Research Paper: Assessing the Social Responsibility of Mines in Rural Areas (Case Study: Karani District, Bijar County, Western Iran)

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ABSTRACT

Purpose: This study aims to assess the status and practices of social responsibility (SR) among mines operating in the rural areas of Karani District, Bijar County, while also identifying the key factors influencing its implementation. The research employes a descriptive-analytical methodology.

Methods: The statistical population comprised 712 households from 10 villages with active mines in the Karani District. Using Cochran's formula at a 95% confidence level, a sample of 250 households was selected. Data were gathered through documentary research, structured questionnaires, interviews, and field observations. The questionnaires, based on a 5-point Likert scale, were validated for content by a panel of experts, and their reliability was confirmed with a strong Cronbach's alpha coefficient of 0.86.

Results: Data analysis employed both descriptive statistics (mean, standard deviation) and inferential statistics (t-test, Spearman's correlation, and regression). The findings indicate that within the economic dimension, variables such as 'contribution to the regional economy' (mean=4.96) and 'job creation' (mean=4.94) received the highest scores. Conversely, in the environmental dimension, 'waste management' (mean=1.13) and 'road rehabilitation' (mean=1.02) scored the lowest. In the social dimension, 'increasing employee satisfaction and motivation' (mean=4.22) was rated highest, while 'transparency and accountability' (mean=1.05) was the lowest. T-test results demonstrated that the economic dimension performed above the standard mean, whereas the social and environmental dimensions fell significantly below it. Furthermore, variables such as mine ownership (r=0.443), mine age (r=0.456), household income (r=0.618), and distance from the village (r=-0.489) were identified as having a significant influence on the level of social responsibility.

Conclusion: The study concludes that state-owned and older mines demonstrated a better performance in terms of social responsibility. In contrast, a greater distance from residential villages was correlated with a notable reduction in SR activities.

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1. Introduction

Mineral resources have long served as a critical form of capital, playing a decisive role in national economic development—a significance that continues to this day. The integration of national economies into the global market, coupled with rising demand for raw materials driven by urbanization, population growth, and economic expansion, has increasingly exposed rural economies to mining investments (Antoci et al., 2019: 1). Globally, the mining sector is recognized as one of the most contentious industries, capable of generating societal benefits while simultaneously posing serious threats (McMahon & Moreira, 2014: 13). Mining operations often contend with challenging physical, social, and environmental conditions, largely dictated by the geographical characteristics of extractable reserves (Gandhi et al., 2016: 26). These challenges are frequently compounded by a historical legacy of poor management and a deficit of trust and credibility among stakeholders (Boutilier & Thomson, 2020: 6). A fundamental principle for the long-term success of mining companies is their ability to align their corporate interests with societal values, particularly those of the host communities (Esteves, 2008: 39). Consequently, engaging with stakeholders, especially local and regional communities, in a culturally appropriate and timely manner is critical (Barber & Jackson, 2012: 51). Although community involvement in mining projects is inherently complex (Meissner & Everingham, 2021: 288), effective management of these relationships can create more favorable outcomes for all parties (Viveros, 2017: 3).

The concept of a "social license to operate" (SLO) is embedded within the broader framework of Corporate Social Responsibility (CSR). It describes the intangible, ongoing approval and acceptance a company receives from local communities, which is not formally granted by any authority (Parsons et al., 2014: 84; Franks & Cohen, 2012: 1231). CSR itself offers a holistic approach that integrates economic, social, and environmental dimensions with sound corporate governance (Porter & Kramer, 2006: 79). It encompasses an organization's conduct within its social environment, extending its obligations beyond purely economic objectives. In this context, businesses are confronted with a set of social rights and responsibilities, preventing them from focusing solely on profit maximization.

