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INTENTION TO USE QUICK RESPONSE CODE INDONESIAN STANDARD (QRIS) AS A PAYMENT TRANSACTION

Muhammad Isa^{*1}, Ahmad Afandi², Aswadi Lubis³

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ABSTRACT

This study aims to determine the three pillars of SDT motivation that influence the use of technology and the four primary constructs of UTAUT that influence the intention to use QRIS for payment transactions. Data were collected using questionnaires distributed to millennials and Generation Z in Indonesia. A total of 150 respondents participated in this study. Structural Equation Modeling was used using SmartPLS version 3.0. The results showed that the three pillars of SDT motivation are autonomous variables that do not positively influence a person's motivation to use technology, whereas competence and relatedness do. Performance expectancy, social influence, and conditions that facilitate the intention to use QRIS for payment transactions positively differ from effort expectancy. The latter motivation positively influences the intention to use QRIS for payment transactions. This study integrates the SDT and UTAUT models, which have not been explored before, to measure motivation to use technology and intention to use QRIS. The results of this study can increase knowledge of digital literacy in Indonesia.

JEL: G40, G10, O10.

Keywords: SDT, UTAUT, intention to use, QRIS.

1. INTRODUCTION

The rapid progress of information technology has led to a shift from cash payments to non-cash payment methods. The Financial Services Authority (OJK) stated that payment instruments could be a suitable solution for small-value payment systems, with a focus on digital transactions (Putri, Isyanto, & Sumarni, 2023). Standard non-cash payment methods include mobile banking and digital wallets. One non-cash transaction method is to use a QR Code. In Indonesia, a transaction method utilizing QR Code scanning is available, known as QRIS (Quick Response Code Indonesian Standard), which is regulated and supervised by Bank Indonesia. QRIS is a Bank Indonesia standard that ensures transaction activities are easy, fast, and secure (Al Farohi, Saragih, & Harahap, 2023).

Since its introduction by Bank Indonesia in 2019, QRIS has significantly changed the way Indonesians transact (Warjiyo, 2024). QRIS transactions experienced year-on-year (yoy) growth of 226.54 percent, with the number of users reaching 50.50 million and the number of merchants reaching 32.71 million (Sutrisno, 2024). Using digital financial services provides opportunities to accelerate economic growth in Indonesia.

Tarigan & Mawardi (2024) stated that economic growth cannot be separated from the region's business potential, encompassing sectors such as transportation and warehousing, trade, plantation, and agriculture, as well as rapidly growing MSMEs. If all sectors adopt digital solutions, they can be confident in making a more significant contribution to the economy and enhancing financial inclusion in Indonesia. Therefore, this great potential requires strong support

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from Bank Indonesia's non-cash or digital payment system, namely QRIS. However, digitalization also presents challenges that must be overcome (Rachman, Julianti, & Arkoyah, 2024).

Indonesia's digital society index score in 2024 was 43.34, up from 43.18 in 2023 (Mediana, 2024). Although there is an increase, this score does not yet indicate that the Indonesian people are fully proficient in adopting digital technology to enhance economic activity. One of the main challenges is the low level of digital literacy among Indonesians, which remains suboptimal. Digital literacy in Indonesia remains low due to several factors, including limited access to technological devices and a lack of opportunities for technology education (Afrina, Zulaikha, & Jumila, 2024). Additionally, many people still lack an understanding of the benefits and proper use of digital technology, which leads to a lack of interest in improving their skills (Izzulhaq, Kurnia, & Maharda, 2024).

Limited digital literacy can hinder the effective use of QRIS. This can be further analyzed by assessing the factors that influence intentions to use QRIS payment transactions, particularly the likelihood of adopting and using the technology. The use of technology can be observed through various factors, but the focus is on the internal and external factors involved in using QRIS as a tool for digital transactions.

Ryan & Deci (2020) explain Self-Determination Theory (SDT) as a contemporary theory of motivation. This theory emphasizes intrinsic motivation over extrinsic motivation. According to SDT, humans have three basic psychological needs: autonomy (the ability to engage in behavior with full volition), competence (the experience of mastery and knowledge), and relatedness (the need to feel connected to others in a meaningful way) (Bergdahl, Latikka, Celuch, Savolainen, Mantere, Savela, & Oksanen, 2023). According to Ryan & Deci (2020), these basic needs are necessary for personal adjustment, integrity, and growth.

However, the use of the SDT model in previous research focused on improving employee performance (Guo, 2023; Manganelli, Thibault-Landry, Forest, & Carpentier, 2018), student learning behavior (Rahayu, Nur, Mardiani, & Nur, 2022), physical education and basic psychological needs (Fernández, Almagro, Tamayo-Fajardo, & Sáenz-López, 2020; Van den Broeck, Ferris, Chang, & Rosen, 2016), employee empowerment (Meyer & Gagnè, 2008), and the development of artificial intelligence (Bergdahl *et al.*, 2023). Few SDT studies discuss adaptation to technology use. SDT can be applied in technology to enhance digital experiences, promote well-being, and achieve positive outcomes. This study focuses on using the QRIS payment technology system.

On the other hand, the Unified Theory of Acceptance and Use of Technology (UTAUT) is an integrated concept of how individuals use technology and new information systems. This model aims to explain why individuals are drawn to using technology (Rachman *et al.*, 2024). Venkatesh, Morris, Davis, & Davis (2003) explain four construct variables in the UTAUT theory: performance expectations, effort expectations, social influences, and facilitating conditions. UTAUT has successfully explained the four constructs underlying the intention to use technology (Ahmad, 2014).

This study integrates the SDT and UTAUT models. These two models are used for evaluation and describe how each measurement variable influences other variables, allowing relationships to be determined in the context of technology adaptation. Most previous major studies have focused only on the technical or utilitarian factors of technology use. In contrast, successful

system adoption depends not only on ease or usefulness but also on the extent to which users' psychological needs are met (Prawitasari, Badiani, Rachmawati, Ningrum, & Mufidah, 2024).

The consideration of user behavior in this model should describe the results of evaluating the success of QRIS users. SDT studies how people make decisions without outside interference or influence, highlighting the extent to which human behavior is self-motivated and self-determined (Manganelli *et al.*, 2018; Van den Broeck *et al.*, 2016). Meanwhile, UTAUT measures customer behavior in the adoption of technology (Ahmad, 2014; Azman & Zabri, 2022). The researcher also conducted a bibliometric mapping analysis, which was verified using VOSviewer, thereby identifying research materials linked to the research construct (Saeidnia, Hosseini, Abdoli, & Ausloos, 2024).

