

## Exploring Design and Security Perception on Digital Payment Adoption Among the Z Generation in Indonesia

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### ABSTRACT

The adoption of digital payments in Indonesia during the COVID-19 pandemic increased, this study will discuss the factors that influence the Z generation in the intention to use digital payment applications and effect from design and security beside TAM 3 model, because this generation is close to the digital world, through this research, we will know using SEM-PLS software with the number of respondents is 138 Z generation spread throughout Indonesia. It was found the direct influence of design and security on perceived ease of use and perceived usefulness has an effect, while other direct effects are not significant (perceived ease of use, perceived usefulness, security on customer intention to use, and perceived ease of use on perceived usefulness). So, the digital payment application development company can develop more related to the design factor and the security level so that the Z generation can use digital payment applications more often.

**Keywords:** Digital Payment, Perceived Ease of Use, Perceived Usefulness, TAM, Z Generation

**JEL Classification:** C20, G23, G41, L86

## **INTRODUCTION**

The adoption of digital payments in Indonesia at this COVID-19 pandemic was increasing, it's because of the intervention of the government which implemented a lockdown policy because that policy consumer taste is increased and forced the Z Generation to be more familiar with technology and change their payment habits digitally (Mansour, 2021) which leads positively to a cashless economy (Vij et al., 2019). Companies digital and payment nowadays as digital payment developers are superior to other financial companies using conventional methods due to the radical transformation of the global financial industry (Turcan & Deák, 2021) even so, this company lacks security experience because it is a new company (Wang & Dai, 2020). Is security a factor that influences Z Generation's intention as a customer in using digital payment applications? Of course, digital payment application development companies prioritize customer experience (Chemmanur et al., 2020).

This study will discuss the underlying intentions of the Z generation in making a transaction using digital payment applications, based on perceptions of security, perceived ease of use, and perceived usefulness (Lai, 2016), by using Technology Acceptance Model (TAM) developed in the 1980s as underpinning and focusing digital payment application through a questionnaire survey. The digital payment itself is an innovative cashless payment system because it makes transactions more effective and efficient and can reduce the possibility of the risk of cash-based fraud in the payment system (Prasetya et al., 2021), done quickly, safely, cheaply, and in real-time, using the user's mobile device (Irradianty, Aldilla; Aditya, 2021) where companies in this field combine digital technology and financial services (Wang & Dai, 2020).

## **LITERATURE REVIEW**

### **Design**

Design in this study is defined as the technical and functional design of a digital payment application in line with the ability of the Z generation to use and utilize it, including an adequate and logical display and design such as tasks without unnecessary repetition, simplified operations, task clarity and adaptability to Z generation need and wants, clear information to proceed through the complete process of digital Payment and allowing consumers to have control of their choices (Lai, 2016). This design is an important factor in the perception of interface design features of digital payment applications, therefore application providers must pay attention to the creation of application plans that are by the Z generation (Naruetharadhol et al., 2021).

### **Security**

System security, the security of the transaction, and official protection on digital payment are a person's consideration in conducting transactions through digital payment applications where the storage and transfer of information through digital payment methods is an important feature for the maintenance of truthfulness, privacy and validation of relationships that can be maintained by several basic procedures, such as encryption, digital signature, checksum/hash algorithm (Alshurideh et al., 2021), and some digital payment applications have provided an additional level of security such as pins before use to reduce the risk (Lai, 2016). Security is the core of digital payment transactions where the application's ability to maintain and store one's digital payment information from unauthorized persons, this security has a significant impact on consumer's intention to use to receive and use digital payment applications (Al-Sabaawi et al., 2021).

### Perceived Ease of Use (PeoU)

Digital payment application is considered as a new technology which is a system that is free of effort and easy to use (Wang & Dai, 2020) if it is difficult to use then the Z generation tends not to use the application because they find it difficult to learn and manage (Mooi, 2018). This perceived ease of use is used to see how far the Z generation will accept digital payment applications in places that do not require a lot of investment in its use (Khaksar et al., 2021). Perceived ease of use was consistently cited as a key preference in the Z generation's evaluation of digital payment applications, although this may vary depending on individual user perceptions (Flaherty et al., 2021).

