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Students' use of Internet-Based Payment Applications: An Extension of the Technology Acceptance Model Theory

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A R T I C L E I N F O

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A B S T R A C T

The main objective of this study is to identify and examine whether perceived organizational innovation (POI) moderates the relationship between perceived trust (PT), perceived risk (PR), social influence (SI), perceived ease of use (PEU), and perceived usefulness (PU) with the use of internet-based payment applications by students (IPA). The analysis is grounded in the Resource-Based Theory (RBT) as an extension of the Technology Acceptance Model (TAM). Data were collected using a survey method through questionnaires distributed to students who use internet-based payment systems. A total of 468 student respondents were obtained using a non-probability sampling method, specifically convenience (accidental) sampling. SPSS 25 was used to conduct descriptive statistical analysis and regression testing for all hypotheses. The results indicate that four factors—PT, SI, PEU, and PU—have a significant positive effect on the use of internet-based payment systems, while PR has a significant negative effect. Another finding shows that perceived organizational innovation (POI) significantly strengthens the relationship between all independent variables (PT, PR, SI, PEU, and PU) and the dependent variable (IPA).

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INTRODUCTION

Students, as part of a modern society characterized by the use of the latest technology, are part of the users of internet-based business transaction and/or payment systems. In business practice, internet-based payment platforms Through *smartphones,* we continue to strive to maintain consistent service quality amidst rapid economic development and the increasing variety in the quality and quantity of internet-based financial services. In recent years, internet-based payment methods have been introduced. The use of *smartphones* as an innovative payment method has significantly revolutionized payment technology. This is supported by the existence and widespread use of internet networks and portable mobile devices. These internet networks and mobile devices play a crucial and significant role in promoting the use of internet-based payment applications. The Indonesian Internet Service Providers Association (APJII) stated that internet user penetration in Indonesia in 2023 will reach 78.19%, or 215,626,156 people out of a total population of 275,773,901 (apjii.or.id). Adapting to the growing number of people who have utilized the internet, internet-based payment applications have emerged, providing a more convenient and high-quality way for users to make personal and business payments, significantly minimizing transaction costs (Mallat, 2007).

Internet-based payment technology also helps users make small payments and reduce the amount of cash used in businesses in most parts of the world (Ondrus & Pigneur, 2006). Consistent technological growth has enabled the creation of mobile phones with important features that facilitate the development of payment systems needed to carry out internet-based cashless transactions. These online payments allow users to pay bills, transfer certain amounts to other people's accounts, conduct internet banking activities, repay loans, and withdraw and deposit money into our bank accounts if the account has been linked to an account on an internet payment application.

These electronic devices can be easily carried anywhere (mobile). Some types, such as smartphones, tablets, and smartwatches, are experiencing increasingly intensive use and have changed aspects of human life in the social and economic fields, one of which is activities related to financial transactions. Pham & Ho (2015) argue that these payment applications will eliminate the need for users to carry or use cash. Teo, et al. (2015) conveyed and added the results of their research that these applications will provide convenience and speed in transactions.

E-wallets, as one of the digital payment instruments in Indonesia, have seen an increase in domestic shopping transaction value. According to databoks.katadata.co.id, Bank Indonesia (BI) reported that throughout April 2023, the value of transactions using electronic money, or *e-money,* held in *e-wallets* reached IDR 37.46 trillion. This represents a 1.4% increase compared to the previous month (March 2023) and a 5.8% increase compared to the previous year (2022). Since the discovery of payment options other than cash, researchers have begun to identify factors influencing users to use internet-based payment applications. This research includes the identification and conclusion of various factors that influence the use of internet-based payment systems. These factors

include perceived ease of use (PEU) and perceived usefulness (PU) (Koening-Lewis et al., 2015); Kim et al., 2010), trust (Lu et al., 2011), security and risk (Arvidsson, 2014), costs (Peng et al., 2011), privacy (Slade et al., 2013), user context (Mallat et al., 2009), culture (Alalwan et al., 2015); social influence (SI) (Kesharwani & Bisht, 2012; Venkatesh & Davis, 2000). The Technology Acceptance Model (TAM) and its development have been widely applied in these studies to determine the intention to use internet-based payment applications. The TAM has provided a framework *for* understanding and comprehending various related variables that influence technology-based financial transaction services.

Based on the description and arguments above, this explanatory study aims to further investigate the relationship between social and technical adoption factors of internet-based payment applications based on the technology acceptance model. Further study or the difference between this study and previous studies is the focus on perceived organizational innovation factors, whether they moderate the relationship between perceived trust, perceived risk, social influence, perceived ease of use, and perceived usefulness with students' use of internet-based payment applications. Previous studies have shown that perceived trust, perceived risk, social influence, perceived ease of use, and perceived usefulness are related to the use of internet-based payment applications.

