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Analysis of the Factors of Implementing QRIS for Micro Enterprises in Karawang Regency

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ABSTRACT

The transition to the cashless society era has influenced micro-businesses to adapt technology in digital payment systems as part of their transaction processes. The adoption of QRIS technology becomes a crucial first step for them to enter the digital ecosystem and enhance competitiveness, especially in Karawang Regency. The lack of digital literacy is identified as one of the significant barriers. This research aims to analyze the factors that influence the adoption of QRIS for micro-businesses in Karawang Regency. The analysis method uses Multidimensional Scaling Analisis dilakukan menggunakan analisis multidimensional scalling (MDS) through the RAPFISH Program. There are three focus dimensions for the analysis: economic, social, and technology. The economic dimension recorded the highest RAPQRIS ordination index score at 64.54687, followed by the technology and social dimensions. Leverage attributes analysis identifies several crucial attributes for maximizing QRIS implementation, such as cash minimization, business type, and understanding of supporting applications.

KEYWORDS *QRIS, MSMEs, multidimensional scalling, RAPFISH, Karawang Regency, Digital*

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are one of the most important economic sectors in Indonesia (Nursini, 2020; Tumiwa & Nagy, 2021). The ASEAN Investment Report (2022) states that the contribution made by MSMEs to Gross Domestic Product (GDP) reaches 60.3%, absorbs 97% of the national labor force from the total national labor absorption, and contributes 14.4% of national exports. The number of MSMEs in Indonesia, which reached 64.47 million, is the primary reason why MSMEs contribute significantly to the Indonesian economy. This number far exceeds that of other ASEAN countries. The existence of MSMEs in Indonesia provides the country with the potential for a strong national economic base due to the large number of MSMEs and significant labor absorption (Syukron Madfuz et al., 2025). The percentage of MSMEs, which increases annually, will help reduce the unemployment rate in Indonesia. MSMEs have three advantages that make them resilient: they produce consumer goods or services close to the community, they tend not to use imported materials, and they mostly use their own capital without relying on bank loans (Mahyuni and Setiawan, 2021).

The direction from the President of the Republic of Indonesia for MSMEs is to target 30 million MSMEs by 2024 to have switched to digitalization. This figure contrasts with the current reality, where only 20 million MSMEs have entered the digital ecosystem. MSMEs that engage with virtual business channels can expand market reach and create opportunities to interact directly with consumers. The digital world also opens opportunities for business actors to explore new sustainable business models (Komalasari et al., 2021).

Efforts to transform micro businesses into digital platforms must be prepared comprehensively. Increasing transaction volume targets must also be considered. Transactions on digital channels are naturally accompanied by digital payments. Data compiled by Bank Indonesia (2022) shows that the value of transactions using electronic money reached Rp. 35.10 trillion as of December 2021. This represents a 58.60% increase from Rp. 22.31 trillion in the same period the previous year.

The shift towards a cashless culture requires MSME actors, especially micro businesses, to adapt by providing digital payment systems for ongoing transactions. According to Dihni (2022), 85.6% of MSMEs still rely on cash transactions for payments. Only about 0.2% of MSMEs have fully implemented non-cash transactions, while 14.2% can serve both payment methods. MSME actors are not limited to the digital market (e-commerce) but also include those in kiosks and street vendors, who must participate in implementing digital payment systems.

Data from the Ministry of Cooperatives and MSMEs states that in 2019, Indonesia had 65,465,497 MSMEs, of which 64,601,352 were micro business units. Data from the West Java Provincial Cooperatives and MSMEs Office on the West Java Open Data Portal in 2021 recorded 315,388 MSMEs, an increase from 233,606 MSMEs in 2016. The role of micro businesses is crucial for economic development in a region, especially in Karawang Regency. Half of economic output in Karawang Regency is supported by micro business activities. However, micro businesses in Karawang Regency still face challenges. Their products have not yet penetrated large industry trade networks, resulting in slow development. Many micro business actors face constraints related to capital and technological knowledge.

In this context, increasing the digital literacy of micro businesses in Karawang Regency, starting with the implementation of QRIS, can be an important first step to enhancing competitiveness. This commitment is vital considering the priority programs emphasized by the Regent and Deputy Regent of Karawang, as stated in Regional Regulation No. 5 of 2021. Karawang Regency aims to improve the quality and competitiveness of human resources, strengthen the people's economy based on local potential and the creative economy, ensure sustainable environmental management, enhance disaster resilience and climate change adaptation, provide clean, effective, and reliable government management, and strengthen supporting infrastructure to foster economic development and basic services.

