

The Effect of User Interface Development on Mobile-banking Usage During the Covid-19 Pandemic

(Case Study on PT BTN's M-Banking Product Re-launch)

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Abstract—This research was conducted to examine the direct and indirect roles of the factors that determine the behavior of using BTN mobile-banking during the Covid-19 pandemic. Population is Malang State Polytechnic faculty-members who use the BTN mobile-banking application. Questionnaire that was adapted from the integration of the Technology Acceptance Model and Theory of Planned Behavior was distributed electronically. The sampling technique used purposive sampling, and 112 data were used as objects of analysis using Path Analysis. The result indicated that Perceived Usefulness and Perceived Ease of Use positively and significantly contribute to Attitude Toward Behavior which leads to the faculty-member's intention to use m-banking, while from the total coefficients it was proved that the easiness predominantly affects intention to use technology. In contrary, Subjective Norm has no significant effect on intention to use. The development of a user interface in a m-banking application during the Covid-19 pandemic is very important for banking industry. However, the easiness has proven to be the most important factor to consider rather than other factors.

Keywords—technology acceptance model, theory of planned behavior, mobile-banking, covid-19

I. INTRODUCTION

The Covid-19 emergency in Indonesia is still ongoing. The map of the distribution of Covid-19 cases confirmed by the Covid-19 Task-Force escalating sharply, especially in big cities, where the centers of economic movement take place [1]. Therefore, the government is trying hard to suppress the chain of Covid-19 spread, one of which is with an appeal to minimize direct interaction between humans through social-distancing. In the monetary sector, Bank Indonesia issued policies related to optimizing the cashless-payment system through several choices of instruments such as: digital banking, electronic money, and QR Code based on its regulation 5/8/PBI/2003. M-banking is a mobile communication service that is accessed through mobile phones based on the Global System for Mobile Communications. Its ability to move without space and time limits allows customers who have easy access to use mobile

financial facilities such as fund transfers, check-balances, transaction history, exchange rate information, credit card, telephone, electricity and insurance payments, as well as make credit purchases.

Long before the emergency of the Covid pandemic, actually PT Bank Tabungan Negara (BTN) had prepared itself to face a wave of shifting economic transactions towards a digital environment, which nearly 50% of banking transactions were carried out through e-channels. However, in early 2020 BTN made a breakthrough by using 500 billion funds to perfect m-banking products through the re-launch of the m-banking service, through the addition of several new user interfaces. As the president director of BTN Mansury explained, it will be more dynamic, modern, attractive, and user friendly [2]. Therefore, this new feature provides an easier and more interesting user experience in using the application, in which users will feel more comfortable. This is expected to support the target of increasing 33% of new users by 2020.

The acceptance of an information technology is generally influenced by special factors relating to the convenience and benefits obtained when using the technology. This is consistent with the technology acceptance model formulation of Technology Acceptance Model/TAM by Davis [3], which examine the acceptance of a technology based on the view of technology easiness and usefulness. It has proven in the following studies Pikkarainen [4], Lee [5], Mafe and Blaz [6], Bangkara and Mimba [7], Patel [8] which stated that Perceived Usefulness and Perceived Ease of Use affect users' intention to use technology.

Theory of Planned Behavior/TPB [9] is another technology acceptance model as popular as TAM, that focus more on the users' behavior of technology which comprised of three variables: Attitude Toward Behavior, is the attitude of a person in deciding to do a behavior, the second is Subjective Norm, that is perceived social pressure to perform a certain behavior, and Perceived Behavioral Control, which represents the a person's ability to perform certain behaviors. As Hernandez and Mazzon [10] emphasized that a person's behavior in using

i-banking technology is determined by their beliefs. This was in line with Pikarainen [4], Bangkara and Mimba [7] who also adopted the TPB variables to explain a person's interest in using i-banking.

