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Research Article

The Impact of Using Quick Response Code Indonesian Standard (Qris) on the Performance of Msmes in Bandung City: Based on the Technology-Organization-Environment (Toe) Framework

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Abstract: *The current research explains the performance of MSMEs in Bandung City, which has used the QRIS payment method based on the TOE framework. This study finds an attempt to understand, through the TOE framework, how technological, organizational, and environmental factors influence the performance of MSMEs in their adoption of the QRIS payment method. The sampling technique used in this research is a non-probability sampling technique. In this study, a sample of 130 was involved in data collection and analysis. Data analysis and processing will be through the method of Structural Equation Modeling (SEM) - Partial Least Square (PLS). The findings show that TOE adoption factors have significant influences on QRIS adoption. Besides that, the adoption of QRIS has positive effects on MSME performance. This research finding thus reveals that the three dimensions of TOE—technology, organization, and environment—are major motivating factors toward MSME-performance-induced adoption of the digital QRIS payment method so that business efficiency and competitiveness could be improved for MSMEs.*

Keywords: *MSME performance, QRIS, TOE framework.*

I. INTRODUCTION

With the advancement of technology and increasingly sophisticated internet infrastructure, daily life has become more facilitated, especially in terms of transactions. As a result, there has been a shift in public behavior towards cashless payment methods, with people transitioning to using digital devices on their smartphones. Besides simplifying the transaction process, using smartphones is considered more efficient and convenient due to integrated security systems. The acceptance of new technology in society is often influenced by the extent to which individuals are willing and able to adopt and utilize the technology (Faizani & Indriyanti, 2021). The application of mobile payments is still perceived differently by SMEs, and the adoption rate is not yet supported by effective implementation. Many SMEs in Bandung still lack an understanding of technology. They face various issues, such as technological incapacity, lack of innovation, limited capital, and even a lack of legal entity. The facts show that as many as 90.96% of SMEs in Bandung do not use computers in their operations, indicating that SMEs' readiness to adopt mobile payment technology is lacking (Utami et al., 2019).

Indonesia has a QR code payment system standard initiated by Bank Indonesia and the Indonesian Payment System Association (ASPI) called QRIS (Quick Response Code Indonesian Standard). QRIS aims to simplify and facilitate electronic transactions in Indonesia by unifying various QR code-based payment methods from different financial service providers and payment service providers into one standard. The implementation of QRIS can improve SME performance because QRIS provides ease and benefits for entrepreneurs and customers in conducting transactions (Hutagalung et al., 2021). When the public has a good understanding of the benefits such as convenience, speed, and security offered by QRIS, they will tend to be more interested and motivated to adopt this technology (Faizani & Indriyanti, 2021).

In 2023, the Representative Office of Bank Indonesia for West Java Province (BI Jabar) stated that 5.9 million or 21.39% of SMEs in West Java Province had used the QRIS payment method. West Java is the province with the highest use of QRIS among SMEs (Prayoga, 2023). However, many SMEs have not yet adopted QRIS as a transaction method. There are three main reasons why SMEs do not choose digital payments as the primary option: first, the concern of SME actors about making mistakes in using digital payments; second, the lack of confidence in non-cash and digital products; third, the lack of understanding of the features and how to use digital payment services (Antareza et al., 2021).

A concept has now emerged called a cashless society. The concept of a cashless society in Indonesia refers to a condition where financial transactions and payments are made without using cash but through electronic payment tools such as debit cards, credit cards, digital wallets, and bank transfers. Cashless aims to provide an effective, secure, and transparent system in finance, whereas more use of cash can reduce production, distribution, and storage costs for cash. A cashless society concept in Indonesia, based on research carried out by Abbas in 2017, is still developing and needs more focus on research. According to Aminata and Sjarif (2020), a cashless society in Indonesia greatly includes debit card transactions, credit card transactions, and electronic money.