### Perceived Usefulness (PU)

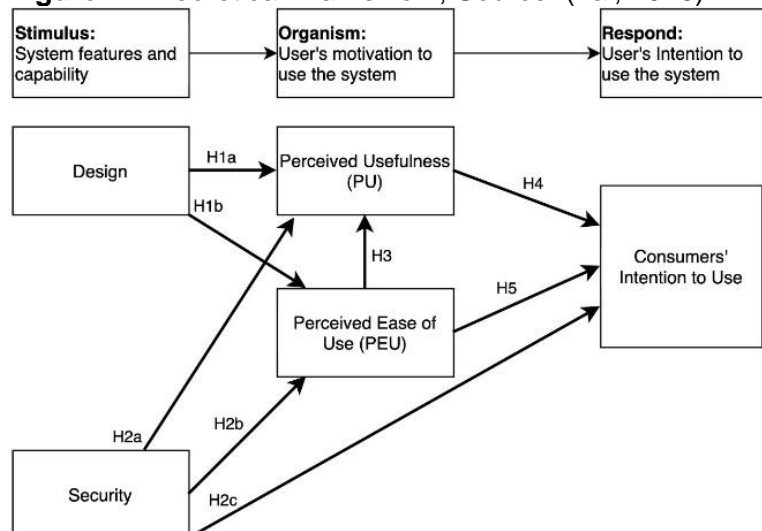
Perceived usefulness is defined as the extent to which the Z generation believes that using a digital payment application helps improve their performance (Wang & Dai, 2020) formed by (1) internal resources related to perceived services compatibility, ease and level of riskiness, and (2) external resources related to their information disseminated by their interpersonal and non-personal social context (Giovanis et al., 2020) The perceived usefulness of a digital payment application is a strong determinant that drives the Z generation to make payment transactions, because it gains benefits such as convenience, easy payment processing, easy access to store accounts, saves time, and allows Z generation to post status updates, private messages, and comments. which turns out to be more practical, hassle-free and effective (Mooi, 2018).

### Consumers' Intention to Use (CIU)

Digital payment adoption is influenced by consumers' intention to use about the benefits of using digital payment applications which are influenced by Perceived ease of use and perceived usefulness (Bailey et al., 2017) which describes a measure of the strength of the intention of Z generation to act in a certain way in using digital payment applications (Naruetharadhol et al., 2021), repeated use will form a habit, this habit will strengthen the intention of the Z generation in using digital payment applications, this habit can also increase the usability and ease of use which in turn will strengthen the intention to use and as a fun source of motivation because of the layout design and visually appealing application colors that add value to the Z generation (Farzin et al., 2021).

## RESEARCH METHOD

**Figure 1.** Theoretical Framework, Source: (Lai, 2016)



This research was conducted to identify the factors that influence in determining consumer intentions adopting the use of digital payment applications. The proposed hypothesis is based on Figure 1 as follows:

- H1a : Design is positively associated with perceived usefulness
- H1b : Design is positively associated with perceived ease of use.
- H2a : Security is positively associated with perceived usefulness.
- H2b : Security is positively associated with perceived ease of use.
- H2c : Security is positively associated with consumers' intention to use
- H3 : Perceived ease of use is positively associated with perceived usefulness.
- H4 : Perceived usefulness is positively associated with consumers' intention to use
- H5 : Perceived ease of use is positively associated with consumers' intention to use

