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How is The Adoption of Digital Marketing Services for Smart City Application Users?

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***Abstract*— Smart City Mobile Apps is currently being developed by property developers in major cities in Indonesia and is used by businesses to market their products through the application. Technology integration in city governance is possible, thanks to the internet of things, a network of electronic devices interconnected and capable of sending data or following up with minimal human intervention. This study aims to identify the characteristics of Smart City Mobile Apps users in the South Tangerang area. The method used to see how well the implementation of digital marketing in Smart City Mobile Apps combines the TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance and Use of Technology) models. Questionnaire data were processed using the Structural Equation Modelling (SEM) method. The study results state that the company's digital marketing strategy through Smart City Mobile Apps is already satisfying. It can be seen from the value of adoption of Smart City Mobile Apps users in utilizing this application, which is considerably large at 0.764 based on the coefficient of determination. The attitude variable influences consumers to use the application in finding trade information in the Smart City, with an influence value of 0.412 and the behavior intention to use with an influence value of 0.726, which shows that the intended behavior of the application and the trust in the benefits of the application can encourage users to use this application for purchasing their daily needs.**

***Keywords*—Smart city; mobile apps; TAM; UTAUT; marketing digital.**

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I. INTRODUCTION

Indonesia's dense activity led to lifestyle changes, which initially did not recognize technology. Almost everyone has been exposed to technology early on. The use of mobile phone enthusiasts is higher in using mobile apps compared to the mobile web today. This is due to the ease offered in mobile application use considering the Indonesian population's dense activity. A survey conducted by Jakpat – mobile Survey Platform Indonesia said as many as 67.35 percent of people prefer to use mobile apps compared to the mobile web. There is 56.12 percent as one reason users prefer to use mobile apps in terms of convenience in their use. The development of mobile application use is not only for communication but has penetrated the world of property. One of them is used in Smart City. A smart city is a city area with integrated information and communication technology in daily governance to enhance efficiency, improve public services, and improve citizens' welfare. Technology integration in city governance is possible, thanks to the internet of things, a network of electronic devices interconnected and capable of sending data or following up with minimal human intervention. The term smart city is the development of an information technology-based city [7]. Several cities in Indonesia have adopted and applied this concept. According to the 2017 Smart City Coordinating Ministry for Economic Affairs' interim results, smart cities' urgency is caused by an increase in the urban population growth rate of 2.75 percent per year. Furthermore, according to data from the Central Statistics Agency (BPS), it is predicted that the population living in cities will be 56.7 percent in 2020. This number will increase to 66.6 percent in 2035. Several cities in Indonesia have now applied the smart city concept in Surabaya, Jakarta, Bandung, Tangerang, Bogor, Bekasi, and Binjai. One of the property developers in the Tangerang area, precisely in South Tangerang, which implements smart city mobile apps, is PT. BUMI SERPONG DAMAI (BSD City), which is part of the Sinar Mas Land Group. As one of the prominent property developers in Indonesia, BSD City innovates and develops itself to keep pace with the times and support its residents' needs following the globalization era by using digital media. In the future,

BSD City aspires to make itself an integrated digital smart city. To support this, BSD City presents a mobile application, OneSmile. OneSmile is the first application created to support the needs of the population and all those who need information related to BSD City to make it easy for each activity to be done simultaneously.

In addition to BSD City, the property developer that applies smart city mobile apps in South Tangerang is Alam Sutera Township. In meeting its citizens' satisfaction related to information on Alam Sutera's activities, Alam Sutera's management launched a mobile digital application called eTown. The Smart City Mobile Apps developed by the two property developers above have features that citizens need and provide information on business activities that occur in the area. Businesses can inform their business descriptions in the application.

Thus, citizens of Smart City Mobile Apps users can become marketing targets for businesspeople. Digital marketing through Smart City Mobile Apps has become a challenge for these businesspeople [2]. An excellent digital marketing implementation strategy is needed in the Smart City Mobile Apps to support the marketing objectives of businesspeople [5], [6], [11]. The method used to explore how well the implementation of digital marketing in Smart City Mobile Apps combines the TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance and Use of Technology) models. TAM and UTAUT are often used in studies that focus on the end-users of technological innovations [4], [10], [13], [14].