The increase in the number of QRIS users in Indonesia can influence increased interest among business players in the adoption of digital payment methods through the lens of the TOE framework. Internal and external technologies with regard to current practice, internal equipment, and available external technologies can influence acceptance from the technology context. Organization context refers to the characteristics, resources, and assets of the company—size, level of operation, hierarchical structure, procedures, human resources, relations between employees, available resources, organizational culture, and its communication and change processes. Meanwhile, the environmental context includes the environment in which the company operates, such as industry structure, competitive pressure, suppliers, socio-cultural issues, and government relations (Aligarh et al., 2023). Based on the issues related to SME performance in adopting QRIS as a digital payment method, several aspects can be analyzed through the TOE (Technology, Organization, and Environment) framework.

II. LITERATURE REVIEW

A) Theory of Diffusion of Innovations

The Theory of Diffusion of Innovations was proposed and popularized by Everett Rogers in 1962. The Diffusion of Innovation (DOI) theory explains the process of adopting Information Technology (IT) with a focus on understanding how technological innovations can be effectively adopted and utilized, thereby achieving optimal development (Rogers, 2003). The main goal of this theory is to explain the steps from the introduction of innovation to its utilization, with the hope that new technology can be widely accepted and used in a particular context or society. Rogers' theory isolated five characteristics of the Diffusion of Innovation: relative advantage, compatibility, complexity, trialability, and observability.

B) Adoption of Digital Payment

Digital payments refer to transactions between a business and its client through mobile phones. Businesses need digital wallets or payment terminals in order to accept mobile payments from clients. Once the payment from the customer is received, the funds will be deposited into the company's account according to the service provider used by the company (Mahakittikun et al., 2021). Thus, mobile payment provides convenience and flexibility in the financial transaction process between customers and companies using mobile devices as the main medium.

C) Technology, Organization, and Environment Framework

The Technology, Organization, and Environment (TOE) framework was introduced by Tornatzky and Fleischer in 1990 to describe the phenomenon of technology adoption within organizational units of analysis. The factors generally associated with the adoption of technology, organization, and environment within an organization according to (Rogers, 2003) are technology: (1) Compatibility, (2) Perceived Usefulness, (3) Relative Advantage, (4) Complexity; (5) Security Concerns, organization: (1) Cost; (2) Organization Readiness; (3) Top Management Support; (4) Organization Size; (5) Organization Culture, environment: (1) Government Support; (2) Competitive Pressure; (3) Environment Uncertainty; (4) Vendor Quality.

D) Hypothesis Development

To illustrate the impact of the TOE (Technology, Organization, and Environment) framework (X), which involves three main contexts: Technological Context (relative advantage, compatibility, and complexity), Organizational Context (organization readiness), and Environmental (Competitive Pressure) context on QRIS Adoption and its influence on MSMEs Performance (Y).

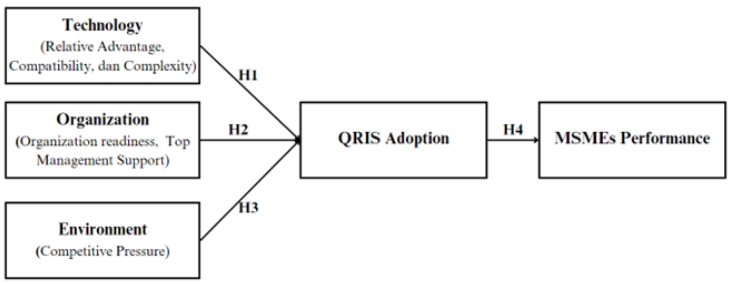

Fig 1. Research Model

H1: Technology influences QRIS Adoption.
H2: Organization influences QRIS Adoption.
H3: Environment influences QRIS Adoption.
H4: Technology, Organization, and Environment influence MSMEs Performance through QRIS Adoption as a moderating variable.

