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Application of SEM: an analysis of Depok City's website

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Abstract. Electronic government is one of the strategies to create a more effective government. Many governments around the globe have applied electronic government, including Indonesia. Although there is various research on the electronic government in Indonesia, only a few studies have focused on analyzing the intention to use government websites, particularly the local government's website. To address the research gap, this paper intends to statistically examine the intention to use Depok City's website based on the user's perspective by applying structural equation modelling. This study was carried out using a survey approach. Data were collected using an online questionnaire on the Depok's citizens. One hundred twenty-five respondents participated in this study. Data were analyzed using covariance-based structural equation modelling. The key findings of this research confirm all developed hypotheses in which system quality, information quality, and service quality influence website intention to use. The results demonstrated in this work provide theoretical and practical implications further elaborated in the light of this paper.

1. Introduction

The revolution of information and technology (IT) has dramatically affected a variety of aspects of human life. Various conveniences have been entirely offered by the IT transformation, such as electronic transactions, online learning, and electronic meeting. One of the most significant change is the application of the internet in the public and private sector organizations. In the public sector context, the adoption is existed acknowledged as electronic government. The electronic government can be defined as the use of the internet to provide public service and information to the citizen, business sector, and public agencies [1], [2]. The government can offer essential information and public service, which is more effective and efficient. Through the internet, the government can serve the citizen only in front of the computer and without face to face meeting. Furthermore, the electronic government can change the orientation of the government, from bureaucratic to the mission-driven [3].

Depok City Government attempts to develop electronic government features. One of them is an official website of Depok City, *www.depok.go.id* (see Figure 1). This website includes general information about Depok (history, icon, art and culture, demography, and geography), government affairs (vision and mission, government leader, and organizational structure), and public service. It is not only used to share various information but also to provide several services to the citizen. The Government of Depok City's public services comprises the assistance related to tax, demography, civil identity, alms, health, electricity, etc. In its development, it has become an effective canal in delivering service quality to the community. To ensure the development of electronic government in Depok City,



the government issued Mayor Regulation No. 46 of 2017 about the guidance of electronic government in delivering government issues.

From the results of the theoretical review on the literature, we summarize that there are three crucial factors influencing citizen's intention to use, specifically system quality, information quality, and service quality. System quality is the quality of the production of the information technology itself. It can be evaluated through web design and interactivity [4]. Information quality is related to how the user perceives the importance of a website's output. The quality of information can be measured using information and security controls. The informativeness of a webpage reflects its capability to connect users about alternative goods or services [5]. Service quality refers to how a website can effectively and efficiently promote shopping and product delivery to users. Service quality is increasingly recognized as an important factor affecting online customers' buying intentions. The quality of service is ordinarily calculated by responsiveness, confidence, and empathy [5].

A number of researchers have studied electronic government in the context of Indonesia. However, only a few studies have focused on local government website intention to use [6]. Therefore, our study has two novelties in addressing the gap in current research. First, the present study provides a quantitative analysis by proposing system quality, information quality, and service quality as predictors of the intention to use of government website. Second, this is a first study understanding the intention to use the Indonesian local government's electronic government website from the perspective of ordinary citizens. To achieve the purpose of this work, we formulate an ultimate research question: what factors affect citizen intention to use Depok City's website? Then, we propose three hypotheses to answer the question; namely, system quality affects website intention to use (hypothesis 1), service quality impacts website intention to use (hypothesis 2), and information quality influences website intention to use (hypothesis 3).

2. Methods

This was a cross-sectional study using a survey method to answer the research question. The research instrument was proposed by referring to the theory and concept adapted from prior research. The questions in an online survey were divided into two parts, key and central question. It conveyed a key question to the respondent before entering the main question: Did you ever access Depok city's website (www.depok.go.id)? If he/she answered yes, he/she continued to fill the main question. The main question consisted of three sections, including general information of the respondent, system quality, information quality, service quality, and website intention to use, respectively. All of the questions were offered in *Bahasa Indonesia*. It used five Likert's scale ranging from strongly unsatisfied (1) to strongly satisfied (5) for the question about system quality, information quality, and service quality. The five Likert scales ranging from strongly disagree (1) to strongly agree (5) were employed to measure website intention to use. All respondents filled the questionnaire anonymously to keep the respondent's privacy. To reduce common method bias, the questions were provided in simple language in order to be easy to understand by the respondent. Harman's single factor was applied to ensure that common method bias was not a serious problem in the present work.

The questionnaire was deployed from March to July 2020. Because of the Covid-19 pandemic, the questionnaires were distributed through the online form by employing google documents. The questionnaires were deployed to the Depok society through a conversational group of Depok residents in various online social media, such as Instagram, Twitter, and Facebook. Several respondents were provided a special gift if they were willing to fill the questionnaire. It was essential to attract the wide interest of the participant in the research. The effort yielded 125 respondents engaged in this survey. The participants came from various backgrounds. From the total of the respondent, 52% was female, 45% was undergraduate, 62% was young or around 20-30 years old, 62% was private employee, 56% respondents came from Facebook group, and 54% was the user of demographical features of Depok City website.

