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Adoption of Facebook as an Online Selling Medium: an Extended Technology Acceptance Model

¹DaudAgusSantoso and ²TrianggoroWiradinata

¹Department of Informatics Engineering, Ciputra University, Surabaya, Indonesia

²Department of Informatics Engineering, Ciputra University, Surabaya, Indonesia

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ABSTRACT

Background: The rapid increase of Internet users in Indonesia opens up opportunities to sell merchandize through the internet media. However, the intention to use each technology has different quantities of adoption level which caused by various factors, such as user experience, perceived number of users, perceived usefulness and perceived ease of use as the antecedents of intention to use. Adequate theory in testing the level of adoption is needed to know which of the factors will contribute significant effect to the intention to use facebook as online selling media. **Objective:** Based on the Technology Acceptance Model (TAM) an extension model was suggested to test several hypotheses using path analysis. Populations used in this study are the online sellers who are already using facebook as an online media shop. A sample of 102 facebook online seller was taken to test five factors and four are found to give significant effect. **Results:** The result suggests that increasing user experience is the most influencing factors to increase the level of intention to use. **Conclusion:** The findings offer valuable insights to online business community or any company who wants to train people who sell in online media to thrive in internet age.

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INTRODUCTION

Facebook is one of the most growing free internet based social network application where we can create our profile and invite others to link to our profile page. Through Facebook we can update our status and watch others status as well. With the complete features that facebook has, many opportunities can be created such as creating fans page for certain product, forming group of online communities and selling products to our network of friends without being classified as spam.

Data from Internet World Stat (2012) confirms a number of 51,096,860 facebook users in Indonesia. In addition, Alexa (2013) recorded that facebook is the second most visited website from Indonesia. This data lead to the background of this study about finding factors determining the intention to use facebook as media of online selling which is linked to the potentially big market of buyers and sellers.

2. literature review:

2.1 Technology Acceptance Model (TAM):

Technology Acceptance Model (TAM) is one of the most embraced models to analyze and understand the factors that influence the acceptance and the use of computer technology which was first introduced by Fred Davis in 1986 in his dissertation in Massachuset Institute Of Technology, subsequently he simplified the theory in 1989 by eliminating Attitude constructs. TAM was heavily constructed based on of the concept of the popular Theory of Reasoned Action (TRA) that explains a person's Behavior is determined by Intention which influenced by Attitude and Subjective Norm. TRA theory was later developed by Fishbein and Ajzen in 1980. However, TAM is more specific than the TRA to be applied to the adoption of technology (Davis *et al.*, 1989 in Teo, 2010). Consequently, many other models were introduced based on TAM such as Unified Theory of Acceptance and Use of Technology (UTAUT) as an extension of TAM that was proposed by Venkatesh *et al.* (2003). They found that user adoption and usage of an information technology are influenced mainly by four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. However TAM

Corresponding Author: Trianggoro Wiradinata, Department of Informatics Engineering, Ciputra University, Surabaya, Indonesia.
Tel: 62-31-7451699; E-mail: twiradinata@ciputra.ac.id

is still preferred in many researches as models of IT adoption because it is easier and simple to implement (Iqbaria, 1995).

TAM defines two perceived factors of technology acceptance that have impact on the intention to use the technology. Those two factors focus on user perceptions about "how the usefulness of the system to the user" (perceived usefulness) and "whether the system is as easy to use" (perceived ease of use). These two factors explain user behavior based on beliefs (perceived usefulness and perceived ease of use), attitude (attitude), desire (intention), and the relationship of user behavior (usage behavior relationship).

The purpose of the Technology Acceptance Model is to provide an explanation about the decisive factor of technology acceptance and can explain user behavior in a variety of computing technologies and user populations (Davis *et al.*, 1989). Initial studies (Davis, 1986) on the information systems indicate that TAM is a very important contribution for literature study of technology acceptance and usage behaviors. A research by Gefen *et al.* (2003) listed many other studies in this area have extended TAM with constructs such as computer playfulness (Moon and Kim, 2001), cognitive absorption (Agarwal and Karahanna, 2000), and product involvement and perceived enjoyment (Koufaris, 2002).

2.2 Overview of Subsequent Studies:

Table 1: Studies based on TAM.