This study aims to identify Smart City Mobile Apps users' characteristics in the South Tangerang area to identify any variables from the TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance and Use of Technology). These two assessments were used to describe the use of Smart City Mobile Apps in the South Tangerang area. These assessments also aim to formulate a digital marketing strategy for business people in the Smart City area that applies digital marketing in the Smart City Mobile App.

II. Materials and Methods

A. Materials

The research model used in this study is a combination of the TAM and UTAUT models. TAM is defined as an assessment of user acceptance of technology, particularly user perception of the benefits of technology (perceived ease of use) and then in using technology (perceived usefulness [8], [14],). TAM is a theory about the research of an information system that describes how to receive and use a technology [8], [9], [10]. UTAUT is a theory about the research of an information system that explains users' purpose in using an information system technology and subsequent use; for more details, it is shown in Figure 1 below. This research employed survey research methods with quantitative research approaches. The intended survey research explains the causal relationship and testing the hypothesis according to research [12].

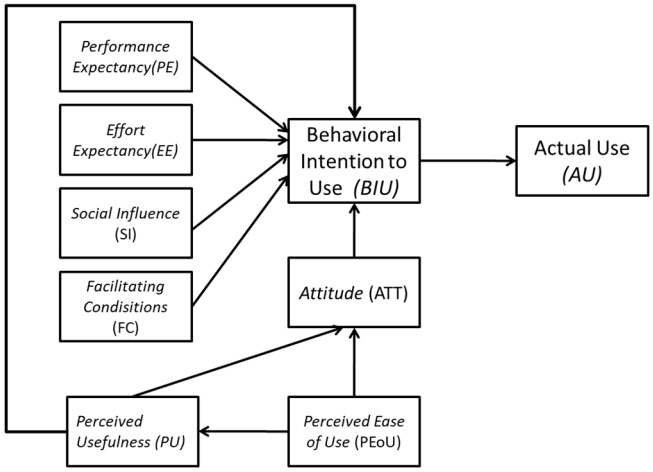

Fig. 1 Research Framework

B. Sample Preparation

This study's population is all Smart City Apps User in the Bumi Serpong Damai (BSD) and Alam Sutera. The number of samples for the Structural Equation Model (SEM) guidelines is 5-10 times the estimated number of parameters [3]. The study uses 25 parameters estimated; thus, the sample used was 8 x 25 = 200 respondents. Moreover, the sample obtained in this study was 212 respondents. Concerning sampling techniques, it must be noted that the sample size does not always decide the quality of research. Some other factors might influence the research quality, such as the robustness of the theory, the design of the research (statistical assumptions), and the quality of its implementation process.

This research was conducted using convenience Sampling. These samples are almost unreliable but are usually the cheapest and quickest to do because researchers have the freedom to choose whom they want to be. However, this method is still useful; for example, in the explorative research stage can look for clues - research instructions, the results can show evidence is abundant enough that more sophisticated sampling procedures are no longer needed. Each sampling technique has its advantages and disadvantages. Convenience Sampling was chosen in this study because the population of smart city application users is unknown exactly how many; thus, each respondent can be filtered through the research questionnaire's screening question. Besides, Convenience Sampling also supports the ease of data collection, does not require a population list, and does not require a high cost. However, according to some literature, this sampling technique is not good at projecting sample data as population data. This may be because the samples taken are based on researchers' ease, not considering sampling different population elements. To reduce the can, attempted sampling of respondents from diverse backgrounds and patterns of sampling places.

