

Improving mobile payment adoption among Gen Z in Indonesia: An extended of technology acceptance model and Delone and McLean information system success model

 Ida Rosnidah¹,  Razana Juhaida Johari²,  Wiwit Apit Sulistyowati^{3*}

^{1,3}Accounting Department, Faculty of Business and Accountancy, Universitas Swadaya Gunung Jati, Cirebon, Indonesia; wiwit.apit.sulistyowati@ugj.ac.id (W.A.S.).

²Faculty of Accountancy, Universiti Teknologi MARA, Shah Alam, Malaysia.

Abstract: This study develops TAM with system quality and service quality that individuals consider when using online financial services. The development of online financial transactions has increased every year, but the adoption of mobile payments has not been optimized. These conditions motivate this study to predict the factors that drive Gen Z's interest in adopting mobile banking for processing financial transactions or online payments. The objective of this study was to extend TAM with system quality and service quality that individuals consider when using online financial services. This study uses a survey method by distributing questionnaires to Gen Z regarding their intention to use mobile payments. 235 valid data points were processed using Structural Equation Modeling through Smart PLS. The findings show that Gen Z focuses on the ease and benefits of mobile payment services, while system quality and service quality are not the main considerations. This implies that for current financial service users, aspects such as convenience and immediate benefits are more dominant in shaping positive attitudes toward new technologies. Therefore, service providers should prioritize improving intuitive interface design and clear communication about the benefits of their products to encourage adoption.

Keywords: DMISSM, Gen Z, Mobile payment adoption, TAM.

1. Introduction

Data from the World Bank's Global Findex shows that by 2021, the average use of digital payments in ASEAN reached 53.22%. While this figure reflects growth, there remains significant potential to increase the adoption of digital payment services. With a population of approximately 673.8 million in 2021 and a percentage of internet users reaching 61.4%, there is a substantial user base for digital payment technology. One of the key factors in the development of mobile payments is the improvement of information and communication technology (ICT) infrastructure. Many ASEAN countries have invested in better internet networks and increased smartphone accessibility. For example, digital payment tools such as GoPay, Ovo, LinkAja, Doku, and Dana are gaining popularity in Indonesia. Additionally, Bank Indonesia launched the Quick Response Code Indonesia Standard (QRIS) in 2019 to facilitate cashless transactions more easily and efficiently. Bank Indonesia also aims to reach 55 million QRIS users with a volume of 2.5 million transactions by 2024.

In encouraging the growth of mobile payments, various ASEAN countries have issued policies to support financial inclusion through digital services. For example, the Financial Services Authority (OJK) in Indonesia has encouraged banks to transform into smart branches with a focus on digital services. Despite progress in the use of mobile payments, challenges remain, especially related to financial literacy and service accessibility for low-income communities. By 2021, the financial inclusion rate in ASEAN will only reach 65%. This shows that many people still do not have sufficient

understanding of how to use digital financial services effectively. This phenomenon motivates this research to predict the factors that encourage Gen Z to use mobile payments.

Studies in several countries have been conducted; for example, a study in Malaysia found that PEOU has a significant effect on user intention to adopt e-learning among university students [1]. Studies in Iraq also indicate the importance of ease of use of e-learning [2]. PEOU also contributes positively to the intention to use mobile banking applications [3]. Several studies show that perceived usefulness has a significant positive effect on the intention to use the system [4–6] as well as the attitude to use a specific system [7, 8]. For example, research in Thailand found that when users feel that new technology can improve their work efficiency, they are more likely to adopt it [9]. These results are consistent with research conducted in China, which also indicates that PU significantly contributes to users' intention to use e-government applications [10]. Studies in Brazil show that although PU is considered important, it does not have a significant influence on the intention to use e-learning systems among university students [11].

Another study found that although users value the technical quality of an app, their decision to continue using the app is influenced more by overall user experience and satisfaction than just the technical aspects of system quality [12]. European studies show that even if the technical quality of an e-learning platform is very good, it is not an indication of users' intention to continue using the platform [13]. To fill the gap in previous studies, this research was conducted by predicting the internal factors that encourage the adoption of mobile payments, as seen from the perceived ease and perceived benefits of using mobile payments. The cashless payment system has the potential to boost economic growth through increased tax revenue [14]. With more transactions digitally recorded, the government can improve its monitoring of tax compliance. In addition, this study identified system aspects based on system quality and mobile banking service quality. This research contributes to the literature by developing the Technology Acceptance Model (TAM) with the DeLone and McLean Information System Success Model [15].