LITERATURE REVIEW

Internet-Based Payment Application (IPA)

The increasing attention to technological growth in the financial services sector can be seen from the existence of *online money transfer services* via *smartphones*. These services are offered by several financial service provider applications such as DANA, ShopeePay, GoPay, OVO, as well as various types of mobile banking applications from various conventional banks in Indonesia. According to Morawczynski (2009), applications that provide financial services can process funds in the form of electronic money faster than using cash. Upadhyay & Jahanyan (2016) explain that mobile money transfers are seen as a service for transferring money using *smartphones* and are application-based. *Online payments* using electronic wallets (*e-wallets*) utilize the internet and third-party channels that are *non-* banking institutions. However, often these applications or third-party institutions are connected to the user's bank account, allowing them to deposit or withdraw money from their bank account with a certain nominal limit per day.

In the context of internet-based payments, transactions can be conducted between users and banks or between users and third parties who are independent financial service providers. Chandra et al., (2010) emphasize that internet-based payments involve the transfer of money (in the form of *e-money* or virtual money) from one party (for example, an individual customer) to another party (such as a seller) who uses the same application on a mobile device (for example, Tokopedia). This is a material TAM service on mobile technology to facilitate the transfer of funds between individuals and/or sellers. When

compared with internet-based payment applications In other words, users must have a bank account to use the mobile banking application on their *smartphone*. However, internet-based payment applications Besides mobile banking, there are different processes. In internet-based payment systems other than mobile banking, financial transactions occur between two parties if the user and seller use the same internet-based payment application (such as Shopee Pay).

Bisht & Mishra (2016) explain that, if you want to transfer money via your mobile phone, you need to register on an internet-based payment application and deposit an amount of money for future transactions. The administrator will handle financial transactions between the two parties. The deposited money will then be stored as electronic money (balance) in the *e-wallet service provider application* on the user's *smartphone* (Morawczynski, 2009). Gbongli et al., (2017) and Demirguç-Kunt & Klapper, (2013) explain that customers can use their electronic money to make transactions such as sending money or paying bills. When a user sends money to another user, the recipient via their mobile phone will receive a notification with a unique code via SMS or *email*, the notification comes from the same internet-based payment application. Lashitew et al., (2019) also emphasized that the recipient of the money can go to the nearest agent to collect cash, or keep the money that has been deposited in *the e-wallet* for future transactions. When using internet-based payments: *e-wallets*, users are usually not required to have a bank account. Therefore, the costs for accessing selected services and making transfers to different service providers are much lower compared to mobile banking, which allows internet-based payments.

Technology Acceptance Model (TAM)

Davis et al., (1989) were the early researchers who introduced and formulated the Technology Acceptance Model (TAM), which later became one of the most popular applied models to explain the acceptance and use of a technology by users (Glavee-Geo et al., 2017). The TAM is used as a theoretical basis for examining how users accept and use a technology. The formulation of the TAM is to explain the determinants of a particular technology's acceptance. The TAM consists of two important independent variables, namely Perceived Usefulness (PU) and Perceived Ease of Use (PEU) in using internet-based payments. PU is defined as the degree or measure of a person's trust in using a particular system that might improve their performance. On the other hand, PEU refers to the extent to which potential users expect a system to be free from complications.

In TAM, the mediation role of PT and PU on the likelihood of system use is explained (Legris et al., 2003). In the TAM model, the relationship between PU and PT with attitudes and behavioral intentions can be predicted. To provide a better explanation of a person's interest and behavior in adopting a technology, previous research suggests that further application of TAM can provide TAM with preliminary materials such as self-efficacy, institutional support, doubt, voluntariness, and perception of user mobility. Therefore, Mehrad & Mohammadi (2016) hope that a number of studies on the use of internet-based payment applications such as this will later expand or complement the initial

TAM formulation by developing TAM constructs. As a relative explanation and breakthrough in explaining the use of internet-based transactions, a person's personal characteristics in the form of Perceived Trust (PT), Perceived Risk (PR), perceived usage costs, compatibility with lifestyle and perceived security are important and significant factors that influence the use of internet-based payment systems.

1. **Perceived Trust (PT**)

Mayer et al., (1995), define trust as users' positive expectations of service providers. Palvia (2009), states that trust generally consists of three components: integrity of internet-based payments and good conduct. Integrity is the commitment of an internet-based payment entity to fulfill its obligations. Internet-based payments indicate that the party concerned has sufficient technical knowledge and expertise to fulfill its promises. Meanwhile, good conduct refers to the service provider's responsibility to safeguard the interests of users. Yan et al., (2009) and Mallat (2007) explain that in terms of electronic services, trust is the most important determinant influencing user perceptions. In line with Yan and Mallat, Gupta & Sareen (2001) also emphasized that consumer acceptance of electronic payment technology requires confidence that user concerns can be addressed. Through an empirical study conducted in Singapore, Srivastava et al., (2010) stated and formulated a trust theory model and identified trust as the most important construct compared to other factors (Shankar & Datta, 2018).