Both of above mentioned models have different points of view in assessing person's attitude to the technology acceptance. To produce a more comprehensive research model, several studies have tried to integrate it. Such as Lee's research [5], on the factors that influence the adoption of i-banking use in Taiwan, which concluded that the main factors that have a positive and significant influence on the use of i-banking are Attitude Toward Behavior and Perceived Usefulness. In line with Rahmatsyah [11] who also integrated TAM and TPB to determine the factors that affect the interest in using m-banking at the Faculty of Economics, University of Indonesia. Likewise, Nasri and Charfeddine [12] integrated the TAM and TPB models to identify factors that influence the acceptance and usage of i-banking in Tunisia. In their research on the adoption of i-banking in Gujarat, Patel and Patel [8] which used TAM model support the same ideas of customer's intention to use i-banking that was positively influenced mainly by perceptions of security, followed by other important factors, namely Perceived Usefulness, Perceived Ease of Use and Social Influence. Although this study does not specifically use the TPB model, in essence, the social influence variable can be equated with the Subjective Norm variable in the TPB.

Citra et al. [13] also examined the intention of using e-money by adopting TPB and Locus of Control, which concluded that Attitude Toward Behavior variable has a positive effect on the intention to use e-money. Meanwhile, Subjective Norm was not proved to significantly influence Intention to Use. However, for respondents in the village, the Subjective Norm variable actually affects people's Intention to Use on e-money, and Wardani et al. [14] concluded that ATB directly affects the Intention to Use m-banking, while Perceived Usefulness has a significant effect on Intention to Use of m-banking through Attitude Toward Behavior in her research about the students' intention on using m-banking in State Polytechnic of Malang.

This study integrated TAM and TPB models without involving the Perceived Behavior Control variable, since it was assumed that all m-banking users are faculty member who have the ability/confidence in using technology. The combination of variables in TAM and TPB aims to obtain a broader picture whether re-launching the high-cost m-banking application during the Covid-19 pandemic will be effective in providing a convenience and usability experience for customers through additional features in the new m-banking user interface, thus affecting customer behavior in conducting cashless transactions. The TAM model of course only reviews the acceptance and use of technology from the factors inherent in the tools or technology used, namely additional features in the new BTN m-banking user interface, therefore it will be complemented by the TPB model that sees the acceptance and use of technology from a user's behavioral perspective, as well as norms or social pressures felt by customers during the

pandemic period, in the form of a direct appeal from the government to use cashless-payments in order to support the implementation of social distancing during the Covid-19 pandemic. Based on the explanation above, the following hypothesis was developed:

H1: There is a direct influence of PU on Attitude Toward Behavior.

H2: There is a direct influence of Perceived Ease of Use on Attitude Toward Behavior.

H3: There is a direct influence of Subjective Norms on Intention to Use.

H4: There is a direct influence on Attitude Toward Behavior on Intention to Use.

H5: Perceived Usefulness influence the Intention to Use through Attitude Toward Behavior.

H6: Perceived Ease of Use influence the the Intention to Use through Attitude Toward Behavior.

II. RESEARCH METHODS

This explanatory research explained the causal relationship between the research variables and hypothesis testing. Population was 551 faculty members at State Polytechnic of Malang. Samples were taken based on the Non-Probability (Purposive Sampling) technique for those made financial transaction using BTN's m-banking service. 112 eligible questionnaires were analyzed using Path Analysis to test the direct effect of exogenous variables on endogenous variables and indirect effects through intervening variables [15]. Exogenous variables used were: Perceived of Usefulness, Perceived ease of use and Social Norm. Intervening variables was Attitude Toward Behavior, and Endogenous Variables was Intention to Use.

III. ANALYSIS

Path analysis is used to prove the influence of exogenous variables on endogenous variables, as well as indirect effects through Intervening variables, utilize following test steps:

A. Linearity Test

Linearity testing is intended to determine whether the relationship between exogenous and endogenous variables is linear or not. The testing criteria stated that if the probability value is <level of significance ($\alpha = 5\%$) then it stated there is a linear relationship between the exogenous and the endogenous variable. The results were presented as follow table 1:

TABLE I. RESULTS OF THE LINEARITY TEST FOR EXOGENOUS VARIABLES AGAINST ENDOGENOUS VARIABLES

Exogenous	Endogenous	F Cal.	Prob.
Perceived Usefulness	Attitude Towards Behaviour	38.519	0.000
Perceived Ease of Use	Attitude Towards Behaviour	65.509	0.000
Subjective Norm	Intention to Use	18.609	0.000
Attitude Towards Behaviour	Intention to Use	99.745	0.000

Source: SPSS Data Output, processed in 2020

The above table stated that the relationship between each of all exogenous toward endogenous variables < the level of significance (alpha (α = 5) %)), so it can be concluded that all the relationships above are Linear.

