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The Contribution of Digitalization, Road Infrastructure, and Fiscal Allocation in Enhancing The Output of Micro and Small Industries : A Perspective from Sumatera

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Abstract

Micro and Small Industry (IMK) play a strategic role in Indonesia's economy, particularly in providing employment and driving regional economic growth. However, their contribution to the Gross Regional Domestic Product (GRDP) in Sumatera remains relatively low, with a much smaller output proportion compared to medium-sized enterprises. The role of society as human resources and the government as policymakers is crucial in enhancing IMK productivity through aspects such as digitalization, infrastructure development, and fiscal allocation. Digitalization improves production efficiency and market expansion, while road infrastructure influences the mobility of production factors, and fiscal allocation aims to support sectoral development, though its effectiveness needs further evaluation. Thus, this study aims to assess the contribution of digitalization, road infrastructure, and fiscal allocation in increasing the output of Micro and Small Industries across 10 provinces in Sumatera from 2017 to 2023. This study employs a quantitative research approach using secondary data published by Statistics Indonesia (BPS), the Ministry of Public Works and Housing (PUPR), and the Directorate General of Fiscal Balance (DJPK). The digitalization aspect is proxied by the ICT Access & Infrastructure Index (IAI) and the ICT Usage Index (IP). The road infrastructure aspect is represented by the Total Road Length (TPJ) and the Road Quality Length (PKJ). Meanwhile, fiscal allocation is proxied by the Special Allocation Fund for Cooperatives and MSME Capacity Building (DAK). The analysis technique used in this study is panel data regression, with the Random Effect Model (REM) as the selected model. The results show that, partially, the variables IAI, IP, and TPJ have a positive effect on IMK output, while PKJ and DAK have a negative effect. Simultaneously, all variables have a positive and significant impact on IMK output across 10 provinces in Sumatera from 2017 to 2023.

Keywords: Digitalization; Road Infrastructure; Fiscal Allocation; Micro and Small Industries

1. Introduction

Currently, the Indonesian economy is in a progressive growth phase since the COVID-19 pandemic hit the world in 2020. Recorded through the Central Bureau of Statistics (BPS), that Indonesia's economic growth has always been at 5% per year since 2022. This progressive economic growth is certainly influenced by various factors, such as stable public consumption, increased Gross Fixed Capital Formation (PMTB) investment, government spending that continues to be allocated to development, and domestic export performance [1]. The sector that plays an important role in encouraging the effectiveness of these factors is the manufacturing industry sector. Manufacturing industries such as food and beverages, textiles, automotive, electronics, pharmaceuticals, and chemical industries, have succeeded in maintaining the stability of the Indonesian economy after the COVID-19 pandemic. The Micro, Small and Medium Enterprises (MSMEs) that continue to be empowered to increase employment opportunities and equitable distribution of community income and the role of MSMEs as the backbone of the Indonesian economy as evidenced by their resilience to economic instability [2].

According to the Ministry of Cooperatives and SMEs, in 2023 MSMEs managed to contribute IDR 9,580 trillion or 61% of Indonesia's total Gross Domestic Product (GDP). This achievement further strengthens the role of MSMEs as the country's priority sector in driving economic growth in the short and long term. However, the productivity of MSMEs is still considered low because the number of MSME businesses covers 99% of the total businesses in Indonesia and employment reaches 97% of the total workforce in Indonesia.

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The high contribution of MSMEs is largely the result of production from middle-class businesses. Based on data from the Central Bureau of Statistics (BPS), of the Rp9,580 trillion produced by MSMEs, around Rp8,965 trillion is the result of middle-class businesses, which implies that the contribution of middle-class businesses in the MSME sector reaches 93%, while the rest is the result of micro and small businesses. Another contrasting comparison is that the contribution of micro and small enterprises to Indonesia's GDP in 2023 is only 3%. Moreover, in 2021, micro and small enterprises are the largest business entities in Indonesia with 63.9 million business units or 99.65% of the total businesses in Indonesia, in stark contrast to the number of medium-sized enterprises which is only 44 thousand business units or 0.07% of the total businesses in Indonesia. This phenomenon further shows the low level of production of micro and small enterprises compared to medium enterprises and large enterprises.

In supporting the development of micro and small enterprises, the government has long categorized micro and small enterprises into special industries called Micro and Small Industries (IMK) as a form of special development for these businesses. The development of IMK is the government's effort to improve the economy because of the huge potential of IMK in driving the economy. Weijland (1998) mentions that the large role of IMKs in the economy is due to the large number of people who depend on them [3].

As part of the manufacturing industry, IMKs have a strategic role in providing employment and driving the economy at the local scale. The characteristics of IMKs are generally the availability of limited capital, labor from family members and adaptability to changes in local market demand. However, limited capital and a small workforce are challenges that micro and small enterprises must face. This challenge is often the reason why these businesses are unable to compete and survive in the highly competitive local market [4].

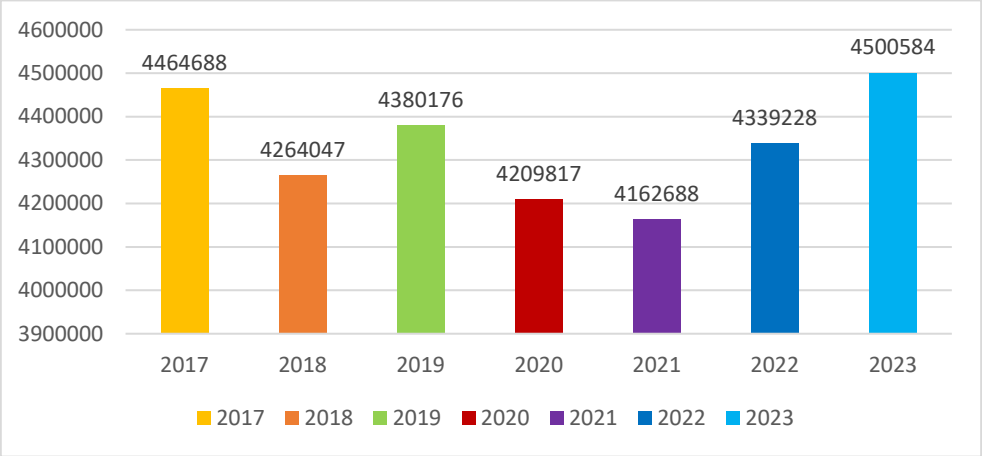

Figure 1.1 Number of Micro and Small Industries (IMK) in Indonesia 2017-2023

Source: Badan Pusat Statistik, 2024

In Figure 1.1, it can be seen that the growth in the number of IMK in Indonesia from 2017 to 2021 has continued to decline at 5%. However, the growth in the number of IMK has increased consistently at 3-4% from 2021 to 2023. The fluctuation in the number of IMK circulating in Indonesia is caused by many businesses that are unable to maintain their business due to limited capital, moreover the COVID-19 pandemic has caused a decrease in people's purchasing power which directly reduces their income. However, the government is actively creating programs that aim to provide stimulus to these micro and small businesses [2]. Spatially, the distribution of the number of IMK in 2023 is dominated by Java Island at 62.02% and Sumatera Island at 14.44%. Meanwhile, the regions with the least number of IMKs are Maluku-Papua and Kalimantan Island, which have a distribution of 2.18% and 4.13% respectively. One of the reasons why the concentration of IMK is centered in Java is because Java has better access to resources, raw materials, and a more consumptive market, compared to other regions or islands in Indonesia [5].

As the third largest island and second most populous in Indonesia. Sumatera Island has great potential to be the driving force of the country's economy. In addition, Sumatera Island is also the island with the most provinces in Indonesia, which is 10

provinces, this creates vulnerability to resource disparities between regions [6]. These geographical challenges indirectly affect the distribution of micro and small industries in Sumatera Island, which is concentrated in certain provinces that have better access to resources. This can be seen in the following graph illustrating the distribution of IMK businesses in Sumatera Island.

