The Influence of Technological Literacy, Education, and Employment on Poverty in Kalimantan

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ABSTRACT: Poverty is a condition in which individuals or groups lack sufficient resources to meet their basic needs. It is a fundamental issue that can affect the economic growth rate of a region. This study aims to analyze the influence of labor force absorption, percentage of computer users, telecommunications consumption, and education level on the number of poor people in the provinces of Kalimantan Island from 2018 to 2022 using panel data regression analysis. The results from the selected Fixed Effects model indicate that telecommunications consumption has a positive impact on the number of poor people, while the education level has a negative impact on the number of poor people. However, labor force absorption and the percentage of computer users do not significantly influence the number of poor people. Based on the research findings, it is hoped that the government can create an extensive telecommunications network. The expectation is that communication facilities and infrastructure will be widely available, leading to reduced telecommunications expenses for the population, allowing them to allocate their money towards daily essential needs. Additionally, adequate communication facilities are expected to aid the teaching and learning process in Kalimantan Island, as the improvement in educational quality has proven to decrease the poverty rate during the research period.

KEYWORDS: education, telecommunications, labour, poverty.

INTRODUCTION

The pursuit of improving socio-economic well-being and reducing the poverty rate has become a primary priority in development policies in Indonesia (Hafiz & Harjatiningisih, 2021). Poverty issues often take the forefront in the formulation of regional development policies. When the poverty rate increases, regional development policies aim to bring forth solutions that address the root causes of poverty. These policies may involve strategic resource allocations in infrastructure, education, healthcare, and empowerment within the local economic sector (Sutrisno et al., 2023).

According to Todaro & Smith (2015), successful regional development policies often involve social protection programs targeting vulnerable communities, such as direct financial assistance, accessible healthcare services, and food aid. This is achieved by considering the needs and actively engaging the participation of communities in the planning and execution of policies. Hence, the correlation between poverty and regional development policies forms a cycle that can be positively influenced through the implementation of sustainable policies (Nalle et al., 2022).

Poverty is a condition where individuals, families, or societal groups lack adequate access to economic resources, thereby being unable to meet basic needs such as food, adequate housing, access to education, healthcare, and other essential services (Mankiw, 2015). It is a state where household income or consumption falls below the level deemed sufficient to meet basic needs (Andrianto & Iskandar, 2019).

Todaro & Smith (2015) define that the measurement of poverty levels in a region will vary depending on the income level and cost of living of the population in that area. Moreover, the income parameter or poverty line set in each region serves as the basic reference for each government in addressing poverty issues and the welfare of its inhabitants (Alamanda, 2020).

Soebagyo (2016) states that the poverty line represents the minimum income or expenditure considered adequate to meet basic needs. According to Ardianti & Hartono (2022), measuring the poverty level can be done using various methods, such as absolute or relative poverty lines related to specific social or economic standards.
Kalimantan Island, with its significant potential as one of Indonesia's largest islands, has been the focal point in various economic, social, and political contexts (Elia et al., 2020). Despite its abundant natural resources, the island also faces significant challenges related to poverty, requiring special attention from both local and central governments in Indonesia, especially with the current plans for constructing Indonesia's new capital city in Kalimantan (Halida et al., 2021).

The plan to build Indonesia's new capital city in Kalimantan has also sparked discussions on how this development will affect socio-economic dynamics, particularly in the context of reducing the poverty rate and balancing development across Kalimantan (Yulita et al., 2023). Stakeholders' efforts aim to ensure that the construction of the new capital city doesn't solely focus on physical infrastructure but also addresses socio-economic aspects that can reduce poverty rates (Puspita et al., 2020).

Based on Figure 1 and 2, it is evident that the poverty rate in Kalimantan Island remains considerably high and has struggled to decrease, especially during the period of 2019-2020 when the economy was declining due to the Covid-19 pandemic. During this time, despite the economic downturn, the poverty rate remained high due to significant job terminations leading to a surge in unemployment and subsequently increasing the number of people living in poverty.
Various policies have been proposed to enhance the well-being of the population and reduce poverty. These policies range from economic empowerment, education, access to healthcare services, social protection programs, to efforts in improving infrastructure. These initiatives aim to elevate the workforce's quality so that in the future, individuals can more easily obtain decent jobs with adequate wages, thereby escaping the poverty line (Sugiharti et al., 2022).