B. Classical Assumption Test-Multicollinearity:

TABLE II. MULTICOLLINEARITY ASSUMPTION TEST RESULTS

Variables	Attitude Toward Behaviour		Intention to Use	
	Tolerance	VIF	Tolerance	VIF
Perceived Usefulness	0.719	1.390		
Perceived Ease of Use	0.719	1.390		
Perceived Usefulness			0.664	1.507
Subjective Norm			0.805	1.243
Attitude Towards Behaviour			0.392	2.553

Source: SPSS Data Output, processed in 2020

The effect of Perceived Usefulness and Perceived Ease of Use on Attitude Toward Behavior produces a VIF value <10 and produces a tolerance value > 0.1. Thus, the exogenous variable in the Attitude Toward Behavior model stated there were no multicollinear symptoms, meaning that the assumption of multicollinearity in the Attitude Towards Behavior model was fulfilled. As well as the multicollinearity assumption test to Perceived Usefulness, Subjective Norm, and Attitude Towards Behavior on Intention to Use produces a VIF value <10 and produces a tolerance value > 0.1. Thus, the exogenous variable in the Intention to Use model were stated no multicollinear symptoms, so the assumption of multicollinearity in the Intention to Use model was fulfilled.

C. Classical Assumption Test-Normality:

TABLE III. NORMALITY ASSUMPTION TEST RESULTS

	Attitude Toward Behaviour	Intention To Use
Kolmogorov-Smirnov Z	0.072	0.072
Probability	0.200	0.200

Source: SPSS Data Output, processed in 2020

The normality assumption test for Perceived Usefulness and Perceived Ease of Use on Attitude Toward Behavior produced Kolmogorov Smirnov test statistic of 0.072 with a

probability of 0.200. Meanwhile, Perceived Usefulness, Subjective Norm, and Attitude to Behavior on Intention to Use showed Kolmogorov Smirnov test statistic of 0.072 with probability of 0.200, it has indicated that the probability > significant level (α = 5%). Means that the residuals generated by the two models were stated to be normally distributed, therefore the assumptions for the normality of the two models are fulfilled.

D. Assumption Test - Heteroscedasticity:

TABLE IV. HETEROSCEDASTICITY ASSUMPTION TEST RESULTS

Eksogen	Attitude Towards Behaviour		Intention To Use	
	T Statistics	Probability	T Statistics	Probability
Perceived Usefulness	3.361	0.001	-1.377	0.171
Perceived Ease of Use	4.366	0.000		
Subjective Norm			-1.457	0.148
Attitude Towards Behaviour			1.589	0.115

Source: SPSS Data Output, processed in 2020

The Heteroscedasticity assumption test for Perceived Usefulness and Perceived Ease of Use on Attitude Towards Behavior showed that Probability > level of significant (α = 5%), then the effect of Perceived Usefulness, Subjective Norm, and Attitude Towards Behavior on Intention to Use produces Probability > level of significant (α = 5%), indicated that the residuals generated by the two models have homogeneous variety, mean that the assumption of heteroscedasticity is fulfilled.