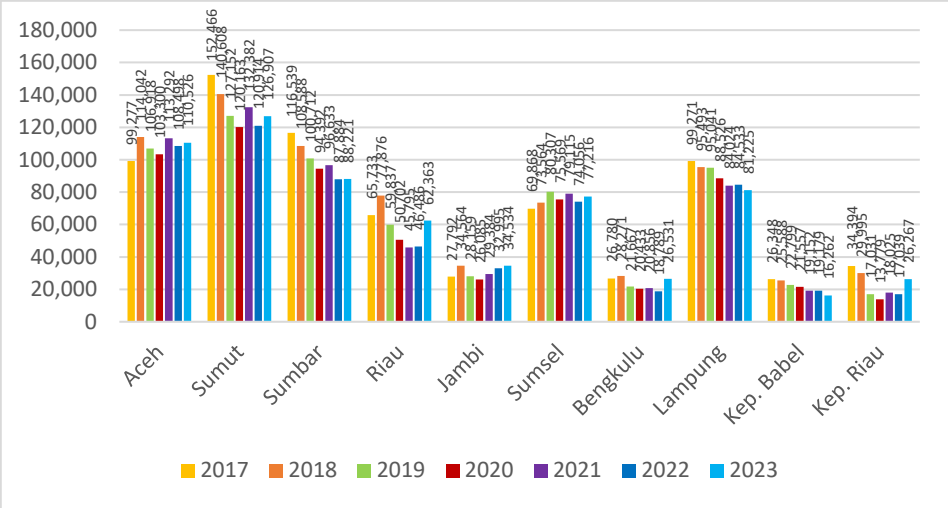

Figure 1.2 Number of Micro and Small Industries (IMK) in Sumatera Island 2017-2023

Source: Badan Pusat Statistik, 2024

It can be seen in Figure 1.2, that the number of IMKs on the island of Sumatera from 2017 to 2023 tends to fluctuate and inconsistent growth between provinces. The provinces with the most IMK are North Sumatera and Aceh with 126,907 and 110,526 IMK respectively in 2023. Both provinces contribute 20% and 17% of the total IMK on the island of Sumatera. Meanwhile, the provinces of Bangka Belitung Islands, Riau Islands, Bengkulu, and Jambi, have the least number of IMKs with their respective contributions of 3%, 4%, 4%, and 5%. The difference in the number of IMKs has a direct impact on the contribution of output produced by each province which can be seen in the graph below.

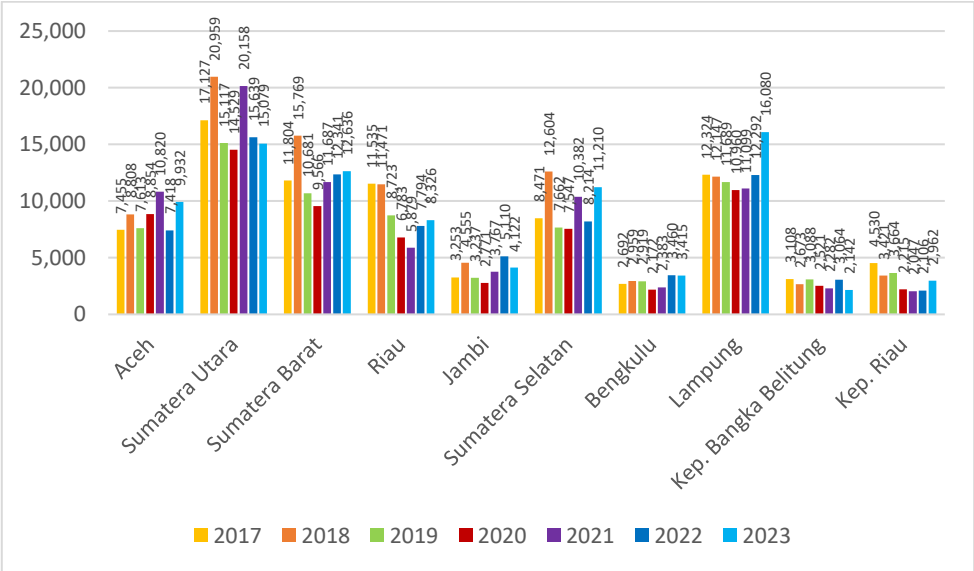

Figure 1.3 Output Value of Micro and Small Industry (IMK) in Sumatera Island 2017-2023 (million rupiah) Source: Badan Pusat Statistik, 2024

Figure 1.3 shows the growth of IMK output which tends to fluctuate as well as in Figure 1.2. North Sumatera as the province with the most IMK is able to produce high output since 2017. However, in 2023, Lampung Province, which does not have as many IMK as North Sumatera, Aceh, or West Sumatera, is able to produce the highest output with a production value of Rp16 trillion, which contributes 19% of the total IMK output of Sumatera Island in 2023. Meanwhile, the provinces of Bangka Belitung Islands, Riau Islands, Bengkulu, Jambi, produce the lowest output compared to other provinces, contributing 2%, 3%, 4%, 5%, respectively, of the total IMK output of Sumatera Island in 2023.

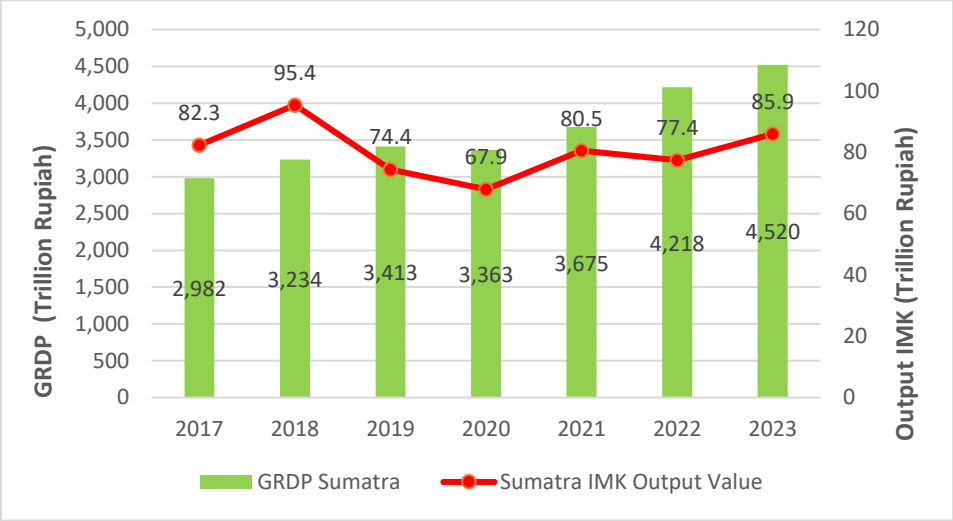

Figure 1.4 Comparison of GRDP to IMK Output in Sumatera Island 2017-2023

Source: Badan Pusat Statistik, 2024

Figure 1.4 shows the contribution of Micro and Small Industries to the total GRDP of Sumatera Island. IMK output growth has tended to decline since 2018, while GRDP growth has increased since 2017. In addition, the contribution of IMK output to the GRDP of Sumatera Island is at 1.8-2.9% from 2017 to 2023. The significant difference in the output value of each province is caused by the disparity between regions that has been explained previously. The government has long made investments in infrastructure, be it transportation infrastructure, energy, to technology and communication infrastructure, as a solution to geographic disparity problems [7].

The largest infrastructure investment made by the government from year to year is road infrastructure. Road infrastructure acts as a stimulus for economic growth in a region that functions for mobility and distribution of goods and services, a good regional mobility can improve transportation performance and affect the production of an industry [8].

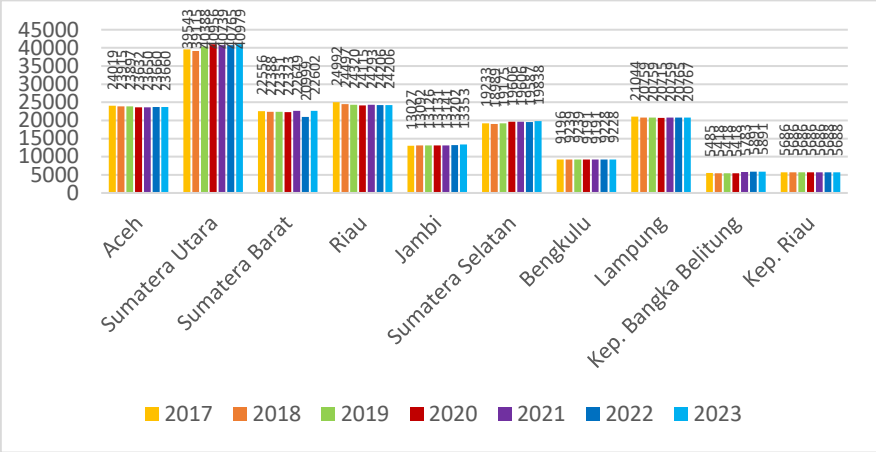

Figure 1.5 Total Road Length in Sumatera Island 2017-2023 (km)

Source: Kementerian PUPR, 2024

The graph in Figure 1.4 shows the same thing as in Figures 1.2 and 1.3, where North Sumatera and Aceh provinces have the longest road infrastructure on the island of Sumatera compared to other provinces with a total road length of 40,797 km and 23,660 km in 2023. Another similarity is that the provinces of Bangka Belitung Islands, Riau Islands, Bengkulu, and Jambi remain the provinces with the lowest road infrastructure development compared to other provinces. This implies that road infrastructure has a relationship or connection with the number of IMK distribution and the output produced. However, the growth of road development in each province has been quite stagnant over the last 5 years. In addition to its availability, road quality also has an influence on the efficiency of distribution of goods and services and other economic activities. Poor road quality can reduce the volume capacity of production goods that can be transported and increase the transportation costs of the production of goods and services. Therefore, the availability of roads must also be in line with the quality that supports them [8].

