



Intention Behavior of Villagers in Adopting Telecommunication Technology: A Case Study of Using Cellular Phone in Indonesia

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ABSTRACT

Telecommunication technology is proven able to increase the welfare of villagers. In Indonesia, there are still thousands of remote village which have not been reached by the facility of telecommunication technology. One of the barriers of telephone program in the village is the people's behavior towards the telecommunication technology of cellular phone. The main purpose of this study is to know what variables that can influence attitude, subjective norm and perceived behavioral control as well as to know how the influence of the variables towards the intention of villagers to own and use the telecommunication technology of cellular phone. The research findings which are obtained from double regression analysis are as follows: (1) attitude towards behavior and perceived behavior is the significant variable which influences intention and (2) the variable of perceived behavior control that is not proven significant can change the relationship between attitude and intention as well as subjective and intention.

Keywords: Intention Behavior, Telecommunication Technology, Cellular Phone

1. INTRODUCTION

The role of Information and Communication Technology (ICT) at present is very vital, especially when the trend of world's economy changed from industrial era into information era, from the resource-based economy into knowledge-based economy (Stiglitz, 2006). Currently, people who have access to the latest information are the ones who can conquer the economy (Yunus, 2007). In many literatures, it was found that the telecommunication technology had an influence to the progress and welfare of a country or community (Hardy, 1980; Hudson, Heather & Parker, 1990; Bayes, 2001; Yunus, 2007). Unfortunately, not all people can enjoy the advanced telecommunication technology. Those who live in the villages and remote area often have no access to telecommunication technology. This leads a bigger gap between life in village and in city. Therefore, the inaccessibility of information also causes lack of knowledge for villagers in health and education sectors. It is common if the information accessibility for villagers became one of points of action resulted in the World Summit on Information Society (WSIS) at the end of 2003. One of the points states that the plan is to connect villages and provide telematics facility, including telecommunication and internet in the late year of 2015.

Researches about villagers' behavior in Indonesia towards telecommunication technology are interesting to be conducted due to several reasons. The first is that there has not been any well implemented village telephone program in Indonesia. From the total of 67,797 villages in Indonesia, there are only 24,000 villages which have already got telecommunication service (Donny and Mudiarjo, 2006). The government has failed in implementing the village telephone program which

was conducted in 2003 for more than 3,000 villages in Indonesia. From several barriers reported by Department of Communication and Information of the Republic of Indonesia (2007), besides the weak system and technology, there is also an indication that the behavior of villagers in adapting the technology has become one of the problems that cause the program unsuccessful. Therefore, it is needed to undertake a research about villagers' behavior towards telecommunication technology. Moreover, the government plans to provide USO village telephones for more than 40,000 villages in Indonesia in the year of 2007 until 2009.

The second reason in undertaking this research is to emphasize the business model (Godong, 2006; Siswanto, 2006) which is based on the Village Phone Model successfully implemented in Bangladesh and Uganda (USA Grameen Foundation, 2005). Meanwhile the other model has more emphasis on technology and policy of national telecommunication industry (Langi, 2005; Bandung et. al., 2006). In fact, within the telecommunication system, one of the most important issues is the telephone user. Venkatachalam and McDowell (2002) state that the need of telecommunication technology of cellular phone that is now commonly offered to people live in cities is not the same as the one that is needed by villagers. Learning how villagers' behavior towards telecommunication technology of cellular phone will help policy makers, both the government and the company managers to make the best decision for regulations and marketing strategy of telecommunication service for villagers. Therefore, learning villagers' behavior towards telecommunication technology becomes an interesting topic to study.

2. KNOWING INTENTION BY USING THEORY OF PLANNED BEHAVIOR

Researchers have been trying to improve behavior models in order to explain people behavior in all aspects of life. At the early development of the theory of behavior, attitude is believed as the most influential variable towards intention and person's behavior. In 1991, Ajzen added perceived behavioral control variable into a TRA model to accommodate a person's self confidence in behavior with all the limitations. This model is later known as *the Theory of Planned Behavior* (TPB). In this model, there are three factors which influence consumer's intentions, namely: (1) the belief of the possibility of the effect towards certain behavior and evaluation from the effect of that behavior (*behavioral beliefs*), (2) the belief of other people's normative hope and motivation to achieve that hope (*normative beliefs*) and (3) the belief of the existence of the factors which can support or interrupt behavior to happen and how big the influence of those factors (*control beliefs*). Behavioral beliefs create attitude towards the behavior (positive or negative attitude towards the behavior), *normative beliefs* create *subjective norms* and *control beliefs* create *perceived behavioral control*.

