

Telecommunication Industry Role in Economic and Social Development in Indonesia: A Case Study of Telkomsel

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ABSTRACT

Telecommunications infrastructure plays an important role in supporting economic growth, digital inclusion, and social development. However, empirical evidence on the broader socioeconomic contribution of telecommunications operators in Indonesia remains limited. This study examines Telkomsel's socioeconomic contribution as a case study of Indonesia's telecommunications industry, considering its extensive network coverage and role in expanding digital infrastructure. The study contributes by integrating macroeconomic, business, and social perspectives. The study used a mixed-methods approach, drawing on secondary quantitative data, a nationwide survey of MSME owners, and qualitative document analysis. The study analyzed regional economic data using linear regression to examine the association between telecommunications infrastructure and Gross Regional Domestic Product (GRDP), while using survey and document data to assess perceived MSME benefits and broader social contributions. The regression results indicated that each additional petabyte of data payload was associated with an estimated IDR 76.19 billion higher GRDP, while each additional BTS was associated with an estimated IDR 9.44 billion higher GRDP. However, with HC3 heteroskedasticity-robust standard errors, neither national-level association was statistically significant at the 5% level. Survey respondents reported perceived improvements in sales, revenue, and day-to-day business operations, while document analysis identified contributions through CSR, infrastructure, and other digital-development initiatives. Overall, the findings suggest that Telkomsel is associated with regional economic activity, MSME development, and broader digital inclusion, although the regression results should be interpreted cautiously.

1. Introduction

Telecommunications infrastructure possesses a significant role in supporting economic activity, productivity, digital transformation, and social inclusion. Previous studies have shown that the development of information and communication technology (ICT) is positively associated with economic and productivity growth across countries (Lam & Shiu, 2010; Qiang, Pitt, & Ayers, 2003). These correlations are particularly important in Indonesia, where the country's vast geography creates challenges in expanding communication infrastructure and ensuring equitable digital access across regions (Rohman, Naufal, & Naufal, 2025). Badan Pusat Statistik (2025) reported that only 72.78% of Indonesians had internet access, indicating that gaps in digital access remain. In response, the Indonesian government has made digital infrastructure development and digital transformation

national priorities, reflected in strategic plans such as Indonesia Digital Vision 2045 and the National Medium-Term Development Plan 2025–2029.

In this context, telecommunications operators play a key role in providing the infrastructure and services needed to support Indonesia's digital development. PT Telekomunikasi Selular (Telkomsel), one of Indonesia's largest mobile network operators, has invested in network expansion and digital product development to strengthen connectivity across the country (PT Telekomunikasi Selular, 2025). Telkomsel was selected as the case study for this research because of its significant position within Indonesia's telecommunications sector. Telkomsel held approximately 48.4% of Indonesia's cellular-subscriber market, and its 4G/LTE network reached more than 97% of the Indonesian population, supported by 293,136 base transceiver stations nationwide (PT Telkom Indonesia (Persero) Tbk, 2026). Because of its scale and infrastructure presence, Telkomsel is a relevant case through which to examine the socioeconomic role of telecommunications investment in Indonesia. However, because this study focuses on a single operator, interpret its findings primarily as evidence from the Telkomsel case rather than as results that can be directly generalized to all telecommunications operators in Indonesia without additional measures.

Existing research has established a broad relationship between ICT development, telecommunications infrastructure, and economic growth. Previous studies have also examined the contribution of internet penetration to economic activity in Indonesia, including the economic impact associated with Telkomsel's internet services (Lembaga Demografi FEB UI, 2024). However, a telecommunications operator's socioeconomic contribution involves several factors that macroeconomic indicators alone may not fully capture. Telecommunications infrastructure may be associated not only with regional economic performance but also with business activities among micro, small, and medium enterprises (MSMEs), improved digital access, and broader socio-economic development. Despite these direct and indirect contributions, empirical evidence integrating these economic, business, and social perspectives remains limited in Indonesia.

This study therefore examines Telkomsel's socioeconomic contribution as a case study of Indonesia's telecommunications industry. Specifically, the study evaluates Telkomsel's economic contribution, examines the association between telecommunications infrastructure indicators and Gross Regional Domestic Product (GRDP), identifies the company's broader contributions to digital inclusion and social development from various reports and documents, and assesses the perceived benefits of Telkomsel's services among MSMEs through a survey. By integrating macroeconomic analysis, MSME-level evidence, and qualitative evidence on broader socioeconomic initiatives, this study provides a more comprehensive assessment of the role that a major telecommunications operator may play in Indonesia's socioeconomic development. The study contributes to the existing literature by connecting telecommunications infrastructure, regional economic performance, MSME development, and broader social outcomes within a single case-study framework.

2. Literature review

Information and communication technology (ICT) significantly impacts a country's social and economic development. Cobos and Carbonel (2023) reviewed more than 100 studies examining the relationship between digitalization and economic development, including both economic growth and transformation. Most of the studies reviewed identified a significant relationship between improvements in ICT and economic growth, firm development, and individual welfare. Similarly, Lam and Shiu (2010) and Qiang, Pitt, and Ayers (2003) discussed the relationship between telecommunications development, productivity, and economic growth. These studies provide a basis for understanding telecommunications infrastructure as an important component of broader economic development. Specifically for Indonesia, Lembaga Demografi FEB UI (2024) examined the economic impact of Telkomsel's internet penetration and showed how telecommunications services can contribute substantially to the national economy. Together, these studies suggest that telecommunications

infrastructure can be viewed not only as a sector-specific investment but also as an enabling component of broader economic activity.

Telecommunications infrastructure also plays an important role in supporting business activities. This study also focuses on micro, small, and medium enterprises (MSMEs), which increasingly rely on internet connectivity and digital communication in conducting their business activities. Telecommunications services can support MSMEs through customer communication, access to online marketplaces, digital payment methods, and other digital business activities. These functions suggest that improvements in digital connectivity may be associated with wider market access, more efficient business operations, and greater participation in the digital economy. The role of telecommunications services for MSMEs is therefore relevant to the telecommunications industry's broader socioeconomic contribution. While macroeconomic indicators capture aggregate economic outcomes, firm-level evidence can provide additional insight into how business users experience digital connectivity in practice. This study therefore considers MSME-level outcomes as one dimension for assessing Telkomsel's socioeconomic contribution.