2. Literature Review and Hypothesis Development

2.1. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis [16] and emphasizes two main factors that influence a person's decision to accept new technology, namely perceived usefulness and perceived ease of use. These factors relate to the ease of use of the system and how much a person believes that using a particular technology will improve their performance or productivity. The model states that if someone considers the technology useful and easy to use, then they are likely to accept it. In other words, the higher the level of perceived usefulness and perceived ease of use, the more positive the user's attitude towards the technology, which in turn affects their intention to use it.

2.2. Perceived Ease of Use and Intention to Use Mobile Payment

Perceived ease of use relates to a person's belief that a particular technology can be used. If users feel that a technology is easy to use, they will be more likely to use it. Intention to use technology refers to the user's desire or plan to use the technology in the future. If a person is comfortable with the technology and finds it easy to use, their intention to use the technology is likely to increase. Users who find mobile payment apps easy to learn and use are likely to have a positive experience, which then increases their intention to continue using the technology. When technology is easy to use, barriers or hurdles that might prevent users from trying or continuing to use the technology are reduced. For example, if a mobile payment app has a simple and fast payment process, users will be more motivated to use it regularly. The easier a technology is to use, the more likely it is to be adopted by a wide range of users, including those who may be less familiar with the technology. Previous studies prove that perceived ease of use has a positive effect on the intention to use the system [17–19].

H₁: Perceived ease of use has a positive effect on the intention to use mobile payment

2.3. *Perceived Usefulness and Intention to Use Mobile Payment*

Perceived usefulness refers to the degree to which users believe that using a particular technology will improve their performance or productivity. In the context of mobile payments, this could mean how much users believe that mobile payments will make their transactions more efficient and convenient than traditional payment methods. If users believe that the technology will be beneficial to them, their intention to use the technology is likely to increase. If users feel that mobile payments allow them to complete transactions more quickly and easily, they will be more inclined to use them. For example, the use of e-wallets that are fast and do not require cash can reduce the time required to make payments. Users who feel that mobile payments offer more convenience, such as the ability to pay bills or shop online without having to carry physical cash or cards, will be more likely to use them. Mobile payment technologies that allow users to make transactions anytime and anywhere, even in places that do not have ATM machines or credit card terminals, increase the perceived value of use and will increase users' intention to use such technologies. Previous studies prove that perceived usefulness has an effect on intention to use [10, 20].

H₂: Perceived usefulness has a positive effect on the intention to use mobile payment

2.4. *System Quality and Intention to Use Mobile Payment*

System quality refers to how well a system meets user needs and functions effectively. In the context of mobile payments, system quality can include several aspects, such as: reliability, ease of use, transaction speed, security, and security. If the app functions well and consistently, users are more likely to use it repeatedly. Apps that are quick to respond to user requests will increase satisfaction and the intention to continue using the app. Users value their time, so apps that are able to provide information or services quickly will be preferred. In the context of the study, if users feel that a mobile payment system is reliable and rarely experiences glitches, they are more likely to use it regularly. Research shows that system reliability contributes positively to user satisfaction, which in turn increases usage intention [21, 22].

H₃: System quality has a positive effect on the intention to use mobile payment

2.5. *Service Quality and Intention to Use Mobile Payment*

Service quality refers to the extent to which the service provided meets customer expectations. In the context of mobile payments, service quality includes various aspects such as transaction speed, ease of use, security, and customer support. Mobile payment is a payment system that allows users to make transactions using mobile devices such as smartphones or tablets. Some of the main factors that affect service quality in mobile payments include reliability and responsiveness. The ability of the system to deliver the promised service consistently is crucial. For example, if the mobile payment application often experiences glitches or transaction errors, this will reduce user confidence. The speed with which the service provider can respond to requests or problems from users is also vital. Fast and effective customer service is critical to improving user experience. When users are satisfied with the quality of service received, they tend to have a higher intention to reuse the service in the future. For example, if a user experiences a fast and secure transaction, they are more likely to recommend the app to others. Good service quality can increase customer loyalty to a particular mobile payment provider. High levels of security and reliability can reduce the perception of risk among users. When users feel that the risk of losing money or personal data is low, they are more likely to use mobile payments regularly. Mobile payment service providers that focus on improving service quality through innovating new features (e.g., loyalty programs or integration with e-commerce) can attract more new users as well as retain existing users.