The absorption of labor in the formal sector plays a crucial role in poverty reduction within a society. As the formal sector grows, stable job opportunities with ensured labor rights, including social security and legal protection, are created. This significantly contributes to poverty alleviation because workers in the formal sector tend to have more assured and stable incomes (Todaro & Smith, 2015). According to Islami & Anis (2019), employment in the formal sector also means greater access to social security programs such as health insurance, pensions, and labor protection, helping to mitigate the risk of families falling into poverty due to a more robust safety net.

Increased productivity within the formal sector has the potential to significantly impact poverty reduction. Workers in this sector often receive better training, access to more advanced technology, and higher production standards, gradually increasing income and reducing economic inequality. Furthermore, labor absorption in the formal sector contributes to tax payments and economic contributions funding social programs and infrastructure development. This indicates that formal sector growth not only directly benefits individuals but also supports more stable economic development (Rusniati et al., 2018).

The implementation of technology in the formal sector not only influences economic growth but also has a significant impact on the education sector and poverty reduction efforts. High technological literacy in the formal sector plays a vital role in enhancing access to and the quality of education (Ratnawati, 2020). According to Ruhyana & Essa (2020), technology provides new means for learning, allowing broader access to online educational resources and interactive learning platforms. With this approach, individuals previously limited in accessing education due to geographic or financial constraints can now access relevant and quality educational materials via the internet (Ginting & Siregar, 2020).

Gautam et al. (2022) state that technology integration in the formal sector can significantly contribute to increased education access and reduced poverty rates by providing broader opportunities for equality and social inclusion. However, it is essential to note that unequal access to technology or inadequate skills in its use can exacerbate societal inequalities in education access and economic opportunities. Therefore, besides developing better technological infrastructure, greater efforts are needed to ensure digital inclusion for all segments of society and to provide training and support to those in need to effectively utilize technology (Zhang, 2020).

Kalimantan Island is known for its abundant natural resources, including coal, oil, and natural gas. However, a paradox of significant poverty persists in some regions, raising questions about the imbalanced utilization of natural resources concerning improving community welfare (Nasrun & Indra, 2020).

While there is economic growth in several cities and regions in Kalimantan, significant disparities in wealth distribution and job opportunities persist. These disparities can be seen in high poverty levels in some areas alongside robust economic growth centers. Moreover, limitations in infrastructure and access to basic services such as education are prevalent (Sutrisno et al., 2023).

Uneven infrastructure development makes it challenging for communities to access crucial elements of the modern economy, such as technology and information. Particularly in remote areas, communication and technological infrastructure are severely lacking. This is regrettable as technological advancements can enhance economic activities and make trade more efficient (Salvatore, 2015). It means that indirectly, technology and information facilities will increase residents' income and consequently reduce poverty rates (Todaro & Smith, 2015).

Adequate education services and infrastructure are crucial for economic development. With high-quality education, the workforce will have specialized skills and can easily secure formal jobs, ensuring they receive decent wages. A highly educated workforce also directly translates to higher productivity and thus higher wages. In other words, poverty levels can be mitigated by improving the quality of education and the workforce in the region (Ariasih & Yuliarmi, 2021).

The use of computers is also suspected to have a significant impact on the economy and poverty. Computers allow for automation, rapid data processing, and operational efficiency. In the business sector, this enhances company productivity by expediting production
processes, inventory management, and communication. Higher productivity often results in better economic growth (Gautam et al., 2022).

Computer usage has opened doors to the digital economy. E-commerce, digital platforms, and various online businesses have become centers of economic growth, creating new opportunities for many. Computers also play a crucial role in education and access to information. With internet access, people can access insights, training, and information more widely. This aids in improving the quality of education and allows more people to have opportunities in better job fields (Greene, 2016).