Research	Reference
The effects of self-efficacy on computer usage and TAM	Iqbaria&Iivari (1995)
Unified theory of acceptance and use of technology	Venkatesh <i>et al.</i> (2003)
Antecedents of Perceived Playfulness: An Exploratory Study on User Acceptance of General Information-Searching Website	Chung & Tan (2003)
Extending the Technology Acceptance Model to Mobile Telecommunication Innovation	Wang <i>et al</i> (2008)
An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention To Use e-learning	Park (2009)
A Mixed methods approach to technology acceptance	Wu (2012)

From the list of studies related to TAM shown in table 1, it can be concluded that the Technology Acceptance Model is still being used in analyzing technology acceptance although this theory is mature. One of the reasons TAM is still widely used because this theory holds the principle of parsimony.

2.3 Variables Operationalization:

2.3.1 Number of User (NOU):

A study conducted by Katz and Shapiro (1986), wrote that consumers who use the products or services that many other people use will get an additional benefit, this phenomenon is known as network externalities (Wang *et al*, 2008). Subsequent study conducted by Farrell and Saloner (1986), and Kauffman *et al.* (2000) reveals the same thing and declare its influence on perceived usefulness (perceived usefulness). Network externalities are technology-specific valuation and related value network (number of users).

2.3.2 User Experience (UE):

Ease of use has a significant relationship with external variables. One of external variables is experience. Thompson *et al.* (1994) argue that the experience measured by the use of information technology systems and the skill level of computer use. The more experience using information technology, the greater the perceived ease of use of these technologies.

2.3.3 Perceived Usefulness (PU):

Davis, *et al* (1989) showed that perceived usefulness and use (usage) has a strong relationship. Statement from Sun and Zhang (2006) supports Davis (1989) that relationship between perceived usefulness, attitude, and behavioral intention to use have consistent results, It can be seen from the results of 72 research studies, 71 studies obtained results that perceived usefulness has a significant connection with attitude, behavior intention to use.

2.3.4 Perceived Ease of Use (PEOU):

Davis (1989) states that the perceived ease of use explains the user perception of the effort to use a technology. Furthermore, according to statement from Sun and Zhang (2006) Perceived Usefulness is significantly influenced by Perceived Ease of Use.

2.3.5 Intention to Use (ITU):

Behavioral intention to use is the behavioral tendency to keep using a technology (Davis, 1989). Level of use of a computer technology on a person can be predicted from the attitude of the user's attention to the technology, such as the desire to add peripheral support, motivation to continue to use, and desire to motivate

other users. The behavior of interest in using technology (behavioral intention to use) is defined as interest (desire) a person to perform a particular behavior (Gefen and Straub, 2000; Venkatesh and Davis 2000). Attitude of concern for use is a good predictor to determine the Actual Usage. However in this study, the initial dependent variable of TAM, Actual Use, is not the focus of research.

From the defined variables above, then a research model was formed which undergone modification with the addition of external variables has shown in figure 1 below.

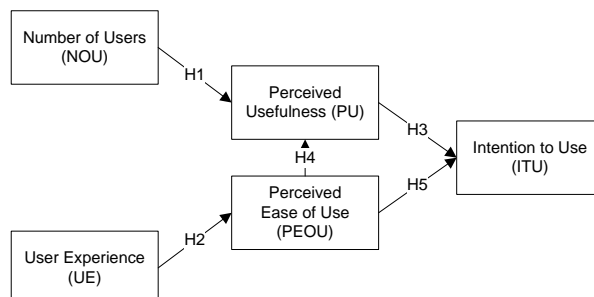


Fig. 1: Proposed Theoretical Model.

In the further development of the TAM, researchers are trying to identify the antecedents of both Perceived Usefulness and Perceived Ease of Use as external variables. The relationships among external variables and TAM variables can be hypothesized and analyzed. Figure 1 above shows the proposed theoretical model that can be used to analyze factors influencing the Intention to Use facebook as the medium for online sales. All relationships among variables will become hypotheses. Table 2 below lists the relationships among variables.

Table 2: Research Hypotheses.

