The Characteristics of Responses to Smart City Device Usage, Maqasid Shariah Perspective: The Case of Kota Depok, West Java, Indonesia

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Abstract

The research aims to analyze the characteristics of smart city device usage from maqasid shariah perspective. The smart city device was developed to support users to fulfill their needs which actually relates to maqasid shariah. Therefore, the higher rate of smart city device usage will increase the quality of life. This includes such factors that make people use this device. This research employs the quantitative method based on the questionnaires distributed to the people of Kota Depok, Indonesia. This device is supposed to increase the activity level of smart city. In fact, only few people use smart city device for their needs and purposes. The benefit of the device is a significant factor to use the smart city device. In addition, not all maqasid shariah aspects covered in the smart city device of Kota Depok.

Keywords:

Smart city, Characteristics, Achievement, Device, Internet.

INTRODUCTION

The issue of smart city has been tremendously blast in Indonesia. This has become an interesting issue in Indonesia since 2010 as it gives benefits to the planning and development of a city in Indonesia. However, although in practice the issue has been scientifically and technologically developed, not much has been discussed in social aspect, especially in the Islamic perspective. Thus, there is a gap on this case for smart city study.

Smart city has become a standard for city development all over the world. It can ease citizen to fulfill their need and increase their life quality. The device has been developed by a high technology to support the activity of the people in the city. This can be basic needs which can be also viewed from maqasid shariah as the basic principles in Islam.

The objective of this research is to analyze the data on the characteristics of smart city device obtained from responses of the people in that city and from maqasid shariah perspective. It starts from related reference discussions

and supporting theories. Description on research methodology and analysis is intended to see the characteristics and supporting theories.

LITERATURE REVIEW

Most literatures on smart city are scientifically and technologically reviewed. They have based their discussion on systematic technology to create efficient economy and better information system in a city. However, in public sector, only few researchers have particularly discussed this. Although in practice each local government already has smart city issues, public sector has not dealt with such issues. Thus, this paper would like to bridge the gap and discuss smart city in public sector perspective as well as the maqasid shariah.

Smart city is defined differently based on context and cases in one place. This paper defines smart city in different perspectives of researchers. In general, smart city uses high technology to ease and to accommodate the need of citizen in one city. However there is no minimum standard one city can be called as smart city although it has applied high technology in servicing people.

Maqasid shariah is the objective of the implementation on shariah whereby shariah can be implied on general term. According Zahrah (2005), maqasid shariah is not only consisting of five aspects such as (a) necessity to preserve religion, (b) life, (c) intellect, (d) progeny, and (e) wealth, but it also covers to enhance the education and to uphold justice. Therefore the smart city goal should be in line with the maqasid shariah as they have common goal. The achievement of smart city goal can be implicitly included also of maqasid shariah which can be generally applied. However, this research is rare and may be new on this topic. Maqasid shariah can be included implicitly as aspects to be concerned with the smart city.

Adapa (2018) studied a smart city and cleaner production issues in India. He assumed that a smart city comprises more than the six dimensions of a smart economy, smart people, smart governance, smart mobility, a smart environment and smart living. Such other models as quadruple helix, society, and fourth element can be added. He found that many activities are required to achieve the status of smart city and cleaner production. This also depends on the characteristic of a city in one country. Accordingly, the definition of smart city changes over time.

Jin *et al.* (2016) stated that Internet of Things (IoT) gets everything and everyone connected. It merges information technology (IT) and physical

infrastructures to achieve the vision of Smart City. They studied the usage of beneficial and efficient application for lightning system.

Abu-Issa, *et al*. (2017) has conducted a research on the usage of android device to give recommendation. They stated that it gives benefits to daily life and support smart city operation. They used 3 approaches: (a) content-based approach, promoting similar item (b) collaborative-based approach, recommendation item and (c) hybrid approach, mix approach. This application will assist users to find recommended places. Thus, this would be the basis of this research.

Papa, *et al*. (2018) studied the attitude-mediated intention of using device (healthcare smart wearable healthcare-SWH) in India. The result shows that attitude (AA) significantly affects intention to use (IU), while attitude has such various factors as perceived usefulness (PU-significant), intrusiveness (not significant), comfort (not significant), and perceived ease of use (PEU-significant). This shows that people more likely to be comfortable when they gain benefits and ease in using the device. Gai, *et al*. (2018) urge the use of financial technology to speed up development, in case of smart city and cloud computing.

Walravens (2015) has created some indicators for smart city application which means getting smarter for any quality of life. They include (a) value network (good governance and stakeholder management), (b) technical architecture (technology governance and public data ownership), (c) financial architecture (return on public investment and public partnership model), and (d) value proposition (public value creation and public value evaluation). The problem of providing an application for smart city is the complexity of city activities. That is why qualitative measurements are needed. Meanwhile, Walravens (2015) a studied the usefulness of smart city device to develop the city of Brussels in Belgium. It can improve the activity of the city for economic development.

