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Articles

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Perceived Security and Trust in Electronic Payment Systems: How They Affect the Decision to Use EPS During the COVID-19 Pandemic

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Abstract:
Research aims: This study is intended to determine the influence of perceived security and trust on the decision to use digital payment systems during the COVID-19 pandemic.
Design/Methodology/Approach: The type of data used in this study was primary data, which was collected using an online survey. Sample used in this study determined by purposive sampling method. The information collected was handled and analyzed using SEM-PLS.
Research findings: This study shows the results that the presence of technical protection explicitly affects the perception of security and trust significantly. In addition, security also greatly affects an individual's confidence in the use of digital payment systems. However, of the various findings made in this study, trust is the only one that influences the choice in using EPS.
Theoretical contribution/Originality: During this pandemic Covid-19, limited studies talk about consumers' perceptions instead of technical protection of digital payment in detail. Meanwhile, consumers' security is the thing that needs to be studied further to create a comprehensive study result.
Practitioner/Policy implication: Results of this study give some implications for the EPS providers to complete and develop a secure EPS system for users, especially in this pandemic era when the EPS users increase and people's mobility is restricted in some areas.
Research limitation/Implication: The implication of this research is to emphasize the importance of one's knowledge regarding risks when using an electronic payment system. It is because the use of EPS in the pandemic era is unavoidable. Therefore, not only providers must improve their security systems, but users must also be aware of the EPS risks and security. Nevertheless, the limitation of this study is that it only used samples in Indonesia; maybe the results will be different when applied in other countries with better EPS security systems.
Keywords: Perceived Security; Perceived Trust; Electronic Payment Systems; COVID-19

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Introduction

The pandemic of Corona Virus Disease-19 (COVID-19) has hit the entire world for almost a year, including Indonesia. Since it was discovered that the first active case in Indonesia was in February 2020, the pandemic is

still the government's primary focus until now, besides the economy. The pandemic has also prompted the government to impose social restrictions in several regions in Indonesia to reduce human interaction, which is considered to be a link in the chain of spreading the virus. Social restrictions encourage people not to travel outside the area and do activities outside the home, which result in a physical market between sellers and buyers being unable to create.

The absence of a physical market encourages individuals and businesspeople to continue to generate income by creating a digital ecosystem. The digital ecosystem is formed to facilitate the needs of sellers and buyers so that the economy continues to run even during a pandemic. During 2020, it was recorded that online product sales reached nearly 180 million product units, with the number of sellers in the marketplace reaching approximately 3,500 online stores, although community mobility decreased by almost 40% (Statistics Indonesia, 2020).

Therefore, all industrial sectors and stakeholders, both government and private parties, need to adapt to changes so that the long-term implementation of system changes, both work systems and economic transactions, can be more optimal (Mungkasa, 2020). With this pandemic, Indonesia as an archipelagic country also desperately needs information technology to integrate communication between regions.

On the other hand, today's technological developments have entered various fields, including the financial industry. Financial technology (fintech) is now a new need around the world. A practical, fast, and efficient financial system changes new business models for individuals in conducting financial transactions (Amelia, 2019). The development of fintech and digital payment systems was encouraged because social restrictions resulted in the physical market not being formed. Therefore, consumers will look for ways to be still able to get what they need; one alternative is by shopping online.

In 2018, before the pandemic era, Bank Indonesia recorded that the volume of digital transactions increased to 2.9 billion; even as of July 2019, it is known that the number of transactions reached 2.7 billion transactions with a transaction value of 69 trillion rupiahs (Bank Indonesia, 2019). The increase in electronic money transactions aligned with BI's program to realize the National Non-Cash Movement (GNNT) launched in 2014. Still, it is undeniable that the pandemic has become one of the movers/accelerators of this movement realization.

Moreover, pandemic conditions have more or less changed individual behavior in meeting their needs. One of the changes in individual behavior during a pandemic is to do more online shopping to meet their needs, and most people admit that they will continue to make online transactions even though the pandemic has passed (Potia & Dahiya, 2020). Although the use of Electronic Payment Systems (EPS) is not a new thing, the security-related issues in the transaction continue to be a major topic in the use of EPS. Most of the EPS users are not used to a more detailed assessment of the security system in EPS, so they tend to base their experience on using EPS. In fact, the behavior of using electronic transactions requires an understanding for users regarding the security level, the risks

that may arise, and the costs that must be incurred to be able to experience the benefits of electronic payment systems (Fabris, 2019).

