

Community empowerment model in mining areas to improve welfare: Some lessons from Jambi Province, Indonesia

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Abstract.

Jambi Province holds significant potential in the coal mining sector, contributing substantially to Local Own Source Revenue and supporting the local economy. With the sixth-largest coal reserves in Indonesia, these resources are spread across key districts such as Sarolangun, Muaro Jambi, Tebo, Batanghari, and Bungo. The coal mining sector provides economic benefits not only through job creation and infrastructure development but also poses significant social and environmental challenges, including air pollution, road damage, and degradation of water quality. This study aims to (1) analyze the social, economic, and environmental impacts of coal mining activities in Jambi Province, (2) evaluate the effectiveness of empowerment programs implemented by companies through CSR, and (3) design an empowerment model that can improve the welfare and economic independence of communities surrounding the mines. The research methodology includes field surveys, SWOT analysis, and Analytical Hierarchy Process (AHP) to determine program priorities. The findings reveal that CSR activities around the mines have a positive impact on community welfare; however, challenges exist in program sustainability and limited community involvement in planning. The SWOT analysis identifies strengths, weaknesses, opportunities, and threats, such as community dependence on the mining sector and significant environmental impacts. Based on the AHP results, the priority programs identified include skills training, support for small and medium-sized enterprises (SMEs), and the enhancement of educational and healthcare infrastructure to create a sustainable impact. To maximize the economic benefits of mining, a community empowerment model that focuses on economic diversification and community engagement is necessary. This study recommends collaboration between companies and the government to develop inclusive and sustainable programs that improve the welfare of communities surrounding mining areas.

Keywords: *Coal mining, Community empowerment, Corporate social responsibility, Sustainable economy*

JEL Classification: D31, O13, Q54, Q56, M14

INTRODUCTION

Jambi Province in Indonesia has rich coal mining potential that contributes significantly to local revenue. Several districts, such as Sarolangun, Tebo, and

Batanghari, have become hubs for mining activity. These mining operations involve both state-owned and private corporations with large-scale production. The extractive industry in Jambi plays a central role in regional economic development. However, mining activities have also brought social and environmental challenges to surrounding communities (Affrian et al., 2021). The distribution of coal mining potential across districts in Jambi Province is presented in Table 1.

Table 1. Coal mining potential in Jambi Province

No	Location	Estimated reserves (million tons)	Annual production (million tons)	Contribution to PAD (%)	Main companies
1	Sarolangun	250	10	35.00	PT Aneka Tambang, PT Sarolangun Bara Prima
2	Muaro Jambi	200	8	25.00	PT Karya Bumi Baratama
3	Tebo	150	5	15.00	PT Tebo Coal
4	Batanghari	100	3	10.00	PT Bukit Asam Tbk
5	Bungo	50	2	5.00	PT Bungo Coal

Source: Ministry of Energy and Mineral Resources (2023)

The data in Table 1 shows that Sarolangun Regency contributes the most to its Local Own-Source Revenue (Pendapatan Asli Daerah = PAD), at 35%, with an estimated coal reserve of 250 million tons. It is followed by Muaro Jambi, with a reserve of 200 million tons and its Local Own-Source Revenue contribution of 25%. Meanwhile, Tebo, Batanghari, and Bungo regencies contribute 15%, 10%, and 5%, respectively. This condition shows that although coal mining is a primary source of income in Jambi Province, the distribution of benefits still varies across each regency.

Despite these significant contributions to local revenue, coal mining also brings substantial social and environmental costs to nearby communities. Local communities face issues such as pollution, infrastructure degradation, and social displacement. The imbalanced distribution of benefits has triggered public concern and reduced social trust. To address these, companies are mandated to implement Corporate Social Responsibility (CSR) initiatives. CSR is expected to compensate for the negative externalities caused by mining. Yet, many programs remain short-term and charity-based, lacking long-term sustainability (Warman, 2013).

Chambers (2006) argues that a participatory approach to empowerment allows communities to manage change independently and ensures that the initiatives implemented genuinely align with their needs. In Jambi Province, the sustainability challenges of programs and community involvement in planning remain major issues that need to be addressed to ensure CSR has a more sustainable impact (Wulandari et al., 2019).