III. Results and Discussion

The following is a summary of descriptive data on the identity of respondents who are willing to help fill out the questionnaire in the following table:

TABLE I
DESCRIPTIVE DATA OF RESPONDENTS' IDENTITIES

Item	Data	Percentage
Gender	Female	62%
Age	30 - 33 Year Old	24%
Income	Rp 9,000,000 - Rp 12,000,000	35%
Profession	Employee	57%

Table 1 above, most respondents are female. Women tend to spend more time using smartphones than men [1], [7], [16]. Women can spend 140 minutes per day, while men only spend 43 minutes a day [4], [13], [15]. Therefore, from the results of the questionnaire distribution, most respondents in this study were female. Besides, female respondents more often use the application because there is one payment feature in the application that makes it easy for users to make payment transactions. The types of payments often made using this feature include IPL, PLN, Mobile vouchers and billing, BPJS, and multi-finance [20]. The largest number of majority respondents in the income range of IDR. 9,000,000 - IDR. 12,000,000 with a percentage of 35%. Followed by respondents with an income of IDR. 6,000,000 - IDR.9,000,000 whose percentage is slightly lower 5% than the income of IDR. 9,000,000 - IDR. 12,000,000. This is alleged because respondents with incomes ranging from IDR. 9,000,000 - IDR. 12,000,000 have income that is directly proportional to lifestyle, monthly expenses, willingness to pay. So the use of the application is also done a lot. The largest number of majority respondents in the income range of IDR. 9,000,000 - IDR. 12,000,000 with a percentage of 35%. Followed by respondents with an income of IDR. 6,000,000 - IDR.9,000,000 whose percentage is slightly lower 5% than the income of IDR. 9,000,000 - IDR. 12,000,000. This is alleged because respondents with incomes ranging from IDR. 9,000,000 - IDR. 12,000,000 have income that is directly proportional to lifestyle, monthly expenses, willingness to pay.

Figure 2 below shows that the second feature of interest to users is Transport with 22 respondents or 13%. The Transport feature is also in demand because most users use public transportation facilities in the BSD Area. With these features, the user can discover some public transportation schedules in BSD City and Alam Sutera.

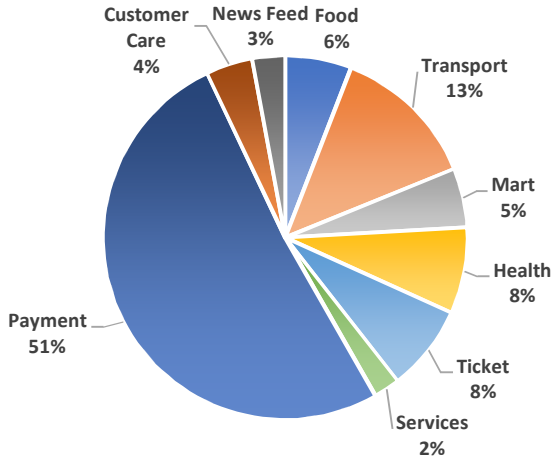

Fig. 2 Data Usage Features

Using SEM-PLS for data analysis, this study uses the measurement model (outer model) and the structural model (inner model). The outer model is a measurement model that stands for the relationship between the construct and the corresponding indicator variables. The inner model of the relationship between latent variables and measurement models describes the relationship between latent variables and their size [3].

A. Outer Model Evaluation-Convergent Validity

There are two criteria for assessing whether the outer model must meet the convergent validity requirements for reflective constructs, mainly that loading must be above 0.70 and the p-value (<0.05) [3]. Following are the results of testing the convergent validity of the measurements (questionnaire).