Therefore, it is crucial to know and improve consumers' perceptions regarding the security system in using EPS to maintain consumer confidence. One thing that influences the consumer's decision to use EPS is sufficient knowledge regarding the risks, costs, and benefits it provides (Crowe et al., 2006). For this reason, this study aims to test empirically consumers' perceived security created by the technical protection provided by EPS service providers against the use of EPS. Although much of the previous literature has discussed in detail the technical security and trust in EPS from the EPS service provider's perspective, consumers' perceptions still need to be studied further to create a comprehensive study result.

Literature Review and Hypotheses Development

Electronic Payment Systems (EPS)

The COVID-19 pandemic changes consumer behavior in various ways, one of which is the behavior of electronic transactions. The pandemic condition that does not allow a person to travel has shifted from being active outside the home to activities mainly carried out from home. This change also causes individuals to switch shopping activities from visiting shops to shopping through e-commerce, most of which automatically pay using electronic transactions (Das et al., 2018; Potia & Dahiya, 2020).

The application of an electronic payment system results in the recognition of electronic money. Bank Indonesia has regulated this in Bank Indonesia Regulation Number: 11/12/PBI/2009. In Indonesia, there are two classifications of electronic money. The first is electronic money, the value of which is not only recorded on electronic media managed by the issuer but also recorded in electronic media managed by consumers. Electronic media managed by consumers can be in the form of chips stored on cards, stickers, or hard drives, found on consumers' personal computers. The second is electronic money, the value of which is only recorded on electronic media managed by the issuer. In this case, the issuer gives the holder access rights to use the money to value the electronics.

In addition, electronic payments are a form of financial exchange between buyers and sellers through electronic communication (Abrazhevich, 2004). Electronic payment instruments currently widely used for regular payment include cash, checks, debit cards, and credit cards. In general, EPS can be grouped into five categories: electronic money, pre-paid card, debit card, credit card, and electronic checks (Dai & Grundy, 2007; Guan & Hua, 2003; Kim et al., 2010). Electronic money and pre-paid card are classified into cash-based systems, while credit cards, debit cards, and electronic checks are categorized into account-based systems.

Meanwhile, the procedures in specific electronic payment systems differ from traditional payment systems. It can lead to security concerns, including concerns over unauthorized

use and transaction status. Although electronic payment systems tend to be faster and easier, consumers' perceived security and trust in EPS are paramount to increasing the use of these systems (Kim et al., 2010; Oney et al., 2017).

Perceived Security of EPS

Perceived security of a system is a person's subjective assessment of a security system (Jusoh & Jing, 2019; Sieger, 2015). This assessment leads to how well a system can protect someone's privacy from existing risks. For example, in an electronic payment system, someone would use e-payment more often if the security perceived by the system is very good, and vice versa. In addition, the perceived security of a system is also the basis for a person to use the system continuously (Zhang et al., 2019). However, unfortunately, the average person cannot with certainty know the extent to which the system is safe. Hence, the availability of information at the beginning (security statements) to an apparent technical mechanism or procedure (technical protection) will increase the perceived security in a system. If the security level in an electronic payment system is too low, it is possible for someone not to use the system because of the fear they are worried about (Tsiakis & Sthephanides, 2005; Hassan et al., 2020). It is supported by several studies stating that a system's perceived security dominates the decision to use the system or not (Aigbe & Akpojaro, 2014; Chukwuemezie, 2013).

Trust in EPS

In general, the concept of trust is the basis for the formation of an exchange relationship between two parties (Tsiakis & Sthephanides, 2005). In other words, exchange will not occur if there is no trust there. In the context of transactions with electronic payment systems, the trust factor is essential. It is because transactions that occur can be done without direct contact (Tsiakis & Sthephanides, 2005). To build this trust, a system needs to ensure the security of using the system (Kim et al., 2010), such as assuring one's data security. Without users' trust, it will be very difficult for a system (in this case, EPS) to be widely used by the public. Security and trust are major concerns for customers using EPS, and they are closely related to each other (Peha & Khamitov, 2004; Linck et al., 2006).

