JURNAL BINA PRAJA
Journal of Home Affairs Governance

ARTICLE

The Effects of Non-cash Transactions Through Quick Response Indonesian Standard (QRIS) on the Number of MSMEs Workers

Agni Agrasevy Dwiatma [1], **Chaikal Nuryakin** [2]

[1, 2] Department of Economics, Faculty of Economics and Business, University of Indonesia, Depok, Indonesia.

agniagrasevy@gmail.com

OPEN ACCESS

Citation: Dwiatma, A. A., & Nuryakin, C. (2025). The Effects of Non-cash Transactions Through Quick Response Indonesian Standard (QRIS) on the Number of MSMEs Workers. *Jurnal Bina Praja, 17*(1), 33–41. https://doi.org/10.21787/jbp.17.2025.33-41

Submitted: 24 February 2025

Accepted: 9 May 2025

Published: 30 April 2025

Abstract: According to data from the Central Statistics Agency for 2022, 66.48% of Indonesians have accessed the internet. This trend supports the rapid development of digitalization in payment systems, particularly with the use of Quick Response Indonesia Standard (QRIS). QRIS aims to enhance transaction efficiency, accelerate financial inclusion, and advance micro, small, and medium enterprises (MSMEs). The shift in consumer behaviour towards digital transactions due to their efficiency and speed has forced MSMEs to adapt by adopting QRIS for their payment systems. This adoption of QRIS by MSMEs will undoubtedly impact their business operations and the number of workers they need. This study uses linear regression with the Two-Stage Least Squares (2SLS) model to examine the relationship between the adoption of QRIS in cashless payment systems and the number of workers required by MSMEs. This approach is applied to address potential endogeneity arising from reverse causality, where QRIS adoption may influence labour demand, but labour capacity might also affect the decision to adopt QRIS, as well as omitted variable bias that could be correlated with both QRIS adoption and employment levels. The result indicates that QRIS has a significant positive direct effect. Although this finding does not align with the Routine-Biased Technical Change (RBTC) theory, which suggests that technology replaces routine workers, the study finds that MSMEs still need workers to serve customers and tally transaction totals (routine workers) before customers make payments through QRIS. Additionally, MSMEs are increasing their workforce by hiring family members or relatives (non-routine workers) to support their operations.

Keywords: Quick Response Indonesia Standard (QRIS); Micro, Small and Medium Enterprise (MSMEs); Routine-Biased Technical Change (RBTC); Two-Stage Least Square (2SLS).

1. Introduction

Today's society is increasingly technologically oriented. According to Statistics Indonesia (2022), 66.48% of Indonesians have accessed the internet. Meanwhile, according to data from the Indonesian Internet Service Providers Association (APJII), the number of internet users is predicted to be 221,563,479 in 2024, up from 278,696,200 in 2023. This growth is dominated by urban regions, accounting for 69.5%. This internet usage benefits those who prefer to use the QRIS (QR Code Indonesian Standard) in non-cash payment transactions. This shift in people's behaviour necessitates that MSMEs adjust to consumer preferences, who prefer to transact with merchants that supply QRIS. Bank Indonesia launched QRIS to increase transaction efficiency, accelerate financial inclusion, and support MSMEs (2020). According to Sulistyaningsih (2022) and several other studies, QRIS boosts MSME income. Furthermore, it will have an impact on economic growth because, according to the Coordinating Ministry for Economic Affairs (2021), MSMEs have contributed by employing 97% of the workforce and attracting 60.4% of investment.

Following its publication in 2020, Bank Indonesia (2023) reported that the MSME sector accounted for 80% of transactions processed through QRIS. MSMEs accounted for 61% of all QRIS merchants. Overall, the growth in nominal transactions using QRIS in 2023 totaled 229.96 trillion rupiah. This figure increased by 130.01% annually. Indeed, the total number of QRIS users reached 45.78 million, while the total number of merchants reached 327.98 million. With the advancement of QRIS, this technological breakthrough may replace the role of cashiers or cash managers in the company's process. This is because, without a cashier, customers may pay directly with their mobile phones by scanning the barcode. Following that, all incoming transactions are automatically recorded in the QRIS merchant's account. Directly recorded transactions will make it easy to track open sales turnover.

