Factors Impacting the Intention to Use M-Payment

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***Abstract*— Recently m-payment or mobile payment is a payment instrument that is widely accepted in Indonesia, not only because of the convenience offered but also due to an enticing economic benefit. However, how long the m-payment provider will survive to subsidize its promotional costs. Therefore, this study examines factors that affect the use of m-payment without looking at economic benefits but focus on customer behavior. The model in this study involved two individual differences and four m-payment features and equipped with two TAM variables that explain the behavior in adopting the technology. Then, empirical examination is conducted, starts with data collection using a survey from m-payment users. Afterwards, data is analyzed utilizing structural equation models (SEM) method. The result indicates that perceived ease of use (PEOU) and perceived of usefulness (PU) are the most powerful factors that influence the intention to use m-payment. Interestingly, among m-payment characteristics, only compatibility and convenience affect the PEOU while mobility and reachability have no effect on either PEOU or PU. This result also can be an insight for m-payment providers to implement their application development strategies based on their customer behavior.**

Keywords—m-payment, individual differences, m-payment characteristics, structural equation models

I. INTRODUCTION

E-commerce has expanded to mobile commerce that also increases the utilization of m-payment. In this paper, m-payment is categorized as payment for a commercial transaction through a mobile device [1]. M-payment is the development of e-payment that allows decent and convenient e-commerce transactions [2].

M-payments in Indonesia are also growing in numbers such as Go-Pay, OVO, LinkAja, and Dana. However, among the m-payments, the one that controls the most market are Go-Pay and OVO. According to Morgan and Stanley's research quoted by Tempo that Go-pay released since 2016 has grown significantly, with an average number of transactions reaching 50 million per month or 1.6 million transactions per day [3]. Go-Pay is a payment application owned by Go-Jek, which is an information technology start-up engaged in transportation that was established in 2010. Meanwhile, its rival OVO is a digital payment platform under the Lippo Group which is a conglomerate company that is engaged in the property, retails, and telecommunication business. OVO announced the growth of its users increase to 400% in 2018 with a total transaction of 1 billion [4].

Both of these companies are in the war of customer acquisition [5]. The strategy has been carried out by both companies is by offering cashback, discounts, and promotions. It can be said whether Go-Pay or OVO are currently spending their own money. There are no figures announced widely by Go-Pay and OVO regarding the number of subsidies they have spent.

Some argue that either Go-Pay or OVO, will continue to launch discounted programs until the budget of one of the parties runs out. Those who are able to survive will reduce subsidies slowly until they reach healthy economic prices. Even though the two companies are large enough and able to bear the burn rate, how long will they survive to do this?

Therefore, it would be better if the company look at the other factors that can make a customer keep using their products without having subsidy that will cut the profit margins. Besides the economic benefit that offers by Go-Pay and OVO, actually, m-payment also provides convenience and speed for transaction [6] and also flexibility in time and places [7]. Therefore, this research will try to examine what factors make customer still want to use m-payment and put the economic benefits aside. Users of m-payment (Go-Pay and OVO) in this research will be specific to millennial since they are considered as a tech-savvy generation. Hence, to obtain this objective, this study applies a model that consists of two belief variables, two individual differences and four m-payment characteristics.

Technology Acceptance Model (TAM) is a model that establish to assess aspects that impact the acceptance of the computer usage which initiated by Fred Davis in 1986 [8]. According to the model of TAM, adoption behavior is defined by the purpose to use a specific system, that is, determined by the PU and the PEOU [9]. This study adapts the model of TAM to the m-payment perspective and integrate it with four m-payment characteristics in Indonesia setting which replicate the previous study by Kim, C et.al, 2010 [10].