Furthermore, an increase in electronic transactions occurred during the pandemic. It is related to the increasing number of transactions made by the public through the digital market. However, the issue regarding the use of a digital payment system is about the security perceived by users. Therefore, regulatory agencies have currently policed this matter so tightly that public trust in digital payments will increase.

People will feel safe when using a digital payment system when the system guarantees privacy, has integrity, and tends to be stable (Kim et al., 2010). The use of this electronic payment system is also suspected to be influenced by the existence of a security statement read by consumers when they are about to make a transaction. In the Indonesian context, consumers who tend to obey the rules will be more confident if there is a security statement in the electronic payment system (Amelia, 2019). Therefore, the

existence of a specific technical mechanism will make a person feel safe and trusting in electronic transactions. Based on the description, the hypotheses were proposed:

***H_1**: Technical protection will positively affect consumers' perceived security of Electronic Payment Systems (EPS).*

***H_2**: Technical protection will positively affect consumers' trust in Electronic Payment Systems (EPS).*

Moreover, the current pandemic condition, which encourages consumers to conduct online shopping and electronic transactions, adds to the user experience in electronic transactions. The impact of this behavior is that consumers have experiences and match them with expectations, so they can assess the security level from using these transactions (Chronopoulos et al., 2020; Potia & Dahiya, 2020). However, consumers' perception is the dominant factor in determining the use of electronic transactions. Therefore, the hypotheses were put forward:

***H_3**: Perceived security in the use of Electronic Payment Systems (EPS) positively affects consumer trust.*

***H_4**: Perceived security in the use of Electronic Payment Systems (EPS) positively affects decisions to use EPS.*

Besides, if consumers already feel trust when using electronic transactions, it can create confidence that this system aligns with what is expected (Runnemark et al., 2015). Therefore, consumers are considered to be able to make rational decisions on what to make. Individual trust in the payment system is also influenced by past experiences. The experience of using EPS can significantly increase expectations regarding the payment system performance and security that will be used in the future (Mensah et al., 2021). Consumer trust is an essential factor in making decisions about the use of electronic transaction systems (Kim et al., 2010; Raghubir & Srivastava, 2008). From the description, the hypothesis was formulated:

***H_5**: Trust has a positive effect on decisions to use EPS.*

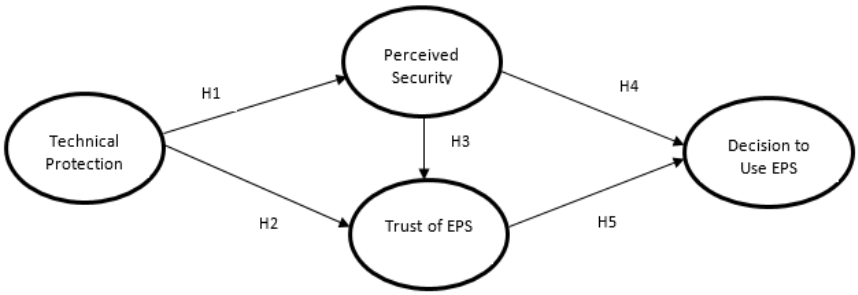

Figure 1 Conceptual Framework

Research Methods

This quantitative research used primary data sources, namely data obtained directly from respondents in the form of raw data without specific interpretation, purely from the experiences felt by respondents (Cooper & Schlinder, 2013). The population in this study was Indonesians who had made online transactions, both purchasing through the digital market and making digital payments during the COVID-19 pandemic.

Data were collected through an online questionnaire survey distributed to respondents. The data collection method employed the purposive sampling technique, namely someone with specific criteria required by the researchers (Sekaran & Bougie, 2016). This study involved individuals who had already made payments using an electronic payment system during the pandemic.

This study obtained 120 respondents, consisting of 37 males and 83 females with a bachelor's average education level. Respondents were dominated by the millennial generation, followed by gen Z, gen X, and baby boomers. The electronic payment system in this research referred to payment using debit/credit cards, digital wallets, such as OVO, DANA, Go-Pay, LinkAja, etc., and transfers using mobile banking or e-banking.

The variables were then measured using a questionnaire with a Likert scale of 1-5 (Strongly Disagree-Strongly Agree), which was adopted from Kim et al. (2010), who examined beliefs and perceptions of digital (non-cash) payment systems. Furthermore, the collected data were analyzed utilizing the PLS-SEM technique. PLS-SEM contains two measurement models: outer and inner models (Hair et al., 2014).