Zhou (2011) identified that perceived confusion and perceived security play a role in the use of internet-based payment systems and significantly influence users' initial trust, which subsequently determines their intention to use internet-based payment applications. Hwang, Tsai, & Yang (2008) explain that availability can be broadly defined as a state where users can access an application anytime and anywhere. In the context of virtual (online*)* payments, Lu et al., (2011) state and formulate a trust-based decision-making model based on trust-transfer theory and the valence framework. Their research findings indicate that trust has an impact on internet-based payment methods, which is also significant for cross-environment relationships and behavioral intentions to use a technology. Information and service quality of internet-based payments positively influence trust, and this trust leads to users continued use of internet-based payment applications (Zhou, 2013). When using *online payment applications,* personal and financial information is usually shared by consumers. Therefore, Duane et al., (2014) and Kim et al., (2010) emphasized that trust plays an important role in the intention to use mobile-based *online payment services.* This perceived trust factor has been studied as a multidimensional construct in the field of social sciences (Carlos-Roca et al., 2009; Bhattacherjee, 2002).

The various literature outlined and reviewed in the paragraph above indicates that PT is a crucial factor in internet-based payments, with the adoption of various technologies. Based on the arguments of existing researchers, we propose and formulate the following hypotheses to be tested:

H1: PT has a positive and significant influence on interest in using internet-based payment applications (IPA).

2. Perceived Risk (PR)

Before using a new technology, to determine whether they are willing to accept the risks, users analyze two potential risks: the level of uncertainty and the level of seriousness of the risks in internet-based payments that may arise from a technology (Featherman & Pavlou, 2003). Consumers will evaluate the potential risks of internet-based payment methods, both external and internal, to assess the usefulness and risks of adopting a new technology (Cho, 2004). In this case, potential users or new users are assumed to be willing to try new technologies before using them for a longer period of time. According to Rogers (2003), the trial of an internet-based payment system refers to the extent to which a technological innovation can be experienced by users before they commit to actual use. This trial can further reduce users' perceptions of uncertainty and encourage them to use the new technology (Tan & Teo, 2000). In addition, Ndubisi & Sinti (2006) revealed that PR can influence fintech usage. Kesharwani & Bisht (2012) also revealed that PR has a negative influence on the behavioral intention to adopt internet banking, while trust has a positive influence on the internet-based payment system or method.

Based on the description and arguments above, we propose and formulate that the higher the PR, the lower the interest in using internet-based payment applications, and vice versa. The following hypothesis is formulated to test the relationship between PR and the use of internet-based payment applications:
H2: PR has a negative and significant influence on interest in using internet-based payment applications (IPA).

Social Influence (SI)

The social influence of internet-based payment systems on technology acceptance behavior has been widely recognized. Kesharwani & Bisht (2012) found and demonstrated that most previous studies focused on subjective norms to understand the essence of social acceptance, but they obtained ambiguous results and their influence on technology became incoherent. Social acceptance only has a significant influence on internet-based payment systems on the use of this technology when its use is required. Furthermore, its influence becomes moderate when users begin to experience the system's target directly (Venkatesh & David, 2000). Several other researchers such as Conner & Armitage (1998) and Terry & Hogg (2000) disagree with this idea, which has a limited concept and meaning because it focuses on a brief part of trust rather than a broader societal context. Therefore, researchers stated the importance of further articulating the relationship between social acceptance and technology acceptance in general, including internet-based payment technology (Karahanna & Limayem, 2000).

In the context of using internet (online) based (mobile) payment application, this study argues that if a family member, friend, or colleague recommends using an application that may provide usefulness, then a person may also believe that when he uses it, he will feel the usefulness. This influence will shape the interest in using the application. Other studies have shown that individuals are very receptive to the influence of social norms to maintain a good personal and social image in a group community (Kesharwani & Bisht, 2012). A reference group or reference group by Schiffman & Kanuk is defined as any individual or group that is considered an example (reference) for someone to

form general or specific values in behavior. Based on research on diffusion and innovation theory, Moore & Benbasat (1991) defines social image as a measure of the use of innovations that are considered to be able to increase a person's status in a social system. Venkatech & David (2000) identified that subjective norms positively influence personal and social image, because for example, an important member of an individual's social group at work feels that someone should use a system, then using the system will likely increase his or her social status in the group. From this explanation and argument, namely the conclusion based on two interrelated concepts, the researcher formulated a hypothesis which stated that SI will influence an individual's interest in using certain internet-based or mobile phone-based *online payment services or applications.*

H3: SI has a positive and significant influence on the interest in using internet-based payment applications (IPA).