In the research conducted to explain behavior of lower-middle business people in Chile in adopting the e-commerce technology (Nasco et. al., 2007), it is found that *attitude* and *subjective norm* are proven have positive and significant influence towards *intention*. However, the constructed *perceived behavioral control* is not proven have significant influence. The research conducted by Nasco et. al. (2007) which states that *perceived behavioral control* (PBC) does not give significant influence to the formation of *intention* is very interesting to be investigated. The insignificant influence of PBC towards *intention* is also found in the research of adopting information technology by lower-middle managers in United States (Riemenschneider, Cyntia et. al., 2003). Referring to that condition, the researchers are interested in investigating the behavior of villagers towards cellular phone technology by using TPB model. In a research using TPB, Celuch et. al. (2007) suggests the next researchers to investigate possibility of variables in TPB whether they have capability to moderate relationship among the variables and *intention*. From the literary study, the researchers put PBC as a moderator variable that will influence relationship between *attitude* and *intention*, and relationship between *subjective norm* and *intention*. Furthermore, the research model can be seen in the following Figure 1.

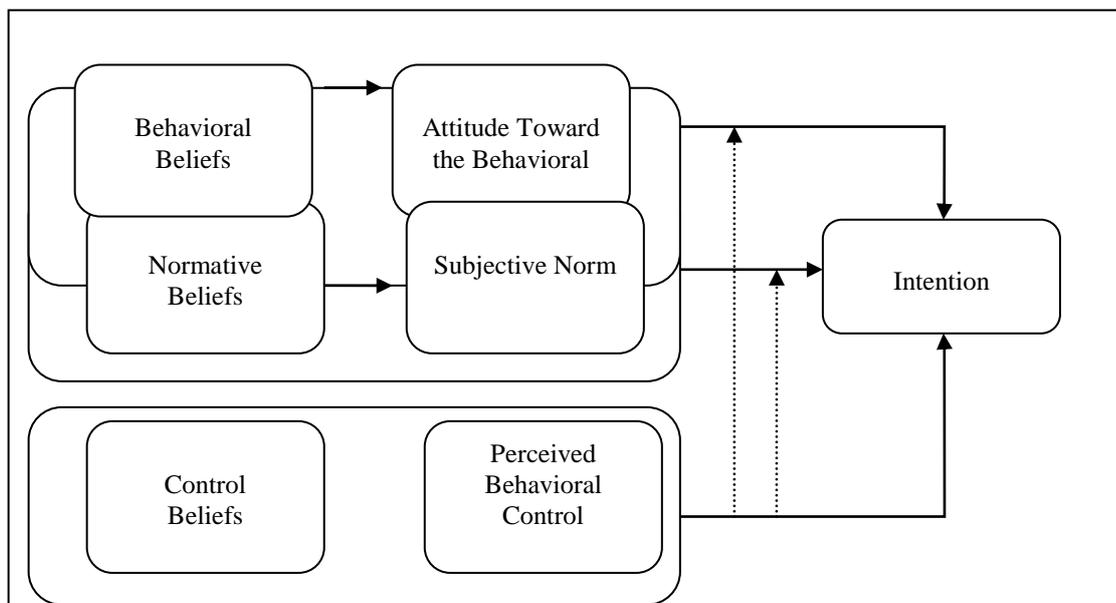


Figure 1. Research Model

2.1 Measuring the Construction of TPB

A guideline to elaborate construction of each variable in the Theory of Planned Behavior has been provided by Ajzen. By direct and indirect measurement for emphasizing each measurement must be arranged based on unique behavior of each population which is going to be researched at early research (Ajzen, 2006; Francis, Jillian et. al., 2004). In arranging construction of each variable, an early research was conducted in the form of interview survey to 30 villagers come from Cikadut Village and Mekarmanik Village in Cimenyan Residency, Bandung Region. The early research was conducted to know what factors of the villagers that