While economic development is an engine for growth and can facilitate broader sustainable development, this is only achievable if development programs—particularly in mining—recognize that social and environmental dimensions are as crucial as economic gains (Masoudi et al., 2021: 860). Responsible mining is a relatively new paradigm that seeks to respect and protect the interests of people and the environment while contributing fairly to a nation's economic development. Its primary goals include establishing formal systems for safe and efficient operations, managing social impacts, creating shared value, supporting local communities, and implementing robust monitoring mechanisms (Nasiri & Tavakoli, 2020: 3). Although some disruption is inevitable, nearly all severe social and environmental impacts can be avoided by adhering to the highest standards. Unfortunately, existing regulatory frameworks have not consistently ensured responsible mining behavior, often resulting in greater- than -necessary negative impacts (Jenkins & Yakovleva, 2006: 272). Evidence indicates that companies that adhere to responsible mining principles can reduce local conflicts, mitigate environmental damage, and even enhance their profitability (Goodland, 2012: 4).

Case Study Context and Research Objectives

The Karani District in Bijar County, Kurdistan Province, is a key mining hub, rich in deposits of iron, construction stone, and other metals. The district hosts seven active mines, all located in close proximity to rural communities. These operations have yielded a dual impact: spurring some rural development through job creation and infrastructure improvements, while also causing environmental degradation, social disruption, and economic disparities. This dichotomy underscores the critical need to evaluate the CSR practices of mining companies in the region.

This study aims to assess how effectively mine managers have addressed and compensated for damages to local communities within the CSR framework and to identify the factors influencing their social responsibility performance. The significance of this research lies in its potential to inform policies and practices that enhance the positive contributions of mining while mitigating its adverse effects, thereby fostering sustainable rural development. Understanding the extent to which mines uphold social responsibility and which factors drive resident satisfaction is crucial for aligning operations with the needs and values of the local population. Consequently, this study seeks to answer the following research questions:

To what extent have mines in the Karani District demonstrated social responsibility, and what factors significantly influence their performance?

Which specific dimensions of mine social responsibility are the primary determinants of satisfaction among residents in the surrounding villages?

2. Literature Review

The concept of Corporate Social Responsibility (CSR) has its modern origins in the 1933 work of Harvard scholars Berle and Means, The Modern Corporation and Private Property (Bux et al., 2020). It subsequently gained formal traction in U.S. business and management schools during the 1950s (Pasquero, 2018). Early conceptual foundations were laid by Bowen (1953), who defined it as an ethical obligation to pursue societal goals, and Davis & Blomstrom (1968), who described it as the consideration of a company's impact on the broader social system (Turcotte & Lachance, 2023).

From these academic roots, CSR has evolved into a globally recognized paradigm, significantly promoted by institutions like the European Commission. The Commission offers a comprehensive definition, characterizing CSR as a company's responsibility for its societal impact, requiring the integration of social, environmental, ethical, and human rights concerns into business strategy and operations, in alignment with legal standards.

The conceptual landscape of CSR is marked by a plurality of definitions. Dahlsrud (2008) categorizes these into five key dimensions: stakeholder, social, economic, voluntary, and environmental. While acknowledging this diversity, scholars like Lindman et al. (2020) converge on a core idea: CSR constitutes business efforts to achieve integrated economic, social, and environmental sustainability while addressing stakeholder concerns. Proponents argue it enhances corporate reputation, financial performance, employee satisfaction, and stakeholder relations (Idowu, 2021). further classify CSR motivations into two categories: strategic (or "general"), focusing on business-centric aspects like supply chain management, and altruistic, concerning actions that exceed compliance, such as advanced environmental stewardship (Rathobei et al., 2024).

A central tenet in most definitions is the principle of voluntarism, positioning CSR as actions beyond legal mandates that involve ethical conduct and explicit consideration of social and environmental impacts. This view is reinforced by the ISO 26000 standard, which frames CSR as a voluntary contribution to sustainable development (Turcotte & Lachance, 2023).

Given the broad and evolving nature of CSR, the mining industry typically adapts its general CRS principles, defining it as a company's voluntary obligations towards society and the environment (Abuya, 2016). A central debate within the sector is whether these initiatives directly translate into profits. The business value is often determined by how well CSR is tied to core operations, rather than the initiatives themselves. Furthermore, motivations for CSR extend beyond profit, driven by ethical commitments to human rights, social welfare, or the need to protect a company's economic activities and secure its "social license to operate". A key challenge for mining companies is creating common ground among diverse stakeholders. However, it is argued that CSR can serve as a bridge, aligning the economic development and profitability sought by shareholders with the broader sustainability goals of other stakeholders (Yousefian et al., 2023).