Perceived Ease of Use (PEU)

According to Davis (1989), PKP is conceptualized as an individual's assessment of the mental burden involved in internet-based payments using new technologies. Venkatesh (2000) identified several determinants of PKP by combining internal control (device efficacy) and external control (supportive conditions) into TAM. Several other studies (Davis, 1986, 1989) also show that PKP can influence PU because, in addition to being considered the same, the easier a technology is to use, the more useful it is. In the context of mobile-based m-banking, several studies have shown that PKP has a positive and significant influence on PU (Wang et al., 2003; Philips et al., 1994). Thus, users are more likely to accept internet-based payment services if there is ease of use in operating or processing the service. This can be a tool in utilizing technology while contributing to reducing transfer costs and improving individual performance (Kesharwani & Bisht, 2012).

In line with previous research, in this study the following hypothesis was formulated to be tested:

H4: PEU has a positive and significant influence on the use of internet-based payment applications (IPA).

Perceived Usefulness (PU)

PU is the level of user confidence that adopting a particular technology will improve their performance (Davis, 1989). In the context of mobile-based *online payments, the smoothness of transactions such as online* bill payments, mobile phone and cable TV top-ups, sending and receiving money, *online shopping,* credit card transfers, and ticket bookings are indicators of ease of use of a system (Shankar & Datta, 2018). Before starting to use any new technology, users critically assess all the usefulness of the technology they will get when using it. Kim et al., (2010), analyzed the influence of user-centered systems on the use of *online payment services* for various types of users and the results showed that PU has a positive and significant influence on the use of mobile-based *online payments.* PU has been empirically validated as an important antecedent of intention to use new technology (Apanasevic et al., 2016; Arvidsson, 2014; Duanne et al., 2014; Keramati et al., 2012; Kim et al., 2010; Chen, 2008).

Therefore, in this research the following hypotheses are formulated and stated to be tested:
H5: PU has a positive and significant influence on the use of internet-based payment applications (IPA).

3. Resource-Based Theory

In this study, in addition to being based on the theory of the technology acceptance model (TAM), this study is also based on the Organizational Resource-Based Theory (RBT) which is an extension of the technology acceptance model theory. The reasons and arguments for the basis of the Resource-Based Theory refer to reviews of previous studies. Robert M. Grant (1996), Richard Rumelt (1984), David J. Teece & Gary Pisano (1994), and Birger Wernerfelt (1995) explain and state that technology adoption depends on the climate of innovation in the organization that encourages the use of new technology and also needs and requires the development of specialized knowledge in the process of adopting the technology. It is further explained that the adoption of this new technology functions as a process of increasing the level of capacity and capability of a higher and quality organization in running its business. Thus, this resource-based theory can logically be used to explain and estimate the process of adopting new technology in a broad business context, including the process of adopting and using new technology in the form of the use of internet-based payment systems. In understanding the organizational innovation climate, it is explained and emphasized how the characteristics or capabilities of the organization can contribute to the creation of value and usefulness for both the company and customers (Jay Barney, Mike Wright, & David J. Ketchen Jr., 2001). Specifically, organizational innovation can be viewed and understood as the main capabilities and abilities of a company that openly cares about and quickly adopts new ideas and solutions, including in the context of adopting new technologies (Werner Kunz, Bernd Schmitt, & Anton Meyer, 2011; Samuel Fosso Wamba & Lemuria Carter, 2013).

Previous studies have identified and concluded that more innovative organizations are more likely to adopt new technologies, such as social media tools and other technologies. Nicos Michaelidou et al. (2011) showed that innovative organizations are more likely to adopt social networking sites like Facebook, Twitter, and LinkedIn. Another study by Samuel Fosso Wamba and Lemuria Carter (2013) concluded that corporate innovativeness is positively related to Twitter adoption in Small and Medium Enterprises (SMEs).

Referring to research by Nicos Michaelidou et al. (2011), it is understandable that considering the slower rate of adoption of new technologies (e.g., social media) in SMEs compared to larger business organizations, it can be concluded that in the context of the early adoption process of new technologies, special attention and encouragement are needed for SMEs. In this way, the success of the adoption process of new technologies can be expected. In line with previous research (Ritu Agarwal & Jayesh Prasad, 1998b), researchers estimate that organizational innovation tends to be more influential as a moderating factor in the relationship between factors of perceived trust, perceived risk, social influence, perceived ease of use, and perceived usefulness with the use of

internet-based payment applications, rather than a direct influence. Specifically, it is expected and stated that higher or lower levels of organizational innovation will strengthen or weaken these relationships.

Theoretical Thinking Framework Model

Based on the literature review, arguments and logical reasoning as explained in section 2 above, the researcher developed and formulated the following Theoretical Framework Model as a basis for testing various hypothesis formulations. As shown in Figure 1, in this study, in addition to the research focus variable in the form of perceived organizational innovation (POI), there are five independent variables, namely perceived trust (PT), perceived risk (PR), social influence (SI), perceived ease of use (PEU), and perceived usefulness (PU) and one dependent variable, namely internet-based payment applications (IPA). The framework is illustrated in the following figure.

