

The Influence of Technology Innovation and Social Media on the Use of Mobile Payment in Indonesia



Hilda Oktavianni JM, Togar Alam Napitupulu

Abstract: Mobile payment services are recently draw special attention of business people in banking and financial technology in Indonesia. The development is based on the use of technological innovations to increase company value and convenience of consumers in the transaction. However, the mobile payment function is not quite attached to the daily needs of users. Besides, by following the growing trends and times that are fully digital, either old or new business people alike want to get as many consumers as possible. Then, to make it happen, they use social media to attract the attention of consumers. Therefore, this study aims to determine whether the technological innovations that companies build in mobile payment services have a significant influence on users' decisions to use their services. And whether using the role of social media significantly influences the trust and loyalty of consumers to the mobile payment service they use. This research was conducted in Jakarta, Indonesia as one of the cities with more dominant mobile payment users. This study uses the methodology of the Technology Acceptance Test (TAM), Diffusion of Innovation Technology (DOIT), and Social Media based on Brand Trust and Loyalty as a research model, as well as distributing questionnaires for use as analysis material. Analysis conducted in this study is following Structural Equation Modeling (SEM) and data processing was using Amos version 23 Statistical Package for the Social Science (SPSS). The results of the study indicated that most variables have an impact on Actual System Use mediated by Intention to Adopt.

Keywords : Brand Loyalty, Brand Trust, Diffusion of Innovation, Mobile Payment, Technology Acceptance Test.

I. INTRODUCTION

Today, the variety of payment systems is one example that proves that technological developments are growing every second. One of them is the mobile payment service, which is one of the payment methods that is adored by millennials in Indonesia, with a higher adoption rate on Java, producing almost 58.5% of Indonesia's gross domestic product (GDP) in 2016 [1]. However, despite the high level of public interest in adopting mobile payment services, it is important to see that not all services have succeeded in developing a payment application platform that is associated and connected to daily

use [1], such as parking merchants, online transportation, coffee shops, e-commerce, and certain shops [2]. However, with this limitation, the transaction volume has even surged each year. This can be seen in research conducted by [1], that the gross transaction value in 2019 - 2020 for mobile payments in Indonesia reaches IDR 459 trillion.

Previous research considers mobile payment services as a technological innovation that requires initial phase testing, wherein the process of deployment and testing, users can directly evaluate available product innovations and make decisions to adopt them [3]. However, on one hand [4] in their research said that social influence and support from close friends are important motives in making decisions to adopt mobile payment, where consumers will feel satisfied if the decision taken is an act that has been recognized their closest people. Apart from the technological innovation of a product and the influence of social media on its use, most studies only cover the factors that influence the use of mobile payments in terms of technology acceptance, and the influence of social media on users is not apparent in its specifications [5,6,7,8].

To build a new perspective on the decision to use mobile payments, the exploration of a product is not only obtained from the influence of descriptive social media. However, this study considers that by showing how ties to a brand on social media and technological innovation have a broad interest in examining the elements that influence the increase in the volume of mobile payment service transactions. Thus, this study believes that the use of technological innovation and the bonding of a brand through social media to its users have an important role in increasing the volume of mobile payment transactions that were not discussed in previous studies.

II. LITERATURE REVIEW

A. Mobile Payment

Mobile Payment, known as electronic payment, generally refers to a payment mode that does not involve cash [9]. The use of mobile payment now allows consumers to eliminate the need to use cash [10]. Providing convenience in transferring information between devices, from individual transactions to others with high payment volumes such as restaurants or other retail stores [11]. Mobile payment is one of the most important drivers of success [12] today in changing the payment market [13]. This can be seen from its ability to settle payments and transactions between three main parties (banks, cellular network service providers, and retailers) in a fast, convenient, safe and simple way, whenever and wherever it can be used [14].

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The mobile payment application in this study covers everything that involves goods, services, and official bills that are initiated in the payment process with cellular telecommunications devices from various industries for its users [15,16].