III. METHODOLOGY

This research is a causal study that will examine how the TOE variables relate to one another (technology, organization, and environment) and MSME Performance through the adoption of QRIS by MSMEs in Bandung City using a quantitative method. To determine the relationships between variables, a survey was conducted by distributing questionnaires to 130 MSMEs in Bandung City that have adopted the QRIS payment method. The data analysis and processing techniques used in this study include Structural Equation Modeling (SEM) - Partial Least Square (PLS). The data analysis methods applied include descriptive analysis, validity testing, reliability testing, and hypothesis testing using Partial Least Squares – Structural Equation Modeling (PLS-SEM). The software used for the analysis is SmartPLS 4. The testing process consists of two stages: the Measurement Model (Outer Model) and the Structural Model (Inner Model).

IV. RESULTS AND DISCUSSION

A) Respondent Characteristics

This study was conducted with MSME actors in Bandung City who use the QRIS payment method for transactions. Based on the age of respondents, the largest group is aged 26–35 years, comprising 50.8% of respondents. The second largest age group is 36–45 years, covering 36.9% of respondents. The age group 18–25 years comprises 9.2% of respondents, while those aged over 46 years constitute only 3.1% of respondents. Based on the length of business operation, the largest group is 1 - 5 years, with 54.6% of respondents, followed by those with more than 5 years of operation, comprising 42.3% of respondents. Businesses operating for less than 1 year make up only 3.1% of total respondents. Based on the number of employees, the majority of businesses have 1 - 5 employees, accounting for 91.5% of respondents. Businesses with 6 - 10 employees make up 8.5%.

B) Descriptive Analysis

This study uses Descriptive Analysis and implements it with a continuum line. The continuum line consists of five categories: 20% - 36% described as Very Low, >36% - 52% described as Low, >52% - 68% described as Moderate, >68% - 84% described as High, and 84% - 100% described as Very High.

Table 1: Descriptive Analysis

Construct	Percentage score	Category
Technology	86,95%	Very High
Organization	86,08%	Very High
Environment	87,35%	Very High
QRIS Adoption	86,40%	Very High
MSME's Readiness	87,02%	Very High

The results of the descriptive analysis showed that the Technology variable obtained a total score of 3,956 with an average percentage of 86.95%. The Organization variable got a total score of 3,357 with an average score of 86.08%. The Environment variable has a total score of 2,847 with an average of 87.35%. QRIS Adoption shows a total score of 2,229 with an average percentage of 86.40%. The MSMEs Performance variable has a total score of 2,265 with an average percentage of 87.02%. Overall, all the variables analyzed were in the Very Good category, indicating that the aspects of Technology, Organization, Environment, QRIS Adoption, and MSMEs Performance had a high positive influence.

C) Measurement Model (Outer Model)

The dependability of the instrument and the reliability of the concept are assessed using the outer model. The measurement of validity in this study focuses on convergent validity and discrimination validity. In the convergent validity test, it is considered valid if it has a loading outer value of more than 0.70 and an AVE—average variance extracted—value of more than 0.50 (Hair et al., 2017). However, the outer loading value between 0.60 and 0.70 is still considered sufficient or acceptable (Hair et al., 2017).

Table 2: Outer Model

Construct	Indicators	Outers Loadings	AVE
Technology	T1	0,758	**0,460**
	T2	0,673	
	T3	**0,584**	
	T4	**0,569**	

	T5	0,620	
	T6	0,737	
	T7	0,725	
Organization	O1	0,604	**0,451**
	O2	**0,516**	
	O3	**0,572**	
	O4	0,802	
	O5	0,759	
	O6	0,729	
Environment	E1	0,695	0,530
	E2	0,796	
	E3	0,743	
	E4	0,633	
	E5	0,762	
QRIS Adoption	QA1	0,776	0,559
	QA2	**0,563**	
	QA3	0,742	
	QA4	0,875	
MSMEs Performance	MP1	0,756	0,635
	MP2	0,807	
	MP3	0,773	
	MP4	0,848	

There are some MSMEs' performance construction indicators with an outer loading value of less than 0.60, either T3, O2, O3, and QA2. An AVE value of less than 0.50 shows the cause of the construct's invalidity. In this case, what needs to be done is to drop the said indicator and then resubmit.