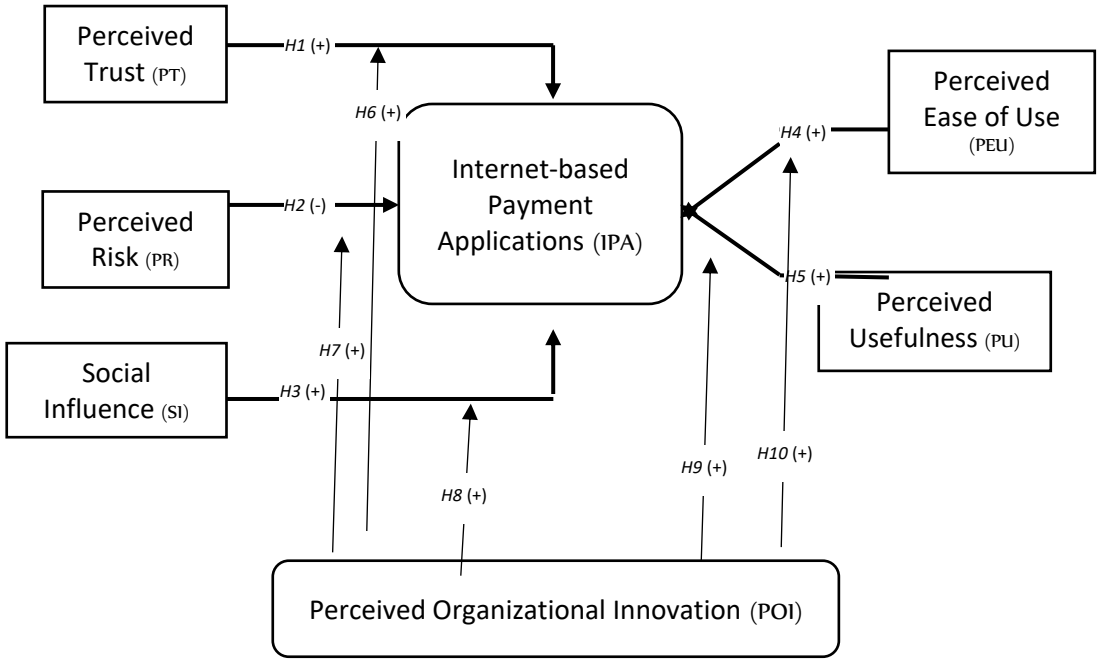

Figure 1. Theoretical Thinking Framework Model

METHODOLOGY

In the research methods section, various things related to the methods for verifying and validating are revealed and explained, whether the various hypothesis formulations that have been explained are logically confirmed by empirical reality in the form of research data and the process of processing this data.

Data collection

In this study, we used primary data, arguing that primary data obtained through respondents is more appropriate for quantitative research based on perception data, such as ours. To obtain data from respondents, this study used a survey instrument (a structured survey questionnaire) to the students who participated in this study. All respondents in the study sample were first

confirmed as users of internet-based payment systems and were active students currently completing their studies at Diponegoro University.

Measuring tools

As part of the measurement tool in this study, we used a structured questionnaire with 24 questions measured on a 5-point Likert scale. All questions used for primary data collection were obtained from a literature review.

Sample Determination and Size Techniques

In this study, the researchers used a *non-probability sampling technique* with the *convenience sampling method,* also known as *accidental sampling,* due to the ease of sampling. Furthermore, the large population size meant that it was impossible to sample the entire population. Therefore, this sampling method was used, as the data could logically be considered representative of the population (Stratton, 2021).

This study used a sample of 468 respondents by delivering questionnaires "directly" through WhatsApp (WA) groups at Diponegoro University containing students. There are a number of WAGs utilized in this study. The number of samples taken and determined is based on the use of the Slovin formula. From the total active student population of Diponegoro University of 56,641 (PDDIKTI), calculated by Slovin, 468 respondents were directly visited to distribute the questionnaire. This number was obtained from the collection of internet-based e-payments using the Slovin formula. From the total active student population of Diponegoro University of 56,641 (PDDIKTI), calculated by Slovin, internet-based e-payments that can be represented are 468 people calculated with a margin of error of 2%.

Data Analysis Methods

This research was conducted with several data analysis and testing procedures, namely data reliability and validity analysis, data normality analysis, descriptive data analysis, and finally analysis and hypothesis testing in the form of linear regression analysis. Multiple linear regression analysis was used to test and determine whether the independent variables in the form of PT, PR, SI, PEU, and PU had an effect or not on the dependent variable in the form of IPA, also to determine whether the variable in the form of POI moderated, strengthened or weakened the relationship between all independent variables with the dependent variable. There are 2 (two) regression models to test the effect of PT, PR, SI, PEU, and PU had an effect or not on the dependent variable in the form of IPA and whether POI moderated the relationship between these independent and dependent variables, as has been used in several studies (Hamilton & Stekelberg, 2017; Saragih & Ali, 2023a) .