Mobile payment technology must be able to develop to support increasingly sophisticated operating systems on mobile phones and be able to adapt existing systems to enable consumers to benefit from the benefits of using mobile payment technology and to ensure the security of payment transactions for users [17]. Also, to be accepted in the global market, mobile payment services must be able to meet general criteria, among others [18,19]:

- **Simple and Easy to Use.** A payment system utilizing technological updates must be easy for users to understand when implemented. Thus, it does not require high effort or learning in the early stages of use. Therefore, it will produce comfort and an attractive first impression on users.
- **Stands Universal and Easy to Operate.** Not only able to give an interesting and useful impression between business to customer (B2C). However, mobile payment services are expected to provide universal benefits, namely transactions between individuals (person to person), and business to business (B2B) by covering a variety of environments, both within the country, certain regions, and globally. The development of technology used must make it possible to interact between systems.
- **Maintaining Security, Privacy and Trust.** At this point, it is generally applied to every business in particular which is online. Customer trust in the details of the information registered must not be misused. And for confidential information must be encrypted according to payment security standards.
- **Convenience in terms of Costs, Speed, and Transactions.** Mobile payment services must be able to compete in terms of costs, speed, and convenience of transactions to be widely accepted by consumers and sellers.

B. The Variety of Mobile Payment System

Mobile technology provides a variety of possible payment methods that have been applied to date, including [17,19]:

- **SMS - Short Message Service.** Short message service (SMS) allows a text with a maximum length of 160 characters that can be sent via mobile phone. Knowing its function in terms of payment, SMS can be used to provide information about a person's bank account status and can also be used to send payment instructions via mobile phone.
- **Subscriber Identity Module (SIM) based application.** The use of a SIM on a cell phone is used for data storage. SIM is also called a smart card or small chip with processing intelligence and memory for data storage. Every time a consumer has a new cellphone, only the SIM card needs to be moved and adjusted again.
- **Near Field Communication (NFC).** A short-range wireless communication with a combination of RFID (Radio-Frequency Identification) and cellphones. This method can exchange data between the reader and the electronic tag attached to an object for identification and

tracking needs.

- **Mobile Wallet.** An application for conducting transactions via mobile anywhere and anytime. This method resembles savings which can be topped up whenever needed. Information stored on it includes bank account or consumer credit card information.

C. Social Media on the Use of Mobile Payment

The existence of web 4.0 has now evolved to change the interaction of humans and machines in a new symbiosis, namely by acting as an assistant or personal agent for users [20]. This is proven by the many business opportunities created through social media. With user involvement in social media, [21] has classified social features into two categories, including:

- **Interaction between user-generated content:** Indicates that mobile applications tend to focus on content in the form of photos and videos rather than text. For example, related to mobile payment services, content creators in one of the mobile payment methods convey the ease and speed of their payment transactions using cinematography by producing useful values and not complicating the lives of those who use them.
- **Interaction between users:** Based on the content that has been shared with users of social media, most will cause interaction between users in the form of online chat in the comments column of the social media platform for mobile payment services. This also gives the impression of interest in certain mobile payment services if the interactions conveyed by other users bind consumers to use mobile payment services.

D. Customer Behavior: Social Media Based on Brand Trust and Brand Loyalty

Since the advent of social media, the current form of communication has changed the communication process played by consumers, namely from passive to active where consumers only receive information about a product or brand through print and word-of-mouth media only [22,23]. However, the opposite is happening now is consumers become active users of the ease of information they receive, find out, and become content creators through various social media platforms such as Blogs, Twitter, Facebook, Instagram, and others. Such circumstances can be said as electronic word of mouth. Where consumers have the freedom to communicate and find out information about products or brands that have, are, or will develop through social media platforms [24].

Changes in communication established as above illustrate the quality of the relationship between brands and consumers that are getting stronger. Where consumers will view a product or brand as a satisfying partner to be used continuously [22,25]. The importance of such a relationship will lead to the nature of the trust and loyalty of consumers to a product or brand.

E. Technology Acceptance Model

The Technology Acceptance Model (TAM) is used to evaluate and identify what elements influence human behavior in accepting technology [26,27]. This theory is one of the most widely applied theories in m-commerce adoption research [28].

Based on his theory, [27] proposes a model which shows several factors to measure user motivation in using technology, including perceived usefulness and perceive ease of use. Perceived usefulness is defined as the extent to which someone views that adopting a system will improve the performance of his work [29]. Perceived ease of use is defined as the extent to which someone believes that adopting technology will be free from troublesome endeavors [29].