The development of telecommunications infrastructure is also closely related to digital inclusion. In Indonesia, unequal access to digital infrastructure remains a challenge. UNDP Indonesia (2024) reported substantial differences in internet access across regions. In 2022, internet access in Jakarta reached 84.7% of the population, while access in Papua was considerably lower at 26.3%. The same report also showed differences between urban and rural areas, with internet penetration reaching 90.9% in urban areas and 80.5% in rural areas. These differences demonstrate that the benefits of digital development are not distributed equally across Indonesia. The UNDP study identified access to ICT infrastructure and digital literacy as key challenges contributing to disparities in digital development. From a socioeconomic perspective, unequal digital access may limit the ability of individuals and businesses in underserved regions to participate fully in digital economic activities. Accordingly, expanding telecommunications infrastructure in regions with limited connectivity can be understood as part of broader efforts to reduce disparities in digital access and participation.

Beyond their core commercial activities, telecommunications companies also participate in initiatives intended to support broader social development. Corporate Social Responsibility (CSR) has become common practice for reasons including ethical responsibility, corporate reputation, and regulatory compliance. In Indonesia, telecommunications companies have also implemented CSR activities as part of their sustainability strategies. For telecommunications companies, such initiatives may be particularly relevant because their existing technological capabilities and infrastructure can be applied to areas such as digital inclusion, education, entrepreneurship, and community development. As a result, a telecommunications company's socioeconomic contribution may extend beyond its direct financial and operational activities. This broader perspective matters for assessing Telkomsel's role because the company's activities include not only telecommunications services and infrastructure development, but also initiatives related to MSMEs, digital access, and social development.

Based on the literature reviewed, this study considers the socioeconomic role of telecommunications through several interconnected dimensions. ICT and telecommunications development are associated with economic growth and productivity, while digital access also influences how much individuals, businesses, and regions can participate in digital activities. Conceptually, telecommunications investment can support the expansion of digital infrastructure, while greater infrastructure availability can increase access to telecommunications services and digital connectivity. These conditions may in turn be associated with regional economic activity, support business activities among MSMEs, and contribute to broader digital inclusion and social development. This study examines Telkomsel's socioeconomic contribution through three main analytical dimensions. First, it evaluates the relationship between telecommunications infrastructure and regional economic performance. Second, it examines the perceived impact of Telkomsel's services on MSMEs. Third, it reviews Telkomsel's broader contributions to digital inclusion, infrastructure development, and social welfare. These dimensions are treated

as complementary rather than as a single causal chain. The study therefore uses multiple forms of evidence to provide a broader assessment of Telkomsel's socioeconomic role without assuming that telecommunications infrastructure alone determines the observed economic and social outcomes.

3. Method

This study used a mixed-methods approach, combining separate quantitative and qualitative analyses to assess Telkomsel's socioeconomic impact in Indonesia. The quantitative component examined Telkomsel's contribution to regional economic performance and its perceived impact on micro, small, and medium enterprises (MSMEs), while the qualitative component examined the company's broader contributions to digital inclusion and social development. These analytical components were treated as complementary perspectives rather than as sequential stages of analysis.

3.1. Quantitative Analysis of Regional Economic Impact

The regional economic analysis used secondary annual data at the regency/city level covering the 2023–2024 period. Gross Regional Domestic Product (GRDP), Gross Fixed Capital Formation (GFCF), and population data were obtained from Statistics Indonesia (BPS). Telkomsel's internal operational data provided data on data payload and the number of Base Transceiver Stations (BTS).

To examine the relationship between telecommunications infrastructure and regional economic performance, two separate multiple linear regression models were estimated. Both models used GRDP as the dependent variable. The first model examined the relationship between Telkomsel's data payload and GRDP, while the second examined the relationship between the number of BTS and GRDP. Both models included GFCF and population as control variables.

The two telecommunications indicators were analyzed in separate models because they represent different aspects of telecommunications activity: data payload reflects network usage, while BTS represents physical network infrastructure. In simple terms, the models examine whether regions with higher Telkomsel data usage or greater BTS availability also tend to have higher GRDP, after accounting for differences in investment and population. The regression models were specified as follows:

$$GDRP_{it} = \beta_0 + \beta_1 PYL_{it} + \beta_2 GFCF_{it} + \beta_3 POP_{it} + \epsilon \dots\dots\dots 1)$$

$$GDRP_{it} = \beta_0 + \beta_1 BTS_{it} + \beta_2 GFCF_{it} + \beta_3 POP_{it} + \epsilon \dots\dots\dots 2)$$

where GRDP represents Gross Regional Domestic Product, PYL represents Telkomsel's data payload, BTS refers to the number of Base Transceiver Stations, GFCF represents Gross Fixed Capital Formation, POP refers to the population of each regency/city, and ϵ represents the error term. GFCF and population were included as control variables to account for regional differences in investment and population size that may also be associated with economic output.

To assess the reliability of the statistical inference, the regression models were examined for multicollinearity and heteroskedasticity. Multicollinearity among the explanatory variables was assessed using the Variance Inflation Factor (VIF) and tolerance values. Heteroskedasticity was assessed using the Breusch–Pagan test to ensure robust coefficient standard errors and accurate confidence intervals.

To examine the relationship between telecommunications infrastructure and regional economic performance specifically in underdeveloped, frontier, and outermost areas, the same regression models were estimated using only observations from 3T regions. The classification of 3T regions followed the Government of Indonesia's official definition in Presidential Regulation No. 63 of 2020 (Perpres No. 63 Tahun 2020). The 3T-region analysis

retained the same dependent, independent, and control variables. This allowed the relationships observed in the national sample to be compared with those observed in regions characterized by more limited infrastructure and connectivity.

3.2. Analysis of MSMEs

The study examined the impact of Telkomsel's services on MSMEs using a nationwide online survey of 500 MSME owners across various business sectors in Indonesia. Respondents were recruited through an online survey platform panel and screened against predefined eligibility criteria: MSME owners in Indonesia who used Telkomsel products or services in their business activities. Based on this recruitment procedure, the study employed a non-probability purposive panel sampling approach. Before the main data collection, the questionnaire was pilot-tested with a small group of respondents with characteristics similar to the target population. The pilot test assessed the questionnaire's clarity, comprehensibility, relevance, and flow. The pilot respondents' feedback helped refine the instrument's wording and structure. Before final administration, multiple experts in survey methodology and relevant subject-matter areas also reviewed the questionnaire to assess its appropriateness for the study objectives and target respondents.

The survey was administered online over approximately one month, from September to October 2025. The questionnaire examined how Telkomsel's services supported business operations, productivity, and other perceived business impacts. The survey also included a five-point scale measuring respondent satisfaction and a ten-point scale measuring respondents' likelihood of recommending Telkomsel's services. The questionnaire primarily consisted of standalone descriptive items rather than multiple items intended to measure common latent constructs. Consequently, an internal consistency reliability coefficient was not calculated. The survey data were analyzed descriptively, focusing on respondent characteristics, patterns of internet and telecommunications use, and reported changes in business activities after using internet services and Telkomsel products. The findings are therefore interpreted as respondents' reported experiences and perceptions rather than as evidence of a causal effect.