The remainder of this research will be organized as follows: second part will present the literature and hypotheses development, the third part will describe the data and methodology that will be used. In part four, it will present the empirical result and continue with the discussion of the result in part five. At the end, part six will state the conclusions.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. Technology Acceptance Model (TAM))

There are several research models in explaining the behavior of computer-usage and TAM is one of a well-organized model in explaining the adoption of IS behavior [9]. Generally, the information systems researchers applied TAM in executing the behavior of technology acceptance for various contexts of information technology (IT). Two variables are applied to understand the intention of users in

deciding to use new IT, those are perceived ease of use (PEOU) and perceived usefulness (PU). Lately, that has been adopted all over the world is the utilization of m-payment systems as it is one type of new IT and hence the researches are extended with regard to investigating the intention of users in using m-payment by applying TAM

Based on prior research, two salient constructs that are important to determine the aim to use m-payment are individual differences and m-payment system (MPS) characteristics. Information system (IS) success is highly driven by individual differences as it is a theoretical model proposed by Zmud (1979) [11] and as the other external variable in determining the users' intention in adopting new IS, namely MPS characteristics, it's system characteristics design may have direct effect on PU and indirect effect via PEOU [9]. The features of m-payment system have a crucial role for the utilization of m-payment, but the empirical results with regards to which manner of acceptance that may be affected by its characteristics is yet to be questioned. Therefore, this research will provide the highlight of m-payment characteristics into the research model.

B. Individual Differences

Individual differences are expected to have relation towards the usage of m-commerce [10] and this research will measure its individual differences by its constructs, those are; personal innovativeness and m-payment knowledge as it has a substantial role in IS and the literature of mobile services [12], [13]. The tendency of an individual in trying IS that has been newly introduced known as personal innovativeness [14] and it is proved to have a positive effect and significant on decisions of online shopping [15]. It is expected that personal innovativeness positively effects the PEOU that will impact to the intention to use m-payment by the users [10]. Furthermore, it is found to be a limited study in utilizing m-payment knowledge to determine the association between knowledge of m-payment and users' aim in using m-payment. The users who have a broad knowledge of m-payment in terms of disclosing personal information to mobile vendors and they will gain experience by using m-payment is expected to conduct the transactions easier by using m-payment systems rather than those who are lack of such knowledge. Therefore, the hypotheses are:

H1a. Personal innovativeness effects positively the PEOU of the intention to use m-payment

H1b. M-payment knowledge effects positively the PEOU of the intention to use m-payment

C. Mobile Payment System (MPS) Characteristics

The strong relationship of characteristics of its system and the theoretical constructs of TAM has been proved on prior research [16]. The unique attributes of mobile technology are consists of mobility and reachability [17]. Mobility defined as the possibility of users to bring their mobile devices in order to accomplish their transactions with its mobile network from anywhere [1], [17]. Two values that benefitted from mobile technology are "computing for anytime and anywhere" [1]. Meanwhile, the possibility of people to be reached anytime and anywhere by using mobile devices refers to reachability [1], [18], [19]. Those features may provide the easiness to use m-payment since they are carrying their mobile devices as well as reachable since m-payment providers might require some clarifications for its transaction [10].

It has a positive effect of trying new services on mobile of its attitude towards the intention to use as it is compatible with the needs and lifestyles of users [17]. Compatibility is proved as the most significant aspects of an objective to use m-payment and it has an indirect effect via PEOU and PU [2]. Another most important factors of mobile commerce success are convenience [20]. Convenience is a harmonization between place and time utilities and it is expected to have a positive effect on both, PEOU and PU on the intention to use m-payment. Based on the explanation above, we proposed several hypotheses as follows:

H2a1. Mobility effects positively the PEOU of the intention to use m-payment.