Stakeholder theory posits that companies should be accountable to all parties affected by their actions and decisions. CSR, therefore, becomes a bridge between corporate interest and community welfare [(Freeman, 1984; Carroll, 1999)]. In Indonesia, CSR is regulated by Law No. 40/2007 and Ministerial Decree No. 1824/2018. However, regulatory compliance does not guarantee effectiveness in implementation. Many

programs fail to achieve meaningful empowerment due to poor community engagement (Susilo et al., 2022; Prasetyo et al., 2021).

Some CSR activities in South Kalimantan have shown positive outcomes in terms of livelihood support. Yet, the community's dependence on company assistance remains high (Resnawaty & Rivani, 2017). Empowerment must go beyond aid and build the capacity for self-reliance. Programs should include skill development, infrastructure support, and local economic growth. Planning and participatory approaches are essential for success (Irawati & Juwita, 2023).

Recent studies show that coal companies often overlook community needs in CSR planning. The lack of alignment between company programs and local aspirations creates friction. Local government involvement and community input are often minimal. This situation reduces the legitimacy and impact of CSR efforts. Therefore, a responsive and context-specific CSR framework is needed (Rajidin & Hamid, 2023). These challenges are not unique to Jambi; in the international context, CSR in mining also faces similar dilemmas. In India, CSR programs in coal mining have improved livelihood and participation, but still struggle with community dependence (Kumar et al., 2022). Women's empowerment is often overlooked in CSR priorities, despite its significant importance (Mishra et al., 2024). The lack of sustainability in program design is also common across countries (Narula et al., 2017). These challenges highlight the universal need for better CSR governance (Das & Naidu, 2024).

The effectiveness of CSR depends on clear indicators and effective monitoring mechanisms. Impact evaluations yield mixed results, depending on the company's commitment and community involvement (Yakin et al., 2023). In South Tapanuli, a multi-sectoral CSR approach has improved education and health services (Saleh & Dalimunth, 2018). Yet, similar models are rare in other provinces. Comparative research is needed to identify scalable success models.

Prior studies have largely focused on company reports or policy evaluations, resulting in descriptive analyses with limited participatory approaches that do not effectively involve community voices. Few studies compare CSR outcomes across companies or regions, and even fewer in Indonesia employ systematic tools, such as SWOT and AHP, to design empowerment strategies in mining regions. This limits understanding of effective empowerment strategies and hinders policy learning and replication of best practices (Noor et al., 2019). In addition, CSR in Indonesia continues to face structural challenges related to legal compliance and socio-economic accountability, as highlighted by Febiola et al. (2024). These gaps underscore the urgency of developing model-based research. CSR programs should evolve into structured and sustainable initiatives that embed multi-stakeholder collaboration and are guided by systematic impact assessments. With its dynamic mining sector, Jambi provides a relevant and strategic context for such research.

Several districts in Jambi reflect contrasting CSR outcomes. Some firms, for example, implement different approaches to community development. These differences offer opportunities for cross-case comparison. Learning from other provinces and companies can strengthen local practices. Empirical research is required to document these variations (Gumanti et al., 2016).

This study addresses the gap by analyzing CSR performance and community perception in Jambi. It employs a mixed-methods approach, involving surveys, interviews, and focus group discussions. The research is grounded in local realities but informed by global experiences. It aims to develop an empowerment model suitable for

Jambi's mining regions. The study also seeks to align CSR goals with community welfare and sustainability.

There is an urgent need to develop a localized empowerment framework in Jambi Province. This framework should respond to the unique socio-economic conditions of each mining district. It should incorporate lessons from other regions and companies. Stakeholder collaboration is essential to ensure program success. This study seeks to answer the following questions: (1) What are the social, economic, and environmental impacts of coal mining in Jambi? (2) How effective are current CSR programs in empowering communities? (3) What empowerment model can support sustainable welfare and reduce extractive dependency?

The expected contribution of this study is a practical model that mining companies can adopt. Policymakers and CSR planners can also use the findings to guide strategic decisions. The study promotes evidence-based CSR, informed by field data and stakeholder input. By comparing Jambi with national and international contexts, this research adds value to CSR scholarship. Ultimately, this work aims to bridge the gap between regulation, corporate action, and community empowerment.