represent three variables, namely *Attitude towards Behavior Beliefs*, *Subjective Norm Beliefs* and *Perceived Behavior Control Beliefs*. In each proposed question, the researchers have prepared options of answer and let respondents to write down their own opinion. To know the attitude towards behavior of the villagers, the researchers also ask several questions related to advantages and disadvantages felt by the villagers when using telecommunication technology of cellular phone, such as the advantage to be able to communicate easily, to save money and time as well as to increase self confidence. In *subjective norm* variable, the

question is related to the closest persons who influence the respondents in making the decision to own and use the telecommunication technology. Meanwhile, for *Perceived Behavior Control* variable the respondents were asked about the factors supporting or avoiding them to use telecommunication technology.

Results of early research about the constructed variables were elaborated more in the form of questionnaire. The answer of the questions which are approved by 75% of the respondents was then written in questionnaire. Total of closed-questions is 46 which consist of 8 questions related to respondents' profile and other 38 closed-questions on Likert scale (ordinal) ranging from 1 until 5 which indicate: strongly agree, agree, no opinion, disagree and strongly disagree. The scoring range is more appropriate to be used for villagers instead of a wide range of scoring that can confuse respondents.

2.2 Research Hypothesis

From the background of research it can be described that there is a strong pull to connect all villages in Indonesia with telecommunication network. This is not only the agenda for the government but also the ones for private companies. It can be seen by wider coverage of telecommunication network to small villages by telecommunication operators in Indonesia. Despite the high number of villages in Indonesia which has not been reached by telephone, there are several villages, especially in the island of Java have almost been reached by telecommunication service (Department of Communication and Information of the Republic of Indonesia, 2007).

Referring to general principle of relationship of each variable in TPB stated by Ajzen (2006), the research hypothesis which is arranged based on the relationship between *attitude toward behavior* variable (AB) and *intention* (I) is:

H1: The attitude of villagers towards telephone has positive influence to their intention to own and use telecommunication technology of cellular phone.

The research hypothesis for the relationship between subjective norm (SN) and intention (I) is:

H2: Subjective norm of villagers towards cellular phone has positive influence to their intention to own and use telecommunication technology of cellular phone.

Variable relationship of perceived behavior control (PBC) in this research is investigated by two models, i.e. independent variable (see figure 2.4) and moderator variable. The research hypothesis for independent variable is:

H3.1: Perceived behavior control of villagers towards cellular phone has positive influence to their intention to own and use telecommunication technology of cellular phone.

Meanwhile, the research hypothesis for moderator variable is:

H3.2: Perceived behavior control of villagers towards owning and using cellular phone influences the relationship between attitude and intention as well as the relationship between subjective norm and intention of villagers towards their intention to own and use telecommunication technology of cellular phone.

3. RESEARCH METHOD

3.1 Arrangement of Research Instrument

Stages of conducting this research are based on the research guideline of TPB proposed by Ajzen (1991). The first stage is to identify population of the research (villagers who have not owned telephones), to determine behavior or intention which are going to be investigated (intention to own and use telecommunication technology), and to undertake early research to reveal specific elements needed in the questionnaire. The early survey was conducted in two different villages in Bandung region.

Referring to the early research, questionnaire that consists of 8 questions which represent behavioral beliefs about the advantage of owning a cellular phone was made. Other 6 questions represent normative beliefs of closest social environment upon having cellular phone and 11 questions represent control beliefs of obstacles to have a cellular phone. Each belief is measured to calculate how big is the value of constructed attitude, subjective norm and perceived behavioral control. The value of attitude towards behavior norm is obtained from behavioral beliefs and outcome evaluation ($A_B = \sum b_i e_i$). Meanwhile, the constructed subjective norm resulted from normative beliefs and motivation to comply ($SN = \sum n_i m_i$) and the constructed perceived behavior control is obtained from control beliefs and perceived power ($PBC = \sum c_i p_i$). Besides the 25 questions above, there are 13 direct questions to measure attitude, subjective norm, perceived behavioral control and intention. The options to answer are measured by 5 Likert scales, ranging from Strongly Agree, Agree, No Opinion, Disagree and Strongly Disagree. Considering that the research population is the villagers in West Java Region, the questionnaire is translated into Sundanese language by a translator in order to ease respondents to understand the questions.