E. Goodness of Fit Model:

TABLE V. GOODNESS OF FIT MODEL RESULTS

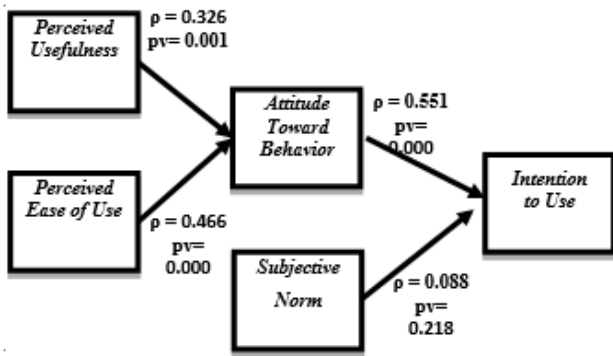
Variable	R ²
Attitude towards behaviour	0.369
Intention to use	0.358
$R_m^2 = 1 - (((1 - R_{12}^2) * (1 - R_{22}^2)))$	
$R_m^2 = 1 - ((1 - 0.369) * (1 - 0.358)) = 0.595$	

Source: SPSS Data Output, processed in 2020

The R-square of Attitude Towards Behavior was 36.9%, indicated that the contribution of Perceived Usefulness and Perceived Ease of Use to Attitude Towards Behavior was 36.9%, while the remain 63.1% was contributed by other variables. The R-square variable of Intention to Use was 35.8%, showed the contribution of Perceived Usefulness Subjective Norm and Attitude Towards Behavior is 35.8%, while the remain 64.2% was other variable contribution. The Total Coefficient of Determination (R_m ^ 2) was 59.5%, indicated the contribution of Perceived Usefulness, Subjective Norm, and Attitude Toward Behavior to Intention to Use as a whole was 59.5%, while the remaining 40.5% is the contribution of other variables not discussed in this study.

F. Hypothesis test:

Path Analysis produced the following path diagram:



Source: Path Analysis Test, processed in 2020

Fig. 1. Results of the research path diagram.

G. Direct Effect Hypothesis

Testing criteria: Probability < level of significant (alpha (α = 5%)), it is stated that there was a significant effect of Exogenous variables on Endogenous variables. The test results were as follows:

TABLE VI. RESULT OF DIRECT EFFECT HYPOTHESIS TEST

Variable Eksogen	Variable Endogen	Coefficient	T Statistics	Prob.
Perceived Usefulness	Attitude Toward Behavior	0.326	4.014	.000
Perceived Ease of Use	Attitude Towards Behaviour	0.466	5.748	.000
Subjective Norm	Intention To Use	0.088	1.238	0.218
Attitude Toward Behaviour	Intention To Use	0.551	5.423	0.000

Source: SPSS Data Output, processed in 2020

The empirical model of the Attitude Toward Behavior variable was as follows:

$$Y1 = \rho1 X1 + \rho2 X2 + \epsilon1$$

$$Y1 = 0.326 X1 + 0.466 X2$$

- The effect of Perceived Usefulness on Attitude Toward Behavior results in a T statistics value of 4.014 with a probability of 0.000. Indicated that the probability < alpha (5%), means there was a significant effect of Perceived Usefulness on Attitude Toward Behavior. The path coefficient of the influence of Perceived Usefulness on Attitude Toward Behavior was 0.326 indicated that Perceived Usefulness has a positive effect on Attitude Towards Behavior, means the better Perceived Usefulness can increase Attitude Towards Behavior.
- The effect of Perceived Ease of Use on Attitude Toward Behavior results in a T statistics value of 5,748 with a

probability of 0,000. Showed that the probability < alpha (5%), which means that there is a significant effect of Perceived Ease of Use on Attitude Toward Behavior.

The path coefficient of the effect of Perceived Ease of Use on Attitude Toward Behavior is 0.466 indicated that Perceived Ease of Use has positive effect on Attitude Towards Behavior, means that the better Perceived Ease of Use can improve Attitude Toward Behavior.