Results and Discussion

In this study, two stages were carried out in the PLS analysis: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model). Then, they were processed with testing the hypothesis. Table 1 shows the question items for all variables considered valid and reliable. It was based on the criteria fulfillment for the validity test, namely the AVE value > 0.5, and the reliability test, namely the composite reliability value > 0.7 and Cronbach's alpha > 0.6 (Hair et al., 2011).

Furthermore, in the structural model evaluation, several indicators of the fit model can be carried out, including the coefficient of determination (R^2). In this study, the R^2 value of the trust and perceived security variables were 0.564 (moderate) and 0.317 (weak), respectively. It means that the technical protection variable in this structural model could only be explained moderately by the trust variable and weakly by the perceived security variable. Meanwhile, the R^2 value of the EPS uses variable was 0.180. It indicates that the trust and perceived security variables could only affect 18% of the EPS use (very weak effect); other variables outside the model influenced the rest.

Table 1 The Results of Validity and Reliability Testing

Variable	Loadings	AVE	Composite Reliability	Cronbach's Alpha
Technical Protection (TP)		0.657	0.884	0.826
SECST3	0.782			
SECST4	0.832			
SECST5	0.860			
SECST6	0.766			
Perceived Security (PS)		0.761	0.905	0.843
PSEC1				
PSEC2	0.866			
PSEC3	0.900			
	0.850			
Trust (TR)		0.687	0.897	0.848
TRUST1	0.737			
TRUST2	0.845			
TRUST3	0.833			
TRUST4	0.893			
EPS Use		0.733	0.845	0.657
KP. EPS1	0.774			
KP.EPS2	0.931			

Table 2 The R^2 Results

Variable	R^2	Adjusted R^2
Trust	0.592	0.585
EPS Use	0.193	0.180
Perceived Security	0.323	0.317

Table 3 displays the hypothesis testing results, where out of 5 hypotheses, only 1 hypothesis was rejected (H_4). It denotes that the consumer's decision to use EPS was only influenced by trust (H_5). It was because the variable perceived security did not affect consumer use decisions on EPS. In addition, H_1, H_2, and H_3 had p-values < 0.05. Thus, it can be concluded that the technical protection variable had a positive and significant effect on perceived security and trust. Security perceptions were proven to influence users' trust in EPS. It aligns with research conducted by (Kim et al., 2010; Mukherjee & Nath, 2003; Thiab & Yusoh, 2018).

Table 3 The Result of Hypotheses Testing

Hypotheses	*Path Coefficient*	Conclusion
H1 (TP → PS)	0.568**	Supported
H2 (TP → TR)	0.198**	Supported
H3 (PS → TR)	0.640**	Supported
H4 (PS → EPS USE)	0.054	Rejected
H5 (TR → EPS USE)	0.398**	Supported