RESEARCH METHOD

The research was conducted in Karawang Regency with a coverage of 5 sub-districts. Primary and secondary data collection will be carried out from January to March 2024. The five sub-districts consist of West Karawang, East Karawang, Klari, East Telukjamber, and Cikampek.

Sampling was carried out on micro business actors in Karawang Regency by the two-stage cluser sampling method. Kerlinger and Lee (2000) suggest that a minimum of 30 samples is needed in terms of quantitative research. The research will focus on the sub-district with the highest number of micro business actors 1 – 5 in Karawang Regency. Respondents were given a limitation, namely micro business actors who have used QRIS. The number of sub-district samples is as follows.

Multidimensional scalling analysis (MDS) is a multidimensional analysis to determine the position of an object against another object based on the assessment of similarity, and to determine the interdependence relationship between variables or data (Johnson, 1992). Multidimension scalling can help in identifying the key dimensions underlying the object of the respondent. The stages carried out in the MDS analysis use the RAPQRIS technique. The stages are arranged as shown in Figure 1:

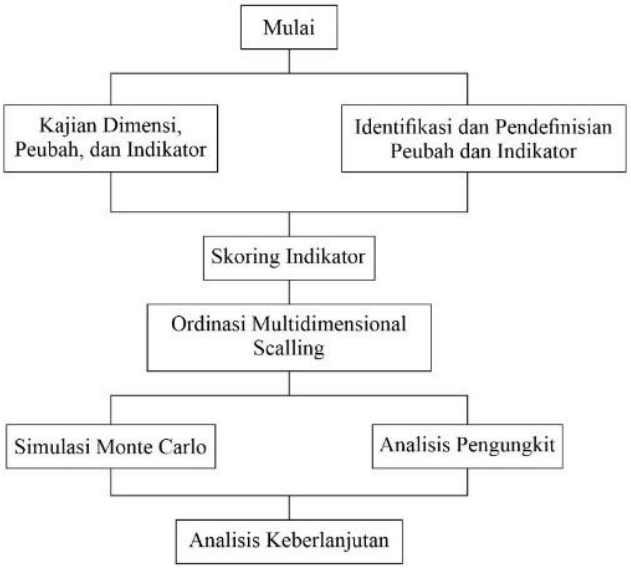

Figure 1. MDS-based RAPQRIS analysis

The determination of dimensions, variables and indicators is identified by creating a composite index. Determining these three things must be based on theory, perspective and appropriate approach in order to analyze the factors and strategies. Each dimension is made a thematic index. Composite indexes are formed from the compilation of thematic indices into symmetric indices and are presented as a single composite measure. The need to compile composite indices occurs in situations when individual indicators cannot

present complex/multidimensional concepts in an adequate manner. Composite indices can ideally measure multidimensional concepts that a single indicator cannot capture.

The stages of analysis using add ins in MDS-based Ms. Excel in outline have stages, namely:

1) The results of data collection are scored for each change/attribute
2) The recap of the scoring of the results of the interview in the field is arranged in the mode of each answer to each attribute
3) Determined the main reference of good and bad on all attributes
4) Creating two other main points, namely the "middle point" which is the bad point and the good point. These two additional main points serve as the reference for vertical directions "up" or "up" and "down" or "down"
5) Create additional reference points called anchors that are used in helping the results of the ordination. This point will also help in compiling a regression analysis to calculate "stress"
6) Enter any data required in the RAPFISH program that has been added in the add ins.
7) RUN RAPFISH
8) RUN LEVERAGE
9) RUN MONTE CARLO

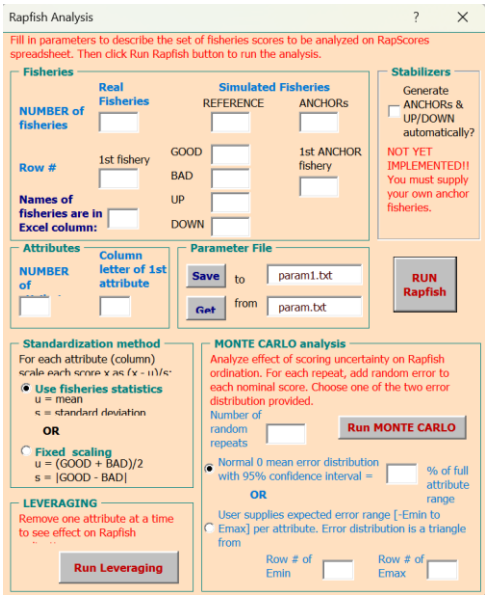

Figure 2. The feasibility of MDS (Goodness of fit)

The feasibility of MDS (Goodness of fit) is assessed from the value of stress calculated by the formula of Kruskal (1964):

$$\sqrt{\frac{\sum(d_{ij} - \widehat{d_{ij}})}{\sum {d_{ij}}^2}}$$

d_ij = Actual distance between two points to i and j

(d_ij)ˆ= Approximate distance based on the MDS model

The magnitude of the stress value is related to the number of dimensions to be analyzed. The greater the number of dimensions, the smaller the stress value. The stress value is also related to the RMS (root mean square) or Rsquare value. The larger the RMS value, the less stress value.