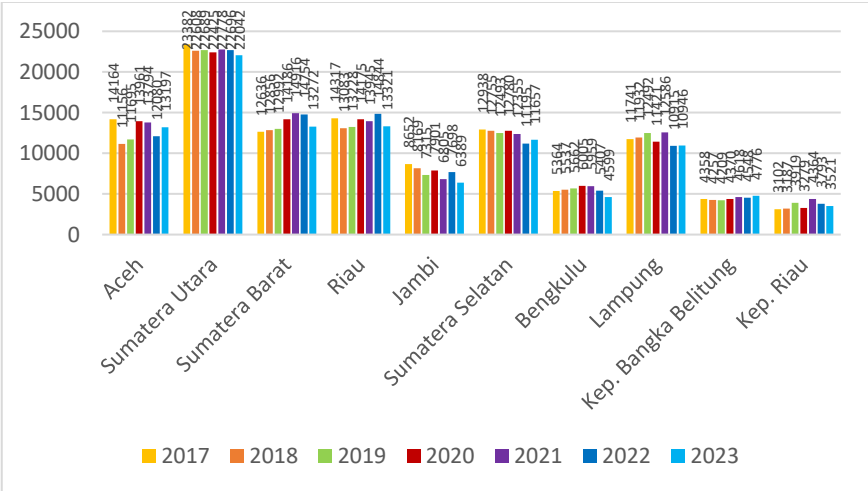

Figure 1.6 Good Quality Road Length in Sumatera Island 2017-2023 (km)

Source: Kementerian PUPR, 2024

Figure 1.5 shows the length of good quality roads in 10 provinces of Sumatera Island from 2017 to 2023. Road quality is measured by the Ministry of PUPR based on the classification of good and medium quality roads. It can be seen that in 2023, North Sumatera Province has the longest good quality roads, namely 22,042 km or 54% of the total length of provincial roads. However, the provinces with the largest percentage are Bangka Belitung Islands Province, which has 4,776 km of good quality

roads or 81% of the total length of provincial roads, and Riau Islands Province, which has 3,521 km of good quality roads or 62% of the total length of provincial roads. This difference shows that there is ineffectiveness in the use of APBD by the government on infrastructure in each province. This is in line with research conducted by [9], which concluded that one of the factors that can affect the quality of regional roads is fiscal capacity. However, the effectiveness and efficiency of its use depends on the policies of the local government itself.

The government created the fiscal policy of regional allocation funds as a form of fiscal decentralization to overcome the limitations and inequalities that occur between regions [6]. In this study, the allocation fund used by the government to build and develop micro and small industries is the Special Allocation Fund (DAK) for Improving Cooperatives and MSMEs.

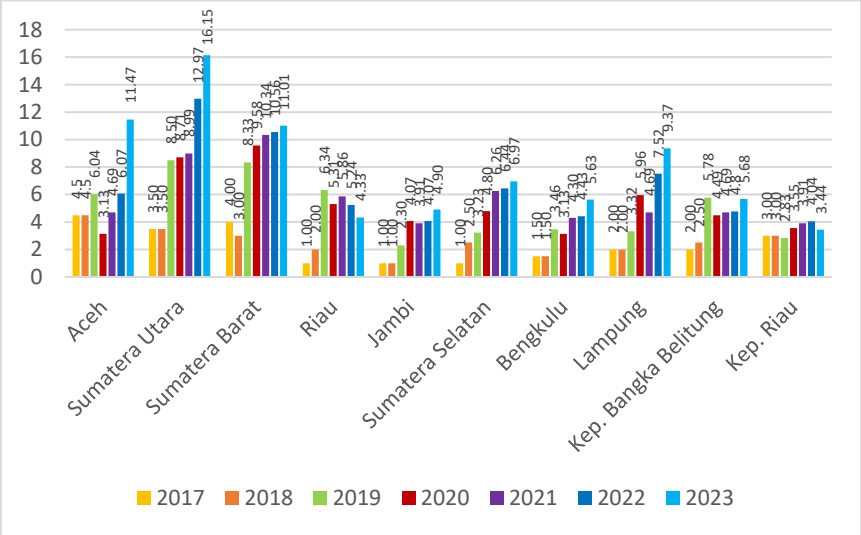

Figure 1.7 Special Allocation Fund (DAK) for the Improvement of Cooperatives & MSMEs in Sumatera Island 2017-2023 (billion rupiah)

Source: DJPK Kementerian Keuangan, 2024

Figure 1.6 shows that the Special Allocation Fund (DAK) for the Improvement of Cooperatives and MSMEs received by each province on the island of Sumatera experienced unequal growth in fiscal allocations between provinces. It can be seen that in 2023, the province with an increase in fiscal allocation is Aceh Province with an increase of 46% from 2022. On the other hand, Riau Province and Riau Islands are the two provinces that experienced a decrease in fiscal allocations by the central government. Both provinces experienced a decrease in allocation funds of -21% and -17% respectively in 2023. This is interesting, as Riau and Riau Islands provinces recorded IMK output growth of 6% and 29% respectively in 2023. In addition, Bengkulu Province, which is the second province with the highest increase in allocation funds with an increase of 21% in 2023, recorded a decline in IMK output value of -1% in the same year. The graph implies that there is government inconsistency in allocating cooperative and MSME funds to each region.

In the era of economic digitalization and the industrial revolution 4.0, industry players are increasingly active in adopting technology. Moreover, IMK with its more competitive competition, requires business actors to be faster and more adaptive in the use of technology as a means of their trade. The adoption of technology by business actors requires a capable technology and communication infrastructure, because the stability of this infrastructure has an impact on the speed of circulation of information related to the goods and services traded by business actors, thereby potentially increasing demand and production or output of the business [10].

Henfridsson & Bygstad (2013) state that technological or digital infrastructure can be defined as a collection of technological elements, networks, systems, processes, and people, which contribute to the functioning of information systems that include social

and technical aspects. The parameters of the digital infrastructure can be measured through three digital technology indicators, namely, internet usage, fixed telephone subscriptions, and cellular telephone subscriptions [11].

The Central Bureau of Statistics (BPS) since 2016 has developed the ICT Infrastructure Index and ICT Usage Index as two indicators of the progress of information and communication technology and digitalization in Indonesia. The parameters in the two ICT indices include all the digital infrastructure indicators previously discussed, such as the number of telephone and internet users, the number of broadband subscribers, the percentage of computer users, and the speed of internet bandwidth. The index scale is in the range of 0 to 10, where the higher the index value indicates that the infrastructure and ICT usage of a region is higher, and the lower the index value indicates relatively low ICT infrastructure and usage.