3.2 Respondents

Research respondents come from 6 different villages in districts located near the border of Bandung City, West Java. This research uses purposive sampling technique. Technique of obtaining data is in-depth interviewing to the respondents directly. This way is enable the researchers to obtain answer of each question in the questionnaire and also observe the villagers as the research objects directly.

4. RESEARCH FINDINGS

4.1 Demography

Number of respondents is 143 persons with 76 males (53.9%) as majority. The ages of the respondents are mostly ranging from 17 to 25 years and from 36 to 40 years. Only a few of them have higher education. One person has a bachelor degree (BA) education and another one has a diploma degree. Majority of female respondents are housewives (27.7%), while other professions which also have a high percentage is private employees (16.3%) and business people (17.7%).

4.2 Factor Analysis

One of the requirements to operate data by using factor analysis and regression is that the data must be metric with minimum interval scale (Hair et. al., 2006). To fulfill the requirement, data tabulation which come from the questionnaire are changed by using Method of Successive Interval (MSI). By using this method, the data is arranged into order data and analyzed by using MSI program in MS Excel in order to become interval scale to fulfill the basic requirement in analyzing data using factor analysis and double regression. The value of *beliefs* is obtained from multiplication of each comment upon *beliefs* (b) given by the respondents with an evaluation (e).

McCarthy et. al. (2003) in his research about meat consumers' behavior by using Theory of Reasoned Action (TRA) as an early model of TPB, stated that the construction made by the early research that the uni-dimensions should be tested first by using factor analysis. Besides, the reliability of the questions must be seen to measure research construction based on Cronbach Alpha.

Results of the analysis factor can be seen in Table 1. From the table, it can be known that the constructed attitude towards behavior consists of 2 questions in which each question is related to the feeling caused by cellular phone and that the cellular phone is a good gadget. Because there are only 2

questions, the construction of the Cronbach Alpha value is not measured. In the construction of subjective norm, 4 questions are grouped into two factors in which each factor has two questions. The first question is related to the belief upon the influence of friends' opinion in buying cellular phone and the card, while the second question is related to the belief of family in buying cellular phone and the card. Cronbach Alpha used for these questions is 0.821. For the construction of *perceived behavioral control* and *intention*, each has 3 questions with Cronbach Alpha values 0.580 and 0.629.

4.3 Regression Analysis and Correlation: Double Linear Regression

To elaborate relationship of variables in this research model, double regression analysis is used as a method. The results of factor analysis which have been done in the following stage are used as a basis of data grouping for each identified variable. By SPSS 15 analysis, it is found in the respondents' histogram that 3 outliers are not included in the analysis. So, the total of analyzed respondent data is 138 persons. This number is still far below the minimum sample of Hair (2006) which mentions 100 samples as a minimum sample for regression analysis, or 5 times bigger than research variables or 15 to 20 times bigger than research variables for a better result.

In this study, the double linear regression analysis is conducted for four times. The first is the relationship that influences attitude (AB). It is found that the people's belief to benefits of telephone is to save the time (AB2) is the most significant predictor ($\beta = 0.278$, $p < 0.05$) comparing with the people's belief that the phone allows them to communicate easily (AB1) and save the cost (AB3). This also shows that villagers believe strongly that the telephone help them save time needed to give information than their belief that the phone can allow them to communicate easily and save the cost. Meanwhile, the positive correlation between AB2 and the attitude can be interpreted that the more convince the villagers to the benefits of cellular phone in saving time, the better attitude they have towards the cellular phone.