According to Goos (2021), the theory of Routine-Biased Technical Change (RBTC) suggests that the current digitisation of technology enhances the routine of manufacturing operations for products and services, including activities related to financial transactions. The advancement of this technology enables the movement to replace workers who perform mundane activities with computers or other artificial technologies. As a result, non-routine work competencies are in more demand than routine job competencies. However, when seen from the workforce side in the micro and small business sector, according to data from Statistics Indonesia (2022), there was an increase compared to 2021. The increase was 3.3% from the original 9,109,297 workers in 2021 to 9,416,779 workers in 2022. The micro and small sectors absorbed more than 60% of the total workforce in 2022. Through this study, researchers aim to analyse the influence of digitalisation on the shape of adjustment in the instalment framework utilising QRIS by MSME actors, focusing on the number of workers needed in the MSME sector. Does QRIS adoption by MSMEs lead to an increase in the number of workers, or does it reduce their need for workers?

2. Methods

This study used Two-Stage Least Squares (2SLS) to estimate and achieve a comprehensive understanding of the effect of non-cash transactions through QRIS on the number of MSME workers.

2.1. Empirical Framework

This study examines the number of workers from a balanced perspective, drawing on supply and demand theory, which assumes that the number of workers represents both the supply and demand for labour. This is because the purpose of this study is to analyse the impact of the supply side of the workforce. Wages influence both worker demand and supply, and therefore, they are considered endogenous variables in this study. The Labour Force Participation Rate (TPAK), which represents the proportion of the workforce relative to the working-age population in Indonesia, is used as an instrumental variable. TPAK reflects the workforce's willingness to work, as well as its salary level. Meanwhile, the number of QRIS merchants, MSME revenue, and inflation are exogenous factors influencing labour supply and demand.

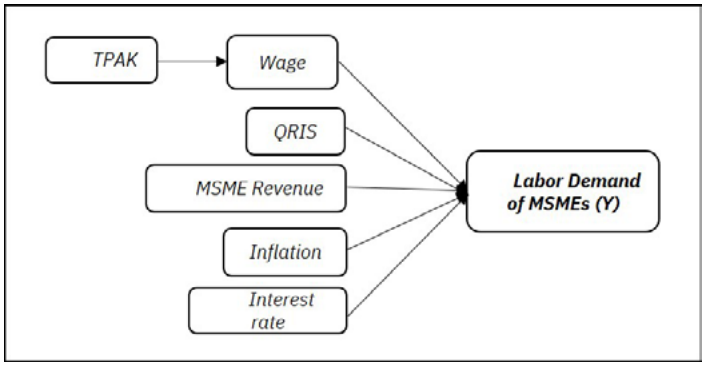

Figure 1. Conceptual Framework

2.2. Estimation Strategy

This study uses a proxy for labour market equilibrium, specifically the equilibrium condition: Labour = labour demand = labour supply. Therefore, the labour demand in this study, which is the dependent variable, is proxied by Labour (the total number of workers) in the labour market equilibrium, or in this study, it is referred to as the worker variable. This research refers to the Routine-Biased Technical Change (RBTC) theory and the Skill-Biased Technical Change (SBTC) theory. The RBTC theory divides the workforce into routine and non-routine workers. In contrast, the SBTC theory divides the workforce into skilled and unskilled categories. However, the Central Statistics Agency only provides data on the overall number of MSME workers, paid MSME workers, and unpaid MSME workers. Therefore, this study assumes that routine workers are proxied by paid workers, and non-routine workers are proxied by unpaid workers, as shown in the matrix below:

Table 1. Worker Proxy

	Routine	Non-Routine
Skilled	Paid worker	Unpaid worker
Non-Skilled	Paid worker	Unpaid worker