3.3. Qualitative Document Analysis

The qualitative component used document analysis to examine Telkomsel's broader contributions to social welfare and digital development in Indonesia. This analysis relied exclusively on secondary sources, including Telkomsel's annual reports, official government publications and statistics, and national media reports. Most of the documents reviewed covered the 2020–2025 period. The team identified and compiled relevant information based on its relevance to the study objectives. The team then grouped the collected information into broader areas, including digital inclusion, economic equality, telecommunications infrastructure, MSME support, and other socioeconomic initiatives discussed in the reviewed documents. The analysis followed a descriptive content-analysis approach, organizing relevant information into recurring areas of socioeconomic contribution rather than coding it through a formal thematic-analysis procedure. This approach provided contextual evidence of Telkomsel's role in social and economic development and complemented the quantitative findings.

3.4. Analytical Integration

The quantitative and qualitative findings were interpreted together to provide a broader assessment of Telkomsel's socioeconomic role. The regional economic analysis examined associations between telecommunications indicators and GRDP, the MSME survey captured perceived business-level outcomes, and the document analysis provided contextual evidence on wider social and digital-development initiatives. By combining these perspectives, the study sought to assess Telkomsel's socioeconomic contribution across

macroeconomic, business, and social dimensions without treating any single analytical component as sufficient on its own.

4. Result and Discussion

4.1. Telkomsel's Economic Contribution

As one of Indonesia's largest telecommunications companies, Telkomsel contributes both directly and indirectly to the national economy. According to its latest sustainability report, Telkomsel generated an economic value of IDR 113.34 trillion through its revenue in 2024. The company also contributed directly to government revenue through spectrum usage fees, licensing fees, taxes, and dividends. In 2024, these contributions amounted to IDR 36.972 trillion, up 6.92% from the previous year and about 1.3% of total government revenue. These figures indicate that Telkomsel has a substantial direct economic presence through its commercial activities and government payments. Beyond these direct contributions, Telkomsel also provides services that may be associated with wider economic activity by providing the connectivity required for communication, digital transactions, and other business activities.

To examine this broader relationship, this study analyzed the association between Telkomsel's telecommunications indicators and Gross Regional Domestic Product (GRDP). Two separate regression models were estimated. The first model used Telkomsel's data payload as the main independent variable, while the second used the number of Base Transceiver Stations (BTS) as the main independent variable. Both models included Gross Fixed Capital Formation (GFCF) and population as control variables.

$$\text{GRDP} = -2766.654 + 76.189 \text{ PYL} + 2.669 \text{ GFCF} + 0.013 \text{ POP} \dots\dots\dots 3)$$

$$\text{GRDP} = -2631.502 + 9.442 \text{ BTS} + 2.651 \text{ GFCF} + 0.012 \text{ POP} \dots\dots\dots 4)$$

At the national level, the regression results show that each additional petabyte of Telkomsel data payload was associated with an estimated IDR 76.189 billion increase in GRDP. The model also indicated that an additional IDR 1 billion in GFCF was associated with an estimated IDR 2.669 billion increase in GRDP, while an increase in population was also positively associated with GRDP. The model explained 93.5% of the observed variation in GRDP. In the second model, each additional BTS was associated with an estimated IDR 9.442 billion increase in GRDP. GFCF and population also showed positive associations with regional economic output. These results suggest that both telecommunications usage and physical network infrastructure are positively associated with regional economic performance. However, the coefficients should not be interpreted as evidence that increases in payload or BTS alone directly cause equivalent increases in GRDP. Other factors also shape regional economic performance, including investment, population, sectoral structure, infrastructure conditions, and broader macroeconomic developments. The model's relatively high explanatory power indicates that the included variables are strongly associated with differences in GRDP across regions, but it does not establish causality. The findings are therefore best interpreted as evidence of a statistical relationship between telecommunications activity and regional economic performance within the scope of the data analyzed.

$$\text{GRDP} = -141.57 + 1.358 \text{ PYL} + 0.003 \text{ GFCF} + 38.575 \text{ POP} \dots\dots\dots 5)$$

$$\text{GRDP} = -134.405 + 0.124 \text{ BTS} + 0.003 \text{ GFCF} + 37.771 \text{ POP} \dots\dots\dots 6)$$

To examine whether a similar relationship holds in underdeveloped, frontier, and outermost (3T) regions, we estimated the same regression models using only observations from those areas. The results show that each

additional petabyte of data payload in 3T regions was associated with an estimated IDR 1.358 billion increase in GRDP, while each additional BTS was associated with an estimated IDR 0.124 billion increase in GRDP. Although the estimated coefficients are smaller than those observed in the national models, the results still indicate a positive association between telecommunications infrastructure and regional economic activity in 3T areas. This may reflect differences in economic scale and structural conditions, where lower levels of economic activity, infrastructure availability, population density, or market development may affect the magnitude of the relationship observed. Nevertheless, the findings suggest that telecommunications infrastructure remains relevant to economic activity in areas with relatively limited connectivity.

To assess the reliability of the regression estimates, we conducted diagnostic tests for multicollinearity and heteroskedasticity. Multicollinearity was assessed using the Variance Inflation Factor (VIF) and tolerance values. The diagnostic results indicated moderate multicollinearity among some explanatory variables, but no evidence of extreme multicollinearity that would prevent estimation of the regression models. The Breusch–Pagan test indicated that the assumption of constant error variance was not satisfied. Therefore, HC3 heteroskedasticity-robust standard errors were additionally estimated to provide more reliable statistical inference in the presence of heteroskedasticity. The HC3 robustness assessment does not change the OLS coefficient estimates because the adjustment applies to the estimated standard errors used for statistical inference. However, the statistical significance of the telecommunications indicators was sensitive to the heteroskedasticity correction. Under HC3 robust inference, the payload coefficient had a p-value of 0.233, while the BTS coefficient had a p-value of 0.121. Consequently, although the estimated coefficients remained positive, neither telecommunications indicator was statistically significant at the conventional 5% level under the HC3 specification. The magnitude and direction of the estimated relationships may therefore still be reported descriptively, but the results should not be interpreted as statistically conclusive evidence of a national-level relationship. The HC3 robustness assessment for the 3T models, however, showed that the positive associations remained statistically significant after correcting for heteroskedasticity. The payload coefficient remained statistically significant under HC3 robust inference ($p < 0.001$), while the BTS coefficient was also statistically significant ($p < 0.001$). This indicates that, unlike the national-level estimates, the 3T regression results were robust to the heteroskedasticity correction.

