitude of usage. In turn, these factors positively affect the user’s satisfaction of the E-government services in Malaysia. Several specialists in the field have conducted similar research studies that are in accordance with the results that are discovered in this study [7, 10, 12, 59, 63, 82–85]. Other than the theoretical implications that were proposed by this research, there are also practical implications that involve the policy makers and practitioners of the fields to make use of the findings of this research. For instance, the quality of system, information, and services, as well as the perceived ease of use and usefulness of the system, in tandem with the attitude and behaviour towards usage all point to increase the users’ satisfaction of the E-government services. Thus, in order to
adopt such system in Malaysia, the factors mentioned in this study must be considered and implemented in some way, shape, or form within the policy and strategy of the nation. Only then, the citizens would be more easily convinced to use or adopt such services in Malaysia.

5.2. Conclusion, Limitations, and Future Work. The goal of this study was to discover the elements that have a significant impact on users’ use, acceptability, and satisfaction with E-government services in Malaysia. According to the study’s findings, the quality of the system, information, and services, as well as the perceived ease of use, utility of the system, and the attitude and behavior towards utilization, all indicate an improvement in users’ satisfaction with E-government services. As a result, for restrictions, the focus should be on the establishment and implementation of citizen-oriented guidelines and instructions that teach people how to utilize E-government services and systems. Another limitation to take into consideration is the cybersecurity factor, as it has been demonstrated to be one of the major factors affecting the users’ trust of the E-government system. This mainly stems from the fear for privacy, security, and risk of using such systems. Therefore, by using mechanisms that enhance security and trust, such as Web 2.0 application, it would make for an easier adaptability. Thus, the quality of the system, service, and information should be focused on, as they have a large impact on the users’ perceived satisfaction of the system. In Malaysia, such investigations and studies regarding the E-government services and their affecting factors are considered to be relatively new, thus the observed results require further affirmation. Therefore, in order to reaffirm the findings and results of the study, a cross-cultural validation would be largely beneficial. This would mean to conduct a similar study in a different country on a larger scale. A country and population that perhaps have a different background would require a greater generalization of the model proposed in this research.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

Dr. Al-Dhan would like to extend the sincere appreciation to the University of Ha’il for supporting and motivating the research activities in all fields.

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