This study aims to analyse the effect of QRIS usage on labour demand, conducting several tests with the 'worker' variable representing the total number of workers, the 'paid' variable representing the number of paid workers, and the 'unpaid' variable representing the number of unpaid workers. According to the Profile of Micro and Small Industries from the Central Statistics Agency, paid workers are those who a business or company employs and receive compensation in the form of a salary, as well as additional benefits such as overtime, gifts, bonuses, and other forms of monetary

or in-kind remuneration. In contrast, unpaid workers are typically owners or family members who are actively involved in the operations of the business or company but do not receive formal compensation.

2.3. Estimation Model and Method

The estimation of the labour demand function may exhibit correlation with the error term or endogeneity between the number of workers (L) and wages (W). To address the endogeneity problem, Gujarati (2003) recommends methods such as Indirect Least Squares, Two-Stage Least Squares (2SLS), and Three-Stage Least Squares. This study employs the Two-Stage Least Squares (2SLS) method. According to Hill (2011), the 2SLS estimation method is applicable in both identified and over-identified conditions, which are present in this research model. An equation can be either identified or over-identified. The identification problem arises when different sets of structural coefficients can be consistent with the same data set. In other words, a specific reduced-form equation may align with multiple structural equations or hypotheses (models). The Two-Stage Least Squares (2SLS) model is also employed to address endogenous explanatory variables within the context of linear regression.

The first stage of Two-Stage Least Squares (2SLS) involves estimating the labour supply function, in this case, the wage, using the instrumental variable (IV), TPAK. The result of the first stage provides the estimated value of the wage. The second stage utilises the estimated value of wages to estimate the labour demand function. To account for potential issues such as endogeneity, heteroscedasticity, and omitted variable bias, the use of instrumental variables is recommended. While these variables are highly correlated with the explanatory variable, they should not be correlated with the error term in the equation. If a valid instrumental variable can be identified, a consistent estimate of the intercept can be obtained. However, finding a suitable instrumental variable is challenging, as is determining whether the selected instruments are truly independent of the endogenous variable. Instrumental variables are those that are correlated with the explanatory variables but not with the error term (Gujarati, 2003).

The effect of non-cash transactions through QRIS on the number of MSME workers was tested using the following equation model:

$$Labor_{it} = LaborSupply_{it} = LaborDemand_{it} \quad (1)$$

$$lnwage_{it} = ß_0 + ß_1 TPAK_{it} + \varepsilon_{1it} \quad (2)$$

$$lnworker_{it} = \alpha_0 + \alpha_1 ln\widehat{wage}_{it} + \alpha_2 lnQRIS_{it} + \alpha_3 lnMSMErevenue_{it} + \alpha_4 inflation_{it} + \alpha_5 interestrate_{it} + \varepsilon_{2it} \quad (3)$$

$$lnwage_{it} = \gamma_0 + \gamma_1 TPAK_{it} + \varepsilon_{3it} \quad (4)$$

$$lnpaid_{it} = \eta 0 + \eta_1 ln\widehat{wage}_{it} + \eta_2 lnQRIS_{it} + \eta_3 lnMSMErevenue_{it} + \eta_4 inflation_{it} + \eta_5 interestrate_{it} + \varepsilon_{4it} \quad (5)$$

$$lnwage_{it} = \lambda_0 + \lambda_1 TPAK_{it} + \varepsilon_{5it} \quad (6)$$

$$lnunpaid_{it} = \sigma_0 + \alpha_1 ln\widehat{wage}_{it} + \sigma_2 lnQRIS_{it} + \sigma_3 lnMSMErevenue_{it} + \sigma_4 Inflation_{it} + \sigma_5 Interestrate_{it} + \varepsilon_{6it} \quad (7)$$

$lnworker_{it}$ = Natural log of the number of MSME workers in 34 provinces in Indonesia
$lnpaid_{it}$ = Natural log of the number of paid workers of MSMEs in 34 provinces in Indonesia
$lnunpaid_{it}$ = Natural log of the number of unpaid workers in MSMEs in 34 provinces in Indonesia