H₄: Service quality has a positive effect on the intention to use mobile payment

3. Methodology

This study employs a quantitative approach to predict factors influencing the intention to use mobile payments. It utilizes four independent variables and one dependent variable. The intention to use is measured by three items, perceived ease of use by four items, perceived usefulness by five items, system quality by five items, and service quality by ten items. The population consists of all accounting students at Swadaya Gunung Jati University, totaling 657 students. Based on the Raosoft sample size calculator, a sample of 243 respondents was determined. Valid data for analysis were obtained from 235 respondents' answers. Data analysis was conducted using Structural Equation Modeling (SEM) with SmartPLS.

4. Results

The majority of respondents in this study were female (72.9%), unmarried (92.8%), aged over 20 years (58.5%), and currently studying at level 2 (36%). Based on Table 1, the mean values of all the variables studied ranged from 3.13 to 4.05, and the standard deviation values ranged from 0.878 to 0.947. This indicates that most respondents expressed agreement with all question items across each variable. It suggests that the perception of ease, usefulness, quality systems, and quality services influences students' intention, as Generation Z, to use mobile payments.

Table 1 shows that Cronbach's alpha values of the five main variables range from 0.713 to 0.941, which are greater than the 0.7 threshold. Additionally, the composite reliability (CR) values for all variables range from 0.908 to 0.955, also exceeding 0.7, indicating that the constructs in this study meet reliability standards. There are two measurement models: the assessment of convergent validity and discriminant validity. Convergent validity is demonstrated through question reliability, construct composite reliability (CR), and variance extracted by the construct. A good reliability value is indicated when the loading value exceeds 0.70. The average variance extracted (AVE) value is used to test convergent validity, and it should be higher than 0.50.

Table 1.

Mean, standard deviation, loading, Cronbach's alpha, CR, AVE.

Construction	Item	M	SD	Loading	Cronbach Alpha	CR (>0.7)	AVE (>0.5)
Intention to use	IU1	3.99	0.929	0.90	0.888	0.930	0.816
	IU2			0.92			
	IU3			0.88			
Perceived Ease of Use	PEoU1	3.13	0.924	0.89	0.921	0.944	0.809
	PEoU2			0.92			
	PEoU3			0.88			
	PEoU4			0.90			
Perceived Usefulness	PU1	4.05	0.891	0.85	0.944	0.957	0.817
	PU2			0.93			
	PU3			0.91			
	PU4			0.90			
	PU5			0.90			
System Quality	SQ1	3.63	0.919	0.85	0.878	0.908	0.666
	SQ2			0.86			
	SQ3			0.85			
	SQ4			0.77			
	SQ5			0.72			
Service Quality	SVQ1	3.79	0.879	0.83	0.947	0.955	0.679
	SVQ2			0.83			
	SVQ3			0.77			
	SVQ4			0.78			
	SVQ5			0.77			
	SVQ6			0.87			
	SVQ7			0.86			
	SVQ8			0.87			
	SVQ9			0.77			
	SVQ10			0.84			

Table 2.

Result of discriminant validity – by Fornell-Larcker Criterion

Variable	IU	PEOU	PU	SQ	SVQ
IU	0.904				
PEOU	0.861	0.899			
PU	0.813	0.864	0.904		
SQ	0.681	0.694	0.728	0.816	
SVQ	0.746	0.770	0.793	0.826	0.824

The Fornell-Larcker criterion has been used to measure the convergent validity of the indicators (Table 2). The italicized values represent the square roots of the AVEs, which are higher than the correlations among the constructs, thereby fulfilling the criteria for linear validity.

Table 3.

Hypothesis testing results H1 - H4

	Original Sample (O)	Sample Mean (M)	Standard Deviations (STDEV)	T Statistics (O/STDEV)	P Value	Decisions
PEOU -> IU	0.578	0.577	0.084	6.874	0.000	Accepted
PU -> IU	0.192	0.187	0.074	2.585	0.010	Accepted
SQ -> IU	0.056	0.065	0.074	0.754	0.451	Rejected
SVQ -> IU	0.103	0.099	0.095	1.078	0.282	Rejected

Table 3 shows that perceived ease of use and perceived usefulness have a positive effect on the intention to use mobile payment, while system quality and service quality have no effect.