Table 1. Hubungan goodness of fit dan stress

No	Stress	Goodess of fit
1	0,200	Bad
2	0,100	Enough
3	0,050	Good
4	0,025	Excellent
5	0,000	Sempurna

From the results of the analysis using MDS, it will be obtained:

1) The status or index of each dimension
2) Stress and RSQ values
3) Leverage attribute/sensitive attribute, which is a leverage attribute or attribute that needs to be improved in order to improve the index and status of each dimension which is a reference for strategizing

RESULTS AND DISCUSSION

Factors that cause micro businesses to implement digital payments in their businesses

In determining the value of the economic, social, and technological dimension indexes, the results of surveys conducted in the field need to be recapitulated by determining the mode of each indicator. This mode is processed in RAPQRIS so that the index values, leverage attributes, and also dimensional weights can be known based on the results of a survey that has been conducted on 30 respondents divided into five sub-districts in Karawang Regency that have been determined beforehand.

Economics

The results of the analysis from RAPQRIS for the economic dimension are shown by the map of the position of the Economic Dimension in the RAPQRIS Ordination at 64.54687. This value shows that it has gone towards GOOD but is not optimal. This value can still be improved in the form of a program. The distribution of RAPQRIS Ordination values for the economic dimension is presented in Figure 2.

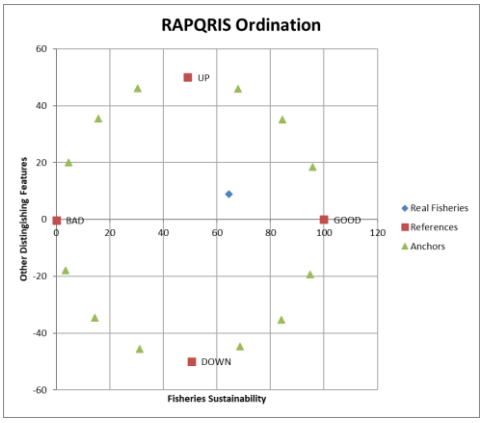

Figure 3. Ordination of RAPQRIS economic dimension

The Stress value in the economic dimension shows a value = 0.1346088 which when interpreted based on goodness of fit is included in the fair or adequate category. According to Kavanagh, the stress value if the value is still below 0.20 indicates that it is still good enough to be used. The RSQ value shows a high value, which is = 0.9468803. This means that 94.6% of the data variations are very indicative.

Leverage attributes can be seen from the maximum value divided by two. The economic dimension has a maximum value of 8, so leverage attributes can be seen from attributes that have a value of more than four. Attributes that are leveraged attributes are Branding, Minimizing cash availability, and Administration fees, Speed of disbursement of funds, and transaction bookkeeping. Leverages attributes will be the main focus in formulating priority programs. A diagram of the leverage of the atrributes for the economic dimension is presented in Figure 4.

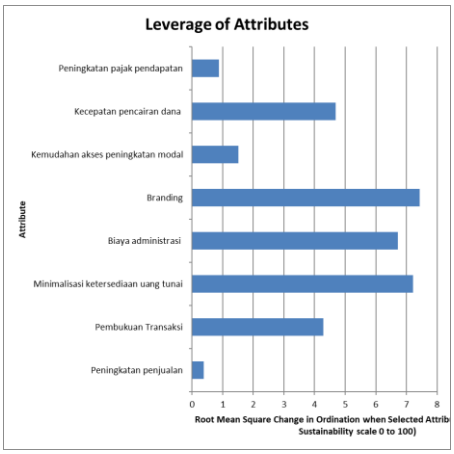

Figure 4. Leverage attributes economic dimension

The attributes that are leveraged attributes in the economic dimension indicate the need for special attention to these attributes. Digital payments, in this case, QRIS can provide consumers with a good view of a business because it is considered to have positioned them as part of a modern business. Such branding can increase

competitiveness and create a positive image in a brand or a business (Kotler and Keller 2016). Minimizing the availability of cash is also an attribute included in leverage attributes because of its role in increasing efficiency. Today's modern society tends to have cash in small value and the use of cash often has constraints in terms of efficiency. The use of cash also has problems related to procurement and management which are quite expensive (Suryanto 2022). This also makes minimizing the availability of cash included in leverage attributes.