$lnQRIS_{it}$	=	Natural log of the number of QRIS UMKM merchants in 34 provinces in Indonesia
$lnwage_{it}$	=	Natural log of Provincial Minimum Wages in 34 provinces in Indonesia
$ln\widehat{wage}_{it}$	=	Natural log Estimates of Provincial Minimum Wages in 34 provinces in Indonesia from equations model (2); (4); and (6)
$TPAK_{it}$	=	Labor Force Participation Rate in 34 Provinces in Indonesia
$lnMSMErevenue_{it}$	=	Natural log of Total Revenue of MSMEs in 34 provinces in Indonesia
$Inflation_{it}$	=	Annual Inflation (y-o-y) in 34 provinces in Indonesia
$Interestrate_{it}$	=	Annual Average Interest Rate (BI-7 Day Reverse Repo Rate)
$ß_0$	=	Intercept
α_0	=	Intercept
γ_0	=	Intercept
η_0	=	Intercept
λ_0	=	Intercept
σ_0	=	Intercept
ε_{it}	=	Error term

Estimation in equations (3), (5), and (7) is performed using the Two-Stage Least Squares (2SLS) approach. In the first stage, as shown in equations (2), (4), and (6), the estimated value of the wage variable is obtained and denoted as the "ln" ("wage") $\hat{}$ it in equations (3), (5), and (7). The estimated wage values from the first stage are then used in the second stage to make further estimates in equations (3), (5), and (7).

2.4. Identification of Problem Model

Before conducting hypothesis testing using the 2SLS method, it is essential to perform order and rank condition tests to determine whether the equation model is suitable for analysis with the 2SLS approach.

Table 2. Identification of Equation Models with Order Conditions

Equation Model	K	M	G	Result
(2)	9	1	2	over identified
(3)	9	6	2	over identified
(4)	9	1	2	over identified
(5)	9	6	2	over identified
(6)	9	1	2	over identified
(7)	9	6	2	over identified

Table 3. Identification of Equation Models with Rank Conditions

Equation Model	Determinant	Result
(4)	≠ 0	Identified
(5)	≠ 0	Identified
(6)	≠ 0	Identified
(7)	≠ 0	Identified
(8)	≠ 0	Identified
(9)	≠ 0	Identified

3. Results and Discussion

Researchers aim to investigate the impact of QRIS on the number of MSME workers. However, this study assessed the total number of MSME workers, as well as the number of paid and unpaid MSME workers.

Based on Table 4, the researcher aims to examine the effect of QRIS on the number of MSME workers. This study, however, analyses three types of workers: the total number of MSME workers, paid MSME workers, and unpaid MSME workers. As indicated in Table 4, the R-squared value for the total worker variable is 0.6759, or 67.59%, indicating that the independent variables explain 67.59% of the variation in

Table 4. **Hypothesis Testing Results**

Variable	*lnworker*	*lnpaid*	*lnunpaid*
lnQRIS	0.199*** (0.0504)	0.274*** (0.0665)	0.195*** (0.0544)
lnUMP	-3.544 (2.632)	-1.420 (2.011)	-4.874 (3.446)
lnrevenue	0.114* (0.0668)	0.261*** (0.0870)	0.0624 (0.0709)
Inflasi	-0.0280* (0.0168)	-0.0559*** (0.0217)	-0.0188 (0.0178)
interestrate	0.180** (0.0731)	0.416*** (0.107)	0.104 (0.0727)
constant	57.67 (40.24)	18.95 (31.52)	78.82 (52.31)
Number of observations	102	102	102
R-sq	0.6759	0.8125	0.6219

Number in parentheses are standard errors

* significant at 10%, ** significant at 5%, *** significant at 1%

Source: *Researchers process analysis (STATA 18 output)*

the total number of MSME workers. The remaining 32.41% due to factors that were not considered in our analysis.