TABLE II
COMBINED LOADINGS AND CROSS-LOADINGS

	Standard Deviation (STDEV)	P Values		Standard Deviation (STDEV)	P Values
AD1 <- ATT	0.031	**0.000**	**ETU2 <- PEoU**	0.053	**0.000**
AU1 <- AU	0.031	**0.000**	**EV1 <- PU**	0.035	**0.000**
AU2 <- AU	0.043	**0.000**	**EV2 <- PU**	0.031	**0.000**
AU3 <- AU	0.055	**0.000**	**FC1 <- FC**	0.291	**0.009**
AU4 <- AU	0.067	**0.000**	**FC2 <- FC**	0.254	**0.000**
BI1 <- BIU	0.047	**0.000**	**FLB1 <- PEoU**	0.045	**0.000**
BI2 <- BIU	0.019	**0.000**	**FLB2 <- PEoU**	0.044	**0.000**
BI3 <- BIU	0.016	**0.000**	**FLB3 <- PEoU**	0.050	**0.000**
BI4 <- BIU	0.026	**0.000**	**HAP1 <- ATT**	0.019	**0.000**
CB1 <- PEoU	0.045	**0.000**	**PE3 <- PE**	0.411	**0.029**
CB2 <- PEoU	0.045	**0.000**	**PE4 <- PE**	0.344	**0.036**
CU1 <- PEoU	0.048	**0.000**	**SI1 <- SI**	0.146	**0.000**
CU2 <- PEoU	**0.041**	**0.000**	**SI2 <- SI**	**0.128**	**0.000**
EE1 <- EE	**0.030**	**0.000**	**SI3 <- SI**	**0.114**	**0.000**
EE2 <- EE	**0.034**	**0.000**	**SI4 <- SI**	**0.145**	**0.000**
EE3 <- EE	**0.037**	**0.000**	**USF1 <- PU**	**0.030**	**0.000**
EL1 <- PEoU	**0.056**	**0.000**	**USF2 <- PU**	**0.036**	**0.000**
EL2 <- PEoU	**0.050**	**0.000**	**VL1 <- ATT**	**0.034**	**0.000**
ES1 <- PEoU	**0.047**	**0.000**	**WMQ1 <- PU**	**0.041**	**0.000**
ES2 <- PEoU	**0.070**	**0.000**	**WMQ2 <- PU**	**0.043**	**0.000**
ETP1 <- PU	**0.035**	**0.000**	**ETU1 <- PEoU**	**0.047**	**0.000**
ETP2 <- PU	**0.060**	**0.000**			

And the following AVE values:

TABLE III
AVERAGE VARIANCES EXTRACTED (AVE)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Attitude (ATT)	0.776	0.778	0.870	0.691
Actual Use (AU)	0.715	0.742	0.816	0.527
Behavior Intention to Use (BIU)	0.854	0.861	0.904	0.703
Effort Expectancy (EE)	0.804	0.815	0.883	0.716
Facilitating Conditions (FC)	0.702	0.795	0.826	0.706
Performance Expectancy (PE)	0.721	0.794	0.799	0.667
Perceived Ease of Used (PEoU)	0.855	0.858	0.882	0.567
Perceievd usefulness (PU)	0.875	0.876	0.903	0.539
Social Influences (SI)	0.769	0.808	0.850	0.589

B. Reliability Values

In reliability testing, the first criterion evaluated is internal consistency reliability [3]. The traditional criterion for internal consistency is Cronbach's alpha, which estimates reliability based on the intercorrelation's observed indicator variables. Because of Cronbach's alpha limitations in the population, it is righter to apply a different measure of internal consistency reliability, which is referred to as composite reliability. The reliability value of 0.60 to 0.70 can be accepted in exploratory research, while in the further research stage, a value between 0.70 and 0.90 can be considered satisfactory [3]. In Table 3 above, it can be concluded that both have met the reliability requirements and have good reliable values.

C. Inner Model Evaluation

Here is a picture of the construct relationship along with the correlation value between constructs used as the research model:

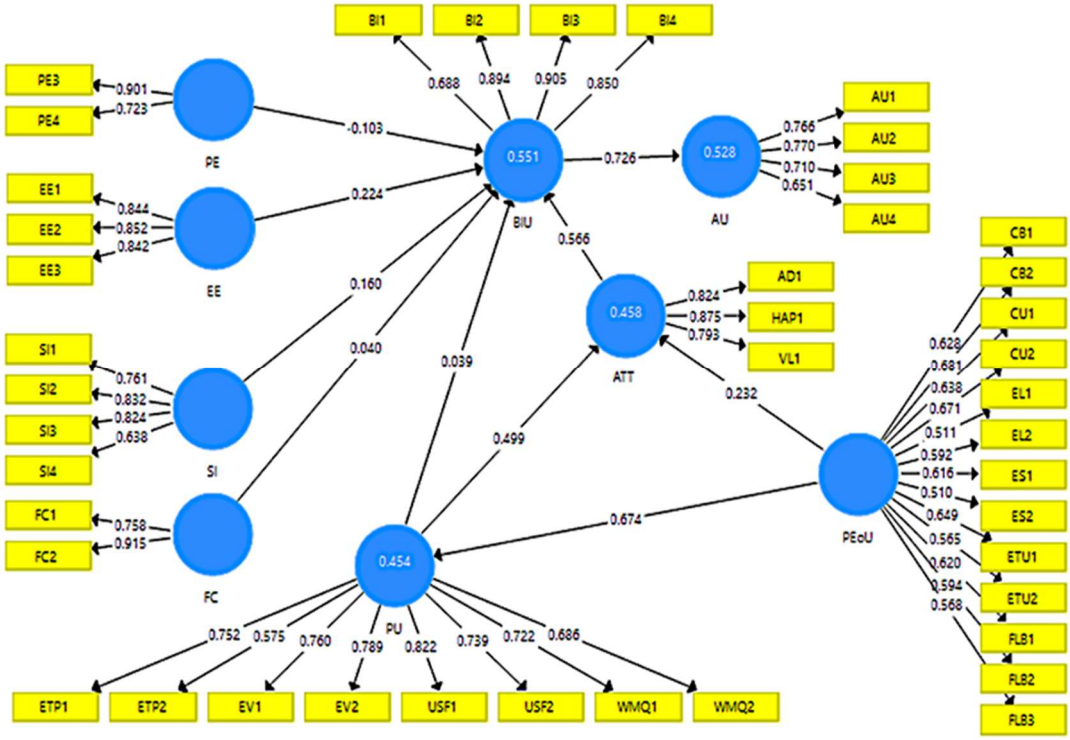

Fig. 3 Correlation between constructs

Testing the inner model is evaluated using two parameters: looking at the coefficient of determination (R2) and the goodness of fit index (GoF). Following are the test results of these two parameters:

1) Average Block VIF (AVIF): Evaluates by looking at the VIF table in the SMARTPLS Ver calculation software output. 3. Following are the results of the output.

TABLE IV
VALUE OF AVERAGE BLOCK VIF (VIF)

	VIF		VIF		VIF		VIF
AD1	1.813	CB2	1.837	ETP1	2.138	FLB3	1.656
AU1	1.272	CU1	1.569	ETP2	1.289	HAP1	2.023
AU2	1.455	CU2	1.951	ETU1	2.125	PE3	1.141
AU3	1.795	EE1	1.543	ETU2	1.812	PE4	1.141
AU4	1.653	EE2	1.869	EV1	2.646	SI1	1.541
BI1	1.388	EE3	1.962	EV2	2.736	SI2	1.562
BI2	2.836	EL1	1.746	FC1	1.227	SI3	1.805
BI3	3.534	EL2	2.065	FC2	1.227	SI4	1.381
BI4	2.553	ES1	1.771	FLB1	1.788	USF1	2.680
CB1	1.860	ES2	1.650	FLB2	1.698	USF2	2.559
VL1	1.392	WMQ2	1.581	WMQ1	1.747		

From the results of the calculation of AVIF above, the value falls into the Ideal index category according to the Tenenhaus category, namely: Average Block VIF (AVIF) is acceptable if ≤ 5, ideally if ≤3.3.

2) The determination coefficient (R2): Evaluates by looking at the R Square table in the SMARTPLS Ver calculation software output. 3. Following are the results of the output.