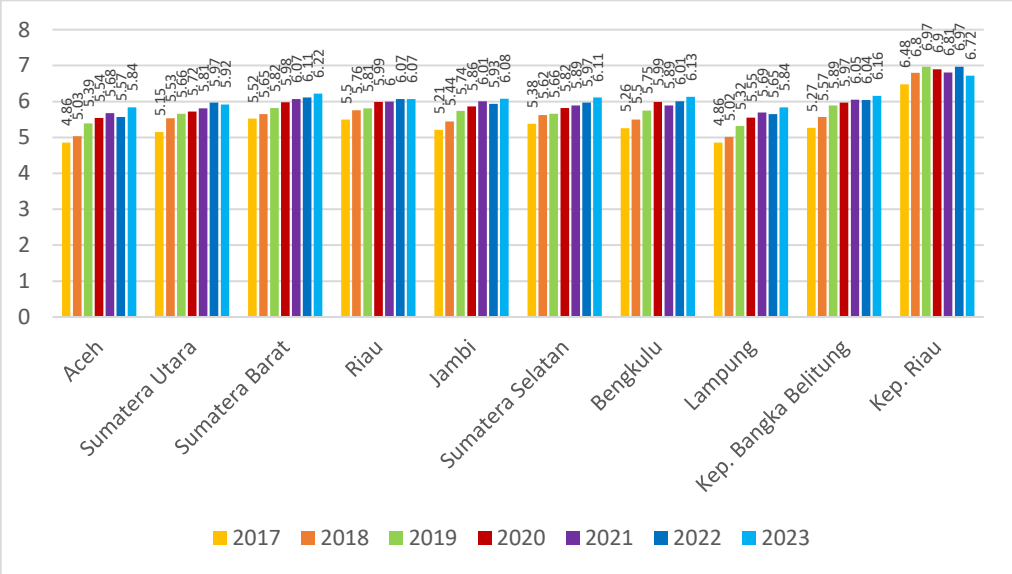

Figure 1.8 ICT Infrastructure & Access Index in Sumatera Island 2017-2023

Source: Badan Pusat Statistik, 2024

In Figure 1.8, it can be seen that the growth of the ICT access and infrastructure index on the island of Sumatera tends to increase from 2017 to 2023. The province with the highest index number is Riau Islands Province with an index number reaching 6.72 in 2023. However, Riau Islands Province is the only province that experienced a decrease in the index number, this decrease occurred in 2019-2021, and experienced an increase in 2022 but decreased again in 2023. This phenomenon is interesting, because it indicates a decrease in cellular phone usage, internet speed, or a decrease in internet usage by residents in Riau Islands Province.

The graph in Figure 1.9 shows the development of the ICT Usage Index in Sumatera Island from 2017 to 2023. The graph shows that each province has experienced growth in the index number since 2017. The province with the highest index number in 2023 is Riau Islands Province with an index number of 6.76. Riau Islands has also consistently had an index number above 6 since 2020. Meanwhile, the province with the lowest index number in 2023 is Aceh Province with an index number of 5.46. The difference in index numbers is a concern in itself, because Riau Islands Province, which has a lower fiscal capacity than Aceh Province, has a higher ICT usage index. Another interesting thing is that the ICT usage index number in Riau Islands Province always increases from year to year, but the ICT access and infrastructure index has decreased in the same year. The growth of ICT access and infrastructure and ICT usage on the island of Sumatera shows an increase in ICT development and digitization that is relatively evenly distributed between regions. This growth has a direct and indirect impact on various economic sectors including the IMK sector. This can be seen through the development of internet adoption by IMK in Sumatera Island and its ratio in the following graph.

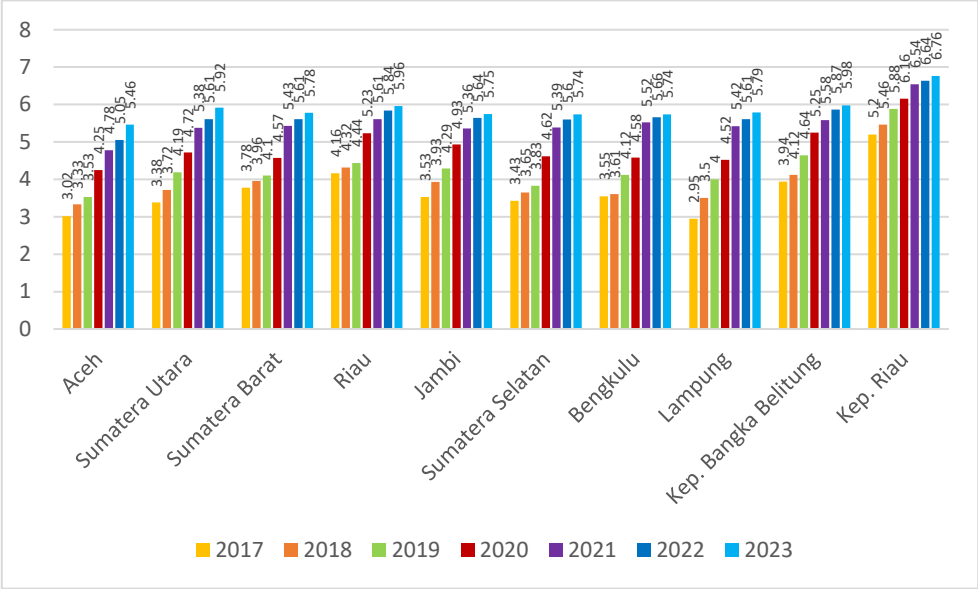

Figure 1.9 ICT Usage Index in Sumatera Island 2017-2023

Source: Badan Pusat Statistik, 2024

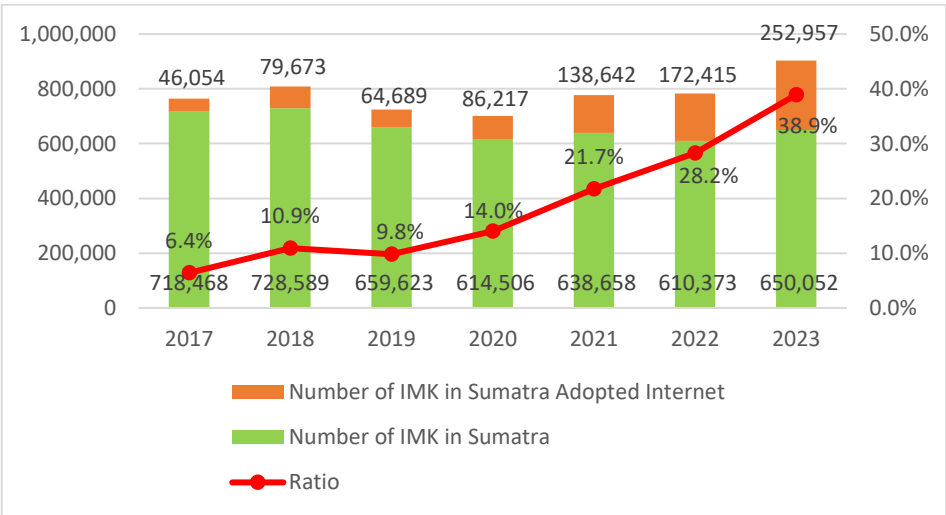

Figure 1.10 Ratio & Development of Internet Usage by IMK in Sumatera Island 2023

Source: Badan Pusat Statistik, 2024

The graph above shows that the level of internet adoption by IMK in Sumatera Island has always increased significantly since 2017. The highest increase in adoption occurred in 2023 with an increase of 46% from 2022. Meanwhile, the ratio of internet usage by IMK has also grown rapidly since 2017, where in 2017 IMK using the internet was only 6.4% of the total IMK operating, and by 2023 it grew to 38.9% of the total IMK. The graph also shows that the adoption rate continues to increase despite the decrease in the number of IMKs, which can be seen in 2020, where the number of IMKs in Sumatera Island decreased by 6%, but the number of IMKs adopting the internet increased by 33%. The same thing happened in 2022, where the number of IMKs

decreased by 4.5% from 2021, but the adoption rate increased by 24%. This indicates the higher dependency of IMKs in using the internet and technology as a means of increasing output value.

Based on the background previously described, researchers are interested in analyzing more deeply the contribution of digitalization and road infrastructure development as well as fiscal allocations by the central government in influencing the output value of Micro and Small Industries (MSMEs) on the island of Sumatera. Given that the contribution of MSMEs is mostly generated by middle-class businesses, while micro and small businesses have not been able to produce high output. The low output value is reflected in the distribution of IMK output in each province of Sumatera Island and its contribution is still very minimal to the overall GRDP of Sumatera Island. The allocation of funds for cooperatives and MSMEs by the central government is also inconsistent, with provinces such as Riau Islands and Riau experiencing a decrease in funding allocations, while provinces such as Aceh and North Sumatera experienced rapidly increasing funding allocations from 2022. This is interesting, because Riau Islands and Riau Province have higher IMK output growth than North Sumatera, and Riau Islands also has higher IMK output growth than Aceh Province in 2023. The consistent growth of digitization on the island of Sumatera that is not aligned with IMK output is a concern, as digitization should improve operational efficiency and subsequently increase production output. The relatively different development of transportation infrastructure between provinces also implies that the contribution of infrastructure as industrial capital still needs to be tested for significance, because Bangka Belitung Islands and Riau Islands provinces have better road quality than other provinces but this infrastructure capital does not reflect the IMK productivity of these two provinces. Referring to the importance of digitalization, road infrastructure, and fiscal allocation, this study is expected to provide a comprehensive picture of the contribution of these factors to the output that can be produced by micro and small industries. In addition, previous research examining the role of digitalization, road infrastructure, and fiscal allocation, on IMK in Sumatera Island is still very limited, so this research is needed to fill the gap. Therefore, researchers are interested in conducting research on "The Contribution of Digitalization, Road Infrastructure, and Fiscal Allocation, in Enhancing the Output of Micro and Small Industries: A Perspective from Sumatera".