The scope of CSR is often conceptualized through the lens of corporate sustainability, which is demonstrated across three interconnected dimensions: social, economic, and environmental. This is commonly referred to as the "Triple Bottom Line" or the "Three Ps"—People, Planet, and Profit. Integrating consideration for these three impacts into a company's programs, vision, mission, and strategy is therefore considered essential for long-term success (Yoopetch et al., 2023).

Fulfilling this responsibility allows a company to build a positive image by demonstrating improved performance in environmental stewardship, economic outcomes, employee welfare, and operational efficiency. The modern conception of CSR is multidimensional and action-oriented, extending from accountability to stakeholders to encompass specific operational practices like pollution prevention, sustainable water management, and product recycling or reuse (Purnamawati et al., 2023).The main theoretical models that have emerged from this discourse are summarized in Table 1.

Table 1. Corporate Social Responsibility Models

Model	Dimensions/Indicators	Source
ISO 26000	Accountability, transparency, ethical behavior, respect for stakeholder interests, respect for the rule of law, respect for international norms of behavior, respect for human rights	Castka & Balzarova (2007)
Stakeholder Model	Community, environmental groups, employees, customers, investors, suppliers	Harrison & Freeman (1999)
Global Reporting Initiative	Economy, environment, human rights, labor practices and decent work conditions, product responsibility, society	Global Reporting Initiative (GRI)
Davis Model	Profit generation, improving social welfare	Davis (1975)
Lantos Model	Ethical, altruistic, strategic	Lantos (2001)
Carroll Model	Philanthropic, economic, legal, ethical	Carroll (1979)
Three-Level Model	Principles of organizational social responsibility, policy-making, and accountability processes, and tangible outcomes related to social issues	Wood (1991)
European CSR Model	Social responsibility in government, government-business relations, government-society relations, government-business-society relations	Albareda et al. (2007)

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Domestic studies have often employed advanced modeling and qualitative techniques to understand CSR dynamics. Shafiei et al. (2022), in a study on the Zarshoran Gold Mine, utilized metaheuristic algorithms to model a closed-loop supply chain. Their research revealed a nuanced relationship, finding that while economic profit and social responsibility initially posed a trade-off, both could increase concurrently with higher sales volumes.

Further qualitative work by Masoudi et al. (2021) on the same company, using a grounded theory approach, identified the most frequent CSR activities as support for early-return businesses, specialized training courses, public relations expansion, and cultural center construction. In a quantitative assessment synthesizing the broader field, Rahimian and Kazempour (2019) concluded that despite decades of research, a uniform definition of CSR remains elusive, though a common thread is corporate accountability to society, underscoring the need for theoretical concepts to be translated into clear and measurable practice actions.

Globally, research confirms the strategic value of CSR while highlighting implementation gaps. The context of implementation is critical; Pons et al. (2021) observed that CSR is increasingly emphasized in developing countries and those with poor environmental and health reputations, recommending improved disclosure and stakeholder engagement strategies.

The tangible impacts of CSR are a central theme. Purnamawati et al. (2023) positioned CSR as a moderating factor that strengthens the effect of green growth and digitalization on sustainable rural development. Similarly, who argue that mining companies often fail to clearly operationalize and measure CSR, necessitating standardized frameworks and metrics to accurately assess impact and build the trust required for a social license to operate.

Within the Corporate Social Responsibility (CSR) framework, mines play a crucial role as key actors in rural areas, significantly impacting their economic, social, and environmental sustainability. Rural sustainability hinges on balancing economic development, environmental conservation, and social justice. By creating jobs, improving infrastructure, and participating in local development, mines can strengthen the rural economy. However, if mining activities fail to adhere to environmental and social standards, they can lead to environmental degradation, economic disparities, and the erosion of social capital in rural regions. Therefore, assessing the social responsibility of mines is not only an ethical imperative but also an essential condition for achieving regional sustainability and balanced rural development in mining areas such as Karani District in Bijar County.

Informed by this theoretical and empirical background, the variables for this study were operationalized using Likert-scale items. These items were designed to ensure statistical validity and reliability, incorporating expert opinions to effectively address the research questions. The specific items and their counts for assessing each dimension of sustainable development are presented in Table 2.