TABLE V
DETERMINATION COEFFICIENT (R SQUARE)

	R Square	R Square Adjusted
Attitude (ATT)	0.558	0.553
Actual Use (AU)	0.528	0.526
Behavior Intention to Use (BIU)	0.551	0.538
Perceievd usefulness (PU)	0.554	0.551
Average	0.548	0.542

In Table 5 above, the value for the Attitude (ATT) construct is 0.558, which means Perceived Usefulness (PU), Perceived Ease of Used (PEoU) can explain the Attitude (ATT) variance of 0.558 or 55.8%, while another variable

explains the remaining 44.2%. In Table 5 above, the value for the Actual Use (AU) construct is 0.528, which means Behavior Intention to Use (BIU) can explain the Actual Use (AU) variance of 0.528 or 52.8%, while other variables explain the remaining 47.2%. In Table 5 above, the value for the construct Behavior Intention to Use (BIU) is 0.551, which means Perceived Usefulness (PU), Performance Expectancy (PE), Effort Expectancy (EE), Social Influences (SI), and Facilitating Conditions (FC) and Attitude Conditions (FC) (ATT) can explain the Behavior Intention to Use (BIU) variance of 0.551 or 55.1%. In comparison, other variables explain the remaining 44.9%. In Table 5 above, the value for the construct of Perceived Usefulness (PU) is 0.554, which means Perceived Ease of Used (PEoU) can explain the variance of Perceived Usefulness (PU) of 0.554 or 55.6%, while other variables explain the remaining 44.4%.

3) The goodness of fit index (GoF): The GoF calculation above is 0.589; the value is included in the Large index category according to the Tenenhaus category, i.e., GoF, small ≥ 0.1, medium ≥ 0.25, large ≥ 0.36.

D. Hypothesis test

Hypothesis testing in this study is intended to measure the significance of exogenous and endogenous variables. The developed hypothesis is measured by comparing the t arithmetic value with the t table at a significance level of 5%. Then figure out the value of the t table for the significance level. Since this research uses PLS-based SEM analysis, the calculation method uses the bootstrapping / resampling technique. Here are the output results:

TABLE VI
RESULTS OF INNER WEIGHT

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Hypothesis
ATT -> BIU	0.566	0.569	0.079	7.170	**0.000**	**Ho Reject**
BIU -> AU	0.726	0.731	0.036	20.088	**0.000**	**Ho Reject**
EE -> BIU	0.224	0.218	0.082	2.744	**0.006**	**Ho Reject**
FC -> BIU	0.040	0.042	0.056	0.717	**0.474**	**Ho Accept**
PE -> BIU	-0.103	-0.072	0.063	1.637	**0.102**	**Ho Accept**
PEoU -> ATT	0.232	0.235	0.072	3.201	**0.001**	**Ho Reject**
PEoU -> PU	0.674	0.682	0.042	16.101	**0.000**	**Ho Reject**
PU -> ATT	0.499	0.498	0.082	6.116	**0.000**	**Ho Reject**
PU -> BIU	0.039	0.034	0.087	0.441	**0.659**	**Ho Accept**
SI -> BIU	0.160	0.147	0.061	2.608	**0.009**	**Ho Reject**

In this study, the value of df was obtained from the number of respondents of 212 respondents, so that the value of df = 210, with a significance value of $\propto = 0.05$ (5%) then obtained value t-table = 1.65 Criteria acceptance and rejection hypothesis is if t calculates < 1.65 then H0 received or H1 rejected otherwise if t count > 1.65 then H1 accepted. From the data above, three hypotheses are rejected, namely: Perceived Usefulness (PU) affects Behavior Intention to Use (BIU) Performance Expectancy (PE) affects Behavior Intention to Use (BIU) Facilitating Conditions (FC) affect Behavior Intention to Use (BIU)

E. Direct, Indirect, and Total Effect

After testing the hypothesis, it will then be analyzed the influence between the research model's constructs developed either directly, indirectly, or the real influence. The following Table 7 and 8 are the results of direct influence and from the construct that has been processed. The table and equation above show that the variable that has the most direct effect on the construct of Actual Use (AU) is the Behavior Intention to Use (BIU) variable of 0.764 [11]. In comparison, the variable that directly influences the Behavior Intention to Use (BIU) construct is the Attitude (ATT) variable of 0.556. Simultaneously, the variable that has the most significant direct effect on the Attitude (ATT) structure is the Perceived Usefulness (PU) variable of 0.499.