Table 1. Loading factor and reliability of each construction

The Components of TPB Model	Loading Factor	Cronbach Alpha*
Attitudes toward behavior	1	
Telephone creates happy feeling	0.819	
Telephone is a good thing	0.819	
Subjective Norm	1	0.821
Belief to the influence of friends' opinion in buying telephone card	0.910	
Belief to the influence of friends' opinion in buying cellular phone	0.839	
Belief to the influence of family's opinion in buying cellular phone	0.808	
Belief to the influence of family's opinion in buying telephone card	0.746	
Perceived Behavior Control	1	0.580
There is no barrier to have a telephone	0.828	
Having a telephone is an easy thing	0.755	
If you want to have a telephone, then you must own it	0.623	
Intention	1	0.629
Efforts to have a telephone	0.831	
Commitment to have a telephone	0.757	
Intention to have a telephone	0.682	

*The calculation of Cronbach Alpha is only for constructed variables with minimum three questions

The second double linier regression is conducted in the beliefs that it can influence subjective norm (SN). The analysis results show that the villagers have a belief that friend (SNF1) and family (SNF2) influence them in buying cellular phone and the card. These two factors show positive influence to subjective norm, i.e. the higher their belief to their family and friends, the higher their subjective norm will be. Meanwhile, by the double linier regression to see relationship on the perceived behavioral control (PBC), it is found that only one belief which is proven significant ($\beta = -0.233$, $p < 0.05$), i.e. the belief to long distance to buy and use cellular phone (PBC4). The other 5 beliefs are not significantly proven. The long distance that the villagers have to buy cellular phone and the cards has a negative influence to their self confidence (PBC) to have cellular phone. It can be inferred from the relationship that the more convince the villagers to get cellular phone and the cards, the less their self confidence will be to buy and have cellular phone.

To test the TPB model, the double linier regression is conducted in the relationship between *attitude toward behavior* (AB), *subjective norm* (SN), *perceived behavior control* (PBC) and *intention* (I). This study found that the villagers' intention is significantly influenced by their

positive attitude towards cellular phone and their self confidence to have cellular phone. The influence of surrounding environment towards the villagers' intention to have cellular phone is not significantly proven.

Besides testing the TPB model, there is also a test to know the relationship of villagers' self confidence that can change the relationship between attitude and intention and the relationship between *subjective norm* and *intention* (PBC as a moderator variable). It was found in the test that *perceived behavior control* cannot influence the relationship between *attitude* and *the intention* to have cellular phone. The only relationship that can be changed by adding the villagers' self confidence factor (PBC) is the relationship between *subjective norm* which come from the influence from friends and the intention. Before *perceived behavior control* is used as a moderator variable, friends' opinion has positive influence to the intention to have cellular phone. After the self confidence factor is added into the model, the influence of friends' opinion becomes negative. This is interesting to be analyzed because when the villagers are more confident to be able to have cellular phone, in fact friends' opinion becomes a factor that can weaken the intention to have cellular phone.