The novelty of this study lies in the development of a location-specific community empowerment model in the coal mining areas of Jambi Province through a participatory approach that integrates quantitative SWOT analysis and the Analytical Hierarchy Process (AHP). This approach enables the formulation of empowerment strategies that are more responsive to local social, economic, and environmental conditions, while prioritizing programs based on the perceptions and needs of affected communities. Unlike conventional CSR approaches, which are often charitable and top-down in nature, this research emphasizes the importance of economic diversification to reduce dependency on the mining sector. It fosters active collaboration among companies, local governments, and communities in developing inclusive and sustainable programs. Thus, the resulting model is not only practical but also contributes to strengthening the concept of community-based CSR that is contextual and sustainable within the mining sector.

METHODS

This research employed a mixed-methods approach combining descriptive and participatory analysis. The aim was to examine the socio-economic and environmental impacts of coal mining in Jambi Province and to formulate effective community empowerment strategies based on local conditions.

Data collection

This research utilized both primary and secondary data. Primary data were obtained through structured surveys, in-depth interviews, and Focus Group Discussions (FGDs). To ensure clarity and consistency, interviews were conducted using structured questionnaires.

The research focused on regencies with the largest coal mining potential in Jambi Province, which were purposively selected: Batang Hari, Bungo, Muaro Jambi, and Sarolangun. From each regency, one or two districts with coal mining sites were selected. From these districts, two to three sample villages were chosen, specifically those located along coal transportation routes, as these areas are most directly exposed to the impacts of mining. In total, 13 villages were selected.

The sample consisted of 100 respondents proportionally distributed, with 25 respondents from each regency. Respondents were selected purposively to capture individuals directly affected by mining activities, including household heads, community representatives, and local stakeholders.

Secondary data were obtained from relevant agencies, including the Department of Energy and Mineral Resources, the Central Bureau of Statistics, Bank Indonesia, and others.

The collected data were then analyzed using two complementary approaches, SWOT and AHP, as described below.

Analytical tools

To analyze this study, several instruments were employed to obtain accurate and systematic results. The primary analytical tools employed were the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis and the Analytical Hierarchy Process (AHP). These tools were selected to support a more systematic, rational, and data-driven decision-making process in developing the most effective empowerment strategy.

SWOT analysis (strengths, weaknesses, opportunities, threats)

SWOT analysis was applied to identify internal and external factors influencing communities around the mining sites. The first step involved identifying the strengths, weaknesses, opportunities, and threats based on field data. The next step was to perform calculations using the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices, which provided a quantitative assessment of these factors.

Based on the total scores, strategic positions were classified into four categories:

1. Weak (1.0–2.0) – internal and external factors are weak, requiring improvements and anticipation of limited opportunities.
2. Moderate (2.1–3.0) – moderate strengths or opportunities, indicating potential but needing internal reinforcement or better use of opportunities.
3. Fairly Strong (3.1–4.0) – solid foundation to achieve empowerment goals, though performance can still be improved.
4. Very Strong (4.1–5.0) – optimal support from internal and external factors, indicating excellent potential for successful empowerment.

The results were then mapped in a SWOT Cartesian Diagram to determine the strategic quadrant:

- Quadrant I (strong opportunities and strengths): aggressive growth strategies.
- Quadrant II (strong strengths, external threats): diversification strategies.
- Quadrant III (weaknesses, but high opportunities): focus on minimizing internal problems.
- Quadrant IV (weaknesses and threats): defensive strategies (Rangkuti, 2016).

Analytical Hierarchy Process (AHP)

AHP was employed to prioritize empowerment strategies identified from the SWOT analysis. This method is based on pairwise comparison (Maga & Indahyani, 2025), allowing both quantitative and qualitative factors to be systematically considered.

The steps of AHP included:

1. Developing a hierarchical structure consisting of:
 - Level 1: Goal (e.g., selecting the best empowerment strategy).
 - Level 2: Criteria (e.g., social, economic, environmental).
 - Level 3: Alternatives (e.g., skills training, SME development, infrastructure support).
2. Conducting pairwise comparisons using Saaty's 1–9 scale.
3. Constructing a comparison matrix and calculating the priority weights by normalizing values.
4. Performing a consistency test, ensuring the Consistency Ratio (CR) ≤ 0.1 .

5. Calculating total weights and ranking alternatives, with the highest score representing the optimal empowerment strategy.

RESULTS AND DISCUSSION

The coal mining sector has made a significant contribution to Jambi's economic growth, particularly through its role in Gross Regional Domestic Product (GRDP) and employment generation. However, the positive impacts have been accompanied by significant social and environmental challenges, including road damage, air pollution, and an unequal distribution of benefits to local communities (Putra et al., 2025). These conditions highlight the importance of evaluating the effectiveness of Corporate Social Responsibility (CSR) programs in mining areas. The following section presents the results of the SWOT and AHP analyses, which aim to identify key factors influencing community empowerment and determine program priorities in Jambi Province.