The population in this study is Z generation who use digital payment applications, online survey questionnaires are used as a method of collecting data through google forms which are blasted to Z generation in Indonesia and have used digital payment applications for the last 12 months, as many as 138 respondents met requirements that have been determined based on cluster sampling, namely sampling is carried out on the sampling unit. This study uses a five-point likert scale to measure Z generation intention to use digital payment applications such as 'strongly agree' to 'strongly disagree'. When answering survey items, respondents determine their level of agreement for a given subject, a five-point scale is used to calculate the reliability of a test that measures attitudes or behavior, Partial Least Square (PLS) in particular is only related to structural modeling, and is not related to hypothesis testing, namely (1) The relationship between latent variables in the inner model is linear and adaptive; (2) The structural model is recursive. In this study, analysis has been done for each variable separately to gather a summary of respondent profile to get the preliminary information and the feel of the data (Sekaran, 2003), respondents are Z generation who were born between 1995-2010 and live spread out in several provinces in Indonesia, following statistical descriptive data from 138 respondents.

**Table 1.** Respondent Profile (N=138)

Variable	Frequency	Percent
<b>Gender</b>		
Female	110	80%
Male	28	20%
<b>Demographics</b>		
East Java	48	35%
West Java	40	29%
Central Java	14	10%
DKI Jakarta	11	8%
DI Yogyakarta	6	4%
West Kalimantan	4	3%
South Sulawesi	4	3%
Banten	3	2%
North Sumatra	2	1%
West Sumatra	2	1%
South Kalimantan	2	1%
Jambi	1	1%
South Sumatra	1	1%
<b>Expense per Month</b>		
< IDR 3,000,000, -	119	86%
IDR 3,000,000, - – IDR 5,000,000,-	19	14%
<b>Frequency of Use</b>		
Every day	23	17%

2-3 times per week	32	23%
4-5 times per week	32	23%
2-3 times per month	37	27%
2-3 times per three months	14	10%

Source: Data processed, 2021

Based on the data in Table 1 above, 80% of respondents are dominated by females and the remaining 20% are male. Most of the respondents are from East Java, as much as 35% and from West Java as much as 29%, the rest are from Central Java 10%, DKI Jakarta 8%, DI Yogyakarta 4%, North Sumatra 2%, West Sumatra 2%, West Kalimantan 3%, South Sumatra 3%, North Sumatra 1%, West Sumatra 1%, South Kalimantan 1%, and Jambi 1%. Most of the Z generation monthly expenditures ranged from less than Rp 3 million or as many as 86% of respondents, while the remaining 14% of respondents spent between Rp. 3 million and Rp. 7.5 million per month. The current Covid pandemic, Z generation, rarely makes transactions using digital payment applications because 27% of respondents make digital payments 2-3 times per month.

## **RESULTS**

The results of the PLS analysis can be grouped into 2 stages that is outer model and inner model. The outer model is looking at reliability value is the same as Cronbach's alpha 0.708 to measure the construct reliability of latent variables; Average Variance Extracted (AVE) is used to determine the achievement of the discriminant validity requirement of AVE 0.50; Discriminant validity, namely by comparing the root value of the AVE with the correlation value between latent variables, the AVE root value must be greater than the correlation between latent variables; Cross-loading is another method to determine discriminant validity, if the loading value of each item to the construct is greater than the cross loading value; The unidimensionality of the model is carried out using composite reliability indicators and Cronbach's alpha with a cut-value of 0.7(Hair et al., 2019).

**Table 2.** Outer model test results

<b>Items</b>	<b>Loading</b>	<b>VIF</b>	<b>CA</b>	<b>CR</b>	<b>AVE</b>
CIU	1,000	1,000	1,000	1,000	1,000
Design 1	0,768	1,486	0,722	0,827	0,545
Design 3	0,668	1,262			
Design 4	0,685	1,331			
Design 5	0,823	1,485			
PEOU 1	0,861	2,005	0,787	0,863	0,613
PEOU 2	0,708	1,380			
PEOU 3	0,834	1,778			
PEOU 6	0,717	1,459			
PU1	0,813	3,336	0,908	0,925	0,581
PU2	0,625	2,271			
PU3	0,767	2,899			
PU4	0,675	1,647			
PU5	0,814	3,568			
PU6	0,715	1,736			
PU7	0,793	2,411			
PU8	0,793	2,155			
PU9	0,837	2,632			
Security 1	0,782	2,155	0,900	0,921	0,627
Security 2	0,831	2,514			
Security 3	0,842	2,709			
Security 4	0,859	2,872			