The R-squared value for the paid worker variable is 0.8124, or 81.24%, implying that the variables examined in this study can explain 81.24% of the variation in the number of paid MSME workers. The remaining 18.76% is explained by factors that were not investigated in this study. The R-squared value for the unpaid worker variable is 0.6219, or 62.19%, showing that the variables in the model account for 62.19% of the variations in the number of unpaid MSME workers, with the remaining 37.81% explained by other factors.

The test results show that QRIS has a considerable impact on the number of MSME workers, both paid and unpaid. The hypothesis examined in this study is that QRIS has no substantial impact on the number of MSME workers. However, the total worker, paid worker, and unpaid worker variables all exhibit significant effects at the 1% level of significance. The paid worker variable, as well as the unpaid worker variable, show significance at the 1% level, with all three showing a positive tendency.

The results, which provide values below the alpha threshold, lead to the rejection of the null hypothesis. Consequently, the hypothesis that QRIS has no significant influence on the number of MSME workers is rejected. These statistics indicate that increasing the number of QRIS merchants by 1% results in a 0.199% increase in the total number of workers, a 0.274% increase in the paid workforce, and a 0.195% increase in the unpaid workforce. Although these figures are notably positive, QRIS's effect on boosting the MSME workforce is minor in magnitude.

Routine tasks in MSMEs that QRIS may replace include the cashier. This is because customers can pay for their items immediately through QRIS, eliminating the need to touch cash or collect change from a cashier. In best practices, QRIS payments are automatically logged in the merchant account linked to the QRIS system. This simplifies the effort of cash management because income recapitulation or bookkeeping can be done directly from account transactions or bank statements linked to the QRIS

merchant account. As a result, the Routine-Biased Technical Change (RBTC) theory predicts that QRIS will replace these routine jobs.

According to the RBTC theory, technology adoption can lower the demand for workers who perform routine jobs. The transition toward digital transactions and payment systems may reduce the demand for workers doing mundane tasks. According to Sebastian (2018), the RBTC theory adequately reflects changes in work distribution; nevertheless, it also raises conceptual, operational, and empirical questions. One key conceptual issue is the difficulty of describing and recording ordinary tasks. The RBTC model defines routine tasks as those that can be codified and automated by machines. However, the extent of codification is frequently lacking in existing databases, and tasks considered routine for human workers may not necessarily be feasible for machine execution. Another conceptual challenge is the potential overlap between routine tasks and cognitive tasks. Many routine tasks (i.e., those that can be codified) inherently require fewer cognitive fun. Another conceptual challenge is the potential overlap between routine tasks and cognitive tasks. Many routine tasks (i.e., those that can be codified) inherently require fewer cognitive functions. As noted by Hendrawan (2024), digital transformation presents a complex and often challenging process for MSMEs (Micro, Small, and Medium Enterprises). One of the primary challenges faced by MSMEs is the limitation of human resources.

According to the Skill-Biased Technical Change (SBTC) theory, as technology advances, the demand for skilled workers is increasing faster than that for unskilled ones. According to Cascio (2022), technology developments complement competent personnel. Technology and skilled workers collaborate to drive economic growth, which in turn influences economic trends. The adoption of technology has a tremendous impact on public consumption patterns. As people seek more practical and convenient solutions, their preferences are turning toward digitalization through the use of technology and the internet. According to Statistics Indonesia (2022), the number of mobile phone subscribers in urban areas has steadily increased from 2020 to 2022. In 2022, urban mobile phone ownership is expected to reach 67.88%. Similarly, internet availability has increased year after year, with 66.48% of the urban population expected to have access to the internet by 2022. The increase in internet users coincides with a shift in customer demand for digital solutions, particularly for financial transactions. Consumers are increasingly choosing to make payments via mobile phones, a procedure made possible by QRIS. To match consumer expectations, MSMEs must adapt to the current trend of digital, cashless transactions. Consumers are more inclined to engage with businesses that accept QRIS because they believe it to be more practical and convenient.

