

The Development and Testing of Technology Acceptance Models for Consumers towards the Intention to Use E-Wallet

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Abstract—Acceptance of technology for consumers is still an interesting part to be investigated to date. Although the Technology Acceptance Model (TAM) has been widely referred by researchers from various sciences, there are still weaknesses that can be investigated, including not fully answering the problems related to cognitive and affective factors in understanding consumer behavior. The purpose of this study is to develop and test an integrated model to determine the intention of consumers to use technology. The object used is the go-pay application as e-Wallet-based Electronic Money which is one of the relatively new technology products as an alternative means of payment or transaction and is part of the National Non-Cash Movement by the government of the Republic of Indonesia. Modeling in this study, integrating the TAM model by involving affective factors namely Pleasure, Arousal, and Dominance (PAD) theory, and prior experience variables as a direct effect on perceived usefulness and attitude toward usage, then its effect on adoption intention. The sample in this study is millennial age people who have known go-pay in areas of East Java with a total sample of 270 respondents. Collecting data through questionnaires using a Likert scale with analysis techniques using Partial Least Square (PLS). The results of this study indicate that Perceived Usefulness, Perceived Easy of Use, Pleasure, and Arousal have a positive effect on attitude and intention to use go-pay, while Prior Experience supports perceived usefulness, but does not support attitude, neither does Dominance support the attitude of using go-pay.

Keywords—*technology acceptance model; consumer acceptance technology; pleasure; arousal; domination; prior experience*

I. INTRODUCTION

Technology is an inseparable part of human life, researchers from time immemorial continued to test to find new things in meeting human needs and behavior. Since the publication of the Technology Acceptance Model (TAM) article by Davis et al. many multidisciplinary studies of science that use technology as part of research refer to the TAM model, although several TAM models have been developed to address the determinants of the use and adoption of technological innovation, but understanding consumer acceptance of

innovative technology is still an unavoidable part [1,2]. The purpose of this study is to develop and test an integrated model to determine the intention of consumers to adopt technology.

In relation to the acceptance of innovative product technology that will be consumed or used cannot be separated from how to understand the consumer's behavior. A lot of the consumer behavior literature explains that cognition and affection factors are a form of psychological response that can arise when someone will do shopping. Affection refers to feeling responses, while cognition is a mental response (thinking), consumers can have both affective and cognitive responses and other elements in their environment [3]. The relationship between affection and cognition remains a psychological issue. Some researchers state that the affective and cognitive systems are least independent. While others state that affection is influenced by the cognitive system [3].

In meeting the gap in the concept of technology acceptance for consumers who do shopping or transactions, there is a psychological theory that has been heavily cited by marketing researchers, namely the PAD emotional state model which is a theory or model that describes and measures emotional states consisting of pleasure, arousal, and dominance that cannot be separated when someone does a shopping or transaction [4]. This PAD model when integrated into the TAM model is expected to be able to make a new model in the acceptance of technology for consumers to be more optimal and can be a solution to the existing problems [5].

Meanwhile, related to technology issues that are inherent in the product and how perceptions in using and its benefits to users, this has been done by Davis et al since 1989 by popularizing its findings, namely Technology Acceptance Model (TAM) which some researchers termed classical TAM. The Technology Acceptance Model which is the application and development of the Theory of Reasoned Action which is used to look at the level of technology use by modeling user acceptance of information systems, which has been the basis of most of the two decades of technology research last [2,6]. The use of the TAM model is then upgraded as TAM-2 and Unified Theory of Acceptance and Use of Technology (UTAUT), then

TAM-3 in the context of e-commerce and involves perceived trust in system usage, which is useful in helping to understand the use of technology in various fields, then the development of the latest model is UTAUT2 by including variables of hedonic motivation, price values, and habits, with moderating variables of individual differences namely, age, sex, and experience [7-10]. But there is a gap both theoretically and empirically in the technology acceptance model, among them has not been able to answer all the problems, especially related to the understanding of the user's affective or emotional system, as well as the inconsistencies of research results [5].