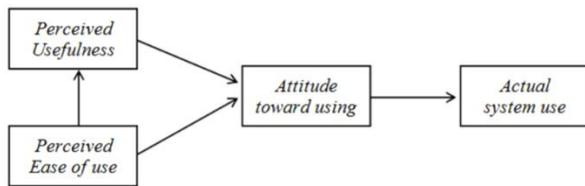


Fig. 1.TAM Model by [27].

F. Adoption of Technology Innovation

Diffusion of Innovation Theory (DOIT) has been widely used in predicting the adoption of new technologies [28]. DOIT is very useful in business studies because this theory explains how new technologies have been effective in influencing customer consumption habits [28]. This theory shows that innovation is an important element in determining the outcome of technology adoption [21] which illustrates the willingness of individuals to try new information technology and plays an important war in determining the results of acceptance of technology users [30].

Several factors influence the adoption of technology in DOIT, including relative advantage, compatibility, complexity, trialability, and observability [31,32]. Previous research stated that relative advantage refers to the extent to which consumers see technological updates to be better than before, compatibility refers to how consumers perceive new technology into their daily lives [28], the variable complexity in DOIT is very similar to the perceived ease of use at TAM [33], trialability (testability) refers to the extent of the perceived risk of consumers using technology updates [28], observability allows consumers to analyze events, find solutions, and predicting the development of technological innovations in the future [34]. Thus, the easier it is for consumers to see the results of an innovation, the more likely it is to have the intention to use technology [28,35].

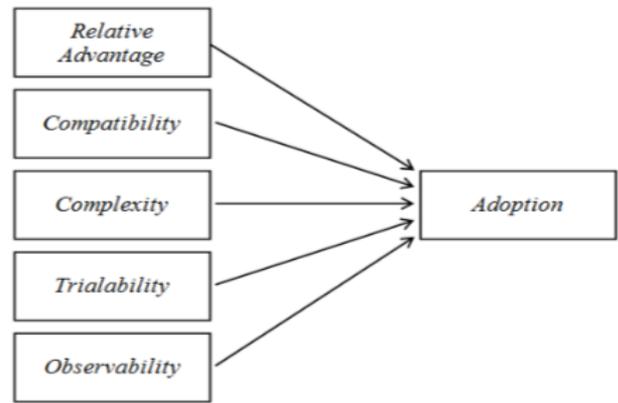


Fig. 2.DOIT Model by [32].

III. RESEARCH METHODOLOGY

Data collection in this study was conducted by distributing questionnaires using Google Docs to 384 Indonesian consumers through social media. Namely, by involving a five-point Likert scale used to measure the impact of the role of social media and technological innovation influencing the decisions of Indonesian consumers in using mobile payment services. The data collection is based on the following research model:

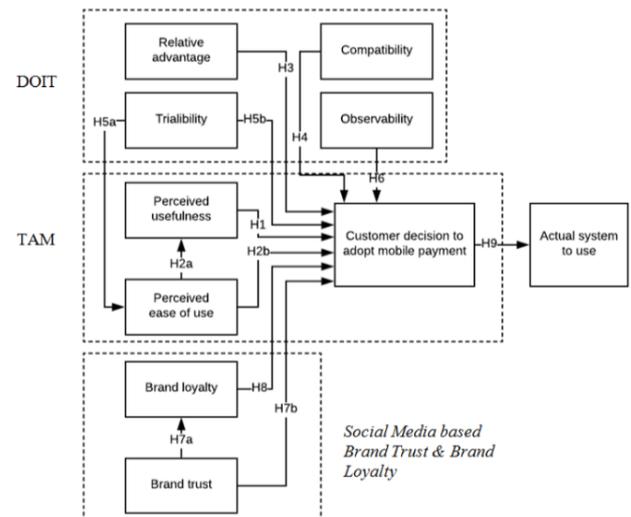


Fig. 3.Research Model - Factors Influencing the Use of Mobile Payment.