TABLE VII
INDIRECT EFFECTS

	Specific Indirect Effect
PEoU -> PU -> ATT	0.336
PEoU -> ATT -> BIU -> AU	0.095
ATT -> BIU -> AU	0.412
PU -> ATT -> BIU -> AU	0.205
PEoU -> PU -> ATT -> BIU -> AU	0.138
EE -> BIU -> AU	0.163
FC -> BIU -> AU	0.029
PE -> BIU -> AU	-0.075
PU -> BIU -> AU	0.028
PEoU -> PU -> BIU -> AU	0.019
SI -> BIU -> AU	0.116
PEoU -> ATT -> BIU	0.131
PU -> ATT -> BIU	0.283
PEoU -> PU -> ATT -> BIU	0.190
PEoU -> PU -> BIU	0.026

TABLE VIII
TOTAL EFFECTS

	ATT	AU	BIU	EE	FC	PE	PEoU	PU	SI
ATT		0.412	0.566						
AU									
BIU		0.726							
EE		0.163	0.224						
FC		0.029	0.040						
PE		-0.075	-0.103						
PEoU	0.568	0.253	0.348					0.674	
PU	0.499	0.233	0.321						
SI		0.116	0.160						

Simultaneously, the variable that has the most significant direct effect on the structure of Perceived Usefulness (PU) is the variable Perceived Ease of Used (PEoU) 0.674. Due to indirect relationships and direct relationships, it is necessary to measure the total variables. Based on the results of the table measurements above, it is identified that the variable with the most significant total effect on Actual Use (AU) is the Behavior Intention to Use (BIU) variable of 0.764. Furthermore, the most significant indirect effect is the indirect effect of Attitude (ATT) on Actual Use (AU) through Behavior Intention to Use (BIU) of 0.412.

IV. CONCLUSION

Attitude (ATT) has been proven to influence Behavior Intention to Use (BIU) in Smart City application digital marketing services. Behavior Intention to Use (BIU) is proven to affect Actual Use (AU) in the Smart City application's digital marketing services. Effort Expectancy (EE) has been proven to influence Behavior Intention to Use (BIU) on digital marketing services in the Smart City application. Facilitating Conditions (FC) are proven to does not affect Behavior Intention to Use (BIU) in the Smart City application digital marketing services. Performance Expectancy (PE) is

proven to does not affect Behavior Intention to Use (BIU) in the Smart City application digital marketing services. Perceived Ease of Used (PEoU) is proven to affect Attitude (ATT) on the Smart City application digital marketing services. Perceived Ease of Used (PEoU) is proven to affect the Perceived usefulness (PU) of Smart City application digital marketing services. Performance usefulness (PU) is proven to affect Attitude (ATT) in Smart City application digital marketing services. Performance usefulness (PU) has been proven to does not affect Behavior Intention to Use (BIU) in digital marketing services for Smart City applications. Social Influences (SI) has been proven to influence Behavior Intention to Use (BIU) in the Smart City application digital marketing services. It is better if the Smart City Apps Developer adds features that can better meet their residents' needs, such as Directory, CCTY, Bust Tracking, Reminder, and History features for IPL payments [17], [18]. It would be better if the Smart City Apps Developer also pays attention to the loading process speed and minimize the possibility of errors. Moreover, it is expected that Smart City Apps Developer will always disseminate and promote all residents regarding the Smart City Application, such as its use, how it works, how to register, and its features [18], [19].

Based on the conclusions obtained, the researchers submitted suggestions for further research. This study discussed customer satisfaction from Smart City mobile application users. This study recommends that further research conduct research in terms of satisfaction in the use of applications and sustainable use of the application. The researchers also suggested that further researchers also examine the level of interest or intention to use citizens related to the Smart City application to use this application. Besides, further research can examine other features that can be added in the application for continuous improvement for Smart City applications.

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