This study also conducted a bibliometric analysis and verified the findings using VOSviewer, which identified research materials linked to the research constructs (see Previous Research). Therefore, this research has the following objectives: (1) to determine the three pillars of SDT motivation (autonomy, competence, and relatedness) that influence a person's motivation to use technology; (2) to determine the four primary constructs of UTAUT (performance expectations, effort expectations, social influence, and facilitating conditions) influencing the intention to use QRIS; (3) to find out whether motivation influences the intention to use QRIS as a non-cash payment transaction tool.

2. THEORETICAL FRAMEWORK AND EMPIRICAL STUDIES

Theoretical Background

Self-Determination Theory (SDT) explains human motivation by emphasizing psychological needs and intrinsic growth tendencies, where behavior is largely self-motivated and self-determined (Ryan & Deci, 2020). In marketing, SDT is used to analyze how autonomy, competence, and relatedness shape consumer choices and behavior. Autonomy reflects the freedom to decide or pursue goals, competence refers to the ability to master and develop skills, while relatedness highlights the need for meaningful social connections. These three pillars are believed to be key drivers of motivation and form the basis for developing the research model and hypotheses (Gagnè & Deci, 2005).

The UTAUT model is a development and integration of eight previous theories and models, namely the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM-TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) (Venkatesh *et al.*, 2003). It has been widely applied across disciplines such as information systems, psychology, and management (MacFeely, Van de Ven, & Peltola, 2024). The UTAUT model outlines four primary constructs in the research framework that can influence usage intention: performance expectancy, effort expectancy, social influence, and facilitating conditions.

The extent to which consumers think technology will make them more productive and deliver better outcomes is known as performance expectancy (Venkatesh *et al.*, 2003). Effort expectancy is more likely to lead to technology acceptance when it is perceived as user-friendly (Venkatesh, Thong, & Xu, 2012). The way a person views others and decides to adopt a new system is known as social influence (Ahmad, 2014). Facilitating conditions make it easier to

perform tasks or adopt new behaviors (Susilowati, Rianto, Wijaya, & Sanny, 2021). So, this research uses these four constructs to measure the use of QRIS technology.

Previous Studies

Bank Indonesia launched the Quick Response Code Indonesian Standard on August 17, 2019. Bank Indonesia aims to accelerate the adoption of technology in payment transactions, making QR-code-based transactions more straightforward, faster, and safer. Business actors, including MSMEs, can utilize QRIS, which encourages the OJK to support MSME development (Al Farohi *et al.*, 2023; Warjiyo, 2024).

This study also conducted a bibliometric analysis mapping on QRIS, analyzing 126 research papers from 2018 to 2023. The research was conducted using the Scopus database, employing bibliographic coupling and co-occurrence analysis. Bibliometric analysis offers a comprehensive understanding of information collection and its various characteristics, including co-citations, co-occurrences, and frequent searches (Błoński, 2023; Passas, 2024). Articles are assessed with VOS Viewer based on the type of co-occurrence analysis using the total calculation technique. The minimum number of keyword occurrences is determined to be 5 out of 224 keywords, of which 37 are selected. Three mapping results will be explained: network, overlay, and density visualization.

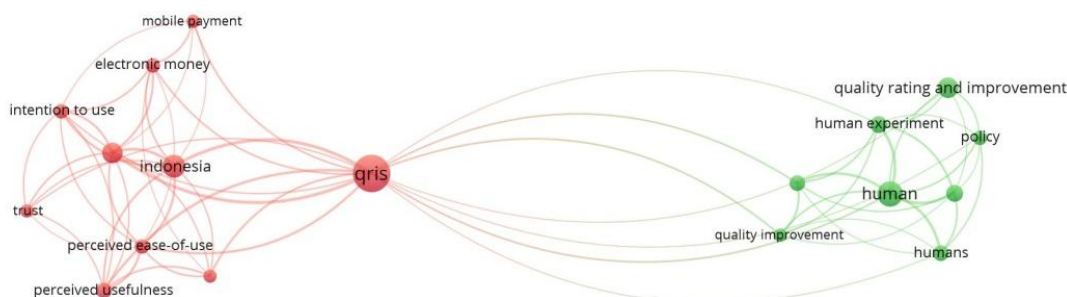


Figure 1. Network Visualization

The Co-Occurrence network visualization study identified 31 data points, divided into two clusters, with 56 links connecting them. These clusters are characterized by two colors: red and green. The first cluster is shown in red; it comprises 10 topics: QRIS, Indonesia, perceived usefulness, perceived ease of use, trust, intention to use, electronic money, mobile payment, and quick response code. The second cluster in green has eight topics: human, quality improvement, policy, human experiment, quality rating and improvement, article, humans, and QR code.

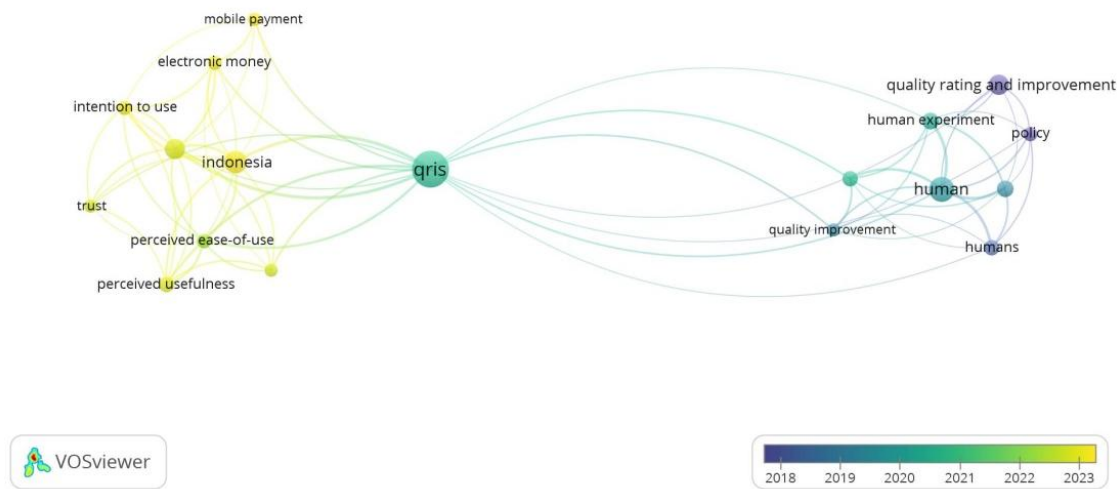


Figure 2. Overlay Visualization

The results depicted in Figure 2 show a co-occurrence overlay visualization of discussions on QRIS publications published across a range of years. The six years 2018, 2019, 2020, 2021, 2022, and 2023 are highlighted based on keyword activity. In 2018, the primary focus was on policy, quality rating, and improvement. Moving into 2019, the discussion shifted to emphasize the importance of humans and quality improvement. In 2020, QRIS was a human experiment and an article. In 2021, QR codes. In 2022, issues arose regarding perceived ease of use, usefulness, and the quick response code. In 2023, Indonesia's trust in, intention to use, and mobile payment.

