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THE EFFECTS OF TECHNOLOGY READINESS AND TECHNOLOGY ACCEPTANCE TOWARD CITIZENS' PARTICIPATION IN BANDUNG SMART CITY PROJECT

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Abstract. Smart city is a world phenomenon that also affected Bandung. Bandung government wants to apply smart city to Bandung which leads to Bandung smart city project. The project main focus is the Smart government. Citizens could actively participate in Bandung smart city project by using social media for reporting city problems. This study goal to know the effects of technology readiness and technology acceptance toward citizens' participation. The research model based on two theories, technology readiness index and technology acceptance model. The data for this study collected from 400 citizens of Bandung. The results of the study showed that four constructs of technology readiness significantly affected perceived ease of use while only two constructs of technology readiness significantly affected perceived usefulness. Both perceived ease of use and perceived usefulness significantly affected intention to use. The result of this study suggests that to increase citizens' participation towards Bandung smart city project, the government needs to do direct socialization to reach more elements of citizens.

Keywords: Technology Readiness, Technology Acceptance Model, Smart City, Bandung Juara

Introduction

Smart City is a well-known trend in the world. It is a symbol of a city that developed with integrating aspects to create a sustainable economics and good quality of living among those people. Smart City believed as one of the solutions that should be prioritized in developed country like Indonesia since it would utilize technology in order to achieve economic sustainability and improving the standard of living. Bandung government want to apply smart city to Bandung which leads to Bandung smart city project. Among many aspects of the smart city, Bandung focused on smart government as their main focus. In order for the project to be a success, citizens' participation is needed. Even the government have five-star utilities if their citizens do not actively participate then the project would be pointless. As for the smart government itself, Bandung government allowed their citizens to actively participate by using social media for reporting city problems. This paper consists of study that tries to determine the effects of technology readiness and technology acceptance towards citizens' participation in the project since the participation that citizens can do involving technology used. Besides, this studies also trying to determine citizens' knowledge towards the project.

Theoretical Framework

Technology Acceptance Model (TAM) was created by Davis (1989) suggesting that three factors, perceived ease of use, perceived usefulness, and attitude toward using the technology, have an influence on users' motivation, which determines their intention to use. Davis (1989) believes that perceived

usefulness and perceived ease of use are the two factors that determine the attitude toward behavioral intention. Perceived usefulness means as "the degree to which a person believes that using a particular system would enhance his or her job performance". While perceived ease of use means as "the degree to which a person believes that using a particular system would be free of effort".

Technology readiness defined as people's propensity to embrace and use new technologies for accomplishing goals in home life and at work (Parasuraman, 2000). Parasuraman (2000) proposed Technology Readiness Index (TRI) to measure people's readiness level to use technology. There are four factors that used to measure technology readiness, they are innovativeness, optimism, insecurity, and discomfort. Optimism defined as a positive view of technology and a belief that technology offers people increased control, flexibility, and efficiency in their lives. Innovativeness is defined as a tendency to be a technology pioneer and thought leader. Discomfort is defined as a perceived lack of control over technology and a feeling of being overwhelmed by it. Insecurity is defined as a distrust of technology and skepticism about its ability to work properly. Optimism and innovativeness are considered as the drivers of technology readiness while discomfort and insecurity are considered as the inhibitors of technology readiness. In order to achieve this aim, a research model was formulated. Model based on the two theories: Parasuraman's technology readiness index and Davis' technology acceptance model. Research model can be seen in figure 1. In order to test the influence of the technology readiness and technology acceptance towards Bandung citizens' intention to use social media for reporting city problems, this hypothesis was developed:

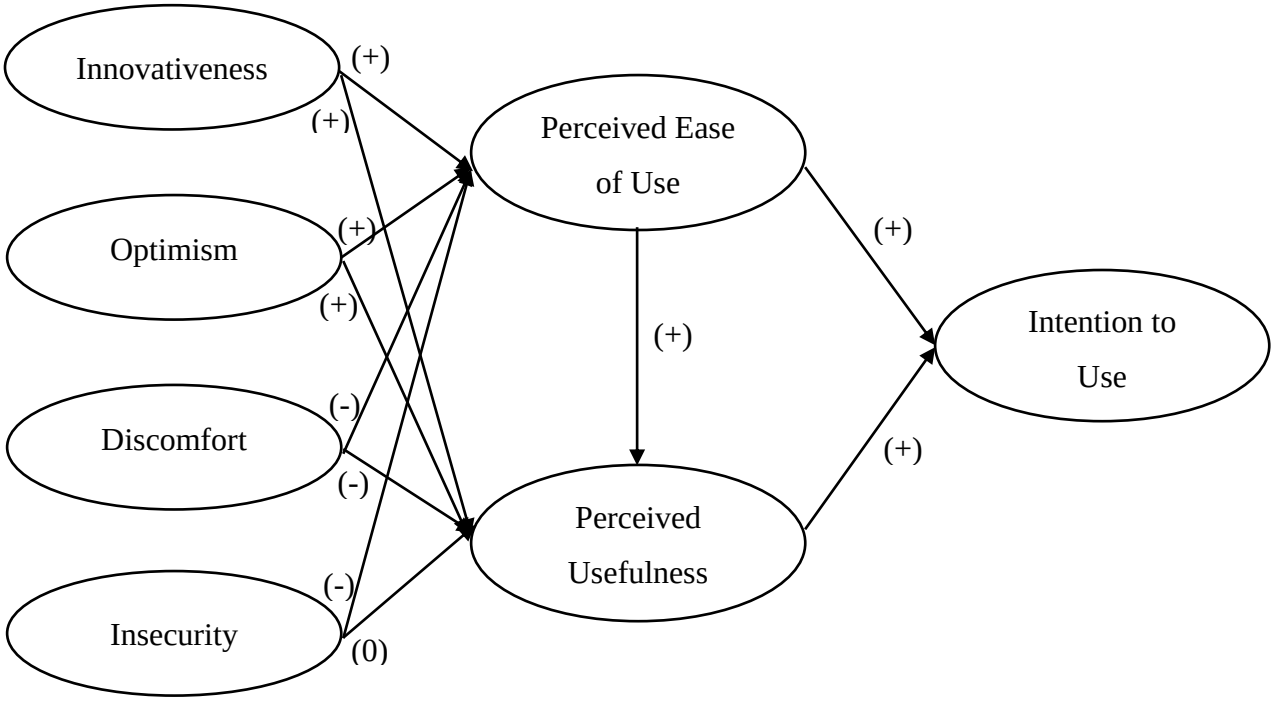

Figure 1. Research Model

H1. Optimism is positively related to perceived ease of use
H2. Optimism is positively related to perceived usefulness
H3. Innovativeness is positively related to perceived ease of use
H4. Innovativeness is positively related to perceived usefulness
H5. Insecurity is negatively related to perceived ease of use
H6. Insecurity is negatively related to perceived usefulness

H7. Discomfort is negatively related to perceived ease of use
H8. Discomfort is not significantly related to perceived usefulness
H9. Perceived ease of use is positively related to perceived usefulness
H10. Perceived ease of use is positively related to intention of use
H11. Perceived usefulness is positively related to intention of use

Research Design

Sample
The data for this study was collected from distributing a questionnaire to 400 Bandung citizens. The questionnaire was divided into three parts. Part one asked respondents questions about their profile. Part two consist of six question asking for respondents' knowledge about the smart city. Part three consist of twenty-one question using Likert 5-point scale where 1 for strongly disagree and 5 for strongly agree. From 400 citizens, 54.50% of them are female and 45.50% of them are male. 53.50% of the citizens aged between 20 – 24 years old.

Measure Development
The measurement items in this research were borrowed by the researcher from the existing literature. The researcher used the 12-item TR scale, which is based on the paper by Shin and Lee (2014) and Lam et al. (2008). The 12-item TR scale was a developed measurement from the original 36-item TR scale constructed by Parasuraman (2000). TAM which consists of perceived ease of use, perceived usefulness, and intention to use measured by using a 3-item scale for each variable. 3-item scale for perceived ease of use and perceived usefulness based on the paper by Shin and Lee (2014) and Hsu et al. (2011). That 3-item scale for each variable was a developed measurement from the original 12-item TAM scale constructed by Davis (1989). Intention to use social media for reporting city problems measured using three items based on the paper by Shin and Lee (2014) and Venkatesh and Goyal (2010).

Validity and Reliability
Validity and Reliability of each factor are tested by using factor loading, composite reliabilities, and variances extracted. All variable were found valid since all variables have factor loading > 0.5. For the reliability, all variables have composite reliability value ≥ 0.7, so all variables could be said as reliable even though variable discomfort and insecurity have variances extracted value < 0.5. Since the composite reliability value is ≥ 0.7, variables discomfort and insecurity are both considered as reliable.