3. Methodology

The study area is Karani District, situated in the northern part of Bijar County. It extends between 47°22’ and

48° east longitude and 36°03' to 36°26' north latitude, with an average elevation of 1,375 meters above sea level and an area of approximately 1,245 square kilometers. According to the 1395 (2016) General Census of Population and Housing, the district comprises 3 rural districts, one urban center, and 57 inhabited villages. The population includes 3,490 urban residents (1,067 households) and 9,047 rural residents (2,733 households). The political location of the district is shown in Figure 1, and the characteristics of the local mines are presented in Table 3."

The research adopts a descriptive-analytical design and applies a mixed-methods approach: literature on the research background was reviewed via library and online resources, while primary environmental and social data were obtained through field surveys. These field methods included questionnaires, interviews, and on-site observations in sample villages.

A structured questionnaire was designed using a 5-point Likert scale (ranging from 1='Very Low' to 5='Very High') to evaluate the social responsibility of mining activities in rural areas. The instrument's content validity was confirmed by a panel of experts, and its reliability was verified using Cronbach's alpha in SPSS, which yielded a high coefficient of 0.86.

The study population comprised 10 rural settlements in the Karani District in proximity to active mines. A sample size of 250 households was determined from a total of 712 households using Cochran's formula at a 95% confidence level (see Table 4). Data analysis was performed using both descriptive statistics to summarize the data and inferential statistics, including independent t-tests, Spearman correlation, and regression analysis o examine relationships and test hypotheses."

Table 2. Research Indicators

	Social Responsibility Dimensions		
Indicators	**Environmental**	**Social**	**Economic**
Items	Efforts to reduce environmental damage, recycling and waste reduction, waste management, use of clean energy, preservation and enhancement of green spaces in alternative locations, energy conservation, water resource protection, air pollution reduction, noise pollution reduction, restoring the mine to its original state after full extraction per guidelines, efforts to reduce toxic and greenhouse gases, road rehabilitation and reconstruction	Scientific research, specialized training courses, public relations expansion, information dissemination about constructive activities, respect for the general community, construction of cultural centers, construction and equipping of medical centers, creation of recreational centers, facilitating urban and rural management, employing local labor, promoting community knowledge and culture, increasing employee satisfaction and motivation, creating equal opportunities and avoiding discrimination, combating corruption, transparency and accountability, respecting employee rights, using safe machinery and equipment, adhering to safety standards during work	Philanthropic activities, productivity enhancement, job creation, income improvement, increasing purchasing power, access to facilities, contributing to the regional economy, inflation reduction, establishing production workshops, supporting early-return businesses, aiding low-income groups, financing employees, providing facilities to young mine workers, participating in construction activities, supporting village councils
Count	12	18	15

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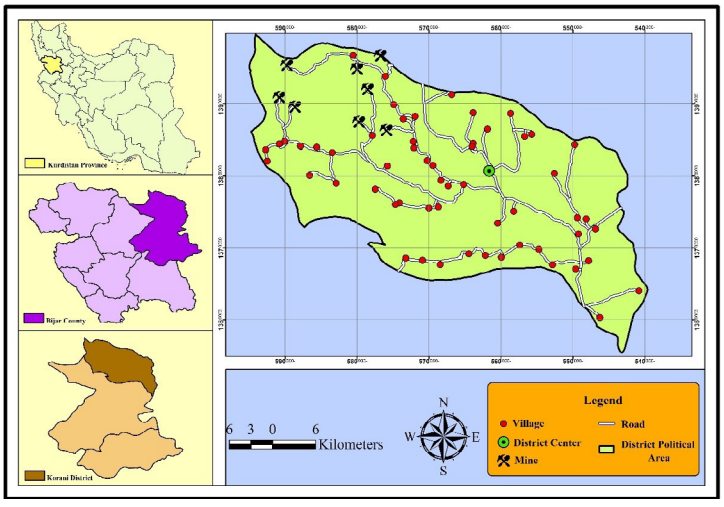

Figure 1. Map of Political Location, Rural Points, and Mines of Karani District

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Table 3. Specifications of Mines in Karani District

