

# The Acceptance of Technological Innovation by the Academics

Khairani R Siregar<sup>1</sup>, Ilham Perdana<sup>2</sup>, Indira Rachmawati<sup>3</sup>

<sup>1,2,3</sup> Telkom University, School of Business and Economics,  
Bandung Technoplex South Campus, JL. Telekomunikasi, Terusan Buah Batu Bandung, West Java 40257, Indonesia

**Abstract:** *The high demand of educational industry has some influences on the academics' lifestyle, specifically the lecturers in which their previous lifestyle was conservative. Their conservative lifestyle was changed to modern lifestyle due to the high level of mobility. This study has two purposes. Firstly, it is conducted to discover whether compatibility, observability, relevance, personal demographic, personal experience, internal environment and external environment have any influences on the attitude of Telecommunication and Informatics Business Management Program Study (MBTI) Telkom University's lecturers toward smartphone adoption. Secondly, this study is also conducted to discover whether the attitude influences behavior intention in smartphone adoption by the academics (MBTI Telkom University lecturers). In achieving the study's objective, the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) are applied. A survey by using questionnaire is carried out as the study's approach. The result of the study provides empirical support to the idea that the characteristics of the innovation from Attitude, Observability, Compatibility, Personal demographics, and Personal experience influence the acceptance attitude toward the use of smartphone.*

**Keywords:** DOI, Innovation Management, Smartphone Adoption, TAM, Technology Acceptance

## 1. Introduction

Cellphone industry has been growing significantly in Indonesia. According to the research conducted by Ericsson Consumer Lab (2012) written by Intana, the growth of smartphone in Indonesia will be three times larger: in 2013, 1.2 billion smartphones will be sold out. Smartphone that has become lifestyle and one of the company policies is the main factor of the increasing number of smartphone sales. According to Milanese in Galih (2012), in the 2016, two-thirds of workers will possess smartphone and 40 percent of them will be mobile. Flurry (2012) states that smartphone adoption in global scale has been growing rapidly compared to any consumer technology. It is known that more than 640 million iOS and Android operating system had been used during July 2012.

This study is expected to help revealing an innovation factor that influences smartphone adoption in academics specifically MBTI Telkom University lecturers by applying two models namely TAM and DOI.

## 2. Theory

### 2.1 Modelling

Model is an abstraction of a reality through the characteristic delineation of the reality itself. Model is also a partial representation of reality; therefore, there are some approaches to it. Daellenbach (2005; 81) states that the approach to the model used will create various consequences.

### 2.2 The Definition of Technology and Technology Adoption

Khalil (2000) defines technology as knowledge, products, processes, tools, methods, and systems required to make

things or to provide services. Simply, Batih (2007) defines technology as a way to do something, medium to achieve something, and as practical application of science. Hidayanti (2005) argues that technology adoption is a decision to accept and use a new innovation or technology at some level by an individual or group of people.

### 2.3 Technology Acceptance Model (TAM)

TAM, according to Lee (2003), is the most influential theory that is applied to discover the individual acceptance of information system (IS). TAM was adapted from the Theory of Reasoned Action (TRA). Even though TAM is considered a successful theory, there are still many studies attempting to investigate the development of TAM, evaluate its limit, and predict its further development. The development of TAM is written as follows:

- 1) Model introduction period (1986-1995). After the introduction of IS to the organization, in this period, user acceptance technology (UAT) has bigger attention. TAM evolved from TRA which caused the experts to conduct research focuses on two things. Firstly, the research should focus on how to apply TAM on technology or other studies. Secondly, the focus is on comparing TAM with its predecessor, TRA, in order to discover what differentiate both of them and to discover its excellence.
- 2) Model validation period (1992-1996). Research in this period investigated whether TAM's instruments are powerful to survive.
- 3) Model development period (1994-2003). After the validation process was considered satisfying, the development by involving external variables that contain individual, organization, and work characteristics is conducted.
- 4) Model elaboration period (2000-now). The elaboration process in this period was divided into two. First process was intended to develop the next TAM generation and

second process was intended to cope with TAM limitations.

	attitude toward the use of smartphone in academics
8	Attitude significantly influences the Behavior Intention toward the adoption of smartphone in academics

2.4 Diffusion of Innovation (DOI)

A study conducted by Sharif et al (2012) provides an explanation of DOI that is acquired from Roger (2003). Roger (2003), the first person who studies the diffusion of innovation theory, explains that diffusion is a process in which an innovation is communicated through certain channel from time to time among the social system members. In his study, Roger further states that innovation is an idea, practice, or object that is new to individual or other adoption unit. Roger (2003) classifies five characters of innovation that influence the number of adoption:

- 1) Relative advantage, level of innovation is considered better than concept.
- 2) Compatibility, level of innovation is consistent with the existing values, the past experience, and the potential needs of every adopter.
- 3) Complexity, level of innovation is considered difficult to be understood and used.
- 4) Trialability, level of innovation could be limitedly experimented.
- 5) Observability, level of innovation could be observed by other people.