1. The regression model (1) to test the influence of perceived trust (PT), perceived risk (PR), social influence (SI), perceived ease of use (PEU), and perceived usefulness (PU) on internet-based payment applications (IPA) is as follows :
   $IPA = \beta_0 + \beta_1 PT + \beta_2 PR + \beta_3 SI + \beta_4 PEU + \beta_5 PU + \varepsilon_{it}$ …….. (1)
2. Meanwhile, the regression model (2) to test the moderating effect of POI on the relationship between perceived trust (PT), perceived risk (PR), social influence (SI), perceived ease of use (PEU), and perceived

usefulness (PU) with internet-based payment applications (IPA) is as follows:

$$IPA = \beta_0 + \beta_1 PT + \beta_2 PR + \beta_3 SI + \beta_4 PEU + \beta_5 PU + \beta_6 POI*PT + \beta_7 POI*PR + \beta_8 POI*SI + \beta_9 POI*PEU + \beta_{10} POI*PU + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where :

- IPA : Internet-Based Payment Application
- PT : Perceived Trust
- PR : Perceived Risk
- SI : Social Influence
- PEU : Perceived Ease of Use
- PU : Usefulness of Perception
- POI : Perceived Organizational Innovation
- ε : *error term*

RESULTS AND DISCCUSION

Description of Research Object

In this study, Table 1 below shows the demographic characteristics of the 468 student respondents. Of the total respondents, 77% were female and the rest were male with an average age of 20 years. Students as respondents in this study, on average have used internet-based payment systems for 3.27 years or approximately 3 years and 3 months. The results of the research survey show that students choose and use more than one type of Internet-Based Payment Application (IPA). Referring to Table 1, it can be stated that the most used type of internet-based payment system by students is the *e-wallet group* , namely Shopeepay (*online shopping application*) with a percentage of 88% followed by Go-Pay (*online* transportation service application) as much as 65%. Meanwhile, the most used IPA from the *m-banking* group is the Livin' by Mandiri application (Bank Mandiri) with a percentage of 40% which is not much different from the use of BRImo (Bank BRI) which is used by 35% of students. One of the main reasons ShopeePay is the most widely used IPA is because the application provides a comprehensive range of features, from *online* marketplaces and food delivery services to a wide range of payment options, including phone credit payments, bills, and transportation and accommodation tickets .

Table 1. Respondent Demographic Information

Demographic Variables	Category	Average	Percentage Amount	
Gender	Woman	-	360	77%
	Man		108	23%
	Total (n)		468	100%
Age (years)	≥ 20 years	20.02	262	56%
	< 20 years		206	44%
	Total (n)		468	100%
	0-3 years	3.27	229	49%

Length of Use of Internet-Based Payments (years)	3.1 - 5 years		169	36%
	≥ 5.1 years		70	15%
	Total (n)		468	100%
Types of Internet-Based Payment Methods Used	BCA Mobile (BCA Bank)		122	26%
	Livin' by Mandiri (Bank Mandiri)		187	40%
	BRImo (BRI Bank)		164	35%
	BNI Mobile Banking (Wondr) (BNI Bank)		131	28%
	BSI Mobile (BSI Bank)		28	6%
	ShopeePay		412	88%
	OVO		192	41%
	FUNDS		253	54%
	GO-PAY		304	65%
	LinkAja!		14	3%
	Other		14	3%
	Total (n)		468	
Source: IBM Statistics SPSS 25				

Reliability and Validity Analysis

Researchers used composite reliability (CR) and average variance extracted (AVE) values to measure the reliability of the data presented in Table 2. Table 2 shows that none of the CR values of each variable are smaller than 0.70, according to the recommendations of Henseler et al. (2009), MacKinnon (2008), Hair et al. (1998), and Fornell & Larcker (1981) as acceptable limits for reliable data.

Table 2. Composite reliability

Variables	CR	AVE
PT	0.830	0.620
PR	0.909	0.769
SI	0.891	0.731
PEU	0.863	0.678
PU	0.838	0.632
IPA	0.860	0.628
POI	0.832	0.714
Source: IBM Statistics SPSS 25		

The convergent validity test criteria by Hair et al. (2014) is an AVE value of more than 0.5. In Table 2, it can be ascertained that the AVE value for each variable is more than 0.5, which means that convergent validity has been met. In the discriminant validity test, researchers refer to the criteria according to Fornell & Lacker (1981) which compares the AVE value with the correlation value of

constructs between variables. Hair et al. (2014), recommends that the square root value of the AVE is greater than the correlation value between other variable constructs. The discriminant validity value is presented in Table 3 and it can be seen that each factor has met the suggested criteria.