Gautam et al. (2022) using the Fixed Effects approach found that digitalization of the economy and advancements in technology and information positively impacted the quality of education, ultimately reducing poverty in India during the years 2017-2020. Another finding suggests that technological literacy and workforce skills negatively affect poverty rates among micro, small, and medium-sized enterprises (MSMEs).

Jacobus et al. (2018) using Ordinary Least Square (OLS) regression analysis found that education and health negatively influence poverty rates in three regions in North Sulawesi Province, namely Bolaang Mongondow Selatan, Minahasa Tenggara, and Kepulauan Sangihe in 2016. Meanwhile, Melati et al. (2021) also supported the notion that improved education and health facilities, along with government social assistance, have reduced poverty levels in West Java Province from 2015 to 2019.

During the period from 2013 to 2017 across 33 provinces in Indonesia, Prasetyoningrum & Sukmawati (2018), using panel data analysis with the Fixed Effects approach, found that the Human Development Index (HDI) positively influenced labor force absorption and effectively reduced the number of poor people.

Based on the background description, poverty is a challenge for every economy, especially with the future relocation of the new capital to Kalimantan Island. Studies on poverty dynamics in the prospective new capital area need to be conducted to understand how the massive economic development will impact poverty and the welfare of Kalimantan's inhabitants. The main goal of this research is to analyze the magnitude of the impact of labor absorption in the formal sector, the percentage of the population using computers, household telecommunications consumption, and the education level on the number of poor people in the provinces of Kalimantan Island from 2018 to 2022 using panel data regression analysis.

**METHODOLOGY**

This research employs the number of poor population as the dependent variable. Meanwhile, technological literacy is represented by the percentage of the population using computers and household consumption in the telecommunications sector. Both these variables are complemented by average years of schooling data, indicating the level of education, as well as labor force absorption representing the employment landscape in Kalimantan Island. The data source is obtained from the publication of the Central Berau Statistics Indonesia.

The panel data regression used in this study is an adaptation from the article by Parianom et al. (2022), where this research includes the technological literacy indicator to analyze its influence on the poverty rate in the provinces of Kalimantan Island from 2018 to 2022. Here is the regression model equation used in this study (Gujarati, 2003):

\[
\text{LOGJPM}_i = \beta_0 + \beta_1 \text{PTK}_it + \beta_2 \text{KMPT}_it + \beta_3 \text{LOGKON}_it + \beta_4 \text{LOGTP}_it + \epsilon_{it}
\]

Where JPM represents the number of poor population in thousands of people, PTK denotes the absorption of labor force in the formal sector in percentage (%), KON signifies the average household consumption for telecommunications expressed in Indonesian Rupiah, KMPT stands for the percentage of the population using computers, and TP represents the level of education in years.

The panel data regression in this study encompasses the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM); selection of the best model estimator using the Chow Test and Hausman Test; testing the goodness-of-fit of the model; and examining the validity of the effects on the chosen model estimator.
RESULT AND ANALYSIS

In panel data regression, selecting an appropriate model is a crucial step in statistical analysis. The results of the model selection test are summarized in Table 1.

Table 1. Model Selection Test

<table>
<thead>
<tr>
<th>Testing</th>
<th>Cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow Test</td>
<td>$F(4, 16) = 1617.099; \text{Prob. } F = 0.000$</td>
</tr>
<tr>
<td>Hausman Test</td>
<td>$\chi^2(4) = 6468.394; \text{Prob. } \chi^2 = 0.000$</td>
</tr>
</tbody>
</table>

Source: Processed Eviews Results

The model selection test results indicate that FEM (Fixed Effects Model) is superior to CEM (Common Effects Model) because the Prob. F value in the Chow Test is 0.000 > 0.01. Furthermore, the Hausman Test result shows a Prob. $\chi^2$ value of 0.000 > 0.01; hence, it can be concluded that the Fixed Effects Model is the best model and will be used in analyzing this research.