The findings of the hypothesis test, presented in Table 4, indicate that the number of MSME workers, both paid and unpaid, is significantly influenced by the adoption of QRIS in MSMEs' payment systems. Unpaid MSME workers are classified as non-routine workers, whilst paid workers are classified as routine workers. The researcher employs paid MSME workers as a proxy for routine workers and unpaid MSME workers as a proxy for non-routine workers to interpret these data in accordance with the RBTC theory. According to the test results, the overall number of workers (lnworkers) and the number of paid and unpaid workers (lnunpaid) increase when QRIS is implemented. The RBTC theory, which posits that technological advancements should lead to a reduction in the number of routine workers, is not entirely consistent with these findings. However, the substantial beneficial impact that QRIS has on the number of paid MSME workers in our study does not align with the premise that these workers are routine.

The number of paid MSME workers (lnpaid) rises in tandem with the increase in QRIS adoption. This may be because MSMEs are reducing routine duties, such as those performed by cashiers or cash managers, when they implement QRIS. Instead, they are assigning personnel to other routine jobs that support their business operations. Ningsih (2024) asserts that labour productivity, which is closely related to the workforce's capacity to generate goods and or services, is positively impacted by digitisation. Similarly, Putri (2020) discovered that the labour market is greatly and favourably impacted by information technology. There is an increase in labour demand that causes a proportional increase in labour supply when workforce competency standards for technology use grow. Because they are small and medium-sized enterprises (SMEs) and usually do not require highly educated personnel, MSMEs are important for labour absorption, especially in the MSME sector (Lestari, 2024).

Meanwhile, the test on the impact of QRIS on the number of unpaid MSME workers yielded a favourable and significant result. This is because the usage of QRIS substitutes tasks that cashiers traditionally conduct. However, MSME owners still need assistance to help them run their operations, particularly in determining the total number of transactions made by each customer before processing payments through QRIS. As a result, MSME owners are more likely to recruit family members or relatives to help with these chores. Family involvement in MSME operations can be a valuable asset to the firm, as emotional connections enhance dedication, helping to achieve business goals and ensure long-term viability (Habberson, 2003). Dyer (1998) defines four components for assessing family involvement in a business: ownership, management, governance, and succession. The capital provided by family members determines ownership; management is reflected in the family member who holds the highest leadership position; governance is the number of family members who play significant roles within the business; and succession is the involvement of multiple generations of family members in the business.

In line with the RBTC theory, the adoption of QRIS technology is expected to replace routine workers, such as cashiers and cash managers. However, the findings of this study indicate that QRIS has led to an increase in both routine and non-routine workers. This can be attributed to the fact that while QRIS streamlines transaction processes and replaces cashier roles, MSMEs still require workers to perform other tasks within the business. Consequently, MSMEs will likely hire non-routine workers, such as relatives or family members, to handle these additional responsibilities. This tendency may also be driven by the limited capital available to MSMEs, leading them to prioritise unpaid workers, typically sourced from family or relatives of the business owners.

4. Conclusion

This study aims to analyse the number of MSME workers affected by technological adaptation that changes payment methods using QRIS. This study focuses on the MSME workforce data from 2020 to 2022 across 34 Indonesian provinces. According to the results of this study's regression analysis, QRIS has a significant and favourable effect on the number of MSME workers. Theoretically, however, RBTC might lessen the need for routine workers. QRIS, on the other hand, has the reverse effect in this study. The use of QRIS increases the number of MSME workers who are routine (paid workers) and non-routine (unpaid workers). This could be because MSMEs actors still need workers to serve customers and calculate the total nominal amount of their transactions (routine workers) before these customers make payment transactions through QRIS and choose to employ their family or relatives (non-routine workers) to run their business.

Acknowledgment

We would like to express our sincere gratitude to the Central Bank of Indonesia and the Department of Economics at the University of Indonesia for their support and assistance throughout this research. The resources and cooperation were essential in granting us access to the essential data and information necessary for our research. The direction and assistance provided by the staff greatly enhanced the depth and quality of our work. We are grateful for their unwavering commitment to supporting research, and their contribution played a key role in the successful accomplishment of the study.