Table 3. Validity Discriminant

	IPA	PT	PR	SI	PEU	PU	OPI
IPA	*0.792**						
PT	0.200	*0.787**					
PR	0.042	0.042	*0.877**				
SI	0.300	0.146	-0.066	*0.855**			
PEU	0.46	0.186	0.099	0.332	*0.823**		
PU	0.453	0.059	0.088	0.246	0.454	*0.795**	
POI	0.534	0.213	0.241	0.312	0.147	0.413	*0.812**
*square root value of AVE Source: IBM Statistics SPSS 25							

Data Normality

To determine whether the data is considered normally distributed or not, researchers use the statistical value criteria of skewness and kurtosis for each item, which must have a range between -4 and +4 to be considered satisfactory (Tabachnick & Fidell, 2001). Referring to Table 4 below, the test results show that all data have represented a normal data distribution.

Table 4. Data Normality and Descriptive Statistics

Factor Name	Items	*N* (Statistics)	Mean (Statistics)	Standard Deviation (Statistics)	Skewness (Statistic)	Kurtosis (Statistics)
PT	PT1	468	4.04	0.621	-0.025	-0.371
	PT2	468	4.04	0.661	-0.041	-0.685
	PT3	468	4.15	0.66	-0.304	-0.168
PR	PR1	468	3.79	0.84	-0.455	-0.231
	PR2	468	3.68	0.779	-0.284	-0.21
	PR3	468	3.81	0.871	-0.34	-0.533
SI	SI1	468	4.15	0.833	-1,097	1,423
	SI2	468	4.09	0.694	-0.473	0.318
	SI3	468	3.83	0.856	-0.671	0.632
PEU	PEU1	468	4.63	0.546	-1.157	0.355
	PEU2	468	4.54	0.572	-0.78	-0.387
	PEU3	468	4.46	0.572	-0.475	-0.734
PU	PU1	468	4.46	0.656	-0.944	0.406
	PU2	468	4.22	0.739	-0.566	-0.312
	PU3	468	4.38	0.712	-0.916	0.35
IPA	IPA1	468	4.24	0.623	-0.214	-0.584
	IPA2	468	4.34	0.527	0.137	-0.881

	IPA3	468	3.96	0.726	-0.044	-0.821
	IPA4	468	3.83	0.654	-0.088	-0.117
	IPA5	468	4.29	0.612	-0.256	-0.604
POI	POI1	468				
	POI2	468				
	POI3	468				
	POI4	468				
Source: IBM Statistics SPSS 25						

1. Analysis and Discussion of Research Results

This section presents the results of empirical research based on the research objectives and empirical data that have been tested for validity, reliability, and normality. Table 5 below presents Model 1 and Model 2, which show the results of multivariate regression analysis. In the table, it can be seen and understood that Model 1 has an Adj. R2 ^{value} of 0.216 or 21.6%, which indicates that the predictor variables in the form of PT, PR, SI, PEU, and PU explain their role in the dependent variable in the form of the use of Internet-Based Payment Applications (IPA). The F-Statistic value in Model 1 shows a p-value of 0.000, less than 0.05, which means or indicates that the Model has significant predictive power, which also means the Model has essential meaning to explain the predicted (dependent) variable. Table 5 shows that Model 2 has Adj. R2 of $^{0.442\ or}$ 44.2 % which means or indicates that the predictor variables in the form of PT, PR, SI, PEU and PU plus the moderating variable in the form of POI explain the role and influence on the dependent variable in the form of the use of Internet-Based Payment Applications (IPA). Like Model 1, the F-Statistic Value in Model 2 shows a p-value of 0.000 less than 0.05 which is significant and indicates that the Model has significant predictive power. This also means that the Model has the essence to make a formulation that the predicted (dependent) variable can be explained by 6 predictor variables. The following are the Regression Results presented and shown in Table 5.

Table 5. Regression Results

Variables	Model 1			Model 2		
	B	T	p-value	B	T	p-value
(Constant)	-,059	-2,055	,041	-,058	-1,400	,163
PT	,220	2,811	,000	,562	3,991	,000
PR	-,002	-1,040	,161	-,009	-3,989	,028
SI	,002	4,488	,006	,011	4,555	,021
PEU	,002	3,603	,013	,001	3,817	,002
M	1,076	2,390	,008	1,217	2,654	,019
PT*POI				,009	5,284	,016
PR*POI				-,008	-4,879	,001
SI*POI				,041	3,508	,013
PEU*POI				,007	4,465	,014

PU*POI				,013	6,565	,021
Adj. R 2 Value	0.216			0.442		
F value	8,509			12,347		
Sig. F	0,000			0,000		
Source: IBM Statistics SPSS 25						

The results of the Model 1 regression are shown in Table 5 above which indicates and shows that the PT factor is related and associated with IPA significantly with an indication of a T value of 2.811 and a p-value of 0.000 or less than 0.05. In contrast to the PT factor, the second variable, PR has no effect on the IPA factor with an indication of a T value of -1.040 and a p-value of 0.161 which means greater than 0.05. For the SI factor, the results of the study as shown in Table 5 indicate that this variable is related and significantly influences IPA at a p-value level of 0.006 which means less than 0.05 with a T value of 4.488. The next factor is PEU which shows that this variable has a significant effect with an indication at a T value level of 3.603 and a p-value of 0.013 which is less than 0.05. Meanwhile, the last factor, PU, has a significant positive relationship or influence on IPA, with an indication of a T value of 2.390 and a p-value of 0.008, which is also smaller than 0.05.