Table 1. Validity and Reliability

Variable	Indicator	λ	CR	VE
Innovativeness	INN1	0.956	0.9	0.7
	INN2	0.783		
	INN3	0.736		
Optimism	OPT1	0.551	0.7	0.5
	OPT2	0.814		
	OPT3	0.664		
Discomfort	DIS1	0.534	0.7	0.4
	DIS2	0.747		
	DIS3	0.575		
Insecurity	INS1	0.718	0.7	0.4
	INS2	0.593		

	INS_3	0.690		
Perceived Ease of Use	$PEOU_1$	0.830	0.9	0.7
	$PEOU_2$	0.849		
	$PEOU_3$	0.782		
Perceived Usefulness	PU_1	0.659	0.8	0.6
	PU_2	0.792		
	PU_3	0.836		
Intention to Use	USE_1	0.726	0.9	0.7
	USE_2	0.892		
	USE_3	0.924		

Results

The hypothesized relationships are tested using structural equation modeling (SEM). From the test results, Chi-Square, RMSEA, and CFI indicate satisfactory model fits. Therefore further analysis of the relationship between variables is conducted. From 11 hypotheses tested, H5 and H7 rejected since their Sig. value is > 0.05.

Table 2 Goodness of Fit Model

Fit Index	Recommended Value	Result
Normed Chi-Square (X^2/df)	$2 < X^2/df < 5$	2.8764
RMSEA	< 0.10	0.069
GFI	> 0.90	0.889
AGFI	> 0.9	0.856
NFI	0.9	0.863
CFI	0.9	0.905

Table 3. Hypothesis Testing

Hypothesis	t	Sig.
H1. Innovativeness -> ease of use	3.138	0.002
H2. Innovativeness -> usefulness	3.701	0.325
H3. Optimism -> ease of use	-2.925	0.000
H4. Optimism -> usefulness	2.678	0.000
H5. Discomfort -> ease of use	- 0.984	0.003
H6. Discomfort -> usefulness	4.373	0.083
H7. Insecurity -> ease of use	- 1.734	0.007
H8. Insecurity -> usefulness	2.202	0.028
H9. Ease of use -> usefulness	8.119	0.000
H10. Ease of use -> intention	3.696	0.000
H11. Usefulness -> intention	6.331	0.000

Table 4. Direct and Indirect Influence

Relation	λ	Direct Influence	Indirect Influence			Total Influence
			PEU	PU	PEU and PU	

Innovativeness -> PEU	0.170	0.029	-	-	-	0.029
Optimism -> PEU	0.221	0.049	-	-	-	0.049
Discomfort -> PEU	- 0.191	0.036	-	-	-	0.036
Insecurity -> PEU	0.166	0.028	-	-	-	0.028
Innovativeness -> PU	- 0.048	0.002	- 0.025	-	-	- 0.022
Optimism -> PU	0.250	0.063	0.129	-	-	0.191
Discomfort -> PU	- 0.101	0.010	- 0.052	-	-	- 0.042
Insecurity -> PU	0.124	0.015	0.064	-	-	0.079
PEU -> PU	0.514	0.264	-	-	-	0.264
PEU -> Intention to Use	0.242	0.059	-	0.234	-	0.293
PU -> Intention to Use	0.456	0.208	-	-	-	0.208
Innovativeness -> Intention to Use	-	-	0.041	- 0.022	0.078	0.097
Optimism -> Intention to Use	-	-	0.053	0.114	0.101	0.268
Discomfort -> Intention to Use	-	-	- 0.046	- 0.046	- 0.087	- 0.179
Insecurity -> Intention to Use	-	-	0.040	0.057	0.076	0.172

Conclusion

Bandung citizens' knowledge towards Bandung smart city project is fairly average. The citizens actually know about government plan in creating Bandung smart city, but most of the citizens do not know the element of the project where they can directly involve in creating Bandung smart city. That element is the existence of government working units and sub-districts official social media. By submitting city problems to the related working unit or sub-district social media, the government will try to solve the problems as fast they can. The number of citizens knowing about government working units and sub-districts official social media are pretty concerning since there are only 30% respondents know that all government working unit have official social media account and only 16.75% respondents know that all sub-district in Bandung has official social media account. Bandung citizens might know that there are several social media account for the government working unit or even sub-district, but statistics proved that the number of respondents who know that all government working unit and all sub-district in Bandung has official social media are low.

In this study, there is a total of 11 hypotheses tested to found a significant relation between each variable. From these 11 hypotheses, there are 2 hypotheses founded not significantly related which are innovativeness towards perceived usefulness and discomfort towards perceived usefulness. The other 9 hypotheses that founded significantly related are innovativeness towards perceived ease of use, optimism towards perceived ease of use, discomfort towards perceived ease of use, insecurity towards perceived ease of use, optimism towards perceived usefulness, insecurity towards perceived usefulness, perceived ease of use towards perceived usefulness, perceived ease of use towards intention to use and perceived usefulness towards intention to use. This study also found that optimism among others technology readiness component have the most influence towards perceived ease of use, perceived usefulness, and intention to use while discomfort has the least influence towards an intention to use. It is

also found that perceived ease of use is influencing perceived usefulness and both variables are influencing intention to use.

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