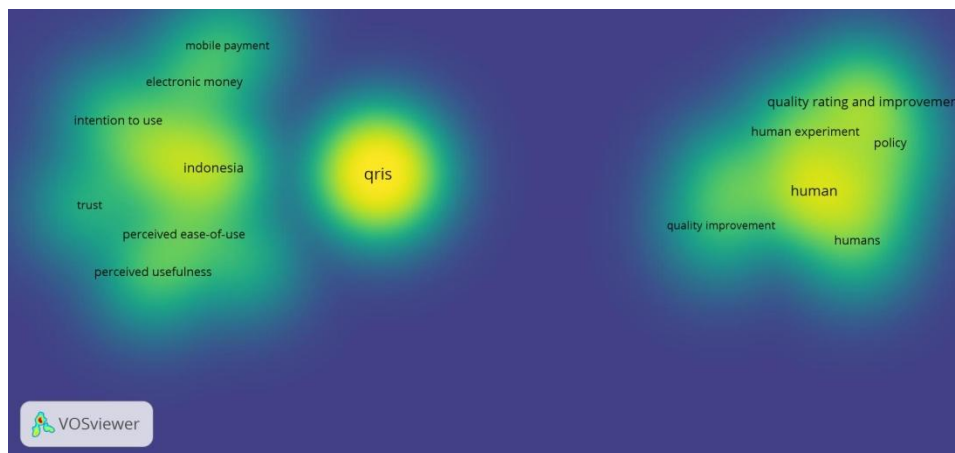


Figure 3. Density Visualization

This visualization illustrates the depth and frequency of discussion related to the selected keywords in research publications. The data is interpreted by examining the colors displayed: brighter colors indicate a higher volume and broader coverage of the publication topic. Then, this study is widely discussed in previous studies related to the keyword of interest. Conversely, darker or faded colors indicate a topic that is less frequently discussed in relevant publications (Passas, 2024). This visualization suggests that the darker, faded circles should be considered potential research topics. This indicates that these topics are less explored, making them promising areas for further investigation. Based on the visualization, common and widely researched topics include

human behavior within the Indonesian region. In contrast, topics such as technology adaptation (perceived usefulness and benefits) are less studied, providing opportunities for deeper exploration.

Therefore, this study is interested in conducting in-depth scientific research on QRIS regarding human behavior, as approached by the UTAUT model. Then, this research chose trust because the circle's color is darker and faded. Trust is a positive attitude that enables someone to accept and believe in their abilities while feeling responsible for their own lives (Jones, 2005). When individuals have strong self-confidence, they are motivated to take action and pursue their life goals. This study aims to understand what drives someone to use technology, focusing on Self-Determination Theory (SDT). This theory examines how people make decisions without interference or outside influence, highlighting the extent to which human behavior is self-motivated and self-determined (Guo, 2023; Rahayu *et al.*, 2022).

Hypothesis Development

Self-Determination Theory (Autonomy, Competence, and Relatedness)

According to the creator of Self Determination Theory (SDT), autonomy is one of the basic human needs that supports motivation. The need for autonomy is the desire to control one's life and actions, and to make decisions based on personal choice (Meyer & Gagnè, 2008). People are more likely to feel motivated, intrinsically engaged, and satisfied when they feel they have control over their lives and actions. They also perform better when they do these things, especially when using technology. According to Jakobsen (2021) research, motivation correlates well with a perceived task-involving atmosphere and autonomy support.

However, according to Rachman, Handayani, & Sugijanto (2022), the element of ability/competence can impact performance because strong ability is associated with high performance. Competence is the ability to carry out or complete a task or job based on skills and knowledge, supported by a work attitude that aligns with the job's needs (Fernández *et al.*, 2020). Certain factors must drive every activity a person undertakes. Generally, the factors that drive a person to engage in an activity typically stem from their needs and desires. For individuals striving for high achievement, perceived competence significantly influences motivation to pursue additional goals (Rahayu *et al.*, 2022). Competence becomes essential in this situation because it influences motivation to use technology.

The desire to establish harmonious relationships with others and feel connected to the surrounding environment is referred to as relatedness or connection (Fernández *et al.*, 2020). Humans and technology have a close relationship because technology is a product of human work designed to make life easier (Sari, 2023). Technology has become part of people's lifestyle needs and influences various aspects of their lives (Fransisca & Ningsih, 2023). This will encourage and motivate people to use technology because they consider it an inseparable part of their lives. The hypothesis of this study is as follows:

H1: Autonomy has a positive effect on motivation to use technology.

H2: Competence has a positive effect on motivation to use technology.

H3: Relatedness has a positive effect on motivation to use technology.

Unified Theory of Acceptance and Use of Technology (Performance Expectations, Effort Expectations, Social Influence, and Facilitating Conditions)

According to Venkatesh *et al.* (2003), performance expectancy refers to a person's belief that using a system or technology can enhance their job or business performance. It can also affect personal confidence in using the application to meet expectations. Therefore, performance expectancy is the most likely predictor of technology adoption intention (Harahap, Afandi, & Siregar, 2023). According to previous research, the desire to use a technology is influenced by performance expectations (Akhtar, Irfan, Kanwal, & Pitafi, 2019; Azman & Zabri, 2022; Chang, Liu, Huang, & Hsieh, 2019; Harahap *et al.*, 2023). QRIS performance expectations can be interpreted as an indication of consumer interest in using QRIS technology. Consumers see QRIS as a profitable payment system for non-cash transactions.