Overall, the findings indicate that Telkomsel's telecommunications infrastructure and network usage are positively associated with regional economic performance. However, the robustness assessment indicates that the national-level telecommunications coefficients are not statistically significant after correcting the standard errors for heteroskedasticity. Accordingly, the regression findings should be interpreted primarily in terms of the direction and estimated magnitude of the observed associations, rather than as definitive statistical evidence of an independent telecommunications effect. The results support the view that telecommunications infrastructure can enable economic activity, while also highlighting that its contribution should be understood alongside other regional economic and structural factors.

4.2. Telkomsel's Role in Digital Sovereignty of Indonesia

Digital sovereignty refers to a country's ability to govern, control, and protect its digital infrastructure and systems within its territory. This issue has become increasingly important as telecommunications networks support communication, commerce, emergency services, and government operations (Pierucci, 2025). Article 33 paragraph (2) of the 1945 Constitution of the Republic of Indonesia states that the state shall control branches of production that are important to the state and affect people's livelihoods. In this context, telecommunications infrastructure is strategically important because it supports national communication and public services. The ownership and governance of critical digital infrastructure may therefore affect not only national security but also the continuity and accessibility of essential digital services.

PT Telkom Indonesia (Persero) Tbk, a state-owned enterprise, holds a 69.9% stake in Telkomsel. Because Telkom Indonesia is a state-owned enterprise, the Indonesian state indirectly holds a majority stake in Telkomsel. This ownership structure provides a relevant context for examining Telkomsel's role in Indonesia's broader digital-development agenda, particularly where telecommunications infrastructure is regarded as strategically important to national interests. Telkomsel also contributes to government revenue through licensing fees, spectrum-related payments, taxes, and dividends, as discussed in the previous section. These contributions support public revenue, while Telkomsel's continued investment in digital infrastructure helps expand national connectivity.

Studies on digital sovereignty have emphasized the importance of maintaining sufficient national control over critical digital infrastructure (Pierucci, 2025). Musoni, Karkare, Teevan, and Domingo (2023) further show that countries adopt different approaches to digital sovereignty depending on their institutional and policy contexts. Despite these differences, physical digital infrastructure remains an important component of national digital capacity because it underpins access to communication networks and digital services. In the Indonesian context, Telkomsel's infrastructure development and indirect state ownership position it as an actor contributing to national digital capacity. Rather than implying that state-linked ownership alone guarantees digital sovereignty, Telkomsel's significance lies in the combination of infrastructure scale, network development, and its connection to a state-owned parent company. From a socioeconomic perspective, digital sovereignty matters to this study because national control and continuity of telecommunications infrastructure can shape the accessibility, resilience, and long-term development of digital services. These conditions may in turn support broader economic activity and social participation, particularly in regions that depend heavily on telecommunications infrastructure for connectivity.

In summary, Telkomsel's role in Indonesia's digital sovereignty can be understood through its contribution to telecommunications infrastructure development, its indirect relationship with state ownership, and its participation in the broader national digital ecosystem. This perspective complements the economic findings by showing that the significance of telecommunications infrastructure extends beyond measurable economic output to include questions of strategic capacity, infrastructure resilience, and long-term national digital development.

4.3. Social Impact and Telkomsel's Initiatives

Digital transformation has become an important component of economic growth and equitable development in Indonesia. As a subsidiary of PT Telkom Indonesia (Persero) Tbk, Telkomsel contributes through telecommunications infrastructure, digital services, partnerships, and initiatives targeting businesses, public institutions, startups, and digital talent.

One area of contribution is support for government digitalization. Presidential Regulation No. 17 of 2023, which designates Telkom Indonesia as the official provider of the Electronic Procurement System (SPSE), reinforces the Telkom Group's role in supporting the government's digital transformation agenda. Implementing SPSE supports efficiency and transparency in public financial management. In this context, telecommunications and digital infrastructure function as enabling components of broader public-sector digitalization rather than as outcomes generated by Telkomsel alone.

Telkomsel has also implemented initiatives targeting micro, small, and medium enterprises (MSMEs). In collaboration with Evermos, Telkomsel introduced an MSME product marketplace feature within the MyTelkomsel application, allowing small business owners to expand their market reach without developing their own digital infrastructure. Telkomsel also launched the 99% Usahaku platform, which offers integrated digital solutions including point-of-sale systems, bookkeeping tools, digital advertising through MyAds, and taxation services. By early 2024, more than 19 million MSMEs had been connected to various Telkomsel digital services. Research by Lembaga Demografi FEB UI (2024) reported that MSMEs using Telkomsel's internet services

increased their total revenue by up to IDR 327 trillion in 2023 and contributed 1.6% to national GDP. These findings suggest an association between digital connectivity and MSME business activity, although outcomes may also be influenced by factors such as business sector, regional market conditions, digital capability, and broader economic trends.

Within the broader digital economy, Telkomsel has continued to invest in connectivity infrastructure and data-driven services. Between 2019 and 2024, Telkomsel's assets grew by an average of 0.81% per year, while Indonesia's digital economy value expanded by 2.08%. E-commerce transaction values rose by 1.46%, and online transportation transactions increased by 0.93% annually. These trends align with the broader expansion of digital economic activity in Indonesia, but they should not be interpreted as evidence that Telkomsel alone drove this growth. Rather, Telkomsel is one of several actors contributing to the infrastructure and services that support digital adoption across sectors.

Telkomsel has also strengthened collaboration among state-owned enterprises as part of efforts to build a more integrated national digital ecosystem. Its partnership with Bank Rakyat Indonesia (BRI), for example, combines telecommunications connectivity with digital financial services. Telkomsel provides connectivity and digital solutions that support BRI's financial services, while the collaboration also expands Telkomsel's reach and service efficiency. Beyond the financial sector, Telkomsel has contributed to digitalization initiatives in transportation, logistics, and smart city development, as well as the deployment of Artificial Intelligence (AI) and Internet of Things (IoT) technologies. Taken together, these activities suggest that Telkomsel's socioeconomic role extends beyond conventional telecommunications services and includes participation in cross-sector digital transformation.

Telkomsel also supports local startup ecosystems through programs such as The NextDev, Telkomsel Innovation Center (TINC), and Telkomsel Mitra Inovasi (TMI). Through TMI, Telkomsel has invested more than USD 40 million in startups including Kredivo, PrivyID, Halodoc, and Tanihub. The IndonesiaNEXT program has also trained thousands of university students in digital competencies including data analytics and programming. These initiatives reflect a broader contribution to digital entrepreneurship and human-capital development, although the descriptive evidence used in this study cannot fully determine their long-term socioeconomic effects.