Table 4.
R square

	R Square	R Square Adjusted
INT	0.768	0.590

Table 4 shows the R Square value of 0.768, indicating that all research variables contribute 76.8%, leaving 23.2% potentially influenced by other factors not examined.

5. Discussion

5.1. *Perceived Ease of Use, Perceived Usefulness and Intention to Use Mobile Payment*

The results demonstrate that perceived ease of use has a positive effect on the intention to use mobile payments. This indicates that the easier it is to use mobile payments, the more likely Generation Z will be encouraged to adopt them. This finding aligns with previous research showing that perceived ease of use positively influences the intention to use a mobile payment system [23, 24]. Furthermore, this research aligns with previous studies conducted in India, Hungary, and France, which found that perceived ease of use has a positive effect on e-wallet usage [25-27].

When mobile payment users feel that mobile payments are convenient to use and create efficiency, the intention of students to use mobile payments will increase. Students argue that transactions are quick and easy without having to carry physical cash or cards. Security factors are also a consideration for users, such as biometric verification and data encryption. Mobile payment allows users to make transactions anytime and anywhere as long as they have access to mobile devices and the internet. Mobile payment can also be integrated with various other services such as e-commerce, transportation, and bill payment, which makes it more attractive to use in everyday life.

The results showed that the benefits of using mobile payment can have a positive effect on interest in using the application. Mobile payments allow users to make transactions quickly and efficiently without the need to carry physical cash or cards. This makes it very easy in various situations, such as shopping, paying bills, or making fund transfers. Mobile payments can be accessed anytime and anywhere as long as users have a mobile device and an internet connection. This provides enormous flexibility and supports an active and mobile lifestyle. Mobile payment users do not need to bother carrying a physical wallet or remembering various PINs and passwords for different payment cards. All payments can be made through a single app on the phone. In addition, many mobile payment apps offer additional features such as financial management, transaction records, spending analysis, and loyalty programs. These features add value to users and enhance their experience of using the service. Previous studies in the United States, China, India, Germany, and Brazil prove that perceived usefulness significantly influenced users' intentions to adopt applications [28-32]. The results of this study support the Technology Acceptance Model (TAM) developed by Davis [33] to explain and predict the acceptance of technology by users. The higher a person's perception of the benefits and ease of use of a technology, the more likely they are to accept and use the technology.

5.2. *System Quality, Service Quality and the Intention to Use Mobile Payment*

The results of this study demonstrate that system quality has no significant effect on the intention to use mobile payments. Although system quality is important, it is not always the primary factor influencing user interest in adopting mobile payments. If the user experience is not intuitive or is difficult to understand, users may lack interest in using the service. A sense of security and trust in the mobile payment platform is crucial; if users perceive security risks despite the system's quality, their interest may diminish. Users seek solutions that are easily accessible and can be integrated with other

daily-used services such as e-commerce or transportation. Many users are attracted to mobile payments due to promotional offers, discounts, or cashback incentives. Without these incentives, even a high-quality system may not sustain user interest. The availability of simpler or more popular alternatives can lead users to prefer other services, even if a quality mobile payment system exists. Perceptions of new technology and habitual behaviors significantly influence adoption. Users accustomed to traditional payment methods may require more than just a quality system to switch to mobile payments. The results of this study are consistent with [34–36] that although system quality affects ease of use, system quality itself does not have a significant effect on the intention to continue using the service.

The results showed that although service quality is an important factor, it cannot encourage users' interest in using mobile payments. Users tend to prefer services that are easy to use and practical. If the service quality is good but users find the process complicated, they may be reluctant to use the service. A sense of security and trust in the service greatly affects user interest. Despite the quality of the service, if there are concerns about the security of personal and transaction data, users may remain reluctant. Users are more interested in services that are integrated with other applications or services they use daily, such as e-commerce or transportation. High service quality does not always guarantee good integration. Negative experiences with similar services in the past may affect users' perception and interest in new services, even if they are of better quality. Some users may already be comfortable with conventional payment methods and require more than just service quality to switch to mobile payments. Strict regulatory compliance and frequent regulatory changes may affect user adoption. If users feel that the service is not compliant with regulations, their interest may decrease. The results of this study are consistent with [36, 37], who showed that although service quality has no significant effect on usage intention towards a particular application. This study has not succeeded in confirming the DeLone and McLean model, which states that system quality and service quality are very important to achieve successful system use. In the context of mobile payment, if both aspects are at an optimal level, it will help increase the use of digital payment applications and overall user satisfaction.