SWOT analysis

The analysis identified ten strengths, ten weaknesses, ten opportunities, and ten threats (Appendix 1). A review of the literature shows that several community empowerment programs have been implemented by mining companies operating in the province. Each program varies in terms of the type of initiative and location. Moreover, the responses from the community toward these empowerment programs have been diverse.

Some CSR programs in Jambi have been positively received by the community, such as health initiatives and skills training programs in Bungo Regency, which have improved community awareness and skills. Infrastructure support provided since 2018 has been considered beneficial, although concerns remain regarding road damage caused by mining transportation. Education support and scholarship programs introduced in 2020 have also been appreciated, despite their limited scope. Furthermore, another program widely regarded as essential is the environmental rehabilitation initiative, which has been implemented since 2015. This program has been well-received, and the local communities have clearly benefited from its impact.

To evaluate the internal and external factors influencing the success and sustainability of the existing empowerment programs, an analysis was conducted using the Internal Factor Analysis Summary (IFAS) matrix and the External Factor Analysis Summary (EFAS) matrix. The results of the IFAS and EFAS calculations are presented in Appendix 1 and Appendix 2. Haryadi (2021) states that these indicators are highly useful for identifying favorable opportunities and determining strategies that can be adopted to leverage them. The strategy that should be applied under these conditions is to support an aggressive growth policy.

From the calculation results of IFAS and EFAS scores, the total IFAS score was found to be 3.63, while the total EFAS score was 3.70. In SWOT analysis using the IFAS and EFAS matrices, scores are typically assigned within a certain range to measure the strength of internal factors (IFAS) and external factors (EFAS). Based on the identification of these factors and the determination of the score differences, it is evident that both IFAS and EFAS values are positive.

These positive values indicate that the strategy suitable for these conditions is to support an aggressive growth policy. The results of the calculations and the subsequent decision are illustrated in the SWOT diagram, in which strength and opportunity factors are assigned positive (+) values. Similarly, weakness and threat factors are also assigned positive (+) values. This diagram is presented in Figure 1.