Thus, the hypotheses for this research are:

H1: The attitude towards the adoption of Depok Smart city device is dependent on Perceived ease of use (POU).

H2: The attitude towards the adoption of Depok Smart city device is dependent on Perceived usefulness (PU)

H3: The Behavioral Intention to use Depok Smart city device is dependent on the attitude -towards adoption (AA) of Depok Smart city device.

H4: The PU of Depok Smart city device is dependent on POU

H5: The Behavioral Intention to use (IU) Depok Smart city device is dependent on the PU.

METHOD

This research employs the survey-based quantitative method. The questionnaires were sent through Whatsapp to the users who stay in Kota Depok or actively visit Kota from 14 to17 May 2018. The respondents are 43 users of android smartphones.

The research refers to framework model of Papa *et al.* (2018) which applies variance-based PLS SEM and small sample size. Due to insignificance, such variables as intrusiveness and comfort are excluded from this research. In addition, observed variables are reduced and modified to fit the research context. List of statements can be seen in appendix 1. Beside that, impact is added as it has significant effect in the previous model (see figure 1 in dash arrow). The analysis of maqasid shariah is based on the aspect of smart city device component and the response of respondents.

Figure 1. Hypothesis model
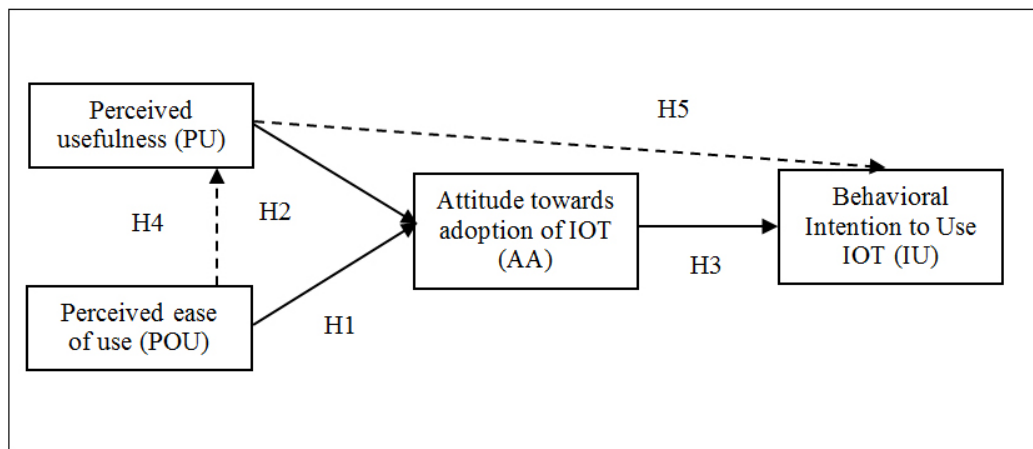
Source: Author

The smart city device includes information about tourism, place (restaurant, banks & ATM, pray, hospital and police), news, and complaints. Citizen can get information on nearest places for specific information and buildings. People who are visiting kota Depok also benefited from this device.

ANALYSIS

The analysis starts from crosstab analysis to enrich the perspectives. Male and female respondents relatively have similar response to the know-how of the Depok smart city device. Approximately, only 40% of the female

and male respondents are familiar with the Depok smart city (see table 1). Male respondents have bigger percentage usage of Depok smart city device compared to female respondent (23.1 % and 13.3%, respectively- table 2). But it is still below 50% usage. Male respondents may have needed of this device.

Table 1. Crosstab of Sex and Know-how of Smart City Device

| | | Know-how | | |
		No	Yes	Total
Sex	Male	8	5	13
	%	61.5	38.5	100
	Female	18	12	30
	%	60	40	100
	Total	26	17	43

Source: Data

Table 2. Crosstab Sex and Use of Smart City Device

| | | Use | | |
		No	Yes	Total
Sex	Male	10	3	13
	%	76.9	23.1	100
	Female	26	4	30
	%	86.7	13.3	100
	Total	36	7	43

Source: Data

Undergraduates have the biggest percentage of Depok smart city device usage (26.3%), while graduates account for only 12.5%, followed by high school graduates (8.3%). The pattern of smart city device is random for education graduate level.

Table 3. Crosstab Education and Use of Smart City Device

| | | Use | | |
		No	Yes	Total
Education	Diploma	4	0	4
	%	100	0	100
	S1	14	5	19
	%	73.7	26.3	100
	S2/S3	7	1	8
	%	87.5	12.5	100
	High School	11	1	12
	%	91.7	8.3	100
	Total	36	7	43

Source: Data

Users of Depok Smart city device are mostly middle-aged (around 30% for 31-40 years old and 29% for 41-50 years old). Teen agers (20-30 years old) are not interested in using this device. This may be caused by the fact that they do not need this device in that age.