Research Hypotheses	Reference
H1: Number Of Users (NOU) has a significant positive direct effect on Perceived Usefulness (PU)	Katz dan Shapiro (1986), Farrell &Saloner (1986), Kauffman (2000)
H2: User Experience (UE) has a significant positive direct effect on Perceived Ease Of Use (PEOU)	Thompson <i>et al.</i> (1994)
H3: Perceived Usefulness (PU) has a significant positive direct effect on Intention To Use (ITU)	Davis (1989)
H4: Perceived Ease Of Use (PEOU) has a significant positive direct effect on Perceived Usefulness (PU)	Davis (1989)
H5: Perceived Ease Of Use (PEOU) has a significant positive direct effect on Intention To Use (ITU)	Davis (1989)

3. Research method:

In order to examine the effects of NOU, UE and TAM constructs on Intentions to Use facebook, a field study technique was employed.

3.1 Population and Sample:

The population in this study is facebook users in Indonesia who uses facebook as a medium for online shop and has generated sales revenue through facebook as their medium of online selling. The exact number of population are unknown, hence a non-probability sampling technique will be used. Selection of samples will use purposive (judgmental) in which researchers will choose samples based on an assessment of some characteristics. This sampling technique is appropriate where specific experiences are needed (Neuman, 2006). Following the requirement of Maximum Likelihood method, the number of samples for this study is determined between 100 to 200 samples. The number of sample recommended also by Ghozali (2011).

3.2 Measurement:

Each of the indicators for the 5 latent variables is measured on a 5-point Likert scale and the measures are treated as interval scale measures in the analyses. Likert scale is a method of dealing with questions about the person's attitude toward something, figure five-point assessment that states the sequence agree or disagree, like or dislike (Istijanto, 2009).

3.3 Primary Data Analysis and Descriptive Statistics:

The questionnaire was administered to 117 facebook online seller. As in the pretest, questionnaires from respondents who had not previously generated sales revenue through facebook were discarded. Normality is used to determine whether the data is normally distributed or not. This test is usually used to measure the ordinal

scale data, interval, and ratio. Emphasized the normality test by looking at the multivariate skewness, kurtosis. Data is said to be normal if $| \text{skewness} | < 3$ and $| \text{kurtosis} | < 7$ (Kline, 2005). Outlier test is used to determine the value of these data is beyond the limit or not. If outlier test show respondent has a value $| \text{Zscore} | > 3 * \text{standard deviation of the mean}$ then that respondent will be discarded.

A preliminary analysis of the prepared data examined descriptive statistics (maximum, minimum, mean, standard deviation, skewness, and kurtosis) for measures associated with each of the model variables. Pearson product moment correlation coefficients were calculated for all of the associations among the variables. Missing values were treated by removing the corresponding questionnaire from the sample rather than attempting to estimate missing values. This resulted in a dataset of 102 responses.

3.4 Instrument Testing:

A valid measurement scale means the instrument should measure what should it be measured. Measurement scale is invalid if it is not useful to researchers because they do not measure or do what should be done (Kuncoro, 2009). Construct validity testing is done by measuring the correlation between each indicator score of variables against the total score of all indicators in a variable. If the Pearson correlation shows significant value < 0.05 then the indicator is valid (Ghozali, 2011). Reliability indicates the consistency and stability of the measurement scale. Reliability is different than validity because reliability focusing on the issue of accuracy (Kuncoro, 2009). In the study, to determine reability, researchers used the Cronbach Alpha (α) coefficients. A questionnaire said to be reliable if the Cronbach Alpha coefficients are above 0.7 (Nunnally, 1978; George & Mallery, 2003).

3.5 Data Analysis:

All of the analysis of causal models in this study used Path Analysis techniques implemented with Amos 19 computer software following the guidance provided by Kline (2005). Path analysis is widely used as a technique where intervening variables are in use and the variables are observables (Kline, 2005). In this study all latent variables will be treated as observable rather than latent for simplicity reason. Fit model testing was used to assess the feasibility of a model. To know the worth and not the model, there are nine criteria that must be met by the model. nine criteria are Chi-Square (CMIN), normed Chi-square (CMIN / DF, χ^2/df), RMR, GFI, AGFI, NFI, IFI, CFI, and RMSEA. Value limit of nine criteria can be seen in table 3.