H2a2. Mobility effects positively the PU of the intention to use m-payment

H2b1. Reachability effects positively the PEOU of the intention to use m-payment

H2b2. Reachability effects positively the PU of the intention to use m-payment

H2c1. Compatibility effects positively the PEOU of the intention to use m-payment

H2c2. Compatibility effects positively the PU of the intention to use m-payment

H2d1. Convenience effects positively the PEOU of the intention to use m-payment

H2d2. Convenience effects positively the PU of the intention to use m-payment

D. Perceived Ease of Use

The indirect effect of PEOU on intention via PU as well as its direct effect on intention has been proved [16]. The usage of m-payment should consider the easiness to learn and to use [10]. Therefore, the hypotheses are as follows:

H3a. PEOU effects positively the PU of the intention to use m-payment

H3b. PEOU effects positively the intention to use m-payment

E. Perceived Usefulness

In the previous study of mobile technology has proved empirical evidence of the objective to use mobile technology by the users [1], [19], [21]. The m-payment will be used by the users if they found it to be useful for in conducting transactions as well as financial issues. Hence, the hypothesis is as follows:

H4. PU effects positively the intention to use m-payment

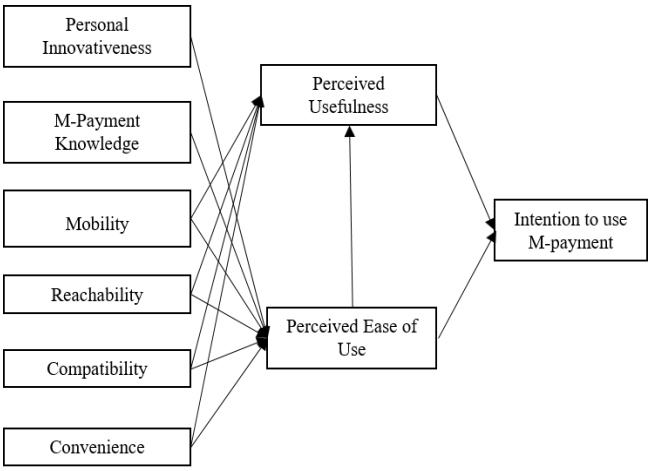

Fig. 1. Conceptual framework

III. Research Methods

This research utilizes a survey method conducted for approximately 2 (two) weeks (1-15 May 2019) with a reference of questionnaires from Kim, C., et al (2010) [10]. The respondent is limited to millennial, in which those who are born between 1983 until 2001 [22], in the city of Jakarta because it is assumed that they were tech-savvy user. The questionnaires distributed via google form to the senior high school, undergraduate and post-graduate students, and employees. In determining the sample size, the researchers refer to general guidelines which is 30-500 respondents that considered as sufficient sample [23], [24]. Out of 207 collected samples, the researchers select 201 respondents as the active users of Go-Pay and OVO who were considered adequately represented the population of millennial. Thus, this research is classified to have sufficient data.

The statistical technique analysis utilized is structural equation models (SEM) method by running the data with SmartPLS 3 [25]. Questions are measured using 5-point of Likert scale, varying from strongly agree to disagree. The preliminary survey is conducted with 30 respondents to ascertain the validity and reliability data of the measure to fulfill the pilot study.

IV. Empirical Analysis

A. Demographic Analysis

There are 201 respondents totally that selected as the sample of this research who are the active users of Go-Pay and OVO. Females dominated (63.7%) over males (36.3%). With regards to the age, it was roughly distributed to 15-20 years old (51.2%) as the major active users and 21-25 years old (39.8%), while the remaining 9% is above 25 years old. In terms of educations, the majority were undergraduate (59.2%) and for its profession were dominated by students (73.6% of senior high school and undergraduate). With regard to income, the respondents mostly earn ≤ IDR 2 million per month (40.3%), while the remaining were on the range of IDR 2-4 million (36.8%), IDR 4-6 million (9.5%), IDR 6-8 million (5.5%), and ≥ IDR 8 million (8%). The utilization of m-payment for the respondents was more or less on the same range, with the highest utilization is ≥ 21 times in a month, while the remaining were 6-10 times (24.9%), ≤ 5 times (17.9%), 11-15 times (17.4%), and 16-20 times (13.4%).