Table 3: Outer Model

Construct	Indicators	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Technology (T)	T1	0,787	0,771	0,846	0,530
	T2	0,708			
	T5	0,617			
	T6	0,748			
	T7	0,741			
Organization (O)	O1	0,634	0,748	0,842	0,635
	O4	0,816			
	O5	0,819			
	O6	0,755			
Environment (E)	E1	0,69	0,777	0,848	0,574
	E2	0,789			
	E3	0,735			
	E4	0,647			
	E5	0,768			
QRIS Adoption (QA)	QA1	0,78	0,736	0,851	0,657
	QA3	0,755			
	QA4	0,884			
MSME's Readiness (MR)	MR1	0,767	0,808	0,874	0,524
	MR2	0,814			
	MR3	0,744			
	MR4	0,815			

After removing some of the indicators with an outer loading below 0.60, the rest of the indicators have shown adequate validity. One can check the reliability through methods such as Cronbach's Alpha and Composite Reliability. If Cronbach's Alpha and Composite Reliability are above 0.70, then it is right to conclude that the reliability of the construct is good enough according to many standards. The AVE (Average Variance Extracted) value for the MSMEs Performance construct has reached a valid level. Generally, an AVE value considered valid should be greater than 0.50, indicating that the construct can explain more than 50% of the variance in its indicators.

D) Structural Model Testing (Inner Model)

The inner model, or structural model, is a part of Structural Equation Modeling (SEM) that explains the relationships between latent constructs (latent variables). The R^2 values are interpreted as weak (0.25), moderate (0.50), and strong (0.75) (Hair et al., 2017).

Table 4: R-Square

Construct	R-square
MSME's Readiness	0,663
QRIS Adoption	0,800

The R-square value for MSMEs Performance is 0.663, indicating that 66.3% of the variation in MSMEs Performance is explained, while the remaining 33.7% is influenced by other variables not used in this study. This R-square value can be considered moderately strong as it approaches the 0.75 threshold. Meanwhile, the R-square value for QRIS Adoption is 0.800, meaning 80%, with the remaining 20% influenced by other variables. This value is very strong as it is above 0.75.

E) Hypothesis Testing (Bootstrapping)

Table 5: Bootstrapping

	Original sample	T statistics	P values	Explanation
Technology -> QRIS Adoption	0,294	3,81	0,000	Accepted
Organization -> QRIS Adoption	0,244	2,747	0,006	Accepted
Environment -> QRIS Adoption	0,412	4,818	0,000	Accepted
QRIS Adoption -> MSME's Readiness	0,813	26,490	0,000	Accepted

The hypotheses in this study can be accepted because the t-statistics value for each hypothesis is greater than 1.65, and the P-values are less than 0.05. The hypotheses in this study can be accepted because the t-statistics value for each hypothesis is generally ≥ 1.65, and the significant path coefficients generally have P-values ≤ 0.05 (Hair et al., 2017). The result, therefore, indicates that technology, organization, and environment significantly drive QRIS adoption, and inversely, QRIS adoption significantly affects the performance of MSMEs.

F) Discussion

The confounding factor technology is significantly very influential on QRIS adoption, which has a t-statistics value of 3.810, greater than 1.65, and P of 0.000, less than 0.05. Thus, this study supports the study by Kwabena et al. (2021), which arrived at the conclusion that it is technology driving the acceptance and adoption of mobile payment systems. The t-statistics value of the organization factor is also very vital, which is 2.747 with a P value of 0.006, hence supporting the findings by Mahakittikun et al. in 2021, indicating that an organization is very vital in enhancing knowledge of mobile payments.