Security 5	0,686	1,516
Security 6	0,737	1,931
Security 7	0,790	2,256

Source: Data processed, 2021

From the Table 2 outer model test results all indicators value are more than 0.5 so that all indicators have convergent validity, next step is multicollinearity and the result for all indicators is less than 10 from VIF Value so there is no multicollinearity problem. All the indicator is reliable because Cronbach's Alpha values > 0.6. next step is discriminant validity test with all indicators of the loading value of the construct > cross-loading, this model has met the requirements of discriminant validity. Then the next step is an analysis of the inner model.

**Table 3.** Path coefficient test results

Hypothesis	Path	Original Sample	Sample Mean	p-values
H1a	Design → PEOU	0.349	0.350	0.001
H1b	Design → PU	0.379	0.388	0.000
H2a	PEOU → Cust.	0.082	0.072	0.450
H2b	PeoU → PU	0.114	0.113	0.282
H2c	PU → Cust.	-0.113	-0.116	0.285
H3	Security → Cust.	0.108	0.112	0.331
H4	Security → PeoU	0.457	0.461	0.000
H5	Security → PU	0.393	0.390	0.000

Source: Data processed, 2021

The path coefficient as shown in Table 3 is to see the influence of each independent variable (exogenous) on the dependent variable (endogenous). First, we will discuss the impact on PeoU. The coefficient for the design to PEOU is 0.349 which means there is a positive influence Design to PeoU (H1a), or it can be interpreted that the better the value of design so PeoU will increase. One-unit increase Design will improve PeoU by 34.9%. Design to PEOU the bootstrap result is 0.350 with a t-count value of 3.299, the p-value is  $0.001 < 0.05$  so accept H1a or which means a direct effect Design to PeoU significant. The coefficient for the security to PEOU is 0.457 which means there is a positive influence Security to PeoU (H4), or it can be interpreted that the better the value of security so PeoU will increase. One-unit increase security will improve PeoU by 45.7%. Security to PEOU the bootstrap result is 0.461 with a t-count value of 5.206, the p-value is  $0.000 < 0.05$  so accept H1 or which means a direct effect security to PeoU significant. So, Design and Security have a significant effect on PeoU.

Second, we will discuss the effect on PU, the coefficient for the variable design to PU of 0.379 which means there is a positive influence design to PU, or it can be interpreted that the better the value of design so PU will increase, one unit increase design will improve PU by 37.9%, where the results of the estimation coefficient test design to PU the bootstrap result is 0.388 with a calculated t value of 5.160 then the p-value is  $0.000 < 0.05$  so reject H0 or which means a direct effect Design to PU significant or statistically significant. The coefficient for the variable PEOU to PU of 0.114 which means there is a positive influence Design to PU, or it can be interpreted that the better the value of PEOU so PU will increase, one unit increase design will improve PU by 11.4%, where the results of the estimation coefficient test PEOU to PU the bootstrap result is 0.113 with a calculated t value of 1.077 then the p-value is  $0.282 > 0.05$  so accept H0 or which means a direct effect PEOU to PU no significant. The coefficient for the variable security to PU of 0.393 which means there is a positive influence security to PU, or it can be interpreted that the better the value of design so PU will increase, one unit increase design will improve PU by 39.3%, where the results of the estimation coefficient test design to PU the bootstrap result is 0.390 with a calculated t value of

4.983 then the p-value is  $0.000 < 0.05$  so reject  $H_0$  or which means a direct effect security to PU significant. So, Design and Security have a significant effect on PU.