Table 3: Goodness-of-fit criteria.

Model Fit	Fit Criteria
Model Chi-Square χ^2	< 5
χ^2/df (Normed Chi-square, NC)	< 3
RMR (Root Mean Square Residual)	Close to 0
GFI (Goodness of Fit Index)	> 0.9
AGFI (Adjusted GFI)	> 0.9
NFI (Normed Fit Index)	> 0.9
IFI (Incremental Fit Index)	> 0.9
CFI (Comparative Fit Index)	> 0.9
RMSEA (Root Mean Square Error of Approximation)	< 0.08

Modification of the model used when the goodness-of-fit or the model fit has not been achieved. Modifying the model performed by eliminate the non-significant relationships and add new relationships between variables are significant according to the correlation and modification indices using AMOS software (version 19).

In the analysis final model, the researchers looked at the influence between variables. Influence between variables divided into three types namely direct effect, indirect effect, and total effects. Direct effect is the straight effect of a variable to another variable. Indirect effect is the effect of a variable to another variable but passes one or several intervening variables. The total effect is the sum of the direct effects and indirect effects or can be said to be the total cause of the correlation. In the analysis of this model, researchers can see where the relationship between variables that has the greatest impact so that it can be used as a guide in formulating policy.

The findings from the analysis of the final model and the testing of the research hypotheses are interpreted and related to the findings from previous studies. In particular, findings from the final model that fully support research hypotheses derived from previous studies are noted. Subsequently, a formulation of policies can be proposed to be done by the e-marketplace providers by focusing on the variables that has a large effect to Intention to Use (ITU) so that can be said that these variables are variables that affect the use of a technology.

4. Results:

4.1 Demographics and descriptive statistics:

Results indicated that people actively selling over the internet are relatively young with over 97% aged 30 or less. The majority was respondents who use facebook profile page (76.1%) and the rest were using facebook

fan page. Around 44.1% of the respondents were students who sell merchandize online as the biggest profile followed by employees (22.5%), entrepreneurs (13.7%) and the rest (19.6%) did not specify their job. Gender wise, the respondents are quite balance with 45.1% males and 54.9% females.

4.2 Statistical Analysis:

In order to test the model, a statistical analysis was conducted in two stages. The first step employed several tests including outlier test, normality test, construct validity test and reliability test. Table 4 below shows a detailed result for all tests in first step. Second step is to measure significance and path coefficients of each relationship in proposed model, evaluating the Goodness of Fit of the proposed model against fit criteria listed in Table 3 and finally make necessary modification based on the measurement.

Table 4: Summary of Descriptive Statistics, Normality, Construct Validity and Reliability Tests.

Variabel	Indicator	Mean	SD	Skewness	Kurtosis	Pearson Corr.	Cronbach Alpha
Number of Users							0.767
	NOU1	4.47	.521	-.095	-1.511	0.878**	
	NOU2	4.57	.498	-.281	-1.960	0.710**	
	NOU3	4.48	.502	.080	-2.034	0.887**	
User Experience							0.850
	UE1	4.42	.604	-.516	-.610	0.927**	
	UE2	4.45	.655	-.788	-.430	0.939**	
Perceived Usefulness							0.805
	PU1	4.60	.492	-.406	-1.872	0.915**	
	PU2	4.60	.492	-.406	-1.872	0.915**	
Perceived Ease of Use							0.853
	PEOU1	4.66	.477	-.671	-1.582	0.933**	
	PEOU2	4.64	.483	-.580	-1.698	0.934**	
Intention To Use							0.721
	ITU1	4.37	.612	-.421	-.638	0.860**	
	ITU2	4.30	.700	-.501	-.850	0.733**	
	ITU3	4.32	.632	-.384	-.654	0.823**	

From the table 4 above, the results show that all variables and their each indicator satisfy the criteria for normality test. Each indicator also shown to have a significant Pearson correlation coefficient at 0.01 meaning, each indicator is valid. The last column displays cronbach alpha coefficient for each variable with more than 0.7 which means each variable is reliable (George &Mallery, 2003).

Table 5: Correlation among Variables.