Regarding the above issue, this research raises the theme of using technology banking products as a transaction tool. Where the current transaction has entered the era of digital technology, supported by the internet, the transaction process no longer needs to use money physically, but e-money or popularly called e-Money. E-Money is a payment instrument that uses electronic media through internet networks and digital technology. E-Money is often referred to as Electronic Cash, Digital Money, Digital Cash, Electronic Currency or Digital Currency. E-Money is very safe to use because it is hard to hack or hijack [11]. E-money in its operations is divided into two types, namely chips or cards based, and E-Wallet-based applications. In this study, researchers limited only to using E-Wallet as part of e-money that can be used as a payment instrument with a mobile application, in this case using the most popular product in Indonesia, Go-Pay, this product is issued by PT. Karya Anak Bangsa application or more popularly known as Go-Jek company.

The Government of the Republic of Indonesia through Bank Indonesia since August 14, 2014 has launched the *National Non-Cash Movement* (GNNT) with the aim of increasing public awareness in the use of non-cash instruments, so that over time a community or non-cash transaction (*Less Cash Society / LCS*) will be formed using non-cash instruments in its economic activities, besides that the BI (Bank of Indonesia) Governor also issued a new regulation on e-Money No.18 / 17 / PBI / 2016 which regulates the circulation of electronic money and digital financial services (DFS) to the public. But the problems that occur not only in Indonesia, which lies in the acceptance of technology for consumer users almost on average in several countries, which so far consumers are still not used to using non-cash transactions [11].

Related to these problems, this study will discuss it through the Technology Acceptance Model (TAM) binoculars by integrating the PAD model emotional factors (pleasure, arousal, dominance) because the reason for consumer involvement when shopping cannot be separated from two main factors in decision making, namely cognitive and affective, in addition to strengthening the capital that will be used, it is very possible that consumers have prior experience or previous experience with almost the same payment instrument, as a result the entry of the prior experience concept is considered appropriate and needs to be included in this study [12].

From the background description above, the formulation of research problems can be taken, namely whether the development of technology acceptance models for consumers

through the integration of the TAM model, with the PAD model involving prior experience, can influence consumers' attitudes and intentions using Go-Pay?

II. LITERATURE REVIEW

This research bases itself on two established theories, models, and frameworks, namely the Technology Acceptance Model (TAM) and the PAD model (pleasure, arousal, and dominance). While introducing several modifications, extensions, and integration, which is then more widely known as the Consumer Acceptance Technology (CAT) model. The backbone of this research model is TAM, which is also the main framework for many studies on information technology adoption, apart from its significance; TAM is a developing model which is modified to suit a multi-disciplinary context. In particular, it has been reported in the previous information system literature that PAD functions well as a complement to TAM in increasing predictive strength and explanation, including discussing emotional users [5,7,13,14]. This study uses go-pay as an object of research.

The following will discuss the theories and variables used in this study, following the hypothesis taking.

A. *Theory of Reasoned Action (TRA)*

TAM develops from TRA, which explicitly states that individual behavior is influenced by their intentions [6]. Their intention is in turn shaped by each attitude towards behavior. In the end, the attitude formed depends on individual trust. Thus, TRA suggests that the decision-making process for individuals involves trust, attitudes, intentions, and behavior. Using the principles of TRA psychology, the assumption of its founders requires individuals to be rationalized and make decisions based on available and accessible information. Thus, the core of TRA's theoretical foundation is that individuals will act based on their beliefs by going through the stages of attitude. TRA emphasizes that behavior is solely influenced by the individual's desire for the behavior. In turn, one's intention to behave is mainly decided by their subjective attitudes and norms. In essence, attitude is a personal factor while subjective norms are social factors.

B. *Technology Acceptance Model (TAM)*

TAM comes from the theory of reasoned action (TRA) and assumes that technology acceptance by individuals is influenced by trust through two variables: perceived usefulness and perceived ease of use. By referring to the original TAM, he suggested that one's acceptance of a technology is influenced by its intentions that are influenced by attitude toward using. While attitude toward using is influenced by the simultaneous effects of two constructs, namely perceived ease of use and perceived usefulness [2].

C. *Consumer Acceptance of Technology (CAT)*

Model of Consumer Acceptance of Technology (CAT) by Kulviwat et al. discussed the shortcomings of the technology acceptance model by combining two previously unrelated models: the TAM and PAD (Pleasure, Arousal, and Dominance) paradigms published by Mehrabian Russel.

CAT is a modified version of TAM and argues that the importance of calculating affection simultaneously with cognition when predicting consumer behavior. The main thing in CAT modeling is a comprehensive combination. CAT explicitly considers how people feel as well as their way of thinking. The entry of cognition and affection makes CAT more appropriate than TAM for the context of consumer behavior where potential users are free to adopt or reject new technology rather than having to obey the decisions imposed on them, regardless of how they feel and their will.