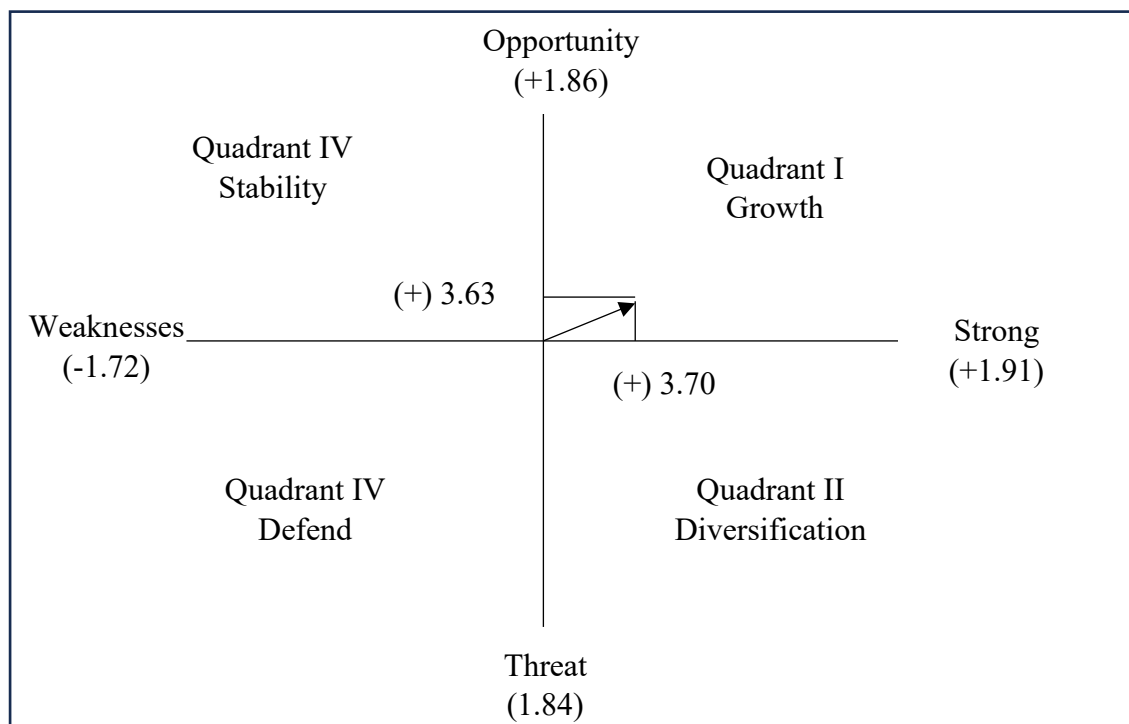


Figure 1. SWOT Cartesian diagram of coal mining in Jambi Province

AHP analysis

The AHP method produces a ranking of community empowerment programs based on scores from highest to lowest. The survey results are presented in Figure 2. Based on the analysis, the Skill Training for Economic Independence program achieved the highest score of 0.20.

Community-based Environmental Rehabilitation ranked second with a score of 0.15, while Education & Health Infrastructure ranked third with a score of 0.13.

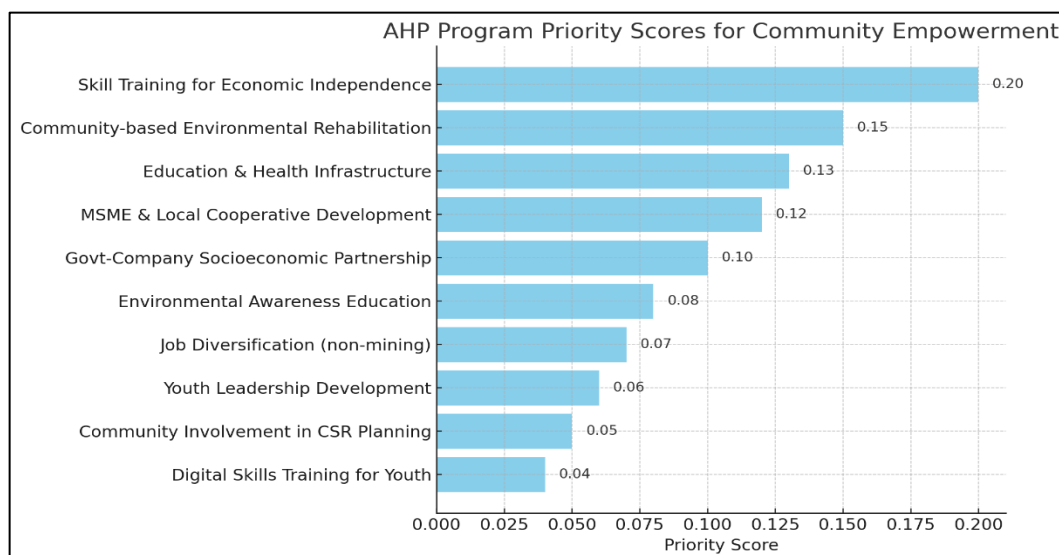


Figure 2. AHP program priority scores for community empowerment.

The MSME & Local Cooperative Development program ranked fourth with a score of 0.12. The Government occupied fifth place–Company Socio-economic Partnership

program, with a score of 0.10. Environmental Awareness Education ranked sixth with a score of 0.08.

The Job Diversification (non-mining) program scored 0.07, placing it in seventh position. The Youth Leadership Development program ranked eighth with a score of 0.06. Community Involvement in CSR Planning ranked ninth with a score of 0.05, and the lowest-ranked program was Digital Skills Training for Youth, with a score of 0.04.

Discussion

The findings indicate that although the coal mining sector significantly contributes to Jambi's economy—particularly through increased GRDP and job creation—its impact on the well-being of communities surrounding the mining areas is not entirely positive. The SWOT analysis reveals strengths such as the availability of CSR funds and partnerships with the government, as well as opportunities including regulatory support and growing public pressure for corporate accountability. However, major weaknesses include the low sustainability of programs and limited community involvement in planning, while the greatest threats stem from economic dependence on mining and widespread environmental degradation.