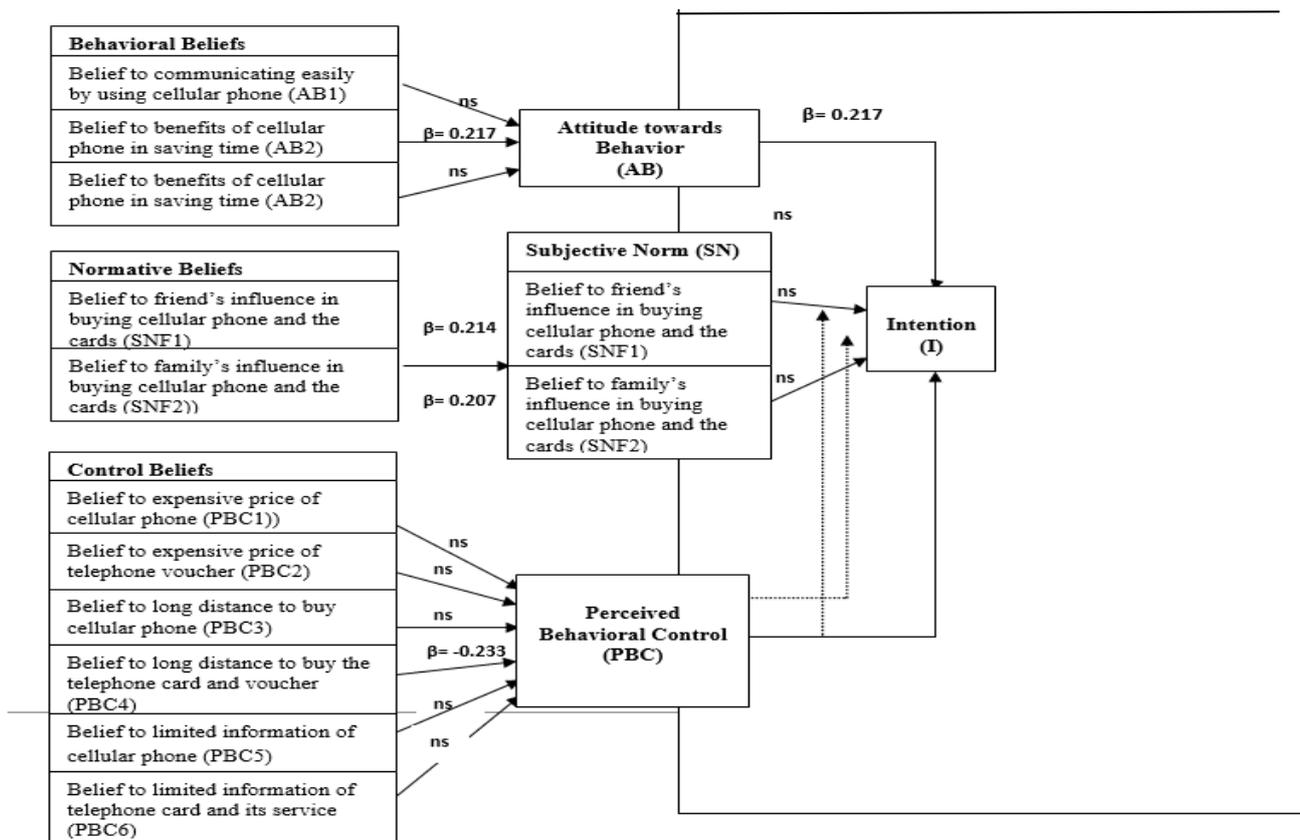


Figure 2. Final results of double regression

The researchers use relationship limitation that can be found possibly due to the inaccurate parameter. Consequently, the respondents tend to be confused in interpreting the proposed questions. The bias or confusion of the concept of PBC variables is also mentioned by Armitage and Conner in Nasco (2007). Therefore, the conclusion is not very convincing.

On the practice, this study can be an input for Indonesian government, especially Department of Communication and Information which become the policy makers in telecommunication sector to have an approach to attitude and self confidence of the people to village telephone. By concerning the factors which are proven having influence, the government is expected to arrange a policy that can accommodate the wants and behaviors of villagers.

5. CONCLUSION AND SUGGESTION

It can be inferred from figure 2 that the results of analysis using double regression can explain the variants of TPB model which is an enhancement of TRA model as follows: (1) 16% intention variants of villagers to buy and use telecommunication technology of cellular phone, and other 84% is caused by other factors. Even though it is significant, the intention variants have not been able to be explained yet; (2) the differential of the model consists of several *beliefs* variables which does not have a significant influence to explain the latent variables (figure 5.1). This is because the TPB model is an advanced model of TRA which is included in multi attributes group. Therefore, this model possibly has problems in a situation where the dimension analysis is used by discrete data.

In previous researches on benefits of technology (Nasco et. al., 2007, Riemenschneider et. al., 2003), it is found that PBC does not significantly influence *intention*. So, in the case of villager's intention to buy and use village telecommunication technology, the SN dimension does not significantly influence intention. In this case study, it is also proven that the suggestion from Celuch (2007) to investigate further on the moderator relationship among variables cannot be proven. In other words, proposed hypothesis is rejected.

Findings of the study are still not optimal yet. It is expected that there will be an advanced research on villagers' behavior by using the same theory and model. In spite of the fact that the study still needs to be continued, there is a finding shows that there is a moderator relationship between PBC variable and SN, though the influence is not very significant. These findings are beneficial as an early point for further investigation in the next researches.

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