Regarding administrative costs, the assumption of MSME actors sees administrative costs as a significant obstacle, on the other hand, even though there are administrative costs in its implementation, in the long term it has the potential to save and increase revenue (Listiyono et al. 2024). This is closely related to the disbursement of funds which takes a long time so that it becomes an obstacle because of the need to turn the funds back for capital expenditure. Transaction bookkeeping is next an attribute in the leverage attributes of the economic dimension. Solihat (2024) explained that this attribute can be a lever because its role is quite vital for merchants. QRIS helps in recording and reporting daily transactions better resulting in more accurate and structured financial reports.

a. Social

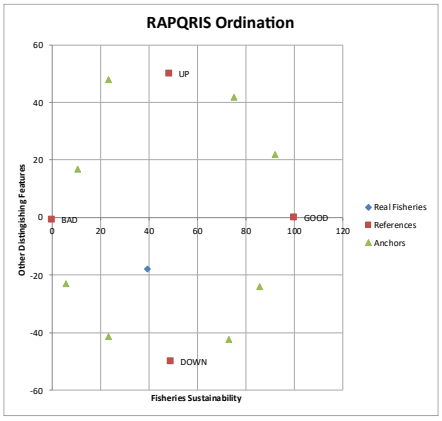

Figure 5. RAPQRIS Ordination Social Dimension

The results of the analysis using RAPQRIS were carried out for the social dimension. The results of the analysis showed that the social dimension had a value of 39.31807 in the RAPQRIS Ordination. This shows that the value is still far from Good or has not reached optimal. This indicates that it is still necessary to reconsider how the value can be increased again through programs from the government so that the value becomes optimal. This value is presented in Figure 5.

The stress value of the social dimension was obtained at a value of 0.1379621 which means goodness fit, namely being in a fair or sufficient condition. Again referring to Kavanagh, the stress value of the social dimension is still below the value of 0.20, indicating that it can still be used. Meanwhile, for the RSQ value in this dimension shows a value of 0.9347428 which means that 93.4% of the data variability is explained in the

ordination graph, then the ordination analysis is said to be representative of the original data.

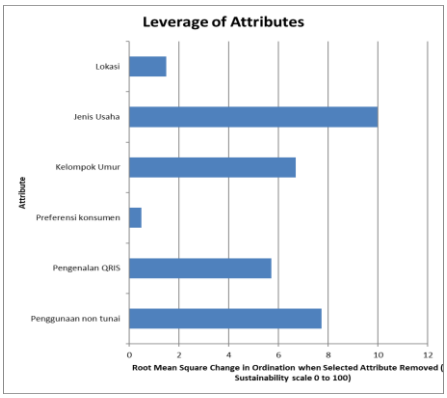

Figure 6. Leverage attributes of the social dimension

The leverage attributes of the social dimension have a maximum value of 12. Attributes that need to be considered in the social dimension can be seen from those that have a value above six. Leverages attributes from the social dimension lead to the type of business, non-cash use, and age group. These attibutes must be considered and become the top priority in the preparation of regional programs. Leverage atttributess for the social dimension is presented in Figure 6.

Special attention should be paid to the attributes included in the leverage attributes. What types of businesses can apply QRIS in the sales process must be considered whether it suits their needs. The use of technology in a business must be considered by looking at the suitability of the role of technology to the business character of MSME actors (Purnomo 2011). Different types of businesses will also affect the decision of business actors in implementing QRIS. Business actors in the culinary field are more adaptable because of the demands from consumers as well as in creating competitive opportunities in the midst of many competitors.

The use of non-cash as an attribute that is included in leverage attributes is also driven by the behavior of people who have prioritized cashless. Society, especially the younger generation, currently needs only a small amount of cash, so this new habit has affected the way of transacting by prioritizing non-cash. Financial incentives such as discounts and cashback also play a significant role in these behavior changes (Hamizar et al. 2023). Age groups act as leverage attributes because currently Gen Z and millennials are very adaptive to new technologies compared to the previous generation, namely Boomers and Gen X. The influence of digital literacy also affects young people in technology adaptation.