With this limitation in the previous model, Kulviwat et al. develop a model that includes a variety of affective reactions that consumers may experience when developing the intent of adoption. The Pleasure, Arousal, and Dominance (PAD) paradigm by Mehrabian-Russell is considered a comprehensive, but partially, integrated nuance with the cognitive components of the TAM model.

III. DEVELOPMENT OF RESEARCH THEORIES AND HYPOTHESES

A. *Perceived Ease of Use (PEOU)*

Perceived Ease of Use is one of the two main constructs in TAM modeling, which is defined as "the level at which a person believes that using a particular system will be free of physical and mental effort" [2]. Because an individual who feels an easy-to-use system will tend to develop good trust in him, therefore Perceived Ease of Use positively influences Attitude Toward Using.

Thus, PEOU is basically about self-efficacy, which refers to how comfortable users feel about the use of a technology. The importance of the Perceived Ease of Use effect on Attitude toward Usage has been widely validated [5,7,13]. Because attitude is an overall evaluation that includes utilitarian and hedonic components, it is hoped that easy-to-use technology will encourage adoption by developing a good attitude towards it.

A review of the literature shows inconsistencies of findings about the effect of perceived ease of use on behavior [1,5]. The direct effect comes from the fact that perceived ease of use can affect the attitude toward using regardless of product usability [1]. Conversely, the indirect effect of perceived ease of use on attitudes through perceived usefulness shows that technology that is easy to use is considered more useful than technology that is more difficult to use, therefore it will affect the more positive attitude towards using [5,7,15]. So the hypothesis that can be taken in this study is:

H1: The higher the perceived easy of use go-pay, the more positive the attitude toward using.

H2: The higher the perceived easy of use go-pay, the higher is perceived usefulness of go-pay.

B. *Perceived Usefulness (PU)*

Perceived usefulness is another predictor of TAM, which is defined as the extent to which a person believes that using a particular system will improve its performance [2]. It can be said that the tendency of a person to use or not to use technology is related to the extent that they believe technology

will be beneficial or beneficial in terms of helping to carry out their work better. The perceived usefulness has received much attention in the adoption literature [16]. Among the many empirical tests from TAM, perceived usefulness has been found as a determinant of strong behavior. At work, research shows that perceived usefulness plays an important role in the acceptance of word processing users, internet services and so on [2,17]. In addition, the positive effects of perceived usefulness on adoption attitudes have been found in various countries around the world. In addition to the direct effects of perceived usefulness on adoption attitudes, Davis found Perceived usefulness effects on adoption intentions. This relationship has been widely confirmed in the literature [18].

Given that Perceived usefulness of high-tech innovation products is almost always found as one of the most important predictors of adoption, this can also be applied to go-to products, the following hypothesis is proposed:

H3: The higher the perceived usefulness of go-pay, the more positive the attitude of wanting to use go-pay.

C. *Emotion Factors*

This section discusses affective responses to high-tech products and their role for consumers in adopting go-pay products. The constructs discussed and their relationships to other variables are borrowed from the PAD theory paradigm and CAT model [1,5].

1) *Pleasure*: Pleasure is an affective dimension related to the degree to which a person feels good, happy, or satisfied in a particular situation. As a dimension of emotion, pleasure may be the strongest, one's emotions vary according to the amount of pleasure they contain. For example, this dimension ranges from happiness on the one hand to unhappiness on the other. Consumer behavior research describes hedonic results as pleasure derived from consumption, or use of a product [19]. Significant empirical evidence shows the influence of pleasure that is quite strong pleasure on the decision to adopt technology products. For example, pleasure was found to have a direct and positive effect on attitudes towards Internet shopping [20].

The strong influence of pleasure on the decision to adopt high-tech products has been found in many countries around the world. Thus, it is expected that people around the world who experience pleasure and excitement because using new technologies tend to have a positive attitude about the application of technology compared to those who have affective reactions that are less happy. So the hypothesis proposed in this study is:

H4: The higher the arousal perceived by consumers, the more positive the attitude of wanting to use go-pay.