6. Conclusion

This study focuses on the factors that influence the use of mobile payments, which are increasingly popular among financial service users. In this context, perceived ease of use and perceived benefits have an impact on the intention to use mobile payments, while system quality and service quality do not show a significant effect. This could be due to the fact that perceived convenience and benefits are more dominant in shaping positive attitudes towards the use of new technology compared to technical or service aspects. This study has practical implications for mobile banking service providers. They need to focus on improving the perceived ease and benefits of their products through intuitive interface design as well as clear communication regarding the advantages of using mobile banking. Thus, while system and service quality remain important, priority should be given to how the product is perceived by users.

Some of the limitations of the study include the limited research design. This research uses a survey or questionnaire method; it is possible that the questions asked do not fully cover all aspects of system quality and service quality. For example, if respondents were not given the option to express their negative experiences in depth related to service quality, then the results could be biased. This research also lacks consideration of previous experience with similar technologies or the level of digital literacy, which may play an important role in users' decisions to use mobile payments.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

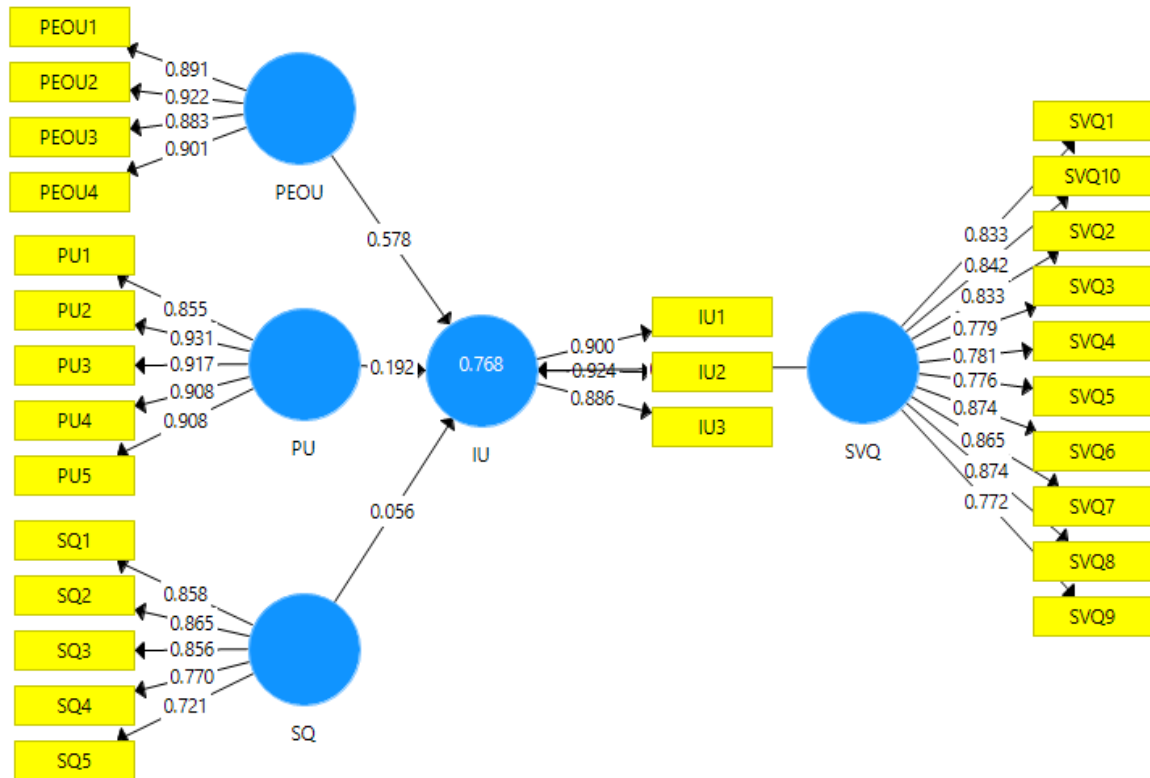
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Appendix 1.

The structural model evaluation and hypothesis testing.