The third discussion, the coefficient for the variable PEOU to CIU of 0.082 which means there is a positive influence PEOU to CIU, or it can be interpreted that the better the value of PEOU so CIU increase, one-unit increase PEOU will improve CIU by 8.2%, where the results of the estimation coefficient test PEOU to CIU the bootstrap result is 0.072 with a t value of 0.756 then the p-value is  $0.450 > 0.05$  so reject  $H_1$  or which means that the direct influence of PEOU on CIU is not significant. The coefficient for the variable PU to CIU of -0.113 which means there is a negative influence PU to CIU, or it can be interpreted that the better the value of PEOU so CIU decrease, one-unit increase PEOU will improve CIU by -11.3%, where the results of the estimation coefficient test PEOU to CIU the bootstrap result is -0.116 with a t value of 1.071 then the p-value is  $0.285 > 0.05$  so reject  $H_1$  or which means that the direct influence of PU on CIU is not significant. The coefficient for the variable security to CIU of 0.108 which means there is a positive influence security to CIU, or it can be interpreted that the better the value of security so CIU increase, one-unit increase security will improve CIU by 10.8%, where the results of the estimation coefficient test security to CIU the bootstrap result is 0.112 with a t value of 0.973 then the p-value is  $0.331 > 0.05$  so reject  $H_1$  or which means that the direct influence of security on CIU is not significant. So, PEOU, PU, and Security have no significant effect on CIU.

**Table 4.** Indirect effects

	Original Sample (O)	Sample Mean (M)	P Values
Design -> PEOU -> CIU	0.029	0.025	0.474
Security -> PEOU -> CIU	0.037	0.034	0.476
Design -> PU -> CIU	-0.043	-0.046	0.306
Design -> PEOU -> PU -> CIU	-0.005	-0.005	0.627
PEOU -> PU -> CIU	-0.013	-0.014	0.583
Security -> PEOU -> PU -> CIU	-0.006	-0.006	0.591
Security -> PU -> CIU	-0.044	-0.044	0.294
Design -> PEOU -> PU	0.040	0.040	0.352
Security -> PEOU -> PU	0.052	0.052	0.296

Source: Data processed, 2021

Based on Table 4 all indirect effects are not significant because all p-values  $> 0.05$ .

**Table 5.** Total Effect

	Original Sample (O)	Sample Mean (M)	P Values
Design -> CIU	-0.019	-0.025	0.722
Design -> PEOU	0.349	0.350	0.001
Design -> PU	0.419	0.428	0.000
PEOU -> CIU	0.069	0.059	0.511
PEOU -> PU	0.114	0.113	0.282
PU -> CIU	-0.113	-0.116	0.285
Security -> CIU	0.095	0.095	0.236
Security -> PEOU	0.457	0.461	0.000

Security -> PU	0.445	0.442	0.000
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Source: Data processed, 2021

The Output Path Coefficient as shown in the Table 5 is to see the total effect of each independent variable on the dependent. So, the total effect that is significant or rejects  $H_0$  is that which has a p value  $< 0.05$ , the total influence of Design and Security on PEOU and PU where the p value is  $0.000 < 0.05$  or rejects  $H_0$ , and other total effects are not significant because p value  $> 0.05$ .

**Table 6. R-Square**

	R Square	R Square Adjusted
Customer Intention to Use	0.014	-0.008
PEoU	0.525	0.518
PU	0.608	0.599

Source: Data processed, 2021

The R Square value of the joint influence on the customer intention to use is 0.014 with an adjusted r square value of -0.008, it can be explained that all independent variables simultaneously affect customer intention to use of 0.008 or 0.8%. Because Adjusted R Square  $0.8\% < 50\%$ , the effect of all independent variables on customer intention to use including weak. While the R Square value of the joint influence on PEOU and PU is 0.525 and 0.609, respectively with an adjusted r square value of 0.518 and 0.599, it can be explained that all independent variables simultaneously affect PEOU by 0.518 or 51.8%, and affect PU is 0.608 or 59.9%. Because Adjusted R Square is 51.8% and 59.9%  $> 50\%$ , the effect of all independent variables on PEOU and PU is moderate.