Environmental factors are significantly affecting QRIS adoption with a t-statistics value of 4.818 and a P values of 0.000. This research is in line with the study of Sulistyaningsih & Hanggraeni, 2021, which said that the environment affects the decision on new technology adoption. The effect of QRIS adoption on MSME performance is significant, with a t-statistics value of 26.490 and P values of 0.000. A study by Sulistyaningsih & Hanggraeni (2021) concludes that QRIS accommodates digital transaction payments, boosts efficiency, and decreases operational costs for MSMEs.

V. CONCLUSION & RECOMMENDATIONS

The following findings can be made in light of the research analysis on the impact of environment, organization, and technology on QRIS adoption and MSMEs performance:

1. The response to the role of technology, organization, environment, QRIS adoption, and MSMEs performance is very high or positive, with an average value above 84%. The majority of respondents believe that the role of technology significantly supports MSME operations, the organization facilitates technology adoption, and the environment is conducive to MSME growth. QRIS adoption received a positive response, indicating broad acceptance among MSMEs ready to leverage technology and digitalization.
2. Hypothesis analysis shows that technology, organization, and environment significantly influence QRIS adoption among MSMEs. This is evidenced by the satisfactory t-statistics and P values, indicating the positive impact of these three factors on QRIS adoption. Additionally, QRIS adoption significantly impacts MSMEs readiness, demonstrating that MSMEs in Bandung are prepared to utilize QRIS and thrive in the digital market.

Recommendations:

1. The government and service providers should enhance digital infrastructure, such as faster internet networks and payment devices compatible with QRIS, to facilitate QRIS adoption.
2. The government and QRIS service providers need to conduct outreach and education on the use of QRIS to raise public awareness, especially among MSME actors, about the benefits, security, and ease of transactions.
3. In supporting the cashless society movement by leveraging QRIS, MSMEs that accept non-cash payments through QRIS should encourage consumers to switch to this method, helping Indonesia transition to a cashless society because QRIS is faster, easier, cheaper, safer, and more reliable.
4. The public should increase their curiosity and trust in QRIS technology to support its use and enhance MSME revenues.
5. Future researchers are advised to cover a broader area beyond Bandung City, including respondents from various regions.
6. Future studies should incorporate qualitative methods, such as interviews, to obtain stronger confirmation of research findings.

Appendix

Construct	Item	Statement
Technology Relative Advantage Compatibility, dan Complexity (Moore & Benbasat, 1991)	T1	Implementing QRIS can help complete tasks efficiently.
	T2	The QRIS payment process is faster than cash payment methods.
	T3	In general, QRIS is suitable for the current situation and conditions.
	T4	In general, QRIS provides sales benefits.
	T5	In general, QRIS is a suitable step for business.
	T6	QRIS payments can be easily adjusted to customer needs and preferences.
	T7	In general, QRIS improves business quality standards.
Organization Organization Readiness (Grandon & Pearson, 2004)	O1	This business has the technological resources for QRIS adoption.
	O2	This business has adequate internet connectivity.
	O3	This business has competent human resources in operating QRIS technology.
	O4	In general, QRIS is an important strategy in sales.
	O5	In general, QRIS supports the business financial system.
	O6	QRIS payments accelerate and increase the efficiency of business financial processes.
Environment Competitive Pressure (Premkumar & Roberts, 1999)	E1	In general, QRIS increases customer trust.
	E2	QRIS payment is a strategic need to compete in the market.
	E3	In general, QRIS is important in increasing competitiveness.
	E4	QRIS payments are a reason to stay competitive.
	E5	QRIS payments are important for business feasibility.
QRIS Adoption (Wu & Chen, 2014)	QA1	In general, QRIS is an efficient payment solution.
	QA2	QRIS payment is suitable to be recommended to partners.
	QA3	In general, QRIS payments are suitable for my business.
	QA4	QRIS payment is suitable as the main payment method in the future.
MSME Performance (Moore & Benbasat, 1991)	MP1	In general, utilizing QRIS increases the standard of business service quality.
	MP2	In general, QRIS makes work easier.
	MP3	QRIS payments facilitate transactions between buyers and sellers.
	MP4	In general, QRIS payments increase customer satisfaction.

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