From an employment perspective, Telkomsel contributes to economic activity both directly and indirectly. The number of Telkomsel employees increased from 4,417 in 2010 to 6,455 in 2023. Over the same broader period, employment in the information and communication sector increased by 1.7% annually, while national employment grew by 5.38%. Based on Indonesia's 2020 Input-Output Table, the information and communication sector recorded a multiplier effect of 1.2044 (Badan Pusat Statistik, 2025). This shows that increases in economic activity within the sector are associated with additional activity elsewhere in the economy through inter-industry linkages. However, because this multiplier applies to the information and communication sector as a whole, it should not be attributed exclusively to Telkomsel.

Telkomsel also helps expand telecommunications infrastructure in Indonesia's underdeveloped, frontier, and outermost (3T) regions. Through its participation in the Universal Service Obligation (USO) program, regulated under Government Regulation No. 80 of 2015 and Ministerial Regulation No. 17 of 2016, Telkomsel managed 3,473 of 6,667 BAKTI BTS sites across Indonesia as of August 2024 (Anggraeni, 2024). This initiative has expanded telecommunications access in previously underserved areas. However, infrastructure development in non-commercial regions also involves financial and operational challenges. The original study notes the potential importance of stronger fiscal support, including tax incentives and operational subsidies, to sustain infrastructure development in these areas.

Overall, the evidence presented in this section suggests that Telkomsel's social contribution operates through several interconnected channels, including public-sector digitalization, MSME support, digital ecosystem

development, entrepreneurship, employment, and infrastructure expansion. At the same time, broader institutional, economic, and technological factors shape many of these outcomes, so Telkomsel's role should be interpreted as contributory rather than exclusively causal.

4.4 How Telkomsel Empowers MSMEs

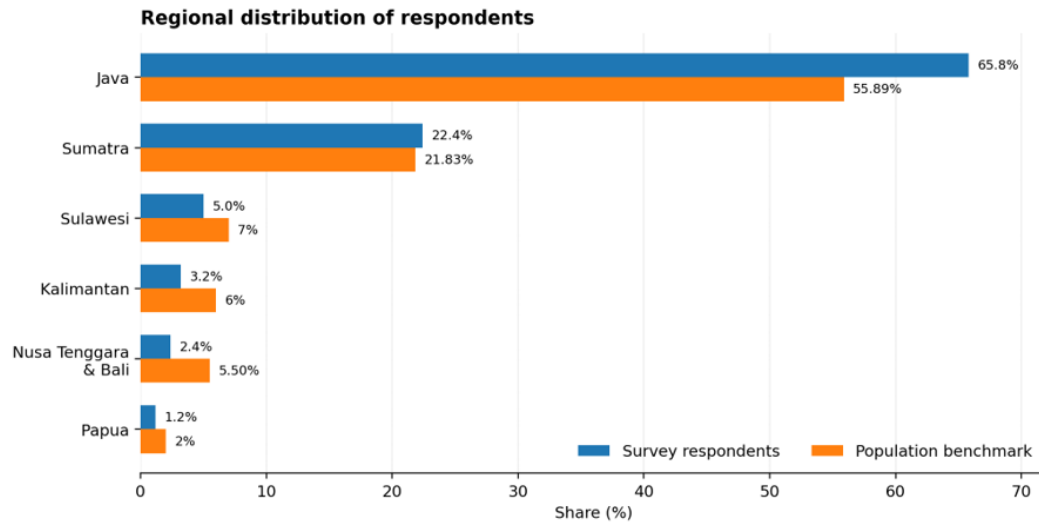


Figure 1. Regional distribution of survey respondents

The survey included 500 respondents from various regions and business sectors across Indonesia. Figure 1 above presents the regional distribution. Java accounts for 65.8% of respondents, Sumatra 22.4%, Sulawesi 5.0%, Kalimantan 3.2%, Nusa Tenggara and Bali 2.4%, and Papua 1.2%. Relative to the population benchmark reported in the survey presentation, Java remains somewhat overrepresented, whereas Kalimantan, Nusa Tenggara and Bali, and Papua appear underrepresented. The survey therefore provides broad national coverage, but its geographic composition is weighted toward Java and Sumatra.

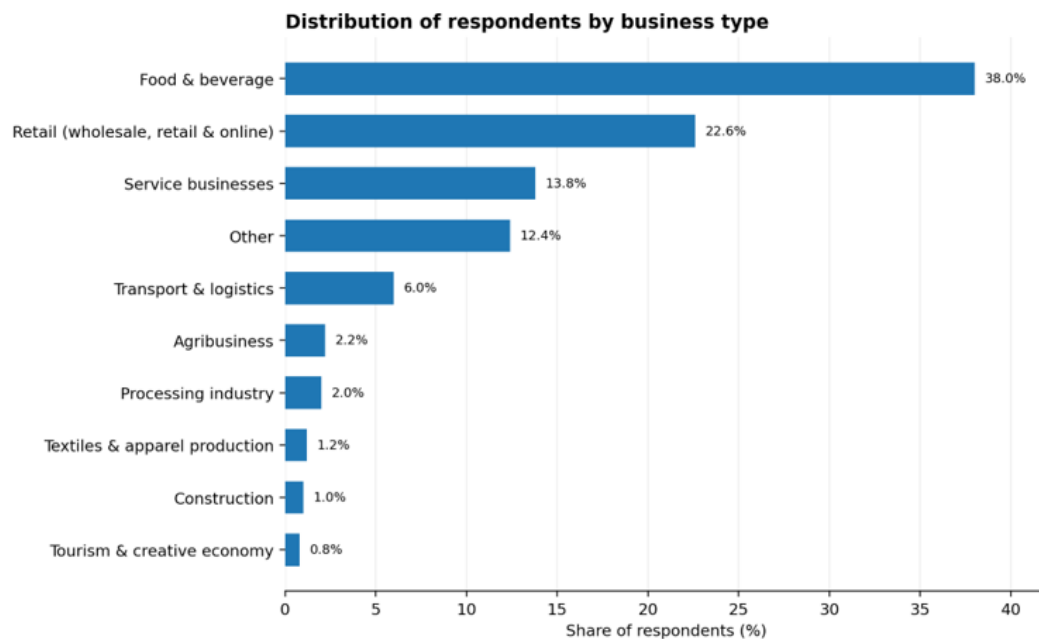


Figure 2. Distribution of survey respondents by business type

Figure 2 shows the distribution of respondents by business type. Food and beverage businesses account for 38% of the 500 valid responses, followed by retail at 22.6% and service businesses at 13.8%. Together, these three categories represent 74.4% of respondents. The findings are therefore likely to reflect the experiences of consumer-facing MSMEs more strongly than those of less-represented sectors such as construction, tourism and the creative economy, textiles, and processing industries. This sectoral concentration should be considered alongside the geographic distribution when assessing how broadly the survey findings can be generalized.