	Variables						
Correlation	Age Range	Income Range	NOU	UE	PU	PEOU	ITU
Age Range	1						
Income Range	.284**	1					
NOU	-.031	.054	1				
UE	-.064	.120	.775**	1			
PU	.069	.204*	.354**	.463**	1		
PEOU	.068	.190	.377**	.459**	.933**	1	
ITU	-.081	.087	.692**	.897**	.408**	.368**	1

The data shown in table 5 above indicate a significant correlation among all model variables. Additionally it also indicates positive significant correlation between age range and income range, which is justifiable when people get older usually they earn more income. Another positive significant correlation between Income Range and Perceived Usefulness give us an idea for future hypothesis where the extent of an individual believe of using facebook is useful for their online selling activities is somehow correlate with their income range need to be empirically examined.

4.3 Analysis of Theoretical Model:

Many previous researches state that the Intention to Use certain technology is affected by many issues. This study examined three aspects of this decision, number of users, user experience, and TAM. This study also showed how these aspects are related to intentions of using facebook features as medium for online selling. The underlying premises of this study were (1) that Number of Users may increase the perception of people on the

usefulness of a technology and (2) that User Experience affects people’s perception on the easiness of use of particular technology. Hence the model in figure 3 above was proposed.

Table 6: Regression Weight and Standardized Regression Weight of Proposed Model.

Regression Weights:					Standardized Regression Weights:			
Variabel		Estimate	P		Variabel		Estimate	
PEOU	<--- UE	0.35	***		PEOU	<--- UE	0.459	
PU	<--- PEOU	0.937	***		PU	<--- PEOU	0.931	
PU	<--- NOU	0.003	0.941		PU	<--- NOU	0.003	
ITU	<--- PU	0.576	0.047		ITU	<--- PU	0.499	
ITU	<--- PEOU	-0.113	0.700		ITU	<--- PEOU	-0.097	

The regression weights in table 6 shows the effect of NOU to PU as insignificant at 0.941 and the effect of PEOU to ITU also as insignificant at 0.700 hence both may be considered to be discarded. The result of regression weights and standardized regression weights of the proposed theoretical model is shown in figure 2 below. Extracting measurement result from the AMOS 19 software, there are two effects that show no significant value. The first effect is the NOU (Number of Users) to PU (Perceived Usefulness) and PEOU (Perceived Ease of Use) to ITU (Intention to Use). Following the criteria of Goodness-of-Fit in table 3, there are no criteria met, hence the model needs to be modified.

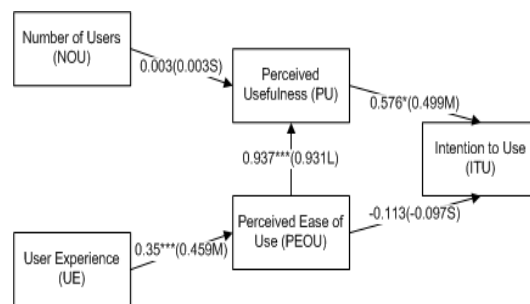


Fig. 2: Measurement Result of Proposed Research Model.

Following the advice from the Modification Indices feature of AMOS 19, the consequent adjustment shown in figure 3 was made.

Table 7: Modification to Proposed Theoretical Model.

Direct Effects		Suggested by
Addition	UE → ITU	Significant correlation in Table 5
Deletion	NOU → PU	No significant direct effect

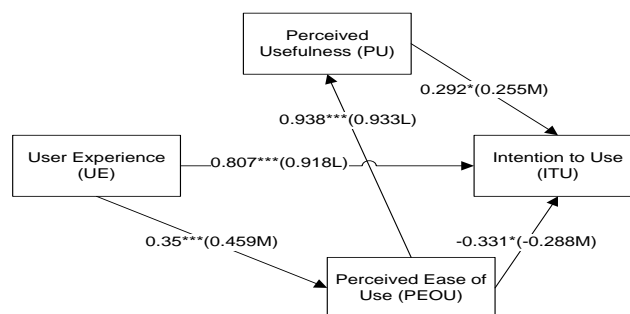


Fig. 3: Modification Theoretical Model.

The above shown figure 3, proposed theoretical model has been modified to achieve the Goodness-of-Fit by direct effect addition and elimination of the relationships as suggested in table 7.