Structural equation modelling (SEM) was used to examine studied hypotheses through the assistance of IBM SPSS Amos version 24.0. SEM was a covariance-based technique closely related to

the outlier, missing data, and normality [7]. The data included in the analysis were free from an outlier, missing, and non-normal data. SEM was used in this research because it can run a causal and complex model with sufficient precision. To test outliers, highlighting the differences between the reduced mean and mean values were used and found that outliers did not have a significant impact on the data [8]. The normality was checked by analyzing the critical ratio of the skewness and kurtosis [9]. It was found that the critical ratio was 2.442 indicating the data were normal and can be used for further analysis. The research had three exogenous (system quality, information quality, and service quality) and one endogenous variable (website intention to use). SEM was utilized to assess the confirmatory factor analysis (CFA), goodness and fit (including modification indices), and hypotheses. The hypotheses of this study were assessed by using t -value and p -value [10].

3. Results and discussion

3.1. Measurement Model

The measurement model was analyzed by checking its validity and reliability. To assess the validity and reliability of the data, a confirmatory factor analysis (CFA) was employed. The factor loadings (standardized regression weight) was measured to analyses the validity. As can be seen in Table 1, the items were valid in constructing each measurable variable because the factor loadings exceeded 0.5, as suggested by Byrne [11]. Reliability and convergent validity were analyzed by assessing composite reliability (CR) and average variance extracted (AVE). The data show that the items were valid and reliable because the values of CR are greater than 0.7 and AVE are above 0.5. The convergent validity was reached because the values of CR were higher than the values of AVE. In sum, the measurement model was useful in reflecting the research construct.

Table 1. Analysis of Measurement Model

Construct and Item	Loadings	Cronbach's α	CR	AVE
System Quality (SYQ)		0.94	0.94	0.71
SYQ1	0.81			
SYQ2	0.79			
SYQ3	0.85			
SYQ4	0.86			
SYQ5	0.88			
SYQ6	0.86			
Information Quality (INQ)		0.93	0.91	0.64
INQ1	0.81			
INQ2	0.75			
INQ3	0.82			
INQ4	0.80			
INQ5	0.80			
INQ6	0.80			
Service Quality (SEQ)		0.92	0.92	0.70
SEQ1	0.79			
SEQ2	0.81			
SEQ3	0.87			
SEQ4	0.84			
SEQ5	0.87			
Website Intention to Use (WIU)		0.91	0.91	0.62
WIU1	0.79			
WIU2	0.76			
WIU3	0.77			
WIU4	0.79			
WIU5	0.80			

Construct and Item	Loadings	Cronbach's α	CR	AVE
WIU6	0.80			

Table 2. showed the means, standard deviations, and correlations among the constructs. The means of each research variable yielded a satisfactory response on system quality (3.38), service quality (3.28), and information quality (3.30) of Depok city's website. The results also displayed that the standard deviations range from 0.69 to 0.80, suggesting a small range across the mean. The data also presented a positive and significant relationship between system quality and website intention to use, as demonstrated by the coefficient correlation ($r = 0.93, p > 0.001$), thereby, H1 is accepted. H2 and H3 were also found to be supported. The results exhibit that service quality ($r = 0.93, p > 0.001$) and information quality ($r = 0.93, p > 0.001$) were positively and strongly correlated with website intention to use. Following Fornell and Larcker, the discriminant validity was identified by comparing the square root of AVE and the correlation of the construct [12]. The square root of AVE was greater than its correlation, thus, it showed an adequate validity.

Table 2. Mean, Standard Deviation, and Correlation

	Mean	SD	SYQ	SEQ	INQ	WIU
SYQ	3.38	0.80	0.84			
SEQ	3.28	0.73	0.88***	0.84		
INQ	3.30	0.67	0.89***	0.88***	0.80	
WIU	3.29	0.69	0.93***	0.93***	0.93***	0.79

Notes: SYQ, System Quality; SEQ, Service Quality; INQ, Information Quality; WIU, Website Intention to Use; SD, Standard Deviation; Square Root of AVE is on bold values at diagonal parentheses; *** $p > .001$

3.2. Model Fitness

A modification index was conducted before testing the hypotheses because the final model had not yet fit the data. It was carried out relied on the recommendations of Amos results. It was identified by inspecting the value of chi-square ($\Delta\chi^2$), goodness-of-fit index (GFI), Adjusted Goodness of the Fit (AGFI), comparative fit index (CFI), root-mean-square error of approximation (RMSEA), Normal Index Fit (NFI), Root Mean Square Residual (RMSR), and the Tucker-Lewis index (TLI), as recommended by Hair et al. [13]. Before modification, the goodness of fit was $\chi^2(d.f) = 327.334(224)$; $\chi^2/d.f = 1.662$; GFI = 0.790; AGFI = 0.741; SRMR = 0.021; RMSEA = 0.073. After modification, the model was more appropriate because it had $\chi^2(d.f) = 228.022(215)$; $\chi^2/d.f = 1.061$; GFI = 0.869; AGFI = 0.832; SRMR = 0.016; RMSEA = 0.022.