2) *Arousal*: Arousal shows a combination of physical activity and mental alertness. This is one of three dimensions in Mehrabian and Russell's emotional model. Individuals vary in the amount of arousal they feel in response to stimuli. At one extreme level, a high level of arousal is defined as the extent to which a person feels happy, stimulated, active, and

alert. On the other hand, a low level of arousal means that someone feels bored, tired, and / or sleepy [21]. According to the literature it is said that individuals often experience a higher level of arousal for surprising and new stimuli hence they give greater attention to determining what it is and its relevance to them [22]. Because new innovations reach a certain level, it makes sense that the initial experience of the product will tend to generate high emotions in arousal.

Previous studies have shown that *arousal* influences attitude formation. For example, in the context of technology adoption, passion has been shown to have a positive influence on attitudes towards Internet shopping use [23], and passion is found to have a significant impact on Microsoft's Pocket PC products [5], the hypothesis proposed in this study is:

H5: The higher the arousal perceived by consumers, the more positive their attitude to using go-pay.

3) *Dominance*: Domination is defined as feeling of power or the influence of situations and excessive people. As one of three dimensions in the Mehrabian and Russell model, emotions vary in the amount and valence of their dominance. For example, dominance can range from feelings of anxiety and weakness, frustration or confusion to feelings of strength and control. Several studies have confirmed a direct and positive relationship between dominance and adoption attitudes [24]. For example, some computer users have feelings of anxiety, fear, or lack of control when using a computer, and therefore have a negative attitude towards computer use [25]. However, so far few have carried out studies with dominance constructs compared to pleasure and arousal because over time assumed domination constructs have a weak role in many areas of consumer behavior [5,26]. But some researchers suggest that involving the dominance of the PAD paradigm is considered more fully capturing the range of human emotions, and validating that dominant emotions are considered to influence adoption attitudes [27,28]. Thus the hypotheses that can be taken for this research are:

H6: The higher the dominance perceived by consumers towards go pay, the more positive they will go to go.

D. Prior Experience (PE)

Some researchers argue that behavior is largely a function of individual perception of an event and its potential results [28]. In the context of this research, one important aspect related to the perception of users of new technology products may be relevant to prior experience. Research has shown that the attitude of people who have prior experience directly with the object of attitudes is quite related to the next attitude-relevant behavior, while the attitude of people without *prior experience* has little or no relationship [29].

Based on the above, prior experience for products related to online or technology-based payments similar to e-wallet may function to strengthen perceived usefulness and improve the consistency of attitude-behavior relationships in the context of go-pay adoption. In the context of technology products, subjects with prior experience will most likely have strong

perceptions of perceived usefulness and attitude toward using these technologies, according to their past beliefs and behaviors [30,31]. From the description, the hypotheses proposed for this study are:

H7: Prior Experience has a direct and positive effect on the perceived usefulness of go-pay as a payment tool

H8: Prior Experience has a direct and positive effect on the attitude of wanting to use go-pay as a payment tool

E. Attitude Toward Using (ATU)

Positive effects of attitudes toward intentions are found in the context of consumer adoption of new technologies. Attitudes have proven to have a direct and positive effect on the intention to adopt various innovations such as self-service technology and gadget technology [5,32]. In many studies on organizational behavior and consumer behavior, attitudes have been found to mediate the influence of cognitive construction on adoption intentions, attitudes have also been found to mediate the influence of affective constructs on adoption purposes [1,5,15,33]. So the hypothesis proposed is as follows:

H9: attitude toward using having a direct and positive effect on intention to use go-pay.

IV. METHOD

The data in this study were obtained from a respondent who was collected using a questionnaire. The data collected consists of the identity of the respondent and questions related to the research indicators. The research population is consumers in the province of East Java who have never shop using the go-pay application as a payment instrument. The sample was determined by using purposive sampling, namely people who have known go-pay as electronic money (payment instruments) with millennial age or who were born in 1980 to 2000. The samples in this study were 270 respondents spread in East Java. Measurement of respondent data using a five-point Likert Scale starting from 1 = strongly disagree up to 5 = strongly agree.

Before being distributed to respondents, it was started by testing the research instrument, namely by testing the validity and reliability testing. This validity test aims to test whether the research questionnaire is appropriate to measure what will be measured. The ideal instrument is that all questions on the instrument have sufficient validity and reliability so that instruments can measure constructs well and produce consistent measurements. Furthermore, reliability testing aims to determine the extent of the consistency of the measuring instrument to be used. Reliability testing is able to show reliable and reliable instruments. The value of an instrument is said to be reliable if the Cronbach alpha value is > 0.6 .