The AHP results confirm that the community prioritizes skills training for economic self-reliance, development of MSMEs and cooperatives, and environmental rehabilitation. These findings align with previous studies emphasizing the importance of economic diversification to reduce vulnerability associated with reliance on extractive industries (Breul & Atienza, 2022; Breul & Nguyen, 2022; Narula et al., 2017; Kumar et al., 2022; Taskarayeva et al., 2025). The strong desire for alternative livelihoods reflects an awareness of the long-term risks of continued dependence on coal. Therefore, CSR programs should go beyond short-term philanthropic activities and focus instead on capacity building aimed at fostering economic independence (Sutisna et al., 2022; Zhang, 2013).

The low prioritization of community participation in CSR planning highlights a critical gap in current practices. This situation mirrors findings from South Kalimantan and India, where communities tend to depend on corporate assistance without actively participating in program formulation (Resnawaty & Rivani, 2017; Kumar et al., 2022). According to the participatory approach proposed by Chambers (2006), empowerment can only be achieved when communities are actively involved in the planning, implementation, and evaluation of programs. Such involvement is essential for fostering a sense of ownership and enhancing program sustainability.

The strong emphasis on environmental rehabilitation underscores the genuine ecological concerns among local communities. Road damage, air pollution, and post-mining land degradation demand more serious and sustained intervention. This finding is consistent with previous studies, which emphasize the importance of integrating post-mining land rehabilitation with community empowerment initiatives to achieve sustainable outcomes (Adu-Baffour et al., 2025; Rosa et al., 2018, 2020; Wulandari et al., 2019). Although environmental education received lower priority scores, it remains a relevant long-term strategy to ensure intergenerational sustainability.

The SWOT findings also affirm that the highest-scoring internal factor is the availability of CSR funds, which play a critical role in program success (Porter & Kramer, 2006). Externally, regulatory support and public pressure represent significant opportunities, while threats such as economic dependence and environmental degradation require strategic management (Freeman, 1984). These insights underscore the need to optimize empowerment programs by prioritizing sustainability, community engagement, and environmental risk management.

Practically, these findings suggest the need to transform CSR from a mere regulatory obligation into a model that is evidence-based, inclusive, and participatory. Local governments can enhance their role through oversight mechanisms and by aligning CSR programs with regional development goals and the SDGs. Collaboration among companies, government bodies, and educational institutions is also needed to expand access to vocational training, MSME development, and environmental rehabilitation initiatives. With this approach, the community empowerment model developed through the integration of SWOT and AHP can serve as a replicable framework, while also making a tangible contribution to the sustainable well-being of communities surrounding mining areas.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The analysis of social, economic, and environmental impacts reveals that while coal mining in Jambi Province significantly contributes to the regional economy and job creation, it also generates adverse environmental and social effects, including road damage, pollution, and community dependency on the mining sector. These impacts require integrated mitigation efforts to ensure balanced and sustainable development.

The evaluation of CSR-based empowerment programs reveals that several initiatives, including skills training, health services, infrastructure development, and educational support, have yielded positive outcomes. However, challenges remain in program sustainability, limited community involvement in planning, and uneven benefit distribution, which need to be addressed through more participatory and long-term strategies.

The proposed empowerment model emphasizes economic diversification, community engagement, and sustainability, with priority programs identified through AHP analysis, including skills training for economic independence, MSME development, and the enhancement of education and health infrastructure. This model provides a practical and strategic framework for companies, local governments, and stakeholders to collaboratively enhance the welfare and economic resilience of communities in mining areas.

Recommendations

To ensure a greater and more sustainable impact, mining companies should strengthen the sustainability of their CSR programs by shifting from short-term or charity-based initiatives toward long-term, structured interventions equipped with measurable success indicators and aligned with the real needs of affected communities. Equally important is the enhancement of community involvement in program planning through participatory mechanisms, such as regular community forums or focus group discussions, so that residents are actively engaged from the planning stage through to evaluation, thereby increasing program relevance, ownership, and sustainability. In addition, priority should be placed on economic diversification and local capacity building, particularly through skills training, the development of MSMEs and cooperatives, and other livelihood initiatives that reduce dependency on the mining sector. These efforts require close collaboration between companies, local governments, and educational institutions to strengthen community capacity in economic, educational, and health sectors. Ultimately, these recommendations should be integrated with regional development priorities and aligned with the Sustainable Development Goals (SDGs), ensuring that

empowerment initiatives in mining areas contribute not only to local welfare but also to broader national and global development agendas.