3. Method

Method steps consist of five systematic steps, namely research preparation step, model conceptualization, data collection and processing, analysis, conclusion and suggestion.

3.1 Model Building Hypotheses

The model building that will be proposed in this study is TAM (Technology Acceptance Model) proposed by Davis (1989). In TAM, subjective norm may influence individual behavior that is connected to the use of technology. In 2008, the initial TAM was perfected by Venkatesh to be TAM3. The other model that is applied in this study is DOI (Diffusion of Innovation) proposed by Roger (2003). According to the proposed conceptual model, the study's hypotheses are as written on the Table 1:

Table 1: Hypotheses Used In the Study

Hypothesis	Explanation
1	Compatibility significantly influences the attitude toward the use of smartphone in academics
2	Observability significantly influences the attitude toward the use of smartphone in academics
3	Relevance significantly influences the attitude toward the use of smartphone in academics
4	Personal demographic significantly influences the attitude toward the use of smartphone in academics
5	personal experience significantly influences the attitude toward the use of smartphone in academics
6	Internal environment significantly influences the attitude toward the use of smartphone in academics
7	External environment significantly influences the

4. Result

This study uses survey with 32 responses from 58 MBTI lecturers. It may mean that more than 50% responses have been acquired. These total responses are considered sufficient for this study which is about information technology. The respondents consist of permanent lecturers; eight male (25%) and 24 female (75%). The average respondents' age is 35 year-old and their work experience is more than three years. Model regression in Table 2 indicates the values' significance between the independent variables.

Table 2: Model 1 Regression Result

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1,367	,630		2,169	,040
Observability(X3)	,493	,128	,476	3,865	,001
Compatibility (X4)	,255	,184	,257	1,389	,178
job relevance (X5)	,136	,183	,149	,743	,465
personal demographics (X6)	-,384	,167	-,306	-2,298	,031
personal experience(X7)	,299	,150	,325	1,991	,058
internal environment(X8)	,043	,166	,045	,259	,798
external environment (X9)	-,252	,209	-,225	-1,205	,240

Table 2 consisting of X3 to X9 are indicate significance between the independent variation. It can be seen that the variables showing the significant result are observability, compatibility, personal demographics, and personal experience. Therefore, a further step, which is Trimming Test, is required in order to eliminate one-by-one the variable that is not significant.

Table 3, the percentage of independent variable's influence toward the dependent variable, in this case is attitude, is 68.7 percent. This may indicate that there is influence of compatibility, job relevance, personal demographics, personal experience, internal environment, and external environment upon attitude which matches the theory and hypothesis mentioned previously.

Table 3: Model 1 Coefficient Determination Value Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,829 <sup>a</sup>	,687	,596	,49558

a. Predictors: (Constant), VAR00009, VAR00003, VAR00006, VAR00005, VAR00007, VAR00008, VAR00004

In Table 3, the percentage of independent variable's influence toward the dependent variable, in this case is

attitude, is 68.7 percent. This may indicate that there is influence of compatibility, job relevance, personal demographics, personal experience, internal environment, and external environment upon attitude which matches the theory and hypothesis mentioned previously. The independent variable that has significant influence is acquired by conducted Trimming test. The Trimming test result can be seen in Table 4. The observability, compatibility, personal demographics, and personal experience has significant influence.