2. Literature Review

2.1 Solow-Swan Growth Theory

In 1956, Robert Solow and Trevor Swan created an economic model known as the Solow-Swan production growth theory. This theory is a renewed theory of production growth that replaced the Keynessian Harrod-Domar model [12]. This theory became one of the most significant breakthroughs in economic theory at the time and is still very influential today [13]. In Solow's production growth theory, factors of production are considered as inputs used to produce goods and services. Specifically, Solow states that the two main factors of production used in his theory are capital (K) and labor (L) [14].

In the production function, there is one common concept, namely constant return to scale, which is when capital and labor experience the same or constant increase and produce output with the same percentage increase as well [14]. For example, if there is a 10% increase in capital and labor, then the implication is that output increases by 10% [15].

Solow's production growth theory is then not only used to measure the value of output and productivity of goods and services, but also developed to measure the economic growth of a country based on the output of goods and services, as well as the level of investment, savings and public consumption, which in turn this theory is known as Solow exogenous growth. This theory also continued to be developed by economists of his time such as Cass & Koopmans (1965), and Diamond (1965) [13].

2.2 Endogenous Growth Theory

Endogenous growth theory was first introduced by Paul Romer and Robert Lucas in 1989 and is known as Romer's endogenous theory. This theory is one of the development theories of Solow's production growth theory. A significant difference between the two theories is that Solow's theory assumes that production factors are exogenous or cannot be influenced, while Romer's theory assumes that production factors are endogenous and changes in production factors regardless of value will still increase the amount of production of goods and services [16].

In endogenous growth theory, the technology or “knowledge” variable is also developed as an endogenous variable, not as an exogenous variable as assumed by Solow [17]. This model considers knowledge and technology as important production factors and investment in research, development, education, and infrastructure, can increase productivity and catalyze long-term economic growth [18] (Fuadi, 2023).

In this study, Paul Romer's endogenous growth theory is relevant because this study not only discusses physical infrastructure, but also digitalization which is a form of knowledge and technology as a factor of economic production growth.

2.3 Public Capital Theory

Public capital theory is a theory first developed by David Alan Aschauer in 1989 in his research entitled "Is public expenditure productive?". This theory explains the role of government spending in the form of investment in public capital. Aschauer's research found that government investment in infrastructure such as roads, bridges, water, and energy, can positively affect the productivity of private sector output. Aschauer argues that the increase in productivity driven by this government investment can lead to an increase in output, and conversely a reduction in public investment in infrastructure can lead to a decrease in output, thereby inhibiting economic growth [19].

Government investment in infrastructure development is capital that aims to increase the productivity of economic output and improve the standard of living of the community at large. Infrastructure is also social overhead capital or basic capital that is important for the needs of society and indirectly provides benefits in production activities [20]. In this study, public capital theory is relevant because this study uses road infrastructure variables to identify its contribution to the output produced by micro and small industries which are private sector industries.

2.4 Fiscal Federalism Theory

According to the 2021 publication of [21], the theory of fiscal federalism was first developed by Wallace E. Oates in 1972 in his book entitled "Fiscal Federalism". This theory is part of public economics and is a development of basic ideas related to fiscal decentralization developed by previous economists such as Frederich Hayek (1944), Samuelson (1954, 1955), and Richard Musgrave (1959).

This theory basically explains two main things, namely, (1) the division of tasks between levels of government to organize and carry out the functions of fiscal allocation and fiscal distribution so as to create a harmonious and competitive government structure to create social welfare. (2) The division of the population between regions and the determination of how each part of the population plays its role in the social environment so that harmonization and healthy competition can be created to encourage maximum welfare [22].

The theory of fiscal federalism is used as a guideline for the government to design finances at the national and subnational levels [23]. According to Oates [24], fiscal decentralization has a positive relationship with the economy, where decentralization can encourage economic growth. In addition, Oates [25] (in Wahyuningsih, 2018) states that economic growth created through fiscal decentralization is caused by the efficiency of local governments in providing public goods that can be used by the community to achieve their respective welfare and become capital for the community in carrying out production activities.

In the context of this study, the theory of fiscal federalism can be the basis for explaining the fiscal allocation variable in influencing the performance of output produced by micro and small industries through allocation funds provided by the central government to each local government on the island of Sumatera.

2.5 Micro and Small Industry

The concept of Micro and Small Industries (MSE) began to be recognized and received attention since 1960-1970. IMK began to be the subject of discussion and research when developing countries were looking for solutions to accelerate economic development. Keith Hart (1973) introduced the concept of IMK in his research entitled "Informal Income Opportunities and Urban Employment in Ghana". In his research, Hart explained the position of IMK as an informal sector and its importance in promoting economic growth and poverty alleviation in Ghana [26].

In 1980-1990, the World Bank and the International Labor Organization (ILO) began to establish programs and financial policies to support the IMK sector. The view of IMK as playing a key role in economic development and job creation in both underdeveloped and developing countries was beginning to be recognized. This recognition of the IMK has encouraged world organizations and many countries to create inclusive economic policies [27].

According to the Central Bureau of Statistics (BPS), Micro and Small Industries (IMK) are industrial businesses that are mostly labor-intensive businesses that aim to drive the local economy and also provide massive employment. IMK is categorized as an informal business with low productivity and use of technology, but in recent years IMK has shown development in the use of technology and innovation in production. In addition, BPS also defines IMK as a manufacturing industry that carries out production activities to transform raw goods into finished or semi-finished goods and or from less valuable goods into higher value goods.

In their research, [28] mentioned that MSMEs are classified based on the number of workers, total assets, annual income, and the amount of capital owned, but the classification can vary between countries. The many classifications can be caused by differences in market structure, production structure, market power, and government policies in various countries. However, in Indonesia itself, IMK is not only classified based on the previously mentioned classifications, but also classified based on the type of industry.

IMK can be distinguished based on the number of workers. (1) Micro industry is an industry with a workforce of 1-4 people, (2) small industry is an industry with a workforce of 5-19 people. In 2023, IMK absorbed 9.84 million workers across Indonesia or around 3.5% of Indonesia's population [5]. Micro and small businesses can also be classified based on business capital and annual sales results in accordance with Government Regulation No. 7 of 2021 on the Ease, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises. In this regulation, it is stated that (1) a micro business is a business with a business capital of at most IDR 1 billion, excluding land and business premises, and has annual sales proceeds of at most IDR 2 billion. (2) A small business is a business with a capital of between Rp1 billion-Rp5 billion, excluding land and business premises, and has annual sales between Rp2 billion-Rp15 billion.

IMK output is the production performance generated by micro and small industry activities through the production process to produce added value. According to BPS, the output produced by micro and small industries is generally finished or semi-finished goods with little skill required to process them. IMK products can be in the form of handicrafts, processed food and beverage products, apparel products, and simple processed agricultural products.

IMK has great potential in increasing Indonesia's GDP, but this is difficult to achieve because IMK has low productivity. This is due to high production costs and inefficiency in using production factors. The high and low value of output produced by IMK is highly dependent on capital, raw material prices, and marketing strategies [29]. The dependence of IMK on capital, prices, and marketing is a form of how business behavior in making decisions based on the technology it has, limited production costs, and also the selection of production factors in accordance with their capital capabilities [30].

2.6 Digitalization

In general, digitization is a process of media transformation from analog or printed form to digital form. This media transformation is one of the most significant changes and affects various aspects of life [31]. The digitization process forms what is known as the information society, which is the development of a traditional industrial society that utilizes mechanical machines manually and develops into a modern industrial society that utilizes machine automation through Technology, Information and Communication (ICT) [32].