Table 2. The Estimation Results of the Fixed Effects Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>Std. Error</th>
<th>t-Statistics</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>6.509</td>
<td>1.631</td>
<td>3.992</td>
<td>0.001</td>
</tr>
<tr>
<td>PTK</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.382</td>
<td>0.707</td>
</tr>
<tr>
<td>KMPT</td>
<td>-0.006</td>
<td>0.004</td>
<td>-1.443</td>
<td>0.168</td>
</tr>
<tr>
<td>LOG(KON)</td>
<td>0.453</td>
<td>0.185</td>
<td>2.450</td>
<td>0.026</td>
</tr>
<tr>
<td>LOG(TP)</td>
<td>-3.189</td>
<td>0.974</td>
<td>-3.275</td>
<td>0.005</td>
</tr>
</tbody>
</table>

R²          | 0.998        |
Adjusted R² | 0.998        |
F-stat,     | 1543.905     |
Prob,(F-stat,) | 0.000     |
Durbin-Watson stat | 2.267 |

Source: Processed Eviews Results

Table 3. Effects and Constants of FEM (Fixed Effects Model)

<table>
<thead>
<tr>
<th>Province</th>
<th>Effects</th>
<th>Constants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalimantan Barat</td>
<td>0.408</td>
<td>6.917</td>
</tr>
<tr>
<td>Kalimantan Tengah</td>
<td>-0.162</td>
<td>6.347</td>
</tr>
<tr>
<td>Kalimantan Selatan</td>
<td>0.161</td>
<td>6.670</td>
</tr>
<tr>
<td>Kalimantan Timur</td>
<td>0.681</td>
<td>7.190</td>
</tr>
<tr>
<td>Kalimantan Utara</td>
<td>-1.089</td>
<td>5.420</td>
</tr>
</tbody>
</table>

Source: Processed Eviews Results

Table 3 presents the constants in five provinces of Kalimantan. It is observed that Kalimantan Timur (East Kalimantan) has the highest constant among the five provinces at 7.190. This implies that concerning the influence of labor absorption, percentage of computer users, telecommunications consumption, and education level on the number of poor people, Kalimantan Timur tends to have the highest number of poor people. Conversely, Kalimantan Utara (North Kalimantan) has the lowest constant, specifically at 5.420. This means that regarding the impact of labor absorption, percentage of computer users, telecommunications consumption, and education level on the number of poor people, Kalimantan Utara tends to have the lowest number of poor people.
Based on the best estimation result, the Fixed Effects Model indicates the existence of a well-fitted model, with a coefficient of determination (R^2) value of 0.998. This implies that 99.8% of the variation in the number of poor population can be explained by the variation in the factors of labor force absorption, percentage of computer users, telecommunications consumption, and the level of education. Moreover, the validity of the influences reveals that the independent variables significantly affect the number of poor population are telecommunications consumption and the level of education. However, labor force absorption and the percentage of computer users do not have a significant effect on the number of poor population in Kalimantan Island during 2018-2022.

Table 4. Results of Validity Test of Effects (t-test)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>Prob.t</th>
<th>Criteria</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTK</td>
<td>-0.001</td>
<td>0.707</td>
<td>&gt; 0.10</td>
<td>No effect</td>
</tr>
<tr>
<td>KMPT</td>
<td>-0.006</td>
<td>0.168</td>
<td>&gt; 0.10</td>
<td>No effect</td>
</tr>
<tr>
<td>LOG(KON)</td>
<td>0.453</td>
<td>0.026</td>
<td>&lt; 0.05</td>
<td>Significant at α = 0.05</td>
</tr>
<tr>
<td>LOG(TP)</td>
<td>-3.189</td>
<td>0.005</td>
<td>&lt; 0.01</td>
<td>Significant at α = 0.01</td>
</tr>
</tbody>
</table>

Source: Processed Eviews Results

Telecommunications consumption has a regression coefficient of 0.453. This means that if telecommunications consumption increases by 1%, the number of poor population will also increase by 0.45%. The coefficient of the level of education is negative, indicating that the level of education has a negative effect on the number of poor population. With a regression coefficient of -3.189, an increase in the level of education by 1% will decrease the number of poor population by 3.19%. The relationship pattern used to actualize these variables concerning the number of poor population is logarithmic-logarithmic.