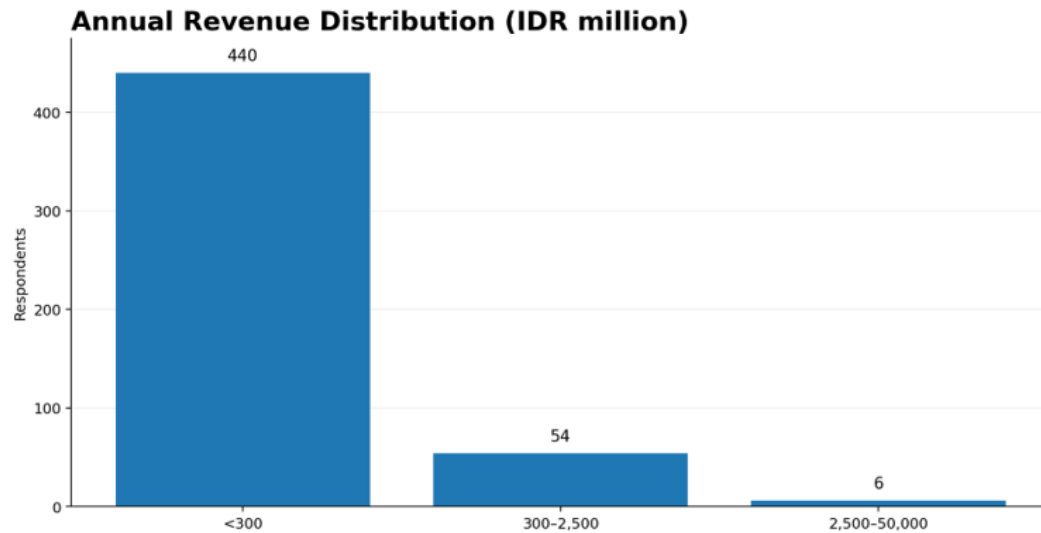


Figure 3. Distribution of respondents by annual revenue category

Based on annual revenue and number of employees, the sample was dominated by micro enterprises. 88% of respondents reported annual revenue below IDR 300 million, while around 11% were between 300 IDR million to IDR 2.5 billion and only a very small proportion fell within the highest reported revenue category.

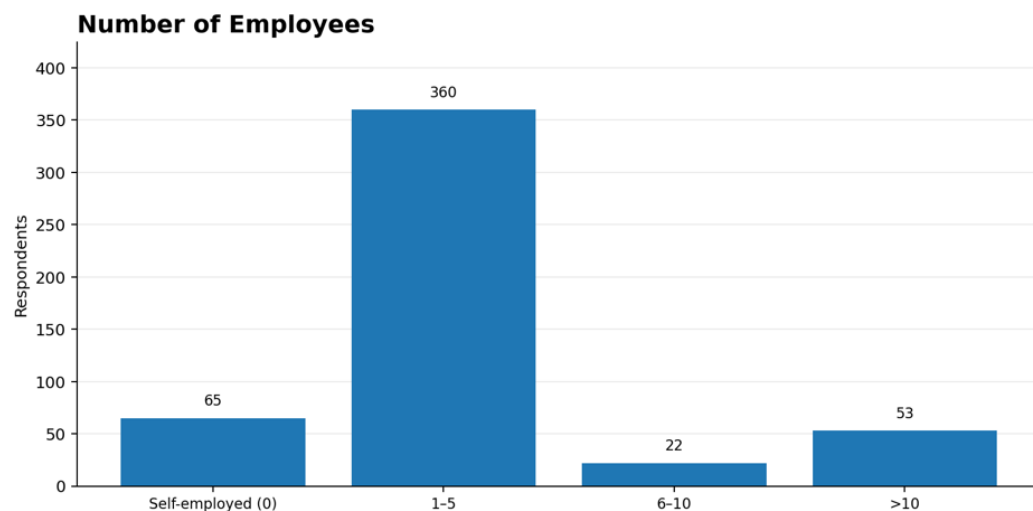


Figure 4. Distribution of respondents by number of employees.

In terms of workforce size, 360 respondents (72%) employed 1–5 people, 65 respondents (13%) were self-employed, 22 respondents (4.4%) employed 6–10 people, and 53 respondents (10.6%) employed more than 10 people. These characteristics indicate that the survey primarily reflects the experiences of relatively small-scale

businesses, which should be considered when interpreting the findings and their generalizability to larger enterprises.

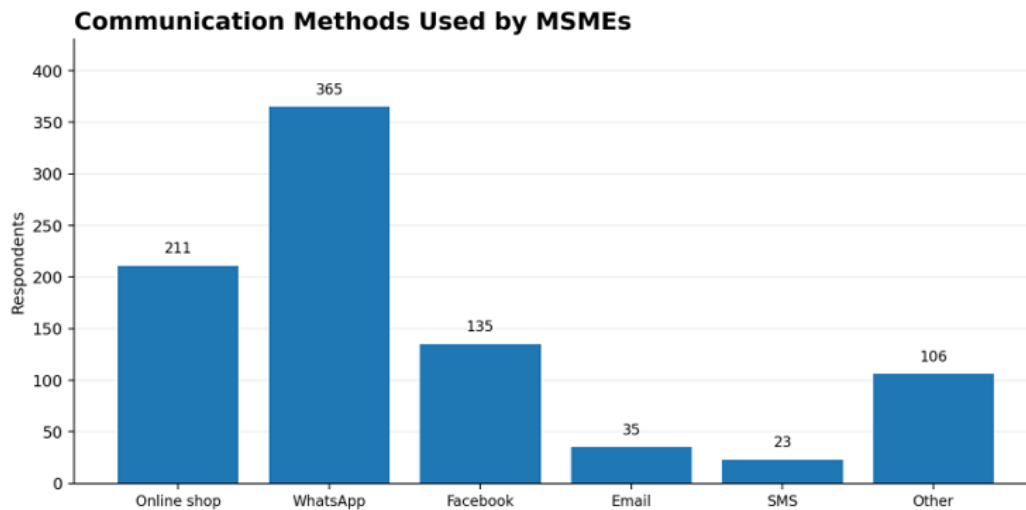


Figure 5. Communication methods used by surveyed MSMEs

For the first multiple response question, the most commonly used communication platform among respondents was WhatsApp, used by approximately 73% of MSMEs. This was followed by online shops at approximately 42% and Facebook at approximately 27%, while email and SMS were used by a much smaller proportion of respondents. The dominance of mobile-based and platform-based communication suggests that many respondents rely heavily on accessible digital channels to interact with customers and support day-to-day business activities.