Apart from performance expectations, another derivative of the UTAUT theory is effort expectations. According to Venkatesh *et al.* (2003), Business expectations refer to the ease of using the technology system. When a system is easy to use, individuals are more likely to use it frequently to complete tasks. Effort expectations show that users believe that the ease of use of a technology system can reduce effort, such as costs and time spent working (Azman & Zabri, 2022; Farzin, Sadeghi, Kharkeshi, Ruholahpur, & Fattahi, 2021). In other words, effort expectations describe conditions in which a person believes that using the system is easy to understand and operate, including making payment transactions, and can reduce the effort expended in terms of time and costs. One advantage of QRIS is that it saves time and reduces the costs associated with payment transactions. The more people perceive QRIS as easy to use, the more customers will utilize it. Several previous studies have demonstrated that effort expectations are a key factor driving technology adoption (Akhtar *et al.*, 2019; Farzin *et al.*, 2021).

Then, there is social influence, which reflects the impact of environmental factors, such as recommendations or opinions from family, friends, or relatives that encourage someone to use technology. According to Venkatesh *et al.* (2012), Social influence refers to the extent to which a person feels influenced by the social environment that encourages them to adopt a new system. In this context, social influence occurs when individuals trust their peers and assume that QRIS is a convenient and effective payment method. Their social impact shapes a person's behavior by enabling them to maintain harmony within the group and foster reciprocal relationships, particularly in the context of technology use. Several previous studies have proven that customers' intentions to use technology are influenced by social factors (Akhtar *et al.*, 2019; Chang *et al.*, 2019).

Facilitating conditions are another factor influencing a person's intention to use a technological system (Susilowati *et al.*, 2021). Several studies show that user-facilitating conditions can influence intentions to use technological systems (Azman & Zabri, 2022; Farzin *et al.*, 2021; Susilowati *et al.*, 2021). Venkatesh *et al.* (2003) define facilitating conditions as the extent to which an individual believes that the necessary infrastructure, facilities, and technical support are available to support the use of the technology system. QRIS can accept payments from various applications via QR codes, so people do not need to install any payment apps. This condition is expected to drive customers to choose QRIS for non-cash payments. From the explanation above, a hypothesis can be derived:

H4: Performance expectations positively affect the intention to use QRIS for payment transactions.

H5: Effort expectations positively affect the intention to use QRIS for payment transactions.

H6: Social influence positively affects the intention to use QRIS as a payment transaction.

H7: Facilitating conditions positively affect the intention to use QRIS as a payment transaction.

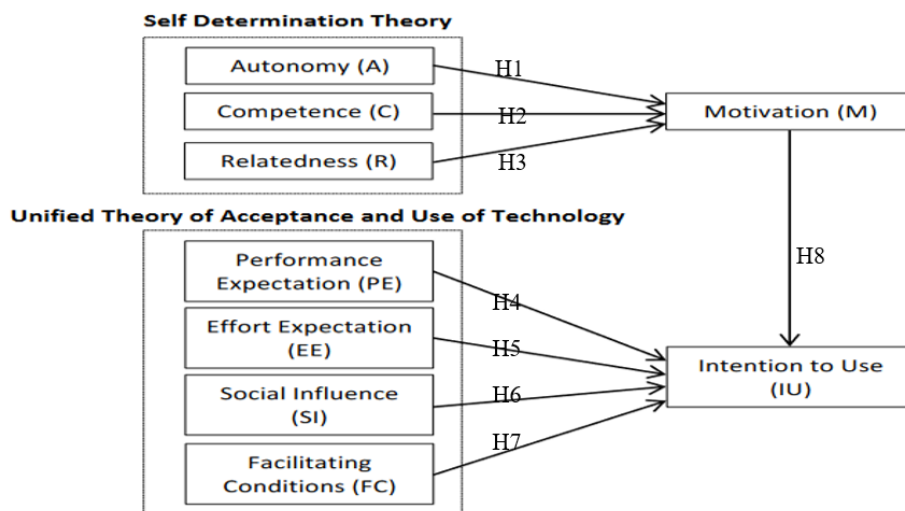
Motivation and Intention to Use

According to Rusliana (2024), motivation has a similar meaning to "motive": a driving force or stimulus that encourages someone to act. Because motivation is dynamic, it can change and develop in response to increased experience and learning from activities (Syamsuddin, 2021). One technology used for payment transactions is QRIS. QRIS is a standard payment system for every transaction (Al Farohi *et al.*, 2023). When merchants need only one barcode for all transactions via payment applications, a person's intention to use technology is influenced by motivation (Putra, Khesi, Purwianti, & Anggraini, 2025; Sudirjo, Mustafa, Astuti, Tawil, & Putra, 2023). When someone has used QRIS, they will use it again. So, the researcher created a research hypothesis:

H8: Motivation has a positive effect on the intention to use QRIS for payment transactions.

Conceptual Framework

This study uses a framework that combines Self-Determination Theory (SDT) and the Unified Theory of Acceptance and Use of Technology (UTAUT). SDT looks at motivation by focusing on three basic needs: autonomy, competence, and relatedness that affect why people use technology (Peters & Calvo, 2023). UTAUT explains how people adopt technology by considering factors like performance expectancy, effort expectancy, social influence, and facilitating conditions, which all shape the intention to use technology (Venkatesh *et al.*, 2003). By combining SDT and UTAUT, this framework captures both motivational and technological factors that influence users' intention to use QRIS.



Note: A= Autonomy, C= Competence, R= Relatedness, M= Motivation, PE= Performance Expectation, EE= Effort Expectation, SI= Social Influence, FC= Facilitating Conditions, IU= Intention to Use

Figure 4. Research Model

3. RESEARCH METHODS

This case study took place in Indonesia from January to June 2025. It focused on two age groups: millennials, born between 1981 and 1996, and Generation Z, born between 1997 and 2008. These groups are known to be familiar with digital payment systems (Wandhe, 2024). The research used primary quantitative data gathered through a structured survey questionnaire. The sample size was determined based on the recommendation of Hair, Anderson, Tatham, & Black (2010), who stated that 100 to 200 participants are sufficient for Structural Equation Modeling (SEM). Also, Bhattacharjee (2012) suggested that the minimum number of participants should be five times the total number of measurement indicators. Following these guidelines, data were collected from 150 participants using a purposive sampling method.

Respondents were selected based on specific criteria or purposive sampling to ensure relevance to the research objectives. First, participants must be from Generation F or Generation Z. Second, participants must have used QRIS as a payment method in their transactions. Third, participants must have used digital payment applications such as mobile banking or e-wallets. These criteria were used to ensure that everyone involved had sufficient knowledge and experience with QRIS, enabling them to better evaluate their motivations and intentions for using the technology.