**Table 7. F Square**

	CIU	Design	PEoU	PU	Security
CIU					
Design			0.161	0.198	
PEoU	0.003			0.016	
PU	0.006				
Security	0.005		0.276	0.194	

Source: Data processed, 2021

So based on the table of F Square values above, the large effect size is the influence of Security and Design on PEOU and PU, while other effects are small or can be ignored.

**Table 8. Q Square (Q2)**

	SSO	SSE	Q <sup>2</sup> (=1-SSE/SSO)
CIU	138.000	139.864	-0.014
Design	552.000	552.000	
PEoU	552.000	382.029	0.308
PU	1242.000	821.027	0.339
Security	966.000	966.000	

Source: Data processed, 2021



So based on the value of Q Square above, the prediction of CIU irrelevant or inaccurate because the value of Q Square < 0.05, while predictions for PEOU and PU are relevant or accurate because the value of Q Square is > 0.05.

**Table 9.** Multicollinearity Inner Model

	CIU	Design	PEoU	PU	Security
<b>CIU</b>					
<b>Design</b>			1.595	1.851	
<b>PEoU</b>		1964		2.107	
<b>PU</b>		2,129			
<b>Security</b>		2,400	1.595	2.035	

Source: Data processed, 2021

Based on the VIF value in the table above, there is no VIF value > 10, so there is no multicollinearity problem.

**Table 10.** Fit Summary

	Saturated Model	Estimated Model
<b>SRMR</b>	0.078	0.079
<b>d_ULS</b>	1992	2008
<b>d_G</b>	0.960	0.962
<b>Chi-Square</b>	658,202	659,622
<b>NFI</b>	0.711	0.710

Source: Data processed, 2021

In order for the model to meet the model fit criteria, the SRMR value must be less than 0.05 with the criteria for RMS Theta or Root Mean Square Theta < 0.079, SRMR or Standardized Root Mean Square < 0.10 or < 0.08 and NFI Value < 0, 9 (Hair et al., 2019)

**Table 11.** rms Theta

<b>rms Theta</b>	0.150
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Source: Data processed, 2021

Based on the SRMR value of 0.079 where rms Theta value or Root Mean Square Theta 0.150 > 0.080, SRMR value or Standardized Root Mean Square 0.079 < 0.08 and NFI value 0.710 < 0.9. So based on the three assessments of the model, one of them meets the model fit criteria. So, it can be concluded that the model fits the data.

## DISCUSSION

based on the results of calculations using SEM PLS that have been described previously, we have conclusions about the answers to the hypotheses that we stated earlier as follows:

- H1a : Design is positively associated with perceived usefulness
- H1b : Design is positively associated with perceived ease of use.
- H2a : Security is positively associated with perceived usefulness.
- H2b : Security is positively associated with perceived ease of use.
- H2c : Security is negative associated with consumers' intention to use
- H3 : Perceived ease of use is positively associated with perceived usefulness.

- H4 : Perceived usefulness is positively associated with consumers' intention to use  
H5 : Perceived ease of use is positively associated with consumers' intention to use

## CONCLUSION

Data is collected at one time and done online, this data may be subject to change due to rapid changes from digital payment application developers and also the tastes of generation Z, therefore research must be carried out regularly, can be done with the same indicators because the conclusions from This study shows that all the p-values of the indicators on the latent variable  $< 0.05$  so that all indicators are valid and reliable for their constructs. For companies that develop digital payment applications, especially in decision making, generation Z can pay more attention to design and security, so that their generation can make transactions more often using digital payment applications, this is because the results of the study show that there is a direct influence of Design and Security on PEOU and PU, while the other direct effects are not significant (PEOU, PU, Security on Customer Use Intention and PEOU on PU). The effect of Total Design and Security on PEOU and PU is significant. While the other direct effects are not significant (Design, PEOU, PU, Security on Customer Use Intentions and PEOU on PU).

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N/A

## DECLARATION OF CONFLICTING INTERESTS

The authors assert that no conflict of interest exists.

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