The empirical model for the Intention to Use variable was as follows:

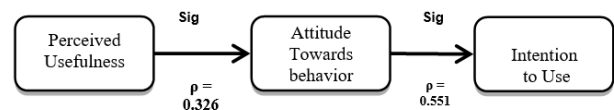
$$Y2 = \rho4 X3 + \rho5 X4 + \rho6 Z + \epsilon2$$

$$Y2 = 0.088 X3 + 0.109 X4 + 0.551 Z$$

- The influence of Subjective Norms on Intention to Use produces a statistical T value of 1.238 with a probability of 0.218, indicated that probability > alpha (5%). Mean that there was an insignificant influence on Subjective Norms toward Intention to Use. The path coefficient of the influence of Subjective Norm on Intention to Use was 0.088, represented the influence of Subjective Norm positively affect the Intention to Use, showed that the better the Subjective Norm can increase Intention to Use.
- The effect of Attitude Toward Behavior on Intention to Use in a T statistical value of 5.423, with a probability of 0.000. This showed that the probability < alpha (5%), it mean there was a significant influence on Attitude Toward Behavior on Intention to Use. The path coefficient of the influence of Attitude Toward Behavior on Intention to Use is 0.551, that indicated the influence of Attitude Towards Behavior has a positive effect on Intention to Use. It means the better Attitude Toward Behavior can increase Intention to Use.

H. Indirect Effect Hypothesis:

The indirect hypothesis testing Perceived Usefulness on Intention to Use through Attitude Toward Behavior can be seen in the following figure:



The coefficient of indirect influence (ρX1-Y1-Y2) = 0.326 * 0.551 = 0.180

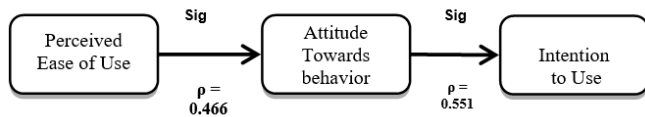
Fig. 2. Coefficient of indirect effect of PU on IU through ATB. Source: Data processed in 2020.

The effect of Perceived Usefulness on Attitude Toward Behavior is stated to have a significant effect, and the effect of Attitude Towards Behavior on Intention to Use is stated to have a significant effect. This means that there is a significant

effect of Perceived Usefulness on Intention to Use through Attitude Toward Behavior.

The path coefficient of the influence of Perceived Usefulness on Intention to Use through Attitude Toward Behavior is 0.180 indicating that Perceived Usefulness has a positive effect on Intention to Use through Attitude Towards Behavior, meaning that the better Attitude Towards Behavior is caused by the better Perceived Usefulness it can increase Intention to Use.

Hypothesis testing indirect Perceived Ease of Use on Intention to Use through Attitude Toward Behavior as follows:



The coefficient of indirect influence ($pX2-Y1-Y2$) = $0.466 * 0.551 = 0.257$

Fig. 3. Coefficient of Indirect Effect of PEoU on IU through ATB Source: Data processed in 2020.

Figure 3 showed the significance effect of Perceived Ease of Use on Attitude Toward Behavior, also the significance effect of Attitude Towards Behavior on Intention to Use. This means that there is a significant effect of Perceived Ease of Use on Intention to Use through Attitude Toward Behavior.

The path coefficient of the influence of Perceived Ease of Use on Intention to Use through Attitude Towards Behavior is 0.257 indicated that Perceived Ease of Use has a positive effect on Intention to Use through Attitude Towards Behavior, meaning that the better Attitude Towards Behavior is caused by the better Perceived Ease of Use can increase Intention to Use.

I. The Dominant Influence:

The exogenous variable that has the most affect to the endogenous variable can be seen through the Highest Total Coefficient regardless of the total coefficient which has positive or negative number. The results of the total coefficient calculation are summarized in the following table.

TABLE VII. TOTAL COEFFICIENT CALCULATION RESULTS

Exogenous	Endogenous	Total
Perceived Usefulness	Attitude Towards Behaviour	0.326
Perceived Ease of Use	Attitude Towards Behaviour	0.466
Perceived Usefulness	Intention To Use	$0.120 + 0.180 = 0.300$
Subjective Norm	Intention To Use	$0.088 + 0.257 = 0.343$
Attitude Towards Behaviour	Intention To Use	0.551

Source: SPSS Data Output, processed in 2020

Based on the table 7, it has known that the most influential or the most dominant variable on Attitude Toward Behavior was the Perceived Ease of Use with a total coefficient of 0.466.