B. Reliability & Validity Analysis

a) Convergent validity

We conducted the analysis using Smart PLS statistical analytics software using 3 measurements, those are; Cronbach's alpha, composite reliability, and average variance extracted (AVE) for convergent analysis. The results suggested that the entire constructs have been fully satisfied as the Cronbach's alpha scores were above 0.70, composite reliability was above 0.60, and AVE was above 0.5 [26]–[28].

TABLE I. Convergent Validity Analysis

Constructs	Cronbach's Alpha	Composite reliability	AVE
INN	0.790	0.875	0.700
MPK	0.833	0.887	0.663
MOB	0.790	0.877	0.705
REA	0.753	0.858	0.668
COM	0.778	0.871	0.694
CON	0.827	0.886	0.660
PEOU	0.901	0.927	0.716
PU	0.878	0.925	0.804
IU	0.884	0.919	0.741

b) Discriminant validity

Afterward, discriminant validity is tested by Fornell-Larcker Criterion, factors loading, and Heterotrait-Monotrait Ratio (HTMT). The results also suggested that the entire constructs have been fully satisfied. In terms of Fornell-Larcker Criterion, all the assessment of the square root average variance extracted shows greater value than the correlation. With regards to factors loading, all the constructs were greater than 0.50. Lastly, HTMT is highly recommended because it explains higher discriminant validity value compare to the other two measurements and all the constructs were below 0.90 and hence it is satisfied [25].

C. Structural Model Analysis

The technique that is applied to examine the structural model analysis is bootstrapping and there are two methods, those are:

a) Hypotheses test results

Covariance structure modelling analysis was conducted to find the effect of individual differences and MPS characteristics on the PEOU, usefulness, and intention to use m-payment with proven results at Table II.

With regard to personal innovativeness, it was found to have a negative association and insignificant, hence, H1a was not supported, while H1b hypothesized for m-payment knowledge (MPK) was supported at 1% significance level with the positive association on PEOU. Furthermore, hypotheses H2a1-H2b2 investigated the m-payment characteristics in terms of mobility and reachability on the

PEOU and usefulness, but surprisingly it was found to be insignificant, hence the four hypotheses were not supported. With regard to compatibility and convenience, it proved positive associations on PEOU at 5% and 1% significance level respectively, while insignificant on PU. Therefore, H2c1 and H2d1 were supported whereas H2c2 and H2d2 were not supported. Lastly, PEOU proved positive association both to PU and intention to use m-payment and significant at 1% significance level as well as positive and significant at 1% level of PU on the intention to use m-payment. Therefore, H3a, H3b, and H4 were supported.

TABLE II. RESULTS OF HYPOTHESES TEST

Attributes	Hypothesis	Path coefficient	T-Stat	P-Values	Results
INN→PEOU	H1a	-0.066	1.051	0.294	Not supported
MPK→PEOU	H1b	0.212	2.969	0.003	Supported
MOB→PEOU	H2a1	0.006	0.086	0.932	Not supported
MOB→PU	H2a2	0.106	1.297	0.195	Not supported
REA→PEOU	H2b1	0.043	0.514	0.607	Not supported
REA→PU	H2b2	0.008	0.092	0.926	Not supported
COM→PEOU	H2c1	0.224	2.361	0.019	Supported
COM→PU	H2c2	0.150	1.683	0.093	Not supported
CON→PEOU	H2d1	0.359	4.153	0.000	Supported
CON→PU	H2d2	0.186	1.902	0.058	Not Supported
PEOU→PU	H3a	0.447	5.864	0.000	Supported
PEOU→IU	H3b	0.276	3.527	0.000	Supported
PU→IU	H4	0.492	5.710	0.000	Supported

b) R-square analysis

Table III describes how exogenous variables could explain their endogenous variable. The intention to use m-payment could be explained by the independent variables for about 51.2%, PU could be described by the independent variables for about 59.1%, and PEOU could be described by the independent variables for about 49.1%. Meanwhile, the remaining 48.8%, 40.9%, and 50.9% respectively could be explained from the other variables that excluded in this research.