Before distributing the main questionnaire, a pilot test with 30 people was conducted to ensure the questions were clear, the tool was reliable, and there was no bias in the questions. These 30 people were selected through convenience sampling and were similar to the leading group, which consists of millennial and Gen Z users of QRIS. The final questionnaire comprised 30 questions, all measured on a five-point Likert scale, and was sent via Google Forms to people who had used QRIS for digital payments.

Data analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM). This technique was selected because the data were not normally distributed, the model was complex, and the study included fewer than 200 participants (Hair *et al.*, 2010; Harahap *et al.*, 2023). The PLS-SEM approach was used to check the research hypotheses with SmartPLS version 3.0. The analysis had two parts: first, evaluating the measurement model, which included checking each item's reliability, internal consistency, average variance extracted (AVE), and discriminant validity. Second, evaluating the structural model, which looked at path coefficients, collinearity, effect size (f^2), coefficient of determination (R^2), and predictive relevance (Q^2) (Hair, Hult, Ringle, & Sarstedt, 2017). Table 1 below explains the indicators of variables being tested in this study.

Table 1. Operational Definition of Variables

Variables	Definition	Indicators	Unit Measure
Autonomy (Bergdahl <i>et al.</i> , 2023; Ryan & Deci, 2020)	A condition where a person feels they have the freedom to make decisions and regulate their own actions.	Driven and extra effort Contribute Under control	Ordinal (Likert)
Competence (Fernández <i>et al.</i> , 2020; Ryan & Deci, 2020)	A person's ability to master skills, understand information, and complete tasks effectively.	Social attitudes Knowledge Skills	Ordinal (Likert)
Relatedness (Manganelli <i>et al.</i> , 2018; Ryan & Deci, 2020)	The need to feel close, accepted, and connected to others.	Sense of responsibility Have a voluntary attitude. Connect Emotionally	Ordinal (Likert)
Motivation (Bergdahl <i>et al.</i> , 2023; Fernández <i>et al.</i> , 2020; Meyer & Gagnè, 2008)	Psychological drive that motivates someone to act.	Achievement Award Satisfaction	Ordinal (Likert)
Performance Expectations (Ahmad, 2014; Harahap <i>et al.</i> , 2023; Venkatesh <i>et al.</i> , 2003)	The belief that the use of a system or tool can improve the quality of work, productivity, or results obtained.	Increase productivity Increase opportunities Its use in everyday life More efficient	Ordinal (Likert)
Effort Expectations (Al Farohi <i>et al.</i> , 2023; Venkatesh <i>et al.</i> , 2003)	Perception regarding the ease of learning or using a system.	Easy to learn User friendly Fair and understandable Easy to master	Ordinal (Likert)
Social Influence (Al Farohi <i>et al.</i> , 2023; Venkatesh <i>et al.</i> , 2003)	Influences from people around them, such as friends, family, or the social environment, can encourage someone to use or avoid a particular technology or system.	Influence of important people Social Factors Other people's participation	Ordinal (Likert)
Facilitating Conditions (Ahmad, 2014; Venkatesh <i>et al.</i> , 2003)	Individual perceptions regarding the availability of resources, facilities, and technical support that enable them to use a system.	Perceived Behavioral Control Facilities available Suitability	Ordinal (Likert)
Intention to Use (Al Farohi <i>et al.</i> , 2023; Venkatesh <i>et al.</i> , 2003; Venkatesh <i>et al.</i> , 2012)	A person's desire or readiness to use a technology or system in the future.	Intention to try Plan to use Intention to behave Intention to continue using	Ordinal (Likert)

4. DATA ANALYSIS AND DISCUSSIONS

Respondent Demographic Data

Respondents were asked eight demographic questions, including gender, domicile according to time zone, age, generation category, last level of education, QRIS payment method used, type of digital payment used, and frequency of QRIS payments. Table 2 shows that most of the people surveyed are women, making up 54.67% of the group. They are spread across different time zones in Indonesia, with the most significant number living in the WIB time zone, accounting for 40.67%. Most respondents are young, with 54% in the 15-25 age group and 55.33% in Generation Z. This suggests that younger people are more likely to use QRIS. In terms of

education, the majority of the respondents have at least a high school diploma or a bachelor's degree, showing they are generally capable of using digital payment systems. When it comes to how they use these systems, the Customer Presented Mode is used more often than the Merchant Presented Mode, with 58.67% choosing it. Mobile banking is the most popular digital payment method, used by 58% of respondents. Also, a high number of people use QRIS regularly, with 69.33% using it more than five times a month. This shows that QRIS is becoming a common way to pay without using cash.

Table 2. Demographic Data of Respondents

Characteristics	Frequency	Persentase (%)
Gender		
Man	68	45,33
Woman	82	54,67
Total	150	100
Time Zone		
Western Indonesia Time (WIB)	61	40,67
Central Indonesia Time (WITA)	47	31,33
Eastern Indonesia Time (WIT)	42	28,00
Total	150	100
Age (year)		
15-25	81	54
26-35	52	34,67
36-43	17	11,33
Total	150	100
Generation Category		
Millennial Generation	67	44,67
Generation Z	83	55,33
Total	150	100
Last Education		
Middle School and Equivalent	2	1,33
High School and Equivalent	63	42
Bachelor	66	44
Masters	14	9,33
Doctor	5	3,33
Total	150	100
QRIS Payment Method Used		
Merchant Presented Mode (MPM)	62	41,33
Customer Presented Mode (CPM)	88	58,67
Total	150	100
Digital Payments Used		
E-Wallet	63	42
Mobile Banking	87	58
Total	150	100
Intensity of Use of QRIS Payment Transactions (month)		
< 5 Times	46	30,67
6-10 Times	71	47,33
>10 Times	33	22
Total	150	100

Evaluation of the Measurement (Outer) Model

The measurement model in the theoretical framework determines the relationship between indicators and latent variables. PLS path modeling is used to measure Cronbach's alpha (α), composite reliability (CR), convergent validity, Average Variance Extracted (AVE), and discriminant validity (Harahap *et al.*, 2023). Convergent validity is demonstrated by factor

loadings, which are considered acceptable if they exceed 0.7. As shown in Table 3, the overall indicator loading value of more than 0.7 is appropriate. Cronbach alpha (α) results ranged from 0.793 to 0.911, while CR values ranged from 0.881 to 0.951. This value poses no problem because the condition (α) must be greater than 0.6 and the CR must be greater than 0.7. Average Variance Extracted (AVE) values are also not affected because all AVE values are more than 0.50, as stated by Henseler, Ringle, & Sinkovics (2009).