The results of the research focus in the form of moderating variables in the form of POI are shown in Table 5, especially in Model 2. The results of the study show that all five variables significantly influence IPA, when there is moderation of the POI variable. In detail, the PT*POI variable significantly influences IPA with an indication of a T value of 5.284 and a p-value of 0.016 smaller than 0.05. The results of the second factor study, after moderation, show that the PR*POI factor is significantly related and negatively influences IPA, with an indication of a T value of -4.879 and a p-value of 0.001 which is smaller than 0.05. The next factor after moderation, SI*POI, the results of the study show that the moderation of the POI factor on SI is related and significantly related to IPA with an indication of a T value of 3.508 and a p-value of 0.013. PEU factor, after POI moderation, the results of the study showed that the PEU*POI variable had a significant effect on IPA with a T value of 4.465 with a p-value of 0.014 smaller than 5%. The fifth factor, after moderation, the PU*POI variable had a significant effect on IPA with an indication of an influence of 6.565 for the T value and 0.21 for the p-value which means smaller than 5%. In addition to being related to moderation in Model 2, the research results also show that all five variables significantly influence IPA, each T value and p-value are 3.991 and 0.000 for the PT variable, -3.989 and p-value of 0.028 for the PR variable, 4.555 and p-value of 0.021 for the SI factor, 3.817 with p-value of 0.002 for the PEU factor and 3.817 and 0.02, and for PU the indication of influence is 2.654 and 0.19.

2. Theoretical and Practical Implications

Data and evidence on the use of internet-based payment applications by both individuals and organizations have shown a significant increase worldwide, including in Indonesia, and among university students. Currently,

most students prefer cashless transactions or prefer to use available internet-based payment applications. Internet-based payment service providers have significantly increased their offerings and services, offering increasingly innovative and attractive services to their users.

From a theoretical perspective, this study and its results indicate that the extension or expansion of the Technology Acceptance Model Theory in the form of Organizational Resource-Based Theory is valid and credible, indicating the existence of various factors that influence the use of internet-based transaction applications, namely perceived trust, perceived risk, social influence, perceived ease of use, and perceived ease. Furthermore, it can be clearly understood that the closest environmental factors, especially the organizational innovation factor (educational institutions) perceived by students have an influence as a moderator on the use of available internet-based transaction applications. Statistically, it shows that five factors, PT, PR, SI, PEU, and PU influence or explain the arguments and reasons for students to use internet-based applications by 21.6%. This explanatory power increases to 44.2% after the addition of another factor, namely POI, which also influences the reasons for using internet-based transaction applications. Thus, it can be stated that this study and research will serve as a further basis for similar studies in the form of research on the use of internet-based applications. The extension model proposed in this study can be tested and verified further. In addition, this research will enrich and provide further direction for similar studies.

Analysis of research results from a practical perspective can be conveyed and stated that first, referring to the research results that show a relationship between the environment, both in the form of SI and POI, then providers of internet-based transaction application services should be more active in socializing applications both to campuses and other places to increase awareness and use of the application. With this socialization activity, it can be expected that the efficiency and effectiveness of application use, User trust in the application is an important factor, therefore it is necessary for service providers of application use to involve users both in the process of evaluating application performance and its development. Finally, based on the understanding that PEU and PU are significant influencing factors in the use of internet-based applications, it is necessary to carry out an innovation strategy that involves application users.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that the extended Technology Acceptance Model integrated with Resource-Based Theory effectively explains students' adoption of internet-based payment applications. The results show that perceived trust, social influence, perceived ease of use, and perceived usefulness positively influence usage, while perceived risk negatively affects adoption, and perceived organizational innovation significantly strengthens these relationships. These findings highlight the importance of both individual perceptions and an innovative organizational environment in encouraging digital payment usage among students. Therefore, service providers should enhance security, usability, and user trust while universities should promote digital financial literacy and innovation support. Future studies are recommended to involve broader samples, use probability sampling, and include

additional variables such as financial literacy and security awareness for more comprehensive insights.

FURTHER RESEARCH

This research still has limitations so further research on this topic is still needed "Students' use of Internet-Based Payment Applications: An Extension of the Technology Acceptance Model Theory"

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