Based on the validity test of the effects, it is evident that the absorption of labor in the formal sector does not influence the number of poor population in Kalimantan Island during 2018-2022. The low absorption of labor in the formal sector contributes to this situation. Table 5 shows that the absorption of labor in the formal sector in most provinces in Kalimantan Island is still very low. Through this data, it can also be concluded that nearly half of the workforce in Kalimantan Island is not engaged in formal employment. This also indicates that the labor system in that region has not been regulated in accordance with labor laws.

Table 5. Labor Force Absorption in Kalimantan (%)

<table>
<thead>
<tr>
<th>Province</th>
<th>Percentage of Formal Labor Force by Province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2022</td>
</tr>
<tr>
<td>Kalimantan Barat</td>
<td>41.23</td>
</tr>
<tr>
<td>Kalimantan Tengah</td>
<td>48.50</td>
</tr>
<tr>
<td>Kalimantan Selatan</td>
<td>42.70</td>
</tr>
<tr>
<td>Kalimantan Timur</td>
<td>55.74</td>
</tr>
<tr>
<td>Kalimantan Utara</td>
<td>51.00</td>
</tr>
</tbody>
</table>

Source: Processed Eviews Results

The low absorption of labor in the formal sector is a crucial issue that needs immediate resolution. Workers are susceptible to receiving wages that do not comply with prevailing regulations, rendering them unable to meet their basic needs, consequently raising the future poverty levels. Furthermore, they do not receive health or retirement benefits. Hence, there is a need for collaboration between the central government and local authorities, particularly in the provinces of Kalimantan, to implement transparent labor regulations for every economic unit operating in the region.

The t-test results indicate that the percentage of computer users does not influence the number of poor people. Computers are considered luxury items and require internet access to maximize their functionality. Additionally, the geographical conditions in Kalimantan, where the distances between regions are significant, contribute to the high prices of computer components. Therefore, only certain segments of the population own them.
The limited accessibility of renewable technology for the population in Kalimantan impedes the economic processes in the region. In the modern era, technology and information infrastructure are utilized for more efficient economic transactions. Thus, the envisioned progress in information technology and tech literacy aimed at enhancing the welfare of the population has not been fully realized, hence not significantly impacting the dynamics of poverty in Kalimantan.

Another finding of this research indicates that the high level of telecommunications consumption among the populace in Kalimantan leads to an increase in the number of poor people. This result seemingly supports why the percentage of computer users has no effect on poverty in Kalimantan. The high cost of telecommunications drives up people's expenses. Moreover, the push for advancements in information technology and tech literacy among the younger generation, necessitating updates on social media, compels them to bear the high communication costs, ultimately sacrificing other essential needs. Consequently, this situation contributes to the increasing number of people living in poverty.

The test of influence validity indicates that the level of education has a negative impact on the number of poor people in Kalimantan from 2018 to 2022. Education forms the primary foundation for economic development. With adequate education and resources, it creates a workforce with higher productivity, making it easier for them to obtain decent jobs and appropriate wages to meet their living expenses. Thus, education directly creates new opportunities for the population to break free from the shackles of poverty.

CONCLUSIONS

The dynamics of poverty refer to the changes or movements in the level and characteristics of poverty over time. It involves analyzing the factors causing poverty, changes in the number of poor people, and variations in the distribution of poverty across different societal groups. This research aims to analyze the influence of the level of labor absorption in the formal sector, the percentage of computer users, telecommunications consumption, and the level of education on the number of poor people in the provinces of Kalimantan Island from 2018 to 2022 using panel data regression analysis.

The results from the selected model, Fixed Effects, indicate that high telecommunications consumption has a positive impact on the number of poor people, while the level of education has a negative impact on the number of poor people. However, labor absorption and the percentage of computer users do not significantly influence the number of poor people.

Through these research findings, it is hoped that the government can create an extensive telecommunications network. The expectation is that communication infrastructure will be widely available, reducing the population's expenses in the telecommunications sector. Consequently, the funds they have can be allocated to their daily basic needs. Moreover, with the availability of adequate communication facilities, it is expected to enhance the teaching-learning process in Kalimantan Island. This is supported by the evident relationship between improving the quality of education and reducing the poverty rate in Kalimantan Island during the research period.

REFERENCES