Table 3. Confirmatory Factor Analysis (CFA)

Variable	Code	Loadings	Value	Weight
Autonomy ($\alpha=0.793$, CR=0.881 and AVE=0.713)				
Feel encouraged and make extra effort to use technology	A.1	0,849		0,371
Have a responsibility to contribute to the use of technology	A.2	0,904		0,445
Have control when using technology	A.3	0,773		0,365
Competency ($\alpha=0.870$, CR=0.920 and AVE=0.794)				
Easily adaptable and have skills in using technology	C.1	0,907		0,376
Know how to overcome obstacles that may arise when technology is used	C.2	0,906		0,397
Feel confident and understand the use of technology	C.3	0,860		0,349
Relatedness ($\alpha=0.862$, CR=0.916 and AVE=0.784)				
Have a responsibility to help people around you when using technology	R.1	0,896		0,382
Volunteer to offer assistance to those in need if there is a disruption to the technology used	R.2	0,900		0,378
Feel emotionally connected to others and want to see them succeed in their use of technology	R.3	0,860		0,369
Motivation ($\alpha=0.883$, CR=0.927 and AVE=0.810)				
Utilize skills in QRIS payment transaction types	M.1	0,885		0,354
Enjoy all QRIS payment transaction activities	M.2	0,923		0,376
Have satisfaction when using QRIS payment transactions	M.3	0,892		0,380
Performance Expectations ($\alpha=0.951$, CR=0.965 and AVE=0.873)				
QRIS helps speed up the transaction process	PE.1	0,912		0,291
Transactions using QRIS have many benefits	PE.2	0,952		0,257
QRIS speeds up transaction completion	PE.3	0,935		0,259
QRIS makes non-cash transactions easy	PE.4	0,938		0,266
Effort Expectations ($\alpha=0.898$, CR=0.929 and AVE=0.765)				
QRIS transactions are straightforward to use	EE.1	0,928		0,262
QRIS is connected to all payment transactions	EE.2	0,957		0,297
QRIS transactions are very efficient in terms of time and effort	EE.3	0,843		0,328
QRIS transactions are straightforward to understand	EE.4	0,864		0,259
Social Influence ($\alpha=0.853$, CR=0.911 and AVE=0.774)				
Environmental factors influence the use of QRIS	SI.1	0,814		0,381
It is recommended that merchants make transactions using QRIS	SI.2	0,915		0,423
It is recommended that other people transact with QRIS	SI.3	0,907		0,390
Facilitating Conditions ($\alpha=0.911$, CR=0.944 and AVE=0.848)				
Know how to use the QRIS payment system	FC.1	0,897		0,389
The payment application used supports QRIS transactions	FC.2	0,936		0,344
Transactions using QRIS according to needs	FC.3	0,931		0,354
Intention to Use ($\alpha=0.855$, CR=0.900 and AVE=0.693)				
Using QRIS transactions for every payment	IU.1	0,865		0,248
Payment activities are carried out using QRIS	IU.2	0,902		0,316
Using QRIS in every transaction	IU.3	0,847		0,255
Transactions with QRIS are carried out at each merchant	IU.4	0,833		0,379

Note: A= Autonomy, C= Competence, R= Relatedness, M= Motivation, PE= Performance Expectation, EE= Effort Expectation, SI= Social Influence, FC= Facilitating Conditions, IU= Intention to Use

The extent to which a construct differs from other constructs is indicated by the discriminant validity presented in Table 4. Discriminant validity is important because it determines whether the test appropriately targets the concept of interest (Zeng, Liu, Gong, Hertogh, & König, 2021). The Fornell-Larcker criterion was used to assess discriminant validity. According to the Fornell-Larcker criteria, discriminant validity testing requires that the square root of the average variance extracted of a construct is greater than the correlation between that construct and other constructs.

Table 4. Fornell-Larcker Criteria

	A	C	EE	FC	IU	M	PE	R	SI
A	0,844								
C	0,774	0,891							
EE	0,688	0,741	0,875						
FC	0,672	0,723	0,700	0,921					
IU	0,633	0,635	0,698	0,772	0,833				
M	0,678	0,739	0,766	0,846	0,716	0,900			
PE	0,678	0,735	0,716	0,801	0,609	0,847	0,934		
R	0,785	0,741	0,714	0,709	0,618	0,726	0,703	0,886	
SI	0,717	0,693	0,782	0,817	0,851	0,784	0,763	0,687	0,880

Note: A= Autonomy, C= Competence, R= Relatedness, M= Motivation, PE= Performance Expectation, EE= Effort Expectation, SI= Social Influence, FC= Facilitating Conditions, IU= Intention to Use

Evaluation of the Structural (Inner) Model

The purpose of testing the structural model is to determine whether the relationships among latent variables provide answers to the questions asked. Hair *et al.* (2010) recommend first examining and evaluating the variance inflation factor (VIF) to identify multicollinearity among independent variables. Regression analysis indicates that the VIFs range from 2.191 to 3.464. According to Hair *et al.* (2010), the variance inflation factor should be less than 5, indicating the absence of multicollinearity. The investigation involves examining the Effect Size (f^2). Harahap *et al.* (2023) used f^2 values of 0.02 (small), 0.15 (medium), and 0.35 (large) to estimate the size of the predictor effect. Table 5 shows that the overall output f^2 ranges between 0.004 and 0.675.

Table 5. Effect Sizes and Multicollinearity

Variable	f^2	VIF
A->M	0,004	3,312
C->M	0,059	2,822
R->M	0,415	2,946
PE->IU	0,107	3,423
EE->IU	0,011	2,191
SI->IU	0,675	3,464
FC->IU	0,027	3,460
M->IU	0,026	3,103

Note: A= Autonomy, C= Competence, R= Relatedness, M= Motivation, PE= Performance Expectation, EE= Effort Expectation, SI= Social Influence, FC= Facilitating Conditions, IU= Intention to Use

The coefficient of determination (R^2) indicates the accuracy with which the proposed model predicts the dependent variable. According to Hair *et al.* (2010), the R^2 threshold value is 0.25 for weak, 0.50 for moderate, and 0.75 for strong. In this study, motivation had a moderate effect (R -square = 0.618). This means that the independent variables collectively explain 61.8% of

the motivation to use technology, while the remaining 38.2% is caused by other variables not examined in the research. The intention to use the variable has a strong influence, with a value of 0.772. This means that the independent variables collectively explain 77.2% of the intention to use QRIS, while the remaining 22.8% is caused by other variables not examined in the research. The Q^2 value indicates the significance of the independent variable on the dependent variable (Ascarya & Indra, 2022). In this study, the Q^2 value for the motivation variable was 0.610, while that for intention to use was 0.764, exceeding the minimum threshold of 0. This indicates that the values were reproduced accurately, thus confirming the model's predictive ability. The results are shown in Table 6.