Digitalization is closely related to the scope of the digital economy. The digital economy is an ICT-based economic activity such as the internet, smartphones, optical networks, wireless networks, and the Internet of Things (IoT). The development and impact of the digital economy is highly dependent on the people who adopt these technologies [33]. According to Mesenbourg (2001) [34], the digital economy starts with the availability of ICT infrastructure that enables connectivity and access to technology. Mesenbourg also believes that the digital economy develops when ICT is used by society to encourage and accelerate various economic and business activities. Meanwhile, according to [35], digital transformation in the economy is an automated process of converting all physical assets into digital form and integrated based on the complexity of the entire digital platform itself.

The most significant ICT implementation in the digital economy is the internet. Internet technology continues to be developed by various organizations and individuals as a basis for industrial management, and industrial progress is characterized by a focus on development in the digital world and the internet. According to Faruqi (2019), the development of technology and the internet utilized by industry can boost the economy through digital trade (e-commerce) [32]. The development of internet technology also encourages innovation and novelty in other technologies that support digitalization such as mobile phones, computers, artificial intelligence (AI), and cloud computing.

In their research [36], state that digital-based economic activities are able to reduce production costs through the efficiency of information-related transportation costs. Digital circulation of information makes it easier for consumers and producers without having to incur transportation costs to meet in person. In addition, from the producer side, overall production costs can be reduced because digitalization can better reach people who previously did not have access to the market, so that indirectly demand will increase and producers can increase production capacity.

2.7 Road Infrastructure

According to Grigg (1988) [37], infrastructure is a physical system that provides transportation, irrigation and drainage, buildings, roads, and other public facilities. Indonesia as a developing country places physical infrastructure development as a vital or priority sector due to its positive impact on the economy and its role as connectivity between regions in Indonesia.

Various economic activities require road infrastructure to develop. Road infrastructure is needed by companies to improve their operational efficiency. However, the nature of road infrastructure as public goods makes it very rare for companies to be interested in developing it, because it is difficult to collect the costs. Thus, the development of road infrastructure for economic development is the responsibility of the government [12]. The nature of road infrastructure as a public good is a form of public capital that is formed or built from government investment [34].

According to Basri (2002) [38] (in Tarigan, 2013), good infrastructure can improve the efficiency of inter-regional connectivity which in turn can control and reduce the disparity in the price of goods and services between regions. Meanwhile, according to the World Bank, poor quality road infrastructure can increase transportation costs, which in turn reduce product competitiveness against products from other regions that have better quality road infrastructure.

2.8 Fiscal Allocation

Fiscal allocation is one of the functions of fiscal policy related to the utilization of the State Budget (APBN). This function is listed in Law No. 17 of 2003 concerning State Finance, which explains that the allocation function in the state budget means that the state budget must be directed to reduce unemployment, waste of resources, and increase the efficiency and effectiveness of the economy [39] (Aziz, 2013).

In implementing the allocation function, the government conducts fiscal decentralization as a form of delegation of central government authority to local governments. This delegation includes the handover and transfer of financing, facilities and infrastructure, and natural resources [25]. The implementation of fiscal decentralization has been stipulated in Law No. 22 of 1999 concerning Regional Government and Law No. 25 of 1999 concerning Financial Balance between Central and Regional Governments.

The division of authority and its delegation from the central government to local governments is based on budget management capacity. The central government has relatively absolute authority in managing the budget compared to local governments, which have relatively limited authority due to the lack of financial access and economic openness in their respective regions (Oates in BKF, 2021). Despite the limitations possessed by local governments, Oates (1993) [25] explains that fiscal decentralization carried out by the central government can increase economic growth and community welfare, because local governments can be more efficient in producing and providing public goods.

In supporting the development and growth of Micro and Small Industries (IMK). The government established the Special Allocation Fund (DAK) Nonphysical Capacity Building Fund for Cooperatives and SMEs (PK2UKM) which is allocated to each region's APBD. This allocation fund has been mandated in the Regulation of the Minister of Cooperatives and Small and Medium Enterprises (PERMEN KOPUKM) No. 03 of 2016 concerning Technical Guidelines for the Use of Non-Physical Special Allocation Funds for Capacity Building of Cooperatives, Small and Medium Enterprises (DAK P2KUKM). The regulation states that this allocation fund aims to provide training to business actors and also mentoring as a form of process to increase output productivity and competitiveness of micro and small enterprises through guidance, consultation, and advocacy. The training provided by the regional apparatus is training in the form of technical skills, cooperative skills, entrepreneurship, competence, management, and business management.

3. Research Method

The approach used in this research is a quantitative approach with the type of data used in this research is secondary data. This research specifically examines the scope of Sumatera Island which includes 10 provinces from 2017-2023. The data used in this study were collected from the publications of the Central Bureau of Statistics (BPS), the Ministry of Public Works and Housing (PUPR), and the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance. The dependent variable used in this study is the Output Value of Micro and Small Industries (IMK), which measures the production of Micro and Small Industries in units of million rupiah. The independent variables used in this study to describe the digitalization aspect are, ICT Access and Infrastructure Index (IAI) and ICT Usage Index (IP), which are measured in units of 0-1. The independent variables used to describe aspects of road infrastructure are Total Road Length (TPJ) and Road Quality Length (PKJ), which are measured in kilometers. The independent variable used to describe the fiscal allocation aspect is the Special Allocation Fund for Capacity Building of Cooperatives and SMEs (DAK), measured in units of billion rupiah.

This study uses both descriptive statistical analysis techniques and inferential statistical analysis techniques. Descriptive statistical analysis is carried out by analyzing the mean, median, maximum, minimum, variance, standard deviation, and frequency

distribution, with the aim of providing an overview of data distribution [40]. The inferential statistical analysis technique used in this study is regression parametric statistics. The regression model used is multiple linear regression with panel data. Panel data regression is a combination of regression with time series and cross section data. Panel data regression has the advantage of providing more informative results, a smaller degree of collinearity or relationship between independent variables, greater degrees of freedom, and more efficiency [41].

This study uses panel data with cross section data in the form of 10 provinces on the island of Sumatera and time series data for 7 years from 2017-2023, with the number of observations for this study covering 70 observations. The multiple linear regression for the panel data equation model formed is as follows.

$$IMKit=\beta0 + \beta1IAIit + \beta2IPit + \beta3TPJit + \beta4PKJi\ t + \beta5DAKit + eit$$

The model determination test needs to be carried out to determine the regression model to be used based on the estimation model, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Tests include the chow test, hausman test, and lagrange multiplier (LM) test. Next, classical assumption testing can be carried out which includes heteroscedasticity test, normality test, multicollinearity test, and autocorrelation test. After testing the classical assumptions, panel data regression estimation and cross-section effect estimation can be performed.

4. Results and Discussion

The first stage of analysis is descriptive statistical analysis. This stage aims to see the maximum, minimum, average, level of data variation, direction of data distribution, and the level of variance of the data coefficient [42].

Table 4.1 Result of Statistical Descriptive Test

	IMK	IAI	IP	TPJ	PKJ	DAK
Mean	8054.600	5.828857	4.848714	18467.30	10816.59	5.065286
Median	7728.000	5.830000	4.990000	20276.50	11717.94	4.460000
Maximum	20959.00	6.970000	6.760000	40979.00	23382.00	16.15000
Minimum	2047.000	4.860000	2.950000	5418.000	3102.000	1.000000
Std. Dev.	4911.294	0.456294	0.965064	10103.89	5521.187	3.028949
Skewness	0.523220	0.453613	-0.133876	0.573655	0.556936	1.264645
Kurtosis	2.434904	3.666799	1.910224	2.915707	2.820883	4.748974
Jarque-Bera	4.125253	3.697400	3.672966	3.859992	3.712317	27.58063
Probability	0.127120	0.157442	0.159377	0.145149	0.156272	0.000001
Sum	563822.0	408.0200	339.4100	1292711.	757161.6	354.5700
Sum Sq. Dev.	1.66E+09	14.36611	64.26298	7.04E+09	2.10E+09	633.0427
Observations	70	70	70	70	70	70

Source: Researcher Processed Data

Table 4.1 Based on the results of descriptive statistical analysis, it can be concluded that the output of micro and small industries (IMK) in Sumatera Island has an average of 8,054.6 units, with relatively normal data distribution. The range of production output between provinces is quite large, which is between 2,047 to 20,959, indicating an imbalance in the contribution of the IMK sector in each region. The standard deviation of 4,911.3 indicates that the variation between provinces is quite significant, with some provinces having much larger production than others. The skewness of 0.523 indicates that the data is slightly skewed to the right, meaning that there are some provinces with IMK output that is much higher than the average. With a Jarque-Bera probability value of 0.127, the data distribution can be said to be normal, so it can be used for further analysis without additional transformation.