Table 4. Crosstab Age and Use of Smart City Device

		Use		
		No	Yes	Total
Age (year)	<20	1	0	1
	%	100	0	100
	20-30	22	2	24
	%	91.7	8.3	100
	31-40	7	3	10
	%	70	30	100
	41-50	5	2	7
	%	71.4	28,6	100
	>51	1	0	1
	%	100	0	100
	Total	36	7	43

Source: Data

Response to the Depok Smart city suggests that it can solve any issues and may be appropriate to solve complaint in Depok Smart city (agreement response rate of 70%). They agree that this device can solve the complaints of the citizens. This issue is similar to Adapa's finding (2018), which suggests that the use of Depok Smart city device can increase comfort to citizen.

Table 5. Crosstab of Complain Issues and Complain Online
of Smart City Device

		Complain Online		
		No	Yes	Total
Opinion	Not very agree	0	1	1
	%	0	100	100
	Not agree	5	1	6
	%	83.3	16.7	100
	Neutral	13	3	16
	%	81.3	18.8	100
	Agree	3	7	10
	%	30	70	100
	Very Agree	2	8	10
	%	20	80	100
	Total	23	20	43

Source: Data

However, concerning the most wanted information of places, hospitals rank first, followed by banks and religious places for praying. Twitter news ranks lowest due to the fact that users can get information directly from internet such social media (Twitter, Facebook) (see table 5). Other enquiries to be included in the application put education (school, courses) in the highly demanded information (10 people) followed by gas station (7 people).

From this response, we can see that most respondents may have aligned to maqasid shariah as putting hospital, bank, pray, and police as higher priority. Hospital and life can be included as necessity to life and pray for necessity to preserve religion. Islamic bank location is also informed in the device, but not for other Islamic financial institutions such as Islamic insurance, leasing and pawn. Other places for investing in Islamic bond and capital markets should also be informed.

Necessity to preserve intellect is suggested by respondents as this information is also important. In kota Depok, there are many Islamic schools from elementary until high school. Only necessity to preserve progeny is not concerned by respondents. Kota Depok has the highest rate of divorce, in 2017 there was over 5000 cases. In 2018, everyday 25 cases of divorce proposal came into the court, only 1% which can be solved and mediated by the court (Republika, 2018). Therefore, this device should give information on how to manage marriage in harmony and location for marriage conflict consultation.

Table 5. Descriptive Statistic of Place Preference

Place	Min	Max	Mean	SD
Hospital	3	5	4.35	.813
Bank	3	5	4.33	.778
Pray	1	5	4.30	.939
Police	3	5	4.23	.868
Complaints	2	5	4.19	.906
Restaurants	2	5	4.09	.811
Tourism	3	5	3.98	.771
News	1	5	3.56	1.031

Source: Data

The analysis of affecting variables can be described in Smart PLS tool. Based on Papa et al. (2018), it shows that Perceived Usefulness (PU) has significant effect on Attitude towards adoption of IOT (AA). Meanwhile,

Perceived ease of use (PEU) does not have any significant effect on Attitude towards adoption of IOT (AA), yet it affects significantly Intention to Use (IU). PEU has two indicators which show that the application is easy to use and clearly understandable, but it still cannot affect attitude towards adoption.

Figur 1. Hypothesis model
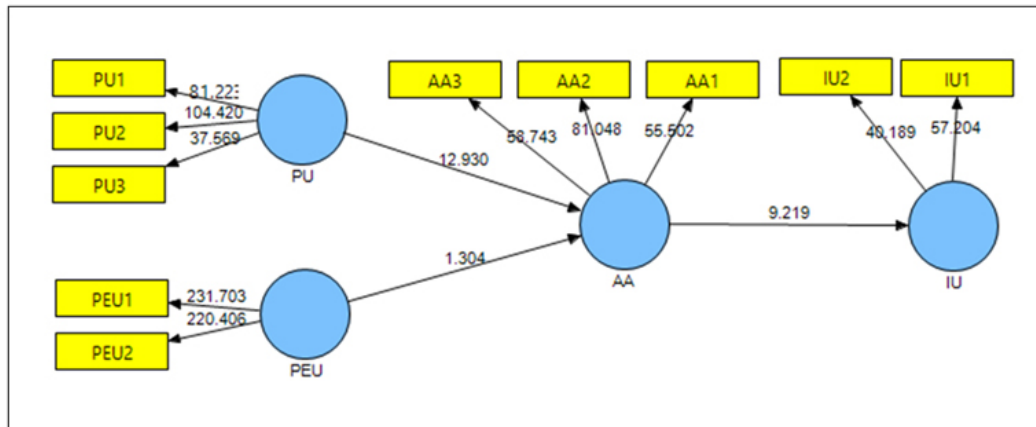
Then, the model is the modified version of the basic model of technology acceptance model (TAM) by Davis (1989). A similar model was developed by Koch et al. (2011) and Gavrilova (2009). However, the modified and updated model has been researched by many authors. From new connection in figure 2, only connection of Perceived ease of use (PEU) to Perceived Usefulness (PU) has significant effect rather than Perceived Usefulness (PU) to Intention to Use (IU). This new connection has caused lower significant number for Attitude towards adoption of IOT (AA) to Intention to Use (IU). The Perceived ease of use (PEU) is still not significant to Attitude towards adoption of IOT (AA). Users may find other alternative information rather than merely using this device.