Table 6. R Square (R^2) and Adjusted R Square (Q^2) Values

Variable	R Square	R Square Adjusted
Motivation	0,618	0,610
Intention to Use	0,772	0,764

The bootstrapping method for hypothesis testing in SmartPLS is presented in Table 7. The significance of the hypothesis is evaluated based on the assumption that it has a positive or negative influence, as indicated by a t-statistic value greater than 1.65 and a P-value of less than 0.05. The bootstrapping results show that competence significantly influences motivation ($\beta = 0.414$; $t = 4.307$; $p < 0.001$), and relatedness also has a positive, significant effect on motivation ($\beta = 0.360$; $t = 3.874$; $p < 0.001$). In contrast, autonomy does not significantly affect motivation ($\beta = 0.075$; $t = 0.683$; $p = 0.495$).

Regarding the intention to use QRIS, performance expectancy has a significant effect ($\beta = -0.425$; $t = 3.247$; $p = 0.001$), whereas effort expectancy is not significant ($\beta = 0.178$; $t = 1.202$; $p = 0.230$). Furthermore, social influence shows the most potent positive effect on intention to use ($\beta = 0.730$; $t = 10.751$; $p < 0.001$), followed by facilitating conditions ($\beta = 0.209$; $t = 1.976$; $p = 0.049$) and motivation ($\beta = 0.173$; $t = 2.097$; $p = 0.036$).

Table 7. Research Hypothesis (Path Coefficient)

Variable	Original Sample	Standard Deviation (STDEV)	T Statistics	P Value	Accepted
A->M	0,075	0,110	0,683	0,495	No
C->M	0,414	0,096	4,307	0,000	Yes
R->M	0,360	0,093	3,874	0,000	Yes
PE->IU	-0,425	0,131	3,247	0,001	Yes
EE->IU	0,178	0,148	1,202	0,230	No
SI->IU	0,730	0,068	10,751	0,000	Yes
FC->IU	0,209	0,106	1,976	0,049	Yes
M->IU	0,173	0,083	2,097	0,036	Yes

Note: A= Autonomy, C= Competence, R= Relatedness, M= Motivation, PE= Performance Expectation, EE= Effort Expectation, SI= Social Influence, FC= Facilitating Conditions, IU= Intention to Use

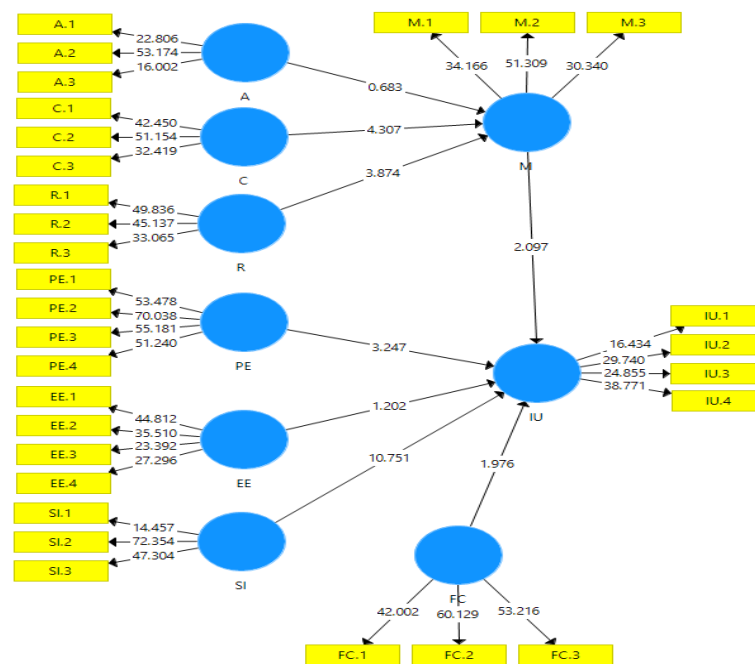


Figure 5. Structural Model

Discussion

The study did not find a strong connection between autonomy and motivation ($\beta = 0.075$; $t = 0.683$; $p = 0.495$). According to Self-Determination Theory, autonomy is about a person feeling in charge of their actions and believing in what they are doing (Ryan & Deci, 2020). However, this result shows that autonomy is not the main reason people use QRIS. Instead, people use it because it has become a standard and required way to pay. This finding supports the idea that, in places where people do not have equal access to digital tools and strict rules apply, like in Indonesia (Afrina *et al.*, 2024), autonomy is less likely to drive s. It also goes against findings from studies where technology use is more optional or personal, such as those by Jakobsen (2021) and Bergdahl *et al.* (2023).

In contrast, competence positively affects motivation ($\beta = 0.414$; $t = 4.307$; $p < 0.001$). According to Self-Determination Theory, when people feel competent, it boosts their intrinsic motivation by increasing their confidence in their ability to complete tasks (Gagné & Deci, 2005). This finding shows that users who feel they can use QRIS are more likely to use the system, suggesting that having skills and understanding of technology is important for keeping people engaged with digital payment systems. This result aligns with previous studies that found that having technological skills increases motivation and positive behavior (Rahayu *et al.*, 2022).

Similarly, relatedness to others increases motivation ($\beta = 0.360$; $t = 3.874$; $p < 0.001$). In Self-Determination Theory, relatedness means feeling connected and supported by others (Manganelli *et al.*, 2018; Van den Broeck *et al.*, 2016). This shows that using QRIS is tied to social factors, where people are more motivated when they see others using it widely in their community. This also supports the idea that digital payments become more common through shared practices and interactions among people (Prawitasari *et al.*, 2024).

The results showed that performance expectancy has a positive link with the intention to use QRIS ($\beta = -0.425$; $t = 3.247$; $p = 0.001$). In the UTAUT model, performance expectancy refers

to the degree to which people believe that using technology can improve their work performance (Venkatesh *et al.*, 2003). These findings suggest that QRIS is now seen as a tool that improves performance and is used like a regular part of daily work. This matches what other studies have found: once mature technologies are widely used and become standard, people start to see them as useful (Akhtar *et al.*, 2019; Azman & Zabri, 2022; Chang *et al.*, 2019; Harahap *et al.*, 2023).