In terms of digitalization, the ICT Access and Infrastructure Index (IAI) has an average of 5.828, with a fairly symmetrical data distribution and not too large differences between provinces, as indicated by the relatively low standard deviation (0.456). Meanwhile, the ICT Usage Index (IP) shows greater differences between provinces, with a standard deviation of 0.965 and a range of values between 2.95 and 6.76. This shows that although digital infrastructure is relatively evenly distributed, the level of utilization by the community and businesses in some provinces is still much lower than in other provinces. The skewness of IP of -0.133 indicates that the distribution of the data is slightly skewed to the left, meaning that there are more provinces with a high

ICT usage index than a low one. However, both IAI and IP have Jarque-Bera probability values above 0.05, so these data can be considered normally distributed.

In terms of road infrastructure, Total Road Length (TPJ) has an average of 18,467.3 km, with a range from 5,418 km to 40,979 km. The high standard deviation (10,103.9 km) indicates that the difference between provinces in terms of road length is very large. The skewness of 0.573 indicates a slight skew to the right, but the data distribution is still close to normal with a Jarque-Bera probability value of 0.145. On the other hand, the Road Quality Length (PKJ) has an average of 10,816.59 km, with a standard deviation of 5,521.1 km, which also shows a large variation between provinces. However, the distribution of the data is still quite normal with a Jarque-Bera probability of 0.156. The difference between TPJ and PKJ indicates that some provinces may have large road lengths but not all of them are in good condition.

In terms of fiscal allocation, the Special Allocation Fund (DAK) for PK2UKM shows an average of 5.065 billion, but with huge differences between provinces, as indicated by a range of values between 1 billion and 16.15 billion and a high standard deviation of 3.028 billion. The skewness value of 1.264 indicates that the distribution of the data is highly skewed to the right, meaning that some provinces received much larger DAK funds than others.

Table 4.2 Result of Chow Test

Effect Test	Statistic	d.f	Prob.
Cross-section F	12.469644	(9.55)	0.0000
Cross-section Chi Square	77.841242	9	0.0000

Source: Researcher Processed Data

The Chow test is conducted to determine the regression model used between the Fixed Effect Model (FEM) or the Common Effect Model (CEM). Based on table 4.2, the Chow test results show that the probability value for cross-section F is 0.0000. This value is smaller (<) than the significance level α = 5% or 0.05, and it can be concluded that there are fixed effects in the regression model and the selected model is the Fixed Effect Model (FEM). Furthermore, the Hausman test can be carried out to determine the regression model used between Fixed Effect (FEM) or Random Effect (REM).

Table 4.3 Result of Hausman Test

Effect Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section Random	7.568621	5	0.1817

Source: Researcher Processed Data

Based on table 4.3, the Hausman test results show that the probability value of cross-section random is 0.1817. This probability value is greater (>) than the significance level α = 5% or 0.05, and it can be concluded that there is no individual effect of either the cross-section unit or the time-series unit that is correlated with the independent variable and the better model used is Random Effect (REM). Furthermore, the Lagrange Multiplier test (LM Test) can be carried out to determine the more appropriate regression model between Random Effect (REM) or Common Effect (CEM).

Table 4.4 Result of Lagrange Multiplier (LM) Test

Effect Test	Cross-section	Prob.
Breusch-Pagan	44.82589	0.0000

Source: Researcher Processed Data

Table 4.4 shows the Lagrange Multiplier test with a probability value of Breusch-Pagan of 0.000. This value is smaller (<) than the significance level α = 5% or 0.05, and it can be concluded that the intercept of the cross-section data is random and the REM model is the most appropriate model to use as a regression estimator in this study.

Table 4.5 Result of Heteroscedasticity Test

Variable	Coefficient	Prob.
IAI	-0.014646	0.9061
IP	-0.021253	0.6675
LOGTPJ	0.079396	0.7035
LOPPKJ	-0.185439	0.4095
DAK	0.006839	0.5460

Source: Researcher Processed Data

The heteroscedasticity test carried out using the Glejser test method, in accordance with the Random Effect (REM) regression model used in this study. Table 4.5 shows that the probability value of each independent variable is greater (>) than the significance level α = 5% or 0.05, and it can be concluded that there is no heteroscedasticity in the data used in the regression model, or in other words, the regression model is homoscedastic and has a fixed residual variance.

Table 4.6 Result of Normality Test

Jarque-Berra	Prob.
2.725247	0.255988

Source: Researcher Processed Data

Table 4.6 shows the results of the normality test which can be seen through the probability value for Jarque-Berra which is 0.255988. This probability value is greater than the significance level α = 5% or 0.05, and it can be concluded that the distribution of residual data in the regression model is normally distributed.

Table 4.7 Result of Multicolinearity Test

Variable	Centered VIF
IAI	5.463546
IP	6.114437
LOGTPJ	4.310531
LOPPKJ	4.101603
DAK	2.618585

Source: Researcher Processed Data

In table 4.7, the multicollinearity test results show that the Centered Variance Inflation Factors (VIF) value of each variable is smaller (<) than 10, and it can be concluded that there is no multicollinearity problem in the regression model.

Table 4.8 Result of Autocorrelation Test

Test	Prob.
Durbin-Watson Stat	1.794532

Source: Researcher Processed Data

The autocorrelation test results in table 4.8 show the Durbin Watson stat value of 1.794532. This figure is close to the value of 2, which means that the residuals in the regression model do not occur autocorrelation or in other words are not correlated between time.

The panel data regression estimation results are the result of a series of regression statistical tests that include the T-statistic test (partial test), F-statistic test (simultaneous test), and R^2 test (coefficient of determination test), with the aim of answering the hypotheses that have been formed in this study. The estimation results can help in determining whether the independent variables have a significant influence on the dependent variable.

Table 4.9 Result of Random Effect Model Panel Data Regression (T-statistic)

Variable	Coefficient	Prob.
C	-0.730943	0.7199
IAI	0.024835	0.8947
IP	0.004301	0.9484
LOGTPJ	1.569426	0.0000
LOPPKJ	-0.624533	0.0418
DAK	-0.017712	0.2504

Source: Researcher Processed Data

The regression estimation results show that the constant coefficient (C) is -0.73. This value can be interpreted that if the other independent variables are constant (ceteris paribus) or zero, then the output value of Micro and Small Industries (IMK) will

decrease by 0.73%. However, the probability is not significant at 0.7199 or greater (>) than the confidence level α = 5% or 0.05. The estimation results on the ICT Access and Infrastructure Index (IAI) variable show a coefficient value of 0.024, which means that every 1 point increase in the index can increase the output value of IMK by 0.024%, but the probability is not significant, which is 0.8947 or greater (>) than the confidence level α = 5% or 0.05. The ICT Usage Index (IP) variable shows a coefficient value of 0.004, which means that every 1 point increase in the index can increase the output value of IMK by 0.004%. However, the probability is not significant at 0.9484 or greater (>) than the confidence level of α = 5% or 0.05. The variable Total Road Length (LOGTPJ) shows a coefficient value of 1.569, which means that every 1% increase in road length can increase the value of IMK output by 1.569 ~ 1.57%. This estimate is significant at the confidence level of α = 5% (0.05) and at α = 1% (0.01), which can be seen in the probability value of 0.000. The estimation result on the variable length of road quality (LOGPKJ) shows a coefficient value of -0.624, which means that every 1% increase in the length of road with stable quality will decrease the output value of IMK by 0.624%. This estimate is significant, which can be seen through its probability value of 0.0418 or smaller (<) than the confidence level α = 5% or 0.05. The estimation result on the Special Allocation Fund for Capacity Building of Cooperatives and SMEs (DAK) variable shows a coefficient value of -0.017, which means that every 1 billion rupiah increase in DAK will decrease the output value of IMK by 0.017%. However, this estimate is not significant, which can be seen through its probability value of 0.2504 or greater (>) than the confidence level α = 5% or 0.05.

Table 4.10 Result of Simultaneous Test (F-statistic)

F-statistic	Prob. (F-statistic)
9.312436	0.000001

Source: Researcher Processed Data

The results of the simultaneous significance test (F-statistic test) in table 4.10 show a probability value of 0.000001. This probability value is smaller (<) than the confidence level α = 5% or 0.05, it can be concluded that the independent variables which include ICT Access and Infrastructure Index (IAI), ICT Usage Index (IP), Total Road Length (TPJ), Road Quality Length (PKJ), and Special Allocation Fund for Cooperative and SME Improvement (DAK), together (simultaneously) significantly affect the dependent variable Output Value of Micro and Small Industries (IMK) in Sumatera Island 2017-2023.