In this study data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics are used to present the distribution of respondents based on several demographic variables and a description of the research variables based on the respondents' answers. Inferential statistical analysis is used to test the research hypothesis. The analysis tool used is Partial Least Square (PLS).

V. RESULTS

Results of distributing questionnaires as in table 1 below.

TABLE I. IDENTITY DATA OF RESPONDENTS

	Resident Identity Data	amount	%
1.	Male gender	142	52,59
2.	Female gender	128	47,41
3.	Elementary & Middle School Education	47	17,41
4.	High school education	105	38,89
5.	S1, S2, S3 education	118	43,70
6.	Work	154	57,04
	a. Income <2 million	27	17,53
	b. Income of 2 to 5 million	85	55,19
	c. Income > 5 million	42	27,27
7.	No / Not Working	116	42,96
8	Marital Status	138	51,11
9.	Not Married Status	132	48,89

TABLE II. RESULTS OF COMPOSITE RELIABILITY, CONVERGENT/DISCRIMINANT VALIDITY TESTING AND R SQUARE

Item	AVE	Composite Reliability	Cronbachs Alpha	R Square
PEOU	0,512484	0,755679	0,643706	
PU	0,522494	0,759892	0,609973	0,2076
PE	0,580611	0,800789	0,656298	
Pleasure	0,694802	0,871939	0,796568	
Arousal	0,540232	0,778744	0,684062	
Dominance	0,548430	0,777962	0,675294	

Based on the test results, it can be interpreted that the latent variable has satisfied discriminant validity seen from all AVE values with a factor loading of more than 0.5 and greater than all other loading items so that it can be said that all items are said to be valid. As soon as the reliability test pupae are shown by the value of all constructs for composite reliability is greater than 0.7 and the Cronbach alpha value is greater than 0.6 so that the entire construct can be said to be reliable. This model explains 20.76% of the variance for perceived usefulness, 78.23% of the variance for Attitude toward using, and 32.9% for the Using Intention variance.

The result of convergent validity computation on PLS shows that each indicator can reflect the overall research variable seen from the value of outer loadings above 0.5. For structural model evaluation (Inner Model) obtained from calculating the computational value of R²; Q² = 1 (1 - (0.2076)²) (1 - (0.7823)²) (1 - (0.329)²) = 0.331. The values (R₁)² (R₂)² and (R₃)² are the R-square of the endogenous variables in the equation model, the quantity of Q² has a value with a range of 0 < Q² < 1, the closer to one means the model is better. So from the results of these calculations obtained the value of Q² is equal to 0.331, so it can be concluded that the model has predictive-relevance that is quite good (Q² = 0.331 > 0). The results of composite reliability, convergent/discriminant validity testing and R Square can be seen in table 2.

The estimated standardized structural coefficients for the hypothesized relationship between the construct and its significance are shown in table 3.

TABLE III. SUMMARY OF THE HYPOTHESES TESTING RESULTS

	Hypothesis	β	T-Statistics	Sign	Result
1.	PEOU -> PU	0,259934	3,688513	<0,01	Accepted
2.	PEOU -> ATU	0,119138	2,318169	<0,05	Accepted
3.	PU -> ATU	0,645126	13,944891	<0,001	Accepted
4.	Pleasure -> ATU	0,099785	2,034374	<0,05	Accepted
5.	Arousal -> ATU	0,250772	4,181206	<0,001	Accepted
6.	Dominance -> ATU	-	0,018208	N.S.	Rejected
7.	PE -> PU	0,278171	4,190596	<0,001	Accepted
8.	PE -> ATU	0,045732	1,020601	N.S.	Rejected
9.	ATU Intention ->	0,573605	10,738916	<0,001	Accepted

The results show that all hypothesized relationships are supported except H6 and H8. The first hypothesis predicting that perceived easy of use about go pay positively affects Perceived Usefulness results is supported ($\beta = 0.26$ P < 0.01), then in the second hypothesis that predicts perceived easy of use about go-pay has a positive effect towards attitude toward using the results also supported ($\beta = 0.12$ P < 0.05).