The ease of use Depok Smart city application can improve Perceived Usefulness (PU) of users. As the application is assumed to be easy, it can result in the usefulness of users. Detail of statistic test can be seen in the appendix 2, table 8 for current statistic test, while table 9 for new model. Abu-Issa, et al. (2017) also concerns that the issue of benefits is majorly effect to the application of smart city device. The issue of life quality improvement was addressed in Walravens' study (2015) while the issue of economic benefits was addressed in Walravens' another study (2015a). This issue may be also be reflected by the incompleteness of maqasid shariah components such as information for necessity to preserve intellect and progeny. Smart city should be covered aspect which is needed by citizen of kota Depok.

Figur 1. Hypothesis model
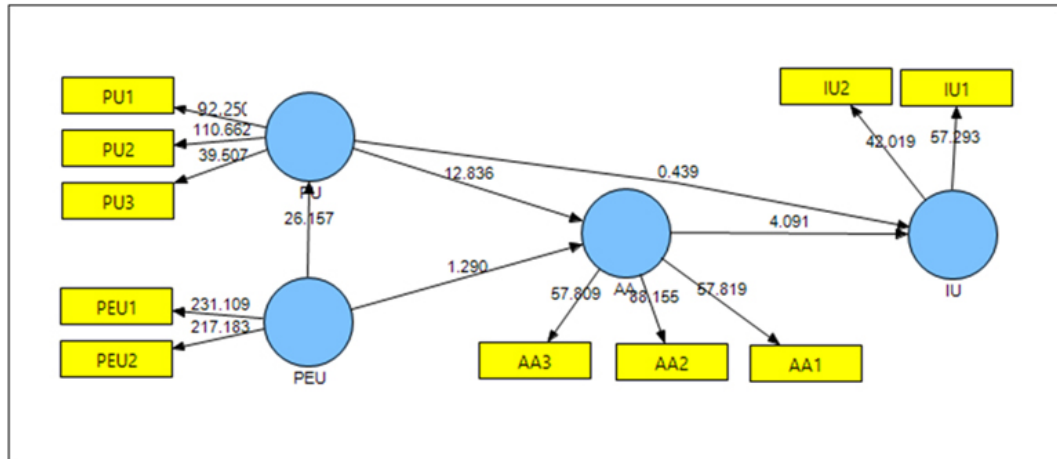
The new model can increase the values of AVE, Composite Reliability, R Square, Cronbach's Alpha, and Communality for IU. While, AA only increases at R Square. On the other hand, PEU decreased in AVE, Composite Reliability, and Communality. However, the new model proves to be better as it gives increasing value for the last variable.

Tabel 6. Data of Variable Relationship

	AVE	Composite Reliability	R Square	Cronbach's Alpa	Communality	Redundansy
AA	0.885477	0.958666	0.904554	0.935282	0.885477	0.127784
IU	0.878100	0.935092	0.579105	0.861395	0.878100	0.507307
PEU	0.976680	0.988203		0.976125	0.976680	
PU	0.900974	0.964638		0.944727	0.900974	

Tabel 7. Data Of New Model of Variable Relationship

	AVE	Composite Reliability	R Square	Cronbach's Alpa	Communality	Redundansy
AA	0.885477	0.958666	0.904663	0.935282	0.885477	0.127251
IU	0.878100	0.935107	0.579561	0.861395	0.878125	0.502677
PEU	0.976680	0.988203		0.976125	0.976680	
PU	0.900974	0.964635	0.788553	0.944727	0.900964	0.709613

CONCLUSION

The characteristics of Depok Smart city can be found in the middle-aged users. They include the education level in which undergraduates prefer using this application. Most respondents expect that the device can solve any

complaint. Incomplete of maqasid shariah aspects may cause some variables are not significant to others.

All hypotheses are consistent to previous researches except for Perceived ease of use (PEU) to Attitude towards adoption of IOT (AA). Meanwhile, the additional hypothesis (Perceived Usefulness (PU) to Intention to Use (IU) was not supported. This shows that users do not directly have intention to use the device for their need.

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