IV. DISCUSSION

Built upon the results of direct effect test, the probability value is $0.000 < \alpha$ (5%) and the Path Coefficient value is 0.326, this show that hypothesis-1 is accepted, as there was a significant effect of Perceived Usefulness on Attitude Toward Behavior. This means that the re-launch of the new BTN m-banking user interface with more dynamic, modern and attractive already increased the use of the application. Therefore, it has an effect on increasing user attitudes and beliefs in a positive way. This research was in line with the statement Fishbean and Ajzen [16]; Ajzen [17]) in the TPB and TAM theory Davis [3] and Pikkarainen [4]; Bangkara and Mimba [7] research which explained that Perceived Usefulness has a direct effect on Attitude Toward Behavior.

Likewise, hypothesis-2 which was stated a significant effect of Perceived Ease of Use on Attitude Towards Behavior, is accepted, based on the support of the Probability value of $0.000 < \alpha$ (5%), and the Path Coefficient value of 0.466. This means that the re-launch of the new BTN m-banking user interface which was more dynamic, modern and attractive has increased the perception of the ease of use of the m-banking application that was felt by users, thus positively affected to increased user attitudes. This research was in line with the beliefs of Fishbean and Ajzen [16], Ajzen [17] in the theory of TPB and TAM Davis [3], as well as research Pikkarainen [4], Bangkara and Mimba [7] which stated that Perceived Ease of Use has a direct effect on Attitude Toward Behavior.

While hypothesis-3 showed a direct effect of Subjective Norms on Intention to Use was rejected, as probability value of $0.218 > \alpha$ (5%). This means that even though there was an increase in social pressure, or in this case the government's appeal to use cashless-payment, this will not affect their increasing attitude towards the use of m-banking. The results of this study were not in line with the beliefs [16] [17] in the TPB theory which stated that Subjective Norms have a direct effect on Intention to Use.

Hypothesis-4 test results show a Probability value of $0.000 < \alpha$ (5%) and a Path Coefficient of 0.551, therefore the statement of Attitude Towards Behavior has a positive and significant effect on Intention to Use is accepted. This means that an increase in user attitudes about the new m-banking user interface will encourage an increase in their behavior in using m-banking. The results of this study are in line with the beliefs of the TPB theory Fishbean and Ajzen [16], Ajzen [17] and research Lee [5], Mafe and Blas [6] and Wardani [14] which states that Attitude Toward Behavior has a direct effect on Intention to Use.

The results of the path coefficient analysis of 0.180 have the effect of the Perceived Usefulness variable on Intention to Use through Attitude Toward Behavior, showing that

Perceived Usefulness has a positive and significant effect on Intention to Use through Attitude Towards Behavior, which means that hypothesis-5 is accepted. Meanwhile, the path coefficient of 0.257 has the effect of the variable Perceived Ease of Use on Intention to Use through Attitude Toward Behavior, represented Perceived Ease of Use has a positive and significant effect on Intention to Use through Attitude Towards Behavior, which means the hypothesis-6 was accepted. It revealed, if there was an increased in the perceived usefulness and ease of use that users feel after using the new m-banking user interface, it will encourage increased confidence in their attitudes and consequences, which in turn will also increase the intention to use m-banking. This research was in accordance with the beliefs [16,17] in the TPB theory, as well as research Pikkarainen [4] and Bangkara and Mimba [7] which states that Perceived Usefulness and Perceived Ease of Use affect Intention to Use through Attitude Toward Behavior.

Meanwhile, based on a total coefficient of 0.551, it was concluded that the most dominant variables affected a person's intention to use m-banking are positive attitudes and beliefs that arise from their experiences after using the new BTN m-banking user-interface.

V. CONCLUSION

The perception usefulness of the BTN m-banking application has a direct effect on the attitude / belief of the Polinema faculty member in accepting it as a good, wise, fun and interesting idea. However, put aside their high level of education, it turns out that the main factor that most dominantly affects the attitude / belief of Polinema faculty member in accepting the BTN m-banking application, which in turn affects their intention / behavior to use it at present as well in the future basically come from their perception after using some features provided in the BTN m-banking application. They have a positive evaluation of features that are very easy to learn, understand, remember and use.

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