The link between a system's effort expectancy and the intention to use QRIS is weak ($\beta = 0.178$; $t = 1.202$; $p = 0.230$). According to Venkatesh *et al.* (2003), effort expectations refer to the ease of using the technology system. When a system is easy to use, individuals are more likely to use it frequently to complete tasks (Susilowati *et al.*, 2021). The study concluded that transactions are complex to learn and use, so users must have expertise. Apart from that, research indicates that customers feel comfortable and trust the cashless system when making payments. Because there are two QRIS payment methods, Merchant Presented Mode (MPM) and Customer Presented Mode (CPM) (Utami, 2024), customers feel that CPM is difficult to use because the billing type for the order is not automatic; the customer themselves has to determine the nominal value of the transaction made. Meanwhile, MPM already has a transaction nominal value available, and not all business people use MPM because the condition is that when a QRIS transaction is carried out, the merchant must have an EDC machine.

In contrast, social influence has the strongest positive link with the intention to use QRIS ($\beta = 0.730$; $t = 10.751$; $p < 0.001$). The UTAUT model highlights that social norms and peer influence significantly shape people's intentions to act (Venkatesh *et al.*, 2012). This study shows that using QRIS is strongly influenced by social pressure, advice from others, and the extent to which it is accepted, underscoring the importance of following others when using digital payments. Previous research also shows that social variables influence customers' intentions to utilize technology (Akhtar *et al.*, 2019; Chang *et al.*, 2019).

Finally, the facilitating conditions have a t-statistic value of $1.976 < 1.66$ and a P-value of $0.049 > 0.05$, so the hypothesis is accepted. Venkatesh *et al.* (2003) define facilitating conditions as the extent to which individuals perceive that infrastructure, facilities, and technical assistance are available to help them use technology systems. Several studies have found that facilitating conditions can influence intentions to use technological systems (Azman & Zabri, 2022; Farzin *et al.*, 2021; Susilowati *et al.*, 2021). Every individual can be assured that QRIS can accept payments through various applications equipped with a QR Code, so users do not need to use multiple payment applications. This is why customers choose QRIS as a non-cash payment method: they tend to prefer e-wallets and mobile banking.

Finally, motivation positively influences intention to use QRIS ($\beta = 0.173$; $t = 2.097$; $p = 0.036$). The t-statistic and P-value indicate that the requirements are met. Motivation is closely related to the term "motive" because it is a driving force or stimulus that encourages someone to act. Because motivation is dynamic, it can develop and shift in response to experiences and knowledge gained through various activities (Syamsuddin, 2021). One of the incentives for action is the use of payment technology, specifically QRIS (Quick Response Code Indonesian Standard). With a single barcode, all merchants can process transactions across various payment applications. Their motivation drives a person's intention to adopt a technology (Sudirjo *et al.*, 2023). If customers have used QRIS, they are likely to continue using it or use it again.

5. CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

This research was approached by two models: SDT, which measures motivation, and UTAUT, which measures intention to use QRIS. Autonomy, competence, and relatedness are the three motivational pillars of SDT. These three elements are believed to encourage the use of technology. However, the research results indicate that only competence and relatedness positively influence motivation to use technology. Meanwhile, autonomy is not a positive factor influencing a person's motivation to use technology. Someone uses developing technology not because of other people's factors or encouragement, but because of their own initiative.

The UTAUT model outlines four primary constructs: performance expectations, effort expectations, social influence, and facilitating conditions. This construct measures the intention to use QRIS for payment transactions. The research results indicate that business expectations do not positively influence the intention to use QRIS. This hypothesis was rejected because customers found QRIS transactions complex and required expertise. This differs from the other three constructs, where the hypothesis is accepted because it meets the requirements. On the other hand, motivation is a positive factor in a person's intention to use QRIS.

Motivation has a moderate effect of 0.618, meaning that autonomy, competence, and relatedness collectively explain 61.8% of motivation to use technology. The remaining 38.2% is caused by other variables not examined in the research. The intention to use the variable has a strong influence, with a value of 0.772. The four constructs of UTAUT and motivation collectively explain 77.2% of the intention to use QRIS. In contrast, the remaining 22.8% is caused by other variables not examined in the research.

Regulators: To increase QRIS utilization, a strong technological infrastructure is needed. The government needs to invest in building a stable, fast internet network across all regions of Indonesia. This will facilitate access and smooth transactions via QRIS. EV-DCI findings indicate that Indonesia's digital competitiveness gap has been consistently decreasing. This refers to an increase in the median index score. In 2020, EV-DCI recorded a median index score of 27.9. This figure continues to rise in 2021 to 32.1, 35.2 in 2022, and 38.5 in 2023. The increase in the median score shows improved digital competitiveness in middle and lower-ranking provinces. This demonstrates that the government must prioritize digital access to accelerate economic growth.

On the other hand, it can also support and synergize with the Financial Services Authority's goal of increasing community capacity to identify potential risks when using digital financial services. Customers still experience difficulties using the Merchant Presented Mode (MPM) and Customer Presented Mode (CPM) payment methods. Bank Indonesia is expected to continue educating the public through seminars, workshops, and social media campaigns that highlight the benefits of QRIS for transactions and payment methods.

Practitioner: MSMEs/merchants play an essential role in QRIS by offering QR codes that consumers can scan to make payments. This QR code can be displayed on information boards, stickers, or LCD screens. As many as 32.71 million merchants in Indonesia have used QRIS; this must be encouraged to continue increasing digital literacy. When many MSMEs utilize QRIS, it can automatically encourage consumers to adopt non-cash transactions. This effort supports Indonesia's transition to a cashless society by accelerating payments, as QRIS payments are faster, more straightforward, affordable, secure, and reliable.

Further research: This study offers novelty by integrating SDT and UTAUT, with SDT's three motivational pillars (autonomy, competence, and relatedness) tested for the first time in the context of technology use motivation. However, the findings are limited by a relatively small sample of 150 respondents, focusing only on millennials and Gen Z in Indonesia, and by a cross-sectional design that cannot capture changes over time. Future studies should therefore involve larger, more diverse samples across generations and regions, adopt longitudinal or experimental designs, and consider additional models, such as UTAUT2 (Venkatesh *et al.*, 2012). Moreover, subsequent research may explore behavioral outcomes beyond intention, such as sustained usage and resistance factors, as well as cross-cultural comparisons in digital payment adoption.

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