Table 4.11 Result of Coefficient Determination Test (R^2)

R-squared	Adjusted R-squared
0.421140	0.375917

Source: Researcher Processed Data

The coefficient of determination (R2) test results in table 4.11 show an R-squared value of 0.421140. This value can be interpreted that about 42.11% of the variation in the output value of Micro and Small Industries (IMK) can be explained by all the independent variables in the regression model. Meanwhile, the Adjusted R-squared value corrects the R-squared value by considering the level of significance and the number of independent variables contained in the model. Thus, the resulting value after considering these elements is 0.375917, which means that about 37.59% of the variation in the output value of IMK can be explained by all the independent variables in the regression model.

Table 4.12 Result of Cross-Section Effect Test

Province	Effect
Aceh	-0.155605
North Sumatra	0.069793
West Sumatra	0.311302
Riau	-0.209016
Jambi	-0.431769
South Sumatra	0.155791
Bengkulu	-0.355485
Lampung	0.308266
Kep. Bangka Belitung	0.214248
Kep. Riau	0.092474

Source: Researcher Processed Data

The results of the cross-section effect test in table 4.12 aim to see the provinces on the island of Sumatera that have higher or lower output values of Micro and Small Industries (IMK) than other provinces after being controlled by the independent variables contained in the model. These cross-section effects describe the deviation from the model average for each province. If the effect value is positive, it means that the province has a higher than average IMK output performance after considering other factors. Conversely, if the value is negative, then the IMK performance in the province is lower than the model average.

The provinces with positive cross section effect values include West Sumatera Province (0.311), Lampung Province (0.308), Bangka Belitung Islands Province (0.214), and South Sumatera Province (0.155). This result shows that after taking into account all independent variables, these provinces have an advantage in IMK output performance that is higher than the model average and better than other provinces. In contrast, provinces with negative cross section effect values include Jambi Province (-0.431), Bengkulu Province (-0.355), Riau Province (-0.209), and Aceh Province (-0.155).

This result indicates that these provinces have lower IMK output performance compared to other provinces. Meanwhile, provinces with cross section effect values close to zero include North Sumatera Province (0.069) and Riau Islands Province (0.092). These results indicate that the IMK output performance in North Sumatera Province and Riau Islands Province is relatively stable and not far from the model average. Another thing that can be shown from these results is that after considering the independent variables, the performance of IMK output in the two provinces does not show significant advantages or disadvantages compared to other provinces.

Based on the results of cross section effect testing that has been conducted previously, it is found that the output performance of Micro and Small Industry (IMK) on the island of Sumatera tends to be dynamic between provinces. Provinces such as West Sumatera, Lampung, Bangka Belitung Islands, and South Sumatera, have an advantage in the performance of IMK over other provinces after considering the variables of digitalization, road infrastructure, and fiscal allocation, where among these provinces, West Sumatera Province is the region with the most superior IMK performance.

Several things that can be a factor in the superiority of the output value in these provinces are the effectiveness and efficiency of government policies in supporting the micro sector and business ecosystem as well as producer productivity and better consumer purchasing power compared to other provinces such as West Sumatera Province, Lampung, and South Sumatera, each of which in 2023 experienced an increase in IMK output from the previous year. However, Bangka Belitung Province, which experienced a 30% decline, still has an IMK performance advantage over other provinces. This implies that there are still other variables outside the model that can significantly describe IMK output performance.

Other results show that provinces with less superior IMK output performance include Jambi, Bengkulu, Riau, and Aceh. The low performance of IMK output in these provinces can be caused by various factors that are not explained in the regression model such as the lack of business diversification, the dominance of the informal or non-manufacturing sector in the economy, and fiscal policies that are less supportive of the Medium, Small and Micro Enterprises (MSMEs) sector.

North Sumatera Province and Riau Islands Province are two provinces that have relatively stable IMK output performance compared to the model average or other provinces. The implication of this result is that there are no specific factors outside the model that can provide significant advantages or constraints to the performance of IMK output in these two provinces.

The panel data regression estimation results show that the ICT Access and Infrastructure Index (IAI) and ICT Usage Index (IP) variables as proxies for digitalization in this study each partially have no significant effect at the $\alpha = 5\%$ or 0.05 confidence level. However, both variables have a positive influence on the value of IMK output in Sumatera Island in 2017-2023. These results are in line with research conducted by [43], in which cellular telephone infrastructure and internet infrastructure have no significant influence on IMK output in Indonesia.

Several things that can cause this to happen are the digital infrastructure gap between provinces on the island of Sumatera, which can be seen through the ICT Access and Infrastructure Index, which is relatively different between provinces. Another factor is the level of digitalization adoption that is still not optimal to improve the performance of the IMK output itself. As discussed in section 1 earlier, in 2023 IMKs that have adopted the use of the internet as a digital medium are still at 38.9% of the total IMK businesses spread across Sumatera Island. Increased adoption should further increase the significance of the contribution of digitalization to the IMK output itself in accordance with the Solow-Swan production growth theory and the endogenous growth theory proposed by Paul Romer regarding technology as the main factor in driving production growth.

The panel data regression estimation results on road infrastructure proxied by the Total Road Length (TPJ) and Road Stability Length (PKJ) variables show a significant positive effect on the TPJ variable and a significant negative effect on the PKJ variable at the $\alpha = 5\%$ or 0.05 confidence level. This result is interesting because there are two different relationships between the two variables. The TPJ variable shows a significant positive effect in line with research conducted by [43], whose research results show that road infrastructure has a positive and significant effect on the value of output produced by IMK in Indonesia and is also in line with public capital theory which states that the availability of public infrastructure such as roads can increase the production of an economy.

The PKJ variable shows a significant influence but with a negative relationship to the value of IMK output. This rejects the hypothesis that the length of road stability can positively affect the IMK output in Sumatera Island in 2017-2023. This result is in line with research conducted by [44] Faber (2014) on how the development of good road infrastructure, namely toll roads, can reduce production output in several districts in China. This is due to increased competition and accessibility between regions that can reduce the production capability of small industries.

The panel data regression estimation results on fiscal allocation proxied by the Special Allocation Fund for Capacity Building of Cooperatives and SMEs (DAK) variable show a negative and insignificant relationship at the $\alpha = 5\%$ or 0.05 confidence level. This negative relationship between DAK PK2UKM and the output value or production results of IMK is also in line with research related to the effect of DAK on economic growth on Sulawesi Island conducted by [45] Ibrahim & Abdul (2019), where their research resulted in the conclusion that DAK has a negative relationship with the GDP of Sulawesi Island. In their research, they mention that one of the reasons this can happen is that DAK has no direct effect in encouraging growth.

The implication of this result is that the management of the Fiscal Allocation Fund for Capacity Building of Cooperatives and SMEs (DAK PK2UKM) should have a positive effect in increasing the output value of the Micro and Small Industry sector in 10 provinces on the island of Sumatera. However, the management of these funds is highly dependent on the ability of local governments in each province. As in the cross-section effect test, some provinces produce superior IMK output after being influenced by DAK PK2UKM and there are other provinces that are still less superior.

5. Conclusions

Based on the results of the research and discussion that has been discussed previously, this research can draw conclusions as such, Digitalization both proxied by the ICT Access and Infrastructure Index (IAI) and the ICT Usage Index (IP) has a positive and insignificant effect on the Output Value of Micro and Small Industries (IMK) in 10 Provinces on the island of Sumatera in 2017-2023. Whereas, Road Infrastructure proxied by Total Road Length (TPJ) has a positive and significant effect on the Output Value of Micro and Small Industries (IMK) in 10 Provinces on the island of Sumatera in 2017-2023. While, Road Infrastructure proxied by the Length of Road Quality (PKJ) has a negative and significant effect on the Output Value of Micro and Small Industries (IMK) in 10 Provinces on the island of Sumatera in 2017-2023. Lastly, Fiscal Allocation proxied by the Special Allocation Fund for Capacity Building of Cooperatives and SMEs (DAK) has a negative and insignificant effect on the Output Value of Micro and Small Industries (IMK) in 10 Provinces on the island of Sumatera in 2017-2023.

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