**Table 4: Model 2 Regression Result**

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	1,277	,615		2,077	,047
Observability(X3)	,508	,122	,490	4,162	,000
Compatibility (X4)	,297	,129	,298	2,295	,030
personal demographics (X6)	-,433	,153	-,345	-2,837	,009
personal experience (X7)	,259	,124	,281	2,090	,046

Table 4, the attitude toward the use of smartphone is influenced by some independent variables: ( $\beta = .49$ ,  $t = 4.162$ ), compatibility ( $\beta = .298$ ,  $t = 2.295$ ), personal demographics ( $\beta = -.345$ ,  $t = -2.837$ ), and personal experience ( $\beta = .281$ ,  $t = 2.090$ ). If the significance value (p-value) is smaller than t-value, the predictor contribution will be bigger. In this model, observability ( $t = 4.162$ ,  $p = .00$ ), compatibility ( $t = 2.295$ ,  $p = .03$ ), personal demographics ( $t = -2.837$ ,  $p = .009$ ), and external environment ( $t = 2.090$ ,  $p = .046$ ) are the significant predictor of attitude toward the use of smartphone. In t-value, observability has higher effect than compatibility, personal demographics, and personal experience do. The beta value is calculated, because it will provide insight into the importance of predictor in the model.

The beta value for observability (.49) reveals observability which is most related to the attitude toward the smartphone use.

To discover the effect of the attitude toward Behavioral Intention, a regression is conducted (the detailed information can be seen in Table 5). It can be seen that in Table 5, the influence value of total variable attitude toward the dependent variable, behavioral intention, is 32.1 percent. This may indicate the existence of influence between the attitude toward behavioral intention which matches the theory and hypothesis mentioned above.

**Table 5: Concise Model Regression of Attitude toward Behavioral Intention**

Model	R	Adjusted R Square	Std. Error of the Estimate
1	,566 <sup>a</sup>	,298	,60498

If X is the factor influencing Y (attitude) meanwhile X is:

- X3: Observability
- X4: Compatibility
- X5: Personal Demographic
- X6: Personal Experience

Thus, the calculation of the influence between  $X \rightarrow Y \rightarrow Z$  is as follows:

1. The influence of X3  $\rightarrow Y \rightarrow Z$   
 $((0,49^2) + (0,49*0,298*0,3) + (0,49*-0,345*0) + (0,49*0,281*0,163)) * 0,566 = 0,1734$
2. The influence of X4  $\rightarrow Y \rightarrow Z$   
 $((0,298^2) + (0,298*0,49*0,3) + (-0,345*0,298*0,014) + (0,298*0,281*0,427)) * 0,566 = 0,0945$
3. The influence of X6  $\rightarrow Y \rightarrow Z$   
 $((-0,345^2) + (-0,345*0,49*0) + (-0,345*0,298*0,014) + (-0,345*0,281*0,355)) * 0,566 = 0,0470$
4. The influence of X7  $\rightarrow Y \rightarrow Z$   
 $((0,281^2) + (0,281*0,49*0,163) + (0,281*0,298*0,427) + (-0,345*0,281*0,355)) * 0,566 = 0,0582$

The calculation above results the total influence which is 37.31 percent. Further explanation can be seen on Figure 3:

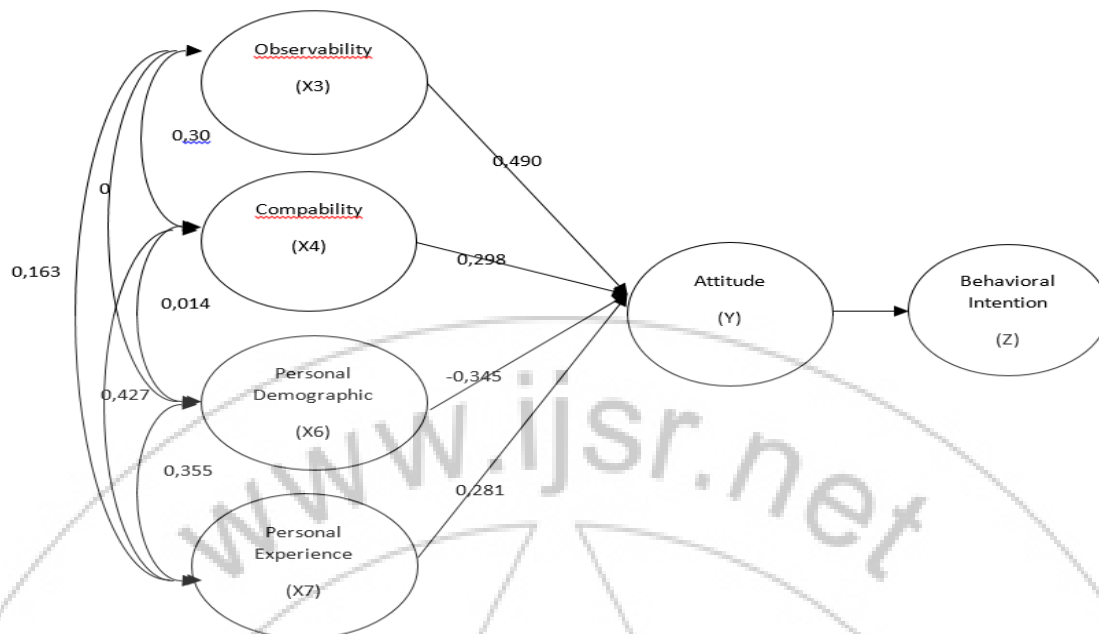


Figure 1: Line Analysis Result

This study provides empirical support for those four hypotheses. Innovation characteristics of attitude, observability, compatibility, personal demographics and personal experience that has been found may be the factor that becomes the attention of users' attitude toward the use of smartphone. Even though external environment, job relevance and internal environment are good enough, they are still not better than other four things that become the lecturer's consideration in accepting the use of smartphone. The innovation characteristic of attitude can be found statistically in this study. The nature of this innovation indicates that the lecturers' attitude toward the use of smartphone is a crucial step in adopting smartphone. This is due to the other lecturers' attitude which considers the positive effect for work created by the use of smartphone. Besides, the personal experience of using smartphone positively could influence users' attitude toward the universal function and application of smartphone in organizing work activity. This may apply in a situation when the new smartphone technology arises for the users.

The innovation characteristic of observability becomes crucial in accepting smartphone. This may indicate that the ease of observing others' work is what interests the lecturers to use that smartphone technology. Meanwhile, personal demographic has negatively triggered the acceptance of smartphone technology by paying attention to the average of work experience, age and productivity that encourages the lecturers to use smartphone.

This study also shows that compatibility is the important predictor of user intention of using smartphone. When the lecturers see smartphone as a technology with high compatibility with other technology at work, they have positive attitude toward the use of smartphone. Other significant characteristic of innovation is job relevance. If the lecturers are certain the use of smartphone will improve their work performance, they will easily adopt smartphone. The result of the study indicates that attitude is not the only

factors that influence the use of smartphone. This is due to total influence of attitude is merely 37.31 percent. Thus, the other hidden factor influencing the acceptance of smartphone use in MBTI lecturers can be further researched.

## 5. Conclusion

The result of the study has an important implication for the head of study program, policy maker, and educational service researcher. This study reveals the innovation specifically related to the use of mobile technology by the lecturers. Smartphone is capable of changing how the lecturers work. This is due to its capability of combining and integrating the function of multiple and varied technology into one device that is flexible and portable. Even though smartphone has many advantages, its function is still finite. Smartphone has limited its available screen size so that the users often complain about that. However, the result of the study provides empirical support; innovation characteristic of Attitude, Observability, Compatibility, Personal demographics, and Personal experience has influence on the acceptance of smartphone use.

Information technology initially was considered a mere supporting MBTI study program and in any other educational institution. However, it has become crucial element in providing job service in education. The information technology of education is also an important component in setting up the goal of education policy by providing educational service. For instance, thanks to information technology, the lecturer's communication cost can be reduced, their mistake in working can be minimized, and their work quality and coordination can be improved. The lecturers' attitude toward the acceptance of technology needs to be comprehended. It has to be done in order to facilitate the advanced technology production, i.e. smartphone, which will be readily used by the lecturers to improve their work quality.



## 6. Other Recommendations

Equalize the length of your columns on the last page. If you are using *Word*, proceed as follows: Insert / Break / Continuous.



**Indira Rachmawati** born in January 23, 1980. Received Bachelor in Environmental Engineering (2003) and Master of Science in Management from Bandung Institute of Technology (2008). Since 2008, work as a lecturer and researcher in School of Business and Economics, Telkom University until now.

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## Author Profile



**Khairani R Siregar** born in august 16, 1981. Received Bachelor in Science in Chemistry (2006) and Master of Engineering in Industrial Engineering from Bandung Institute of Technology (2008). During 2008-2009 working as expert staff for Vice President Business and Corporate Development PT. Garuda

Maintenance Facility Indonesia. In late 2010 start to join Telkom University as lecturer for School of Business and Economics until now.



**Ilham Perdana** born in December 6, 1974. Received Bachelor in Informatics Engineering (1998) and Master of Engineering in Industrial Engineering from Bandung Institute of Technology (2001). In late 2010 start to join Telkom University as lecturer for School

of Business and Economics until now.