TABLE III. RESULTS OF HYPOTHESES TEST

Variables	R Square	T-Stat	P-Values
Intention to Use M-Payment	0.512	7.664	0.000
Perceived Usefulness	0.591	8.376	0.000
Perceived Ease of Use	0.491	7.527	0.000

V. DISCUSSIONS

This research provides empirical results of analyzing the users' acceptance of Go-pay and OVO as the m-payment systems that largely used by Indonesian millennial currently. It is extended with two factors of individual assessment and four characteristics of the system. Some of the results are in accordance with Kim et.al (2010) findings [10] and some are not.

As the tech-savvy users, Indonesian millennial are expected to be highly innovative, but surprisingly they are not kind of trendsetter, instead of being followers to utilize the m-payment system and hence its system is easy to use to adopt m-payment. Yet, personal innovativeness is found to be insignificant. Conversely, Indonesian millennial have quite good knowledge about m-payment and thus they have no difficulty in adopting it.

In terms of the four characteristics of its system, only compatibility and convenience prove significant effects on PEOU. Moreover, convenience found to be the best predictor among the four system characteristics for PEOU. In fact, mobility and reachability have insignificant effect on both, PEOU and PU. Therefore, it is reported that the intention to use m-payment of the entire respondents are basically not because of its mobility and reachability as their fundamental reasons. The attributes of mobile technology that provide uniqueness in terms of mobility and reachability are similarly offering the same advantages with online payments and hence we could not differentiate the advantages between mobile and online payments. In short, the utilization of m-payment by Indonesian millennial is because of its lifestyles and needs as they found it to be compatible, as well as another alternatives and time pressures situation to do a transaction that makes them comfortable to use m-payment.

PU is greatly predicted by PEOU and it is also explained by the two individual characteristics and four system characteristics. Both, PEOU and PU affect significantly the intention to use m-payment of Indonesian millennial. The advancement of technology for its payment which is not merely by online, but also utilizing the mobile devices provide the easiness to accomplish the transaction and the users could feel the benefit from it.

VI. CONCLUSIONS

This study has the objective to define factors that affect the usage of m-payment especially Go-Pay and OVO. To obtain our aim, a research model is operated which conclude two individual differences and four m-payment system characteristics as the external variables, PEOU and PU as the belief variables, and IU as the dependent variable. This study is a replica research of Kim et.al (2010) research [10] in Indonesia setting, but some findings are inconsistent with Kim's study.

The empirical results reveal that among two individual differences, only m-payment knowledge is the determinant of PEOU while personal innovativeness is not. Furthermore, compatibility and convenience have significant effect on PEOU. Meanwhile, mobility and reachability is insignificant factors to PEOU use and PU. In addition, PEOU and perceived of usefulness are proved as determinant factors of intention to use m-payment.

This paper provides valuable insight to the m-payment providers about the user preferences. The m-payment technology shall be keep updated in order to meet the skyrocketed customers' needs and it is also should be highly innovative. Offering discounts, cashback, and promotions might be the best way to introduce the existence of m-

payment currently, but not for the next five to ten years ahead. On top of that, Indonesian millennial are likely to be the giant users of m-payment. Therefore, Indonesian start-up companies should also start to take steps to count their own profit achievements, instead of using their own money to promote their products and services.

This research also contains some limitations and still can be developed for further research, such as by expanding the number of respondents and using other moderating variables.

APPENDIX

INN	Personal innovativeness
MPK	M-payment knowledge
MOB	Mobility
REA	Reachability
COM	Compatibility
CON	Convenience
PEOU	Perceived ease of use
PU	Perceived usefulness
IU	Intention to use m-payment

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VII.