References

Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). (2024). *Jumlah Penggunaan Internet Indonesia Tembus 221 Juta Orang*. https://apjii.or.id/berita/d/apjii-jumlah-pengguna-internet-indonesia-tembus-221-juta-orang

Badan Pusat Statistika. (2022). *Statistika Telekomunikasi Indonesia Tahun 2022*.

Bank Indonesia. (2023). *Laporan Kebijakan Moneter Triwulan IV 2023*.

Biro Komunikasi, Layanan Informasi, dan Persidangan. Kementerian Koordinator Bidang Perekonomian. (2021). *UMKM Menjadi Pilar Penting Dalam Perekonomian Indonesia*. https://ekon.go.id/publikasi/detail/2969/umkm-menjadi-pilar-penting-dalam-perekonomian-indonesia

Cascio, U, Elizabeth & Narayan, Ayushi. (2022). Who Needs a Fracking Education? The Educational Response to Low-Skill-Biased Technological Change. *Sage Journals, 75*(1), 56-89. https://doi.org/10.1177/0019793920947422

Dyer, W. G. (1988). Culture and continuity in family firms. *Family Business Review, 1*(1), 37-50. https://doi.org/10.1111%2Fj.1741-6248.1988.00037.x

Goos, M., Rademakers, E., & Rottger, R. (2021). Routine-Biased Technical Change: Individual-Level Evidence From A Plant Closure. *Reseacrh Policy*, 50.

Gujarati, N., Damodar. (2003). *Basic Econometrics Fourth Edition*. North America: Gary Burke.

Habbershon, T. G., Williams, M., & MacMillan, I. C. (2003). A unified systems perspective of family firm performance. *Journal of Business Venturing, 18*(4), 451-465. https://doi.org/10.1016/S0883-9026(03)00053-3

Hendrawan, A. S., Chatra, A., Iman, N., Hidayatullah, S., Suprayitno, D. (2024). Digital Transformation in MSMEs: Challenges and Opportunities in Technology Management. *Jurnal Informasi dan Teknologi, 6*(2). https://doi.org/10.60083/jidt.v6i2.551

Hill C. R., Griffiths., E. William., Lim, C. G. (2011). *Principles of Econometrics Fourth Edition*. United State of America: John Wiley & Sons, Inc.

Lestari & Santoso, B. (2024). Peranan Usaha Mikro Kecil Menengah (UMKM) dalam Penyerapan Tenaga Kerja di Kabupaten Seluma, Provinsi Bengkulu. *Jurnal Bisnis Manajemen, 2*(2), 357-368. https://doi.org/10.61930/jurbisman.v2i2.610

Ningsih Rahayu, Sri. (2024). Pengaruh Teknologi Terhadap Produktivitas Tenaga Kerja di Indonesia. **BENEFIT: Journal Of Business, Economics, And Finance, 2**.

Putri, R., & Idris. (2020). Pengaruh Teknologi Informasi dan Komunikasi Terhadap Pasar Tenaga Kerja dan Pertumbuhan Ekonomi di Indonesia. *Jurnal Kajian Ekonomi dan Pembangunan. Volume 2*. Nomor 4. https://doi.org/10.24036/jkep.v2i4.13386

Sebastian, R., & Biagi, F. (2018). *The Routine Biased Technical Change hypothesis: A Critical Review. JRC Technical Reports*. Luxembourg: Publications Office of the European Union.

Sulistyaningsih, H., & Hanggraeni, D. (2022). Investigating the Adoption of QR Code Indonesian Standard through Organizational and Environmental Factors and Its Impact on Micro Small Medium Enterprise Performance. *Global Business and Management Research: An International Journal. Vol. 14*, No. 3s. https://www.gbmrjournal.com/pdf/v14n3s/V14N3s-67.pdf