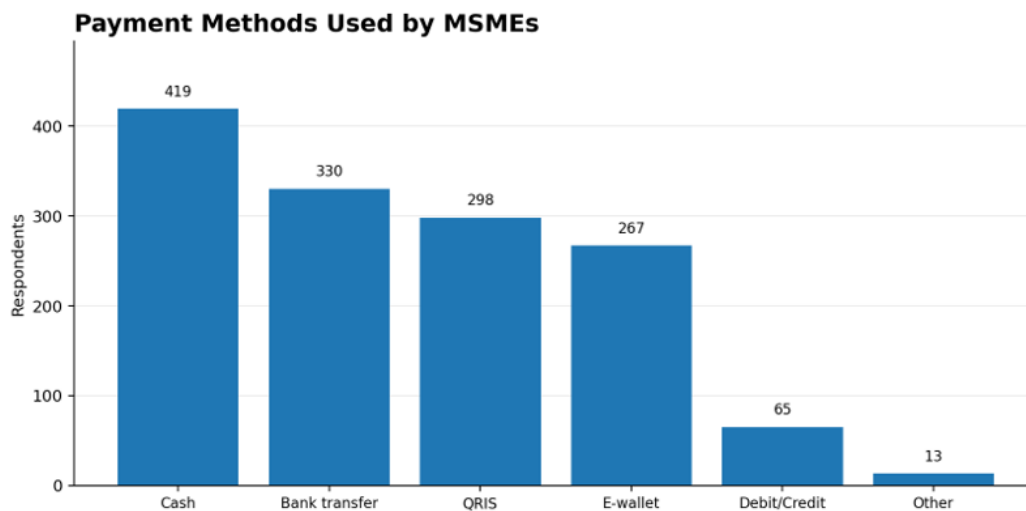


Figure 6. Payment methods used by surveyed MSMEs

In terms of payment methods, cash remained the most widely used option, reported by approximately 83% of respondents. At the same time, digital payment methods were also commonly used. Bank transfers were reported by 66% of respondents, while approximately 60% used QRIS, alongside other online payment methods. These findings indicate that cash and digital payments coexist within the surveyed MSMEs rather than representing a full transition from one payment system to another.

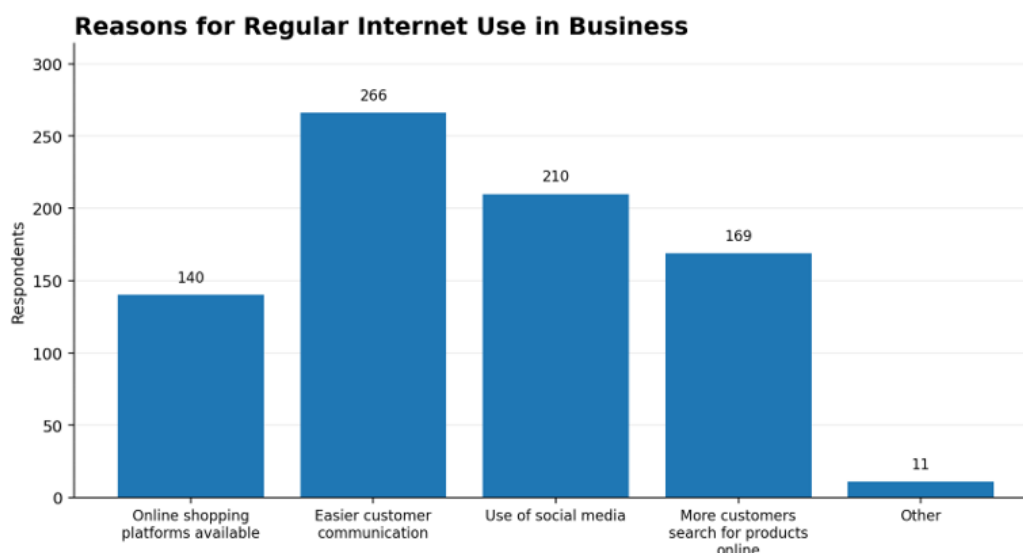


Figure 7. Reasons reported for regular internet use in business

For MSMEs that regularly used the internet, the most frequently reported reason was communication with customers, cited by 266 respondents. This was followed by social media use, cited by 210 respondents, and the increasing tendency of customers to search for products online, reported by 169 respondents. The availability of e-commerce platforms was also identified as an important factor supporting internet use. Taken together, these findings suggest that the value of internet access for MSMEs is closely linked to practical business functions such as customer communication, promotion, and market access.

Table 1. Reported average change in revenue after adopting internet use and after using Telkomsel, by business sector

Business sector	Revenue change after internet adoption	Revenue change after using Telkomsel
Service businesses	+28.71%	+31.24%
Other	+44.94%	+24.71%
Food and beverage	+40.64%	+31.81%
Retail (wholesale and retail, including online)	+38.48%	+42.27%
Transportation and logistics	+36.88%	+28.18%

Table 1 presents reported changes in business revenue after adopting internet use and after using Telkomsel across different business sectors. The results include only business sectors with at least 30 respondents to ensure the average is more representative. The survey results show reported revenue increases across multiple sectors after adopting internet use and, in many cases, after using Telkomsel. The magnitude of the reported increase varies substantially across sectors. These differences suggest that the relationship between digital connectivity and business performance is not uniform across all types of MSMEs. Sector characteristics, customer behavior, market conditions, business scale, and how digital tools are used may all influence the outcomes individual businesses experience. However, the general pattern suggests trends toward increased revenue after MSMEs adopted the internet for their business activities. Accordingly, the results should be interpreted as self-reported associations rather than as evidence that internet use or Telkomsel services directly caused the reported revenue increases. The survey design captures respondents' perceived business outcomes and experiences, but it does not isolate the effect of telecommunications services from other factors that may have affected business performance during the same period.