The data obtained is then tested for validity and reliability to find out whether all the instrument criteria in the research model are relevant and valid to be built. After being tested, an analysis is carried out to get a ranking of factors that influence consumers in using mobile payment services and analyze multiple regression equations based on parameters that will be suspected as factors that influence the use of mobile payment services. The research model described above can be described in a mathematical model as multiple regression with the following equation:

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$$Y = \beta_{11}X_9 + \varepsilon_1 \dots\dots\dots(1)$$

$$X_9 = \beta_{21}X_1 + \beta_{22}X_2 + \beta_{23}X_3 + \beta_{24}X_4 + \beta_{25}X_5 + \beta_{26}X_6 + \beta_{27}X_7 + \beta_{28}X_8 + \varepsilon_2 \dots\dots\dots(2)$$

$$X_1 = \beta_{31}X_2 + \varepsilon_3 \dots\dots\dots(3)$$

$$X_2 = \beta_{41}X_5 + \varepsilon_4 \dots\dots\dots(4)$$

$$X_8 = \beta_{51}X_7 + \varepsilon_5 \dots\dots\dots(5)$$

Data analysis and processing are carried out using AMOS Version 23 SPSS (Statistical Package for the Social Science).

IV. DATA ANALYSIS RESULTS

A. Validity Test

A validity test is done to show that the results of each variable are by the theoretical understanding of this measurement model.

Where statistically significant at a certain level when equal to or greater than the critical value (t-table) in the Critical Values for t-Test table. In this study, the level of significance (α) is at 0.05 (two-tailed) with a sample of 392 (df = 391), so that what is obtained is 1.96. The following is the validity test table for each variable.

Table- I: Validity Test Table

Variable	T-Stat	T-Table	Remark
Perceived Usefulness			
PU1	26.198	1.96	Valid
PU2	31.113	1.96	Valid
PU3	24.329	1.96	Valid
Perceived Ease of Use			
PEOU1	39.577	1.96	Valid
PEOU2	45.590	1.96	Valid
PEOU3	34.633	1.96	Valid
Relative Advantage			
RA1	38.358	1.96	Valid
RA2	55.909	1.96	Valid
RA3	55.197	1.96	Valid
Compatibility			
C1	31.173	1.96	Valid
C2	76.768	1.96	Valid
C3	66.379	1.96	Valid
Trialability			
T1	27.206	1.96	Valid
T2	23.365	1.96	Valid
T3	19.100	1.96	Valid
Observability			
O1	23.142	1.96	Valid
O2	27.781	1.96	Valid
O3	19.009	1.96	Valid
Brand Trust			
BT1	44.064	1.96	Valid

BT2	30.913	1.96	Valid
BT3	44.814	1.96	Valid
Brand Loyalty			
BL1	32.656	1.96	Valid
BL2	29.518	1.96	Valid
BL3	24.975	1.96	Valid
Customer Decision			
CD1	22.675	1.96	Valid
CD2	54.667	1.96	Valid
CD3	53.669	1.96	Valid
Actual System to use			
AS1	50.144	1.96	Valid
AS2	41.137	1.96	Valid
AS3	54.019	1.96	Valid

By using SPSS (Statistical Package for the Social Sciences) version 23, the results of the validity test above indicate that the t-stat is greater than (1.96) with $\alpha = 0.05$. Therefore, it can be concluded that all tested variables are declared valid for use as further research material.

B. Reliability Test

Reliability tests are carried out to measure the consistency of each variable to find out that mobile payment services can be relied upon by consumers for use in everyday life. Based on the reliability test, Cronbach Alpha (α) was obtained to decide that each factor in this study was reliable. The decision refers to the provision if $\alpha \geq 0.6$, then the tested mobile payment service can be relied upon. Following are the reliability test decisions based on the calculation of variables made on SPSS version 23:

Table- II: Reliability Test Table

Variable	Cronbach Alpha (α)	N of Items	Remark
Perceived Usefulness	0.729	3	Reliable
Perceived Ease of Use	0.872	3	Reliable
Relative Advantage	0.907	3	Reliable
Compatibility	0.916	3	Reliable
Trialability	0.628	3	Reliable
Observability	0.620	3	Reliable
Brand Trust	0.865	3	Reliable
Brand Loyalty	0.748	3	Reliable
Customer Decision	0.851	3	Reliable
Actual System	0.912	3	Reliable

The reliability test table above shows the Cronbach alpha value of each variable studied. Thus, it can be concluded that the Cronbach alpha calculation for all variables on mobile payment services can be relied upon by consumers in their daily lives.