3.3. Structural Model

We used SEM to analyses the studied hypotheses. The hypotheses testing revealed that system quality ($\beta = 0.222$; $t = 2.153$; $p < .05$), service quality ($\beta = 0.255$; $t = 2.261$; $p < .05$), and information quality ($\beta = 0.468$; $t = 2.505$; $p < .05$) positively and significantly affected citizen's intention to use government website, thereby H1, H2, and H3 were accepted (see Table 3). Information quality through informativeness and accuracy of the information was the strongest predictor of website intention to use. It predicted intention to use of the website about 0.219 or 30% (0.468×0.468). We also identified the R -square (R^2) of the relationship to measure prediction power. As seen in Figure 1, the R^2 was 0.95, indicating that 95% of website intention to use's variance could be explained by system quality, service quality, and information quality. Following the rule of thumb, these variables substantively predicted the intention to use of local government website [14]. In other words, system quality, service quality, and information quality were essential factors determining website intention to use.

Table 3. Hypotheses Testing

Hypotheses	Estimate	t -value	Direct Effect	Conclusion
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H1: System quality → Website intention to use	0.22	2.15*	0.08	Significant
H2: Service quality → Website intention to use	0.26	2.26*	0.09	Significant
H3: Information quality → Website intention to use	0.47	2.51*	0.19	Significant

Note: Critical t -value * 1.980 ($p > 0.05$)

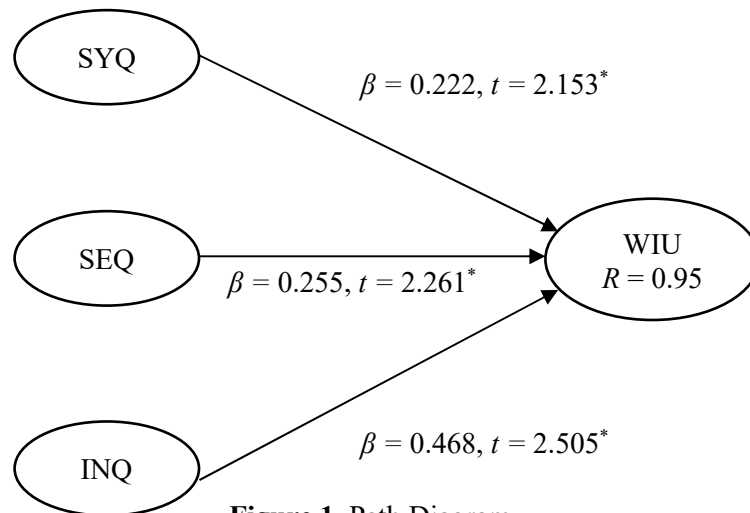


Figure 1. Path Diagram

3.4. Discussion

The official website is one of the crucial needs of the local government today. Many local governments encourage to develop their website in order to be more informative and compelling. Depok City's government also arranges to improve the official website to deliver important information and public services. The effectiveness of the website is strongly related to the intention of the user to visit the website. Our study finds that the intention to use is influenced by system quality, service quality, and information quality provided by the website's administrator. The results are in line with several prior research recognizing that these three variables contributed to the government website's intention to use. For instance, Saha et al. pointed out that information quality and system quality correlated with the municipality's e-tax website in Sweden [15].

Our findings likewise suggest that information quality has the strongest correlation to the website's intention to use than two other predictors. Our result confirms the study conducted by Chen, who revealed that information quality has the most significant impact on Taiwan's online tax-filing system [4]. In his inquiry, Chen highlighted that the effect of information quality on creating a tax-filing online system was 28%. It means the current result is higher two percent than Chen's study. Finding is also similar to Detlor et al. studying community municipal portal use in Canada. They also found that information quality strongly affected the intention to use Canada's municipal website [16].

4. Conclusion

This research aims to empirically and statistically analyses the factors affecting the intention to use the Depok City government website. Based on the literature review, we propose three factors determining government website intention: system quality, service quality, and information quality. These factors are further investigated and proposed a hypothesized model in this research. We studied 125 respondents who have accessed the Depok City government website through the online survey and analysed their responses regarding the research focus. Findings entirely accept our three hypotheses in which local government website intention to use is strongly predicted by system quality, service quality, and information quality. These predictors can corroborate intention to use government websites around 95 percent.

This study has both theoretical and practical contributions concurrently. Our research enriches the body of knowledge on electronic government in an Indonesian context in terms of theoretic. The current study is one of the pioneers in the study of intention to use a local government website in Indonesia by applying a structural equation modelling approach. Consequently, future research can add the predictor or exogenous variable, mediator and moderator, and utilize specific theory in explaining website intention to use, such as the technology acceptance model (TAM) [17]. Regarding the practical contribution, our study's findings can be applied by the local government in Indonesia in developing electronic government. Our results show that system quality, service quality, and information quality sincerely influence website intention to use. Furthermore, we recommend the local government continuously enhance the official website's features and system. It is important as a strategy to improve the user's satisfaction and encourage their motivation to use the website continuously.

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