The estimated standardized structural coefficients for the hypothesized relationship between the construct and its significance are shown in Table 4. The results show that all hypothesized relationships are supported except H6 and H8. The first hypothesis predicting that perceived easy of use about go pay positively affects Perceived Usefulness results is supported ($\beta = 0.26$ P < 0.01), then in the second hypothesis that predicts perceived easy of use about go-pay has a positive effect towards attitude toward using the results also supported ($\beta = 0.12$ P < 0.05).

Like the prediction in the third hypothesis, in this study found a significant positive impact on the Perceived Usefulness construct on attitude using go-pay ($\beta = 0.12$ P < 0.001).

At H7, H8 and H9 it is expected that there will be a positive relationship between Prior Experience to Perceived Usefulness about go-pay and the results are supported ($\beta = 0.28$ P < 0.001), but not in the Prior Experience of using go-pay, because the results are not supported ($\beta = 0.05$ Non Sign). While the relationship between attitude toward using go-pay intention there is a positive and significant relationship ($\beta = 0.57$ P < 0.001). The results of hypothesis testing can be seen in figure 1.

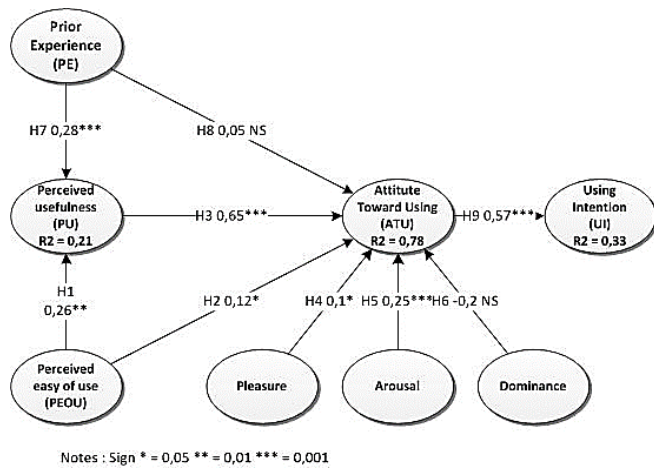


Fig. 1. PLS results of research model of main test.

VI. DISCUSSION AND FINDINGS

The purpose of this study was to develop and test an integrated model to determine the intention of consumers to use go-pay, of the nine hypotheses proposed, seven hypotheses were accepted, while two hypotheses were rejected, namely H6 and H8. For the six hypotheses received, it is in accordance with previous research on technology acceptance for consumers even though the product is different. Go-pay product as electronic payment instruments proved to be considered by consumers not different from other technology products, especially for exogenous constructs such as PEOU, PU, pleasure, arousal. But it is not in the dominance construct and prior experience. The hypothesis which states that dominance has a positive effect on attitude is unacceptable, this is probably due to the feeling that consumers who cannot have a tendency to feel happy or sad when asked, this result is also in line with the results of previous CAT model studies [5].

Then our other findings are on exogenous prior experience (PE) constructs, in H7 that PE has a positive effect on perceived usefulness, it is acceptable for consumers to consider that go-pay as a payment instrument has a perceived usefulness that is influenced by past experience when they use electronic payment equipment of the same type, but not on H8, which consumers consider past experience has nothing to do with their attitude of wanting to use go-pay, because the possibility of their past experience when paying with electronic payment is considered not the same as when they knew go-pay.

VII. CONCLUSION

This research is the development of the previous model, which combines the TAM model and the PAD theory which is then modeled with the name Consumer Acceptance of Tehcnology (CAT), but in this study added prior experience variables to strengthen the model of consumer interest in making payments with Go-pay. Of the nine hypotheses, seven hypotheses were accepted, and two hypotheses were rejected, namely the dominance variable to attitude, and the prior experience variable toward attitude using go-pay.

The implications of this research for managerial, especially for e-wallet products, should not only be traditional services,

because consumers are now smarter and demand something more and innovative, service by providing stimuli that can respond cognitively and emotionally for example by providing features that are entertainment or games.

The most important thing is for e-wallet products, it should be not traditional services, because consumers are now smarter and demand something more and innovative, service by providing stimuli that can respond cognitively and emotionally for example by providing features that are entertainment or games.

While for academics and researchers, it is expected to develop this research, because in this study there are still many weaknesses, including models with very limited constructs and few respondents' use, opportunities that can be used for future research, for example with different technology products, or adding variables that can make the model of acceptance of technology for consumers more complex and comprehensive, by adding moderation or mediation variables.

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