b. Technology

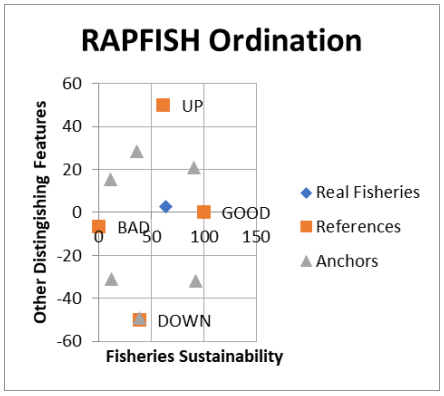

Figure 7. RAPQRIS Ordination of the technological dimension

Based on the results of the analysis using RAPQRIS Ordination, the results of the technology dimension have a value of 64.263. The value is towards the Good criterion or can be called optimal. This can be a material for improving the dimensions of technology so that it can be more optimal. This value is presented in Figure 7. Regarding the stress value obtained, the technology dimension has a stress value of 0.147509 which is included in fair or quite good in the goodness of stress table. The value is still below the limit value which indicates a bad value at 0.20 so that the value of 0.147509 is sufficient to be used in the analysis. Furthermore, regarding the RSQ produced in this analysis, a value of 0.938684 was obtained. The interpretation of the value is that 93.8% data variability is explained in the ordination graph, so the ordination analysis is said to be representative of the original data.

Based on the Leverage attributes, the Technology Dimension has a maximum value of 16, so that leverage attributes can be seen from attributes that have a value of more than eight. The attributes that are leveraged attributes are the level of ease, and the understanding of supporting applications. A diagram of the leverage of attributes is available in Figure 8.

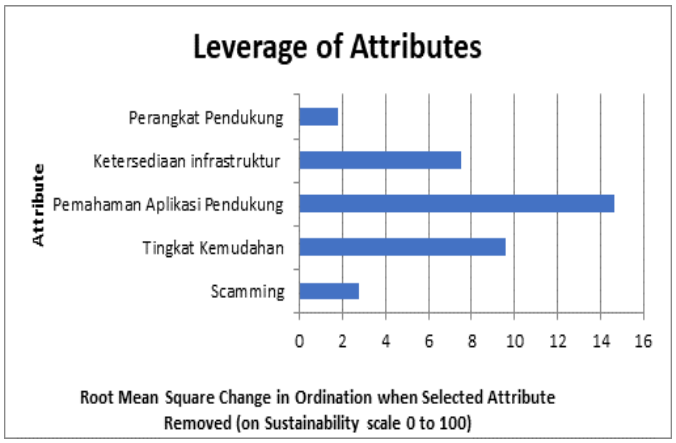

Figure 8. Leverage attributes of the technology dimension

Research conducted by Ikwan and Indriani (2024) explains that perceived ease of use in using QRIS is very influential in its adoption. The easier QRIS is to use, the greater

the opportunity for MSME actors to implement QRIS in their business. QRIS is designed to be simple to use so that it is very relevant to be applied to MSMEs that have limited resources. Understanding of supporting applications also contributed. Understanding QRIS supporting applications is an obstacle in the adoption of QRIS technology if users are unable to operate and optimize the functions of the application. Inability to use the application will actually slow down the transaction process. These two attributes must be really considered by the government, especially local governments, in order to increase sustainability. Success in facilitating the availability of infrastructure, especially in signals, will increase digital literacy which will have an impact on the adoption of QRIS in MSMEs. Looking at the merchant's side, they can finally understand more about the menus available in the supporting application that can help maximize their business.

The results of leverage attributes from the three dimensions, namely the economic, socio-cultural, and technological dimensions, have similarities, namely the existence of leverage attributes that have maximum value. The economic dimension has attributes, namely branding, administrative costs, and transaction bookkeeping, which already have maximum value, but are still included in the leverage attributes. The social dimension has attributes, namely the type of business. The dimension of technology that already has the maximum value is the level of convenience. This shows that these attributes even though they have maximum value, their contribution to the whole, if changed, will make sustainability compromised. Ario et al. (2021) provide an explanation in their analysis that a value that is already maximum, if not managed properly, can be an inhibiting factor, so that its failure can directly affect the sustainability of an ecosystem. These attributes are the main support of sustainability when properly optimized.

CONCLUSION

The implementation of QRIS in Karawang Regency requires focused attention on three primary dimensions: economic, social, and technological. Within these dimensions, critical attributes influence the sustainability and effectiveness of QRIS adoption, including branding, cash minimization, administrative costs, speed of fund disbursement, transaction bookkeeping, business type, non-cash usage, user age group, ease of use, and understanding of supporting applications. These leverage attributes are essential for shaping strategies that promote wider and more effective implementation of QRIS among micro enterprises. Future research could explore in-depth sector-specific barriers and facilitators within these dimensions, as well as longitudinal assessments of QRIS impact on business growth and financial inclusion in Karawang Regency to inform more tailored policy and support mechanisms.

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