**p-value < 0.05

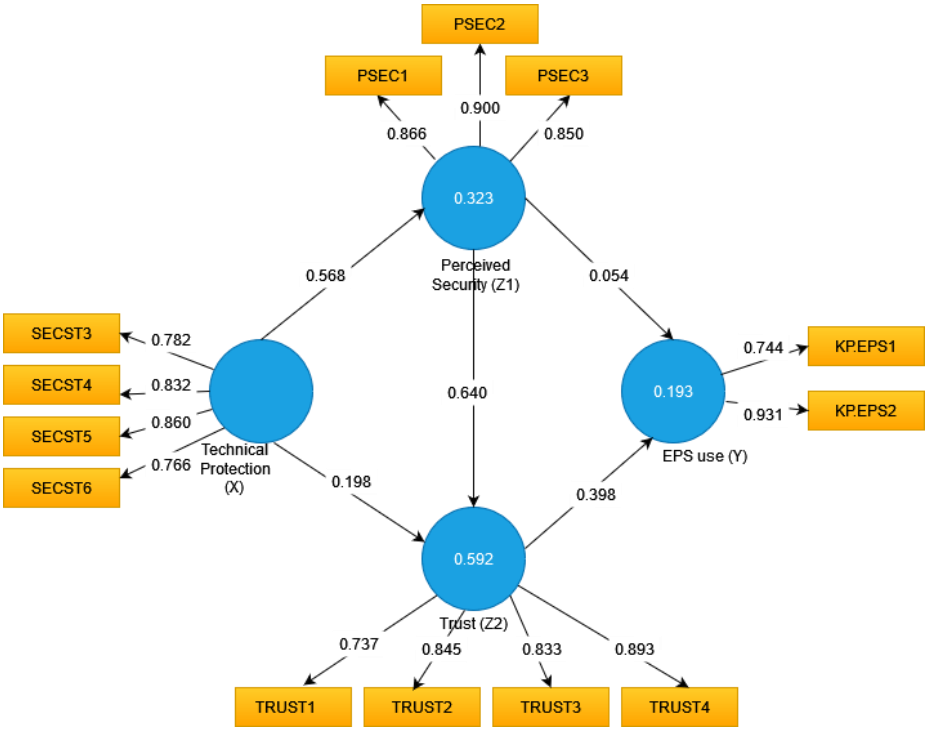

Figure 2 Structural Model Results

Electronic Payment System (EPS) is vital for businesses and consumers, especially considering the increasing number of buying and selling transactions since electronic commerce (EC) began to develop (Kim et al., 2010; Oney et al., 2017). EPS is a payment system that facilitates an electronic commerce security transaction between one party (business organization) and another party, namely consumers (Lim et al., 2007; Oney et al., 2017). Chellapalli and Kumar (2020) and Linck et al. (2006) added that EPS plays an essential role in serving payment transactions to consumers. Thus, it is not surprising that EPS has become the attention of many researchers and practitioners, especially since the emergence of electronic commerce, such as research carried out by Thiab & Yusoh (2018), Chellapalli and Kumar (2020), Seno (2012), and Oney et al. (2017).

Until now, the attention to EPS has focused more on the problem of perceived security and trust (Ally & Toleman, 2005; Chellapalli & Kumar, 2020; Zhang et al., 2019; Oney et al., 2017; Shon & Swatman, 1998; Thiab & Yusoh, 2018). It is crucial because as part of a technology that supports electronic commerce or electronic payment, EPS must continue to improve security to lead to a consumer trust level as a user (Urs, 2015). Trust is also critical, especially in online transactions, which is very high risk (Reichheld and Schefter, 2000 in Oney et al., 2017). In other words, if the security and trust aspects of using EPS are still problematic, then these two things can play a role in slowing down the development of electronic commerce (Centeno, 2002 in Oney et al., 2017) or other online transaction systems. Hence, it is crucial to identify and improve factors that can influence consumer's perceived security and trust (Kim et al., 2010; Linck et al., 2006; Tsiakis & Sthephanides, 2005).

Conclusion

In Indonesia, the COVID-19 pandemic has changed quite a lot in individual behavior, especially in shopping, one of which is the increasing number of electronic transactions utilizing digital payment systems. Due to large-scale social restrictions in several regions, it has resulted in the absence of physical markets, thus encouraging individuals and businesses to continue to generate income by creating a digital ecosystem.

One of the problems related to the use of electronic payment systems is in terms of system security. Currently, EPS service providers are competing to create a detailed security system; however, consumers do not always understand this security from the existence of adequate technical protection (Aigbe & Akpojaro, 2014; Hassan et al., 2020). Therefore, this study empirically examined the factors influencing EPS use, particularly in terms of safety and consumers' trust.

Based on the hypothesis testing, technical protection was proven to affect users' perceived security and trust. It is consistent with the research (Kim et al., 2010; Chellappa & Pavlou, 2002; Thiab & Yusoh, 2018). Technical protection is considered fundamental to EPS security (Chellapalli & Kumar, 2020). In addition, technical protection is designed to minimize the risks and prevent other parties from gaining access to the user's detailed information, so the technical protection mechanism can increase the EPS security so that it also has an impact on the user's trust in EPS.

This study's results indicate that the existence of technical protection could affect perceived security and consumer confidence in EPS; however, perceived security alone did not necessarily encourage consumers to use EPS. Broadly speaking, this study confirms that one of the factors that can contribute to user trust is system security and knowledge about the risks. When users understand EPS security very well, it will affect the high level of user trust in EPS, leading to a decision to use EPS.

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