This study is limited in scope to four regencies in Jambi Province with a sample of 100 respondents, which restricts the generalizability of the findings to other regions or larger populations. The cross-sectional design also does not capture the long-term sustainability of CSR programs or the evolving dynamics of community empowerment. Future research could be expanded to other provinces or conducted across mining companies to capture variations in CSR effectiveness. Longitudinal studies are also recommended to assess the durability of empowerment outcomes over time. Further exploration of gender dimensions, youth involvement, and governance structures could provide deeper insights into inclusive and sustainable CSR practices.

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Appendix 1. IFAS analysis for the community empowerment model in mining areas

Internal Factors	Weight	Rating	Score	Description
1. Financial resources	0.1	4	0.4	Mining companies have substantial funds for empowerment programs.
2. Job creation	0.08	3	0.24	Mining operations help reduce unemployment.
3. CSR initiatives	0.07	3	0.21	CSR programs, such as health and education, improve local welfare
4. Infrastructure development	0.06	3	0.18	Companies support the construction of roads, schools, and other facilities.
5. Training programs	0.08	3	0.24	Training programs enhance community skills.
6. Economic stimulus	0.06	2	0.12	Mining increases demand for local businesses.
7. Partnership with government	0.06	3	0.18	Good collaboration facilitates support.
8. Public health initiatives	0.05	2	0.1	Health programs improve quality of life.
9. Educational support	0.06	2	0.12	Support for schools and scholarships has a positive impact.
10. Social programs	0.06	2	0.12	Engaged in community, cultural, and social activities
Total Strengths	0.68		1.91	
1. Lack of sustainability	0.07	2	0.14	Short-term programs have no long-term impact.
2. Environmental degradation	0.09	4	0.36	Mining operations pollute the environment.
3. Limited skills development	0.07	3	0.21	Job training is limited to basic skills
4. Top-down implementation	0.05	3	0.15	Lack of community participation reduces effectiveness.
5. Unequal access to benefits	0.06	3	0.18	Not all residents benefit from programs.
6. Non-independent economic focus	0.06	2	0.12	Communities depend on mining.
7. Short-term focus	0.05	2	0.1	Programs emphasize immediate needs.
8. Community disappointment	0.05	3	0.15	Dissatisfaction arises from unfulfilled promises.
9. Insufficient environmental rehabilitation	0.07	3	0.21	The environment is not restored after mining operations.
10. Low transparency	0.05	2	0.1	Lack of communication reduces trust.
Total Weaknesses	0.72		1.72	
Total IFAS Score			3.63	

Appendix 2. EFAS analysis for the community empowerment model in mining areas

External Factors	Weight	Rating	Score	Description
1. Sustainable development policy	0.09	4	0.36	Regulations support sustainable programs.
2. Public accountability demands	0.08	3	0.24	Public pressure increases corporate responsibility.
3. Skills diversification	0.07	3	0.21	Entrepreneurship training broadens career options.
4. Educational technology	0.05	2	0.1	Digital tools for learning in mining areas
5. Promotion of local businesses	0.06	3	0.18	Support for MSMEs reduces dependency.
6. Community involvement	0.07	3	0.21	Active community participation in programs
7. Environmental rehabilitation projects	0.06	2	0.12	Post-mining environmental restoration
8. Youth empowerment	0.06	3	0.18	Programs for youth improve the future economy.
9. Alignment with SDGs	0.06	2	0.12	Programs aligned with global goals improve reputation.
10. Non-mining sector development	0.07	2	0.14	Jobs in ecotourism and agriculture sectors
Total Opportunities	0.67		1.86	
1. Dependence on mining	0.08	3	0.24	Economic dependency poses risks if mining ceases.
2. Environmental and health damage	0.09	4	0.36	Mining pollution negatively impacts health.
3. Lack of community trust	0.06	3	0.18	History of distrust reduces program effectiveness.
4. Social conflict	0.06	2	0.12	Unequal benefit distribution triggers conflict.
5. Weak regulation	0.07	3	0.21	Weak government policies reduce program impact.
6. Land competition	0.06	2	0.12	Conflicts arise when mining overlaps with productive land.
7. Coal price instability	0.05	3	0.15	Price fluctuations affect corporate investment.
8. Resistance to change	0.05	2	0.1	Some companies resist adopting new practices.
9. Resource depletion	0.06	3	0.18	Resource exhaustion reduces long-term benefits.
10. Public health risks	0.06	3	0.18	Health impacts from air and water pollution
Total Threats	0.68		1.84	
Total EFAS Score			3.70	