C. Hypothesis Test

Hypothesis testing is done to analyze each variable that has been built on the research model (Fig. 3). A hypothesis will be rejected if it has a p-value < 0.05. The results of hypothesis testing in the table below are done using SPSS Amos version 23. The following is the results of the hypothesis test based on the research model that has been formed:

Table- III: Hypothesis Test Table

Hypothesis	Relationship	P-Value	Remark
H1	PU → CD	0.006	Significant
H2a	PEOU → PU	< 0.001	Significant
H2b	PEOU → CD	0.428	Not Significant
H3	RA → CD	0.040	Significant
H4	C → CD	0.007	Significant
H5a	T → PEOU	< 0.001	Significant
H5b	T → CD	0.003	Significant
H6	O → CD	0.091	Not Significant
H7a	BT → BL	< 0.001	Significant
H7b	BT → CD	0.081	Not Significant
H8	BL → CD	0.007	Significant
H9	CD → AS	< 0.001	Significant

The results of hypothesis testing concluded that the factors that significantly had a direct influence on consumers' decision to use mobile payment services (customer decision) include: perceived usefulness, relative advantage, compatibility, trialability, and brand loyalty. Then, the factors that significantly have an indirect effect on consumers' decision to use mobile payment services (customer decision) include perceived ease of use, trialability, and brand trust. Thus, the results of hypothesis testing indicate that the consumer decision factor (customer decision) to use mobile payment has a significant effect on the actual system used.

D. Multiple Regression Equation

Table- IV: Regression Weight

Hypothesis	Relationship	Estimates
H1	PU → CD	0.351
H2a	PEOU → PU	0.551
H2b	PEOU → CD	-0.076
H3	RA → CD	-0.048
H4	C → CD	0.122
H5a	T → PEOU	0.982
H5b	T → CD	0.279
H6	O → CD	0.072

H7a	BT → BL	0.680
H7b	BT → CD	-0.194
H8	BL → CD	0.452
H9	CD → AS	0.759

Based on the results of the above hypothesis test, the multiple regression equation that has been submitted previously can be written as:

$$Y = \beta_{11}X_9 + \epsilon_1 \dots\dots\dots(1)$$

$$Y = 0,759X_9$$

$$X_9 = \beta_{21}X_1 + \beta_{22}X_2 + \beta_{23}X_3 + \beta_{24}X_3 + \beta_{25}X_5 + \beta_{26}X_5 + \beta_{27}X_7 + \beta_{28}X_8 + \epsilon_2 \dots\dots\dots(2)$$

$$X_9 = 0,351X_1 + (-0,076) X_2 + (-0,048) X_3 + 0,122X_4 + 0,279X_5 + 0,072X_6 + (-0,194) X_7 + 0,452X_8$$

$$X_1 = \beta_{31}X_2 + \epsilon_3 \dots\dots\dots(3)$$

$$X_1 = 0,551X_2$$

$$X_2 = \beta_{41}X_5 + \epsilon_4 \dots\dots\dots(4)$$

$$X_2 = 0,982X_5$$

$$X_8 = \beta_{51}X_7 + \epsilon_5 \dots\dots\dots(5)$$

$$X_8 = 0,680X_7$$

Where,

- Y = AS (Actual System)
- X1 = PU (Perceived Usefulness)
- X2 = PEOU (Perceived Ease Of Use)
- X3 = RA (Relative Advantage)
- X4 = C (Compatibility)
- X5 = T (Trialability)
- X6 = O (Observability)
- X7 = BT (Brand Trust)
- X8 = BL (Brand Loyalty)
- X9 = CD (Customer Decision)
- ε = Error Factor

V. CONCLUSION

Based on the discussion of respondents' data analysis, it can be concluded that the results of the measurement of validity test against the assessment indicators indicate that the model has been formed is relevant and valid to be built. Moreover, the reliability test results show that all research variables can be relied upon to determine the effect of social media and technological innovation on the adoption of mobile payment.

The ranking of the factors that most influence on consumers' decision to use mobile payment services in Indonesia is the brand loyalty factor from the translation of social media research models based on brand trust and brand loyalty of 0.452. And based on technological innovation, the most influential factor was trialability of 0.279.



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