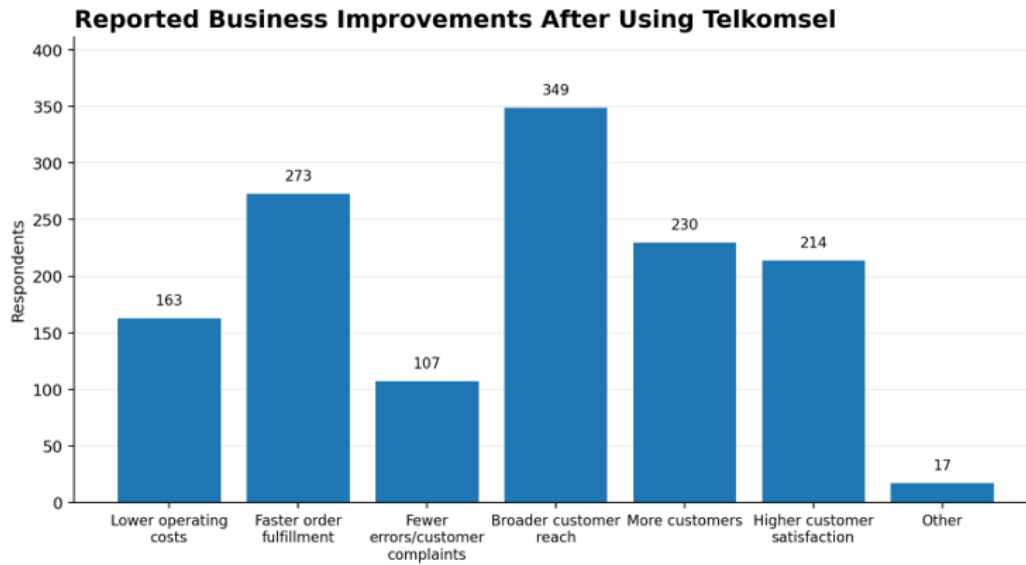


Figure 8. Business improvements reported after using Telkomsel products and services

Beyond revenue, respondents also reported improvements in several aspects of business performance after using Telkomsel products and services. The most commonly perceived improvements included broader customer reach, faster order fulfillment, increased customer numbers, and higher customer satisfaction. These findings suggest that respondents associate Telkomsel's services not only with financial outcomes, but also with operational and customer-related aspects of business activity.

Overall, the survey results indicate that respondents perceive Telkomsel's services as supporting MSME business activities in several ways, including communication, market access, daily operations, and business performance. However, because the findings are based on self-reported survey responses and the sample is dominated by micro enterprises, the results should be interpreted as indicative of user experiences within the surveyed group rather than as universally generalizable evidence for all MSMEs in Indonesia.

5. Conclusion

This study examined the socioeconomic role of the telecommunications industry in Indonesia through the case of Telkomsel. The findings indicate that Telkomsel contributes economically and socially through digital infrastructure investment, government and business collaboration, support for MSMEs, and direct contributions to the national economy.

In terms of direct economic contribution, Telkomsel generated an economic value of IDR 113.34 trillion in 2024 and contributed IDR 36.972 trillion to government revenue through spectrum usage fees, licensing fees, taxes, and dividends. This represented a 6.92% increase from the previous year and accounted for approximately 1.3% of total government revenue that year.

The regression analysis further identified positive estimated associations between Telkomsel's telecommunications indicators and regional economic performance. At the national level, each additional petabyte of Telkomsel data payload was associated with an estimated IDR 76.19 billion increase in Gross Regional Domestic Product (GRDP), while each additional BTS was associated with an estimated IDR 9.44 billion increase in GRDP. However, after applying HC3 heteroskedasticity-robust standard errors, neither the payload coefficient ($p = 0.233$) nor the BTS coefficient ($p = 0.121$) was statistically significant at the 5% level. These national-level estimates should therefore be interpreted as positive estimated associations rather than statistically conclusive relationships. In the analysis focusing specifically on underdeveloped, frontier, and outermost (3T) regions, each additional petabyte of data payload was associated with an estimated IDR 1.36

billion increase in GRDP, while each additional BTS was associated with an estimated IDR 0.124 billion increase in GRDP. Under HC3 robust inference, the positive associations reported for the 3T models remained statistically significant. These findings indicate that the relationship between telecommunications usage, physical network infrastructure, and regional economic activity may differ between the national and 3T-region analyses.

The MSME survey, involving 500 respondents, also indicates that respondents perceived benefits from internet connectivity and Telkomsel's services in their business activities. The sample was predominantly composed of micro enterprises, with 88% reporting annual revenue below IDR 300 million and approximately 89% employing 10 or fewer employees. Respondents reported improvements in areas including sales, revenue, customer reach, order fulfillment, customer numbers, and day-to-day business operations. The qualitative findings further show that Telkomsel participates in initiatives related to digital inclusion, infrastructure expansion, MSME support, entrepreneurship, digital skills, and broader digital transformation.

From a theoretical perspective, the findings support the view that telecommunications infrastructure can be understood as an enabling component of socioeconomic development rather than solely as a sector-specific investment. By examining regional economic outcomes, MSME experiences, and broader social initiatives together, this study highlights the multidimensional relationship between digital connectivity and socioeconomic activity. From a policy perspective, the findings suggest that continued development of telecommunications infrastructure may support broader economic participation, particularly in regions where digital access remains limited. Policies that encourage infrastructure expansion, support connectivity in non-commercial areas, and promote digital adoption among MSMEs may therefore contribute to more inclusive digital development. The findings therefore indicate that operators' socioeconomic role may extend beyond network provision to include support for digital business adoption, cross-sector collaboration, and participation in broader digital ecosystems.

This study should be interpreted within several scope conditions. First, as a single-operator case study, the findings are most directly applicable to Telkomsel and should be viewed as analytically informative rather than statistically representative of all telecommunications operators in Indonesia. Nevertheless, Telkomsel's extensive network coverage and substantial position within the national telecommunications sector make it a relevant case for examining the broader socioeconomic role of telecommunications infrastructure. Second, the national-level statistical significance of the telecommunications indicators was also sensitive to the correction for heteroskedasticity, further emphasizing the need for cautious interpretation of the estimated relationships. Third, the MSME findings are based on self-reported survey responses and are dominated by micro enterprises, which limits how far the results can be generalized to all MSMEs. Finally, the qualitative analysis is based on secondary documents and descriptive content analysis rather than primary qualitative data.

Future research could extend this study by comparing multiple telecommunications operators, examining the long-term effects of digital infrastructure investment, and assessing the socioeconomic contributions of emerging technologies such as 5G, Artificial Intelligence, the Internet of Things, and cloud computing. Additional research could also apply stronger causal or longitudinal methods to better isolate the effects of telecommunications development from other economic and social factors.

Overall, the findings suggest that Telkomsel plays an important role within Indonesia's broader digital ecosystem and is associated with economic activity, MSME development, digital inclusion, and infrastructure expansion. The regression evidence nevertheless varies across geographical contexts and is sensitive to the statistical treatment of heteroskedasticity at the national level. The study therefore contributes to understanding how a major telecommunications operator may support socioeconomic development, while also emphasizing the need for cautious interpretation of operator-level impacts within a wider and more complex economic environment.

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