As displayed on Table 8, all Goodness of Fit criteria have been met by the modified theoretical model. The result indicates all relationship between variable are significant. It can be said that this model is feasible to use.

The regression weights and standardized regression weights shown in Table 9 confirms all direct effects among variables in modified theoretical model (figure 5) are significant. Among all direct effects, it can be seen

User Experience strongly cause Intention to Use and Perceived Ease of Use strongly cause Perceived Usefulness.

Table 8: Goodness-of-Fit Result.

Model Fit	Fit Criteria	Result
Model Chi-Square χ^2	< 5	1.226
χ^2/df (Normed Chi-square, NC)	< 3	1.226
RMR (Root Mean Square Residual)	Close to 0	0.004
GFI	> 0.9	0.994
AGFI		0.940
NFI	> 0.9	0.997
IFI		0.999
CFI		0.999
RMSEA	< 0.08	0.047

Table 9: Regression Weight and Standardized Regression Weight of Modified Model.

Regression Weights

			Estimate	P
PEOU	<---	UE	.350	***
PU	<---	PEOU	.938	***
ITU	<---	PU	.292	.033
ITU	<---	PEOU	-.331	.018
ITU	<---	UE	.807	***

Standardized Regression Weights

			Estimate
PEOU	<---	UE	.459
PU	<---	PEOU	.933
ITU	<---	PU	.255
ITU	<---	PEOU	-.288
ITU	<---	UE	.918

4.4 Comparison of Findings and Hypotheses:

The findings in this study will be categorized into two comparison tables where table 10 shows fully supported hypotheses and table 11 shows partially supported hypotheses.

Table 10: Fully Supported Hypotheses.

Research Hypotheses	Reference
H2: User Experience (UE) has a significant positive direct effect on Perceived Ease Of Use (PEOU)	Thompson <i>et al.</i> (1994)
H3: Perceived Usefulness (PU) has a significant positive direct effect on Intention To Use (ITU)	Davis (1989)
H4: Perceived Ease Of Use (PEOU) has a significant positive direct effect on Perceived Usefulness (PU)	Davis (1989)
H5: Perceived Ease Of Use (PEOU) has a significant positive direct effect on Intention To Use (ITU)	Davis (1989)

Table 11: Partially Supported Hypothesis.

Research Hypotheses	Reference
H1: Number Of Users (NOU) has a significant positive direct effect on Perceived Usefulness (PU)	Katz dan Shapiro (1986), Farrell &Saloner (1986), Kauffman (2000)

The partially supported H1 means Number of Users (NOU) shows positive significant correlation with Perceived Usefulness (PU), however it has no significant direct or indirect effect to Perceived Usefulness (PU).

4.5 New Result Found from the Study and Interpretation of Result:

Subsequent to the modification of proposed theoretical model, there was a significant positive direct large effect from User Experience (UE) to Intention to Use (ITU). This new result shows that the experience of online seller is an important factor that affects Intention to Use facebook as medium to sell merchandize online.

The total effect of a factor to other factors consists of direct and indirect effect. Table 12 below will lists the total effects and standardized total effects among factors in modified theoretical model shown in figure 3.

Table 12: Total Effects and Standardized Total Effects.

Total Effects

	UE	PEOU	PU
PEOU	.350		
PU	.329	.938	
ITU	.786	-.058	.292

Standardized Total Effects

	UE	PEOU	PU
PEOU	.459		
PU	.428	.933	
ITU	.895	-.050	.255

This result indicates that e-marketplace provider who wants to compete with facebook features when proving facilities to sell online must take serious measure on policy related to User Experience (UE) since this factor shows the largest total effect to Intention to Use (ITU). The e-marketplace provider may strongly consider

policy such as giving tutorials and providing clear instructions to online seller so that they can understand better and thrive in the e-marketplace. On the other hand e-marketplace place may ignore policies related to Number of User (NOU) since this factor has shown to have no significant effect directly or indirectly to Intention to Use (ITU).

Conclusion

Throughout this study a model has been proposed to explain how external variables of TAM such as Number of Users (NOU) and User Experience (UE) have influenced online sellers' intention toward facebook adoption as medium for selling merchandize.

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