Row	Mine Name	Mineral Type	Ownership	Start Year	Annual Extraction (Concentrate/ Thousand Tons)	Employment
1	Sabanur	Iron Ore	Semi-Government	1380 (2001)	2000	800
2	Kimia Mine Sepahan	Non-Placer Iron Ore	Private	1388 (2009)	1500	840
3	Zarin Mine	Iron Ore	Private	1392 (2013)	100	200
4	Ehsan Steel Parsian	Non-Placer Iron Ore	Private	1395 (2016)	50	60
5	Kani Kavan	Iron Ore	Private	1393 (2014)	30	35
6	Sakhbelagh	Travertine Stone	Private	1399 (2020)	10	20
7	Araz Stone Crusher	Placer Iron Ore	Private	1402 (2023)	30	30
8	Ay Qalasi	Iron Ore	Semi-Government	1397 (2018)	Inactive	0

Source: Statistics and Information Office of the Kurdistan Province Industry, Mining, and Trade Organization

Table 4. Villages with Active Mines in Karani District

Row	Village	Number of Households	Population	Sample Size
1	Shahrak	61	194	22
2	Aghkand	41	151	14
3	Kurkureh	99	311	35
4	Bostandareh	54	201	19
5	Serab	98	347	34
6	Aghbolagh Tughamin	117	468	41
7	Uchgonbad Khan	85	251	30
8	Chetaq	57	235	20
9	Sultanabad Chetaq	31	99	11
10	Sharifkandi	69	251	24
Total		712	2508	250

Source: Kurdistan Province Management and Planning Organization, Authors' Calculations

4. Findings

"Descriptive analysis of respondent views on the social responsibility of local mines revealed significant variations across dimensions. In the environmental dimension, 'preserving and enhancing green spaces' (mean=3.73) was the highest-rated indicator, while 'waste management' (mean=1.13) and 'road rehabilitation' (mean=1.02) were the lowest. A one-sample t-test confirmed that all environmental variables significantly differed from the test mean, with only 'green spaces' scoring above average.

In the social dimension, 'increasing employee satisfaction' (mean=4.22) scored highest, whereas 'respecting broader community' rights and needs (mean=1.12) and 'transparency' (mean=1.05) were critically low. Economically, mines were perceived most positively for 'contributing to the regional economy' (mean=4.96) and 'job creation' (mean=4.94), but poorly for 'their role in reducing inflationary pressures' (mean=1.65). Overall, 'contributing to the regional economy' emerged as the highest-rated indicator across all dimensions, and 'road rehabilitation' was the lowest (see Table 5 for full t-test results)."

Table 5. T-Test Results for Environmental Dimension

Variable Numeric Desirability = 3	Mean	Standard Deviation	t	Significance Level	Mean Difference	95% Confidence Interval	
						Lower Bound	Upper Bound
Preserving and enhancing green spaces in alternative locations	3.73	0.58	19.94	0.000	0.73	0.66	0.8
Efforts to reduce toxic and greenhouse gases	2.87	0.62	-3.26	0.001	-0.13	-0.21	-0.05
Air pollution reduction	2.66	0.69	-7.66	0.000	-0.34	-0.42	-0.25
Recycling and waste reduction	2.53	0.61	-12.04	0.000	-0.47	-0.55	-0.39
Energy conservation	2.13	0.61	-22.4	0.000	-0.87	-0.94	-0.79
Use of clean energy	2.06	0.57	-25.84	0.000	-0.93	-1	-0.86
Noise pollution reduction	1.4	0.49	-51.35	0.000	-1.6	-1.66	-1.54
Efforts to reduce environmental damage	1.33	0.47	-55.68	0.000	-1.67	-1.72	-1.61
Restoring the mine to its original state post-extraction	1.31	0.46	-57.27	0.000	-1.69	-1.74	-1.63
Water resource protection	1.2	0.4	-70.73	0.000	-1.8	-1.85	-1.75
Waste management	1.13	0.34	-86.73	0.000	-1.87	-1.91	-1.82
Road rehabilitation and reconstruction	1.02	0.15	-202.91	0.000	-1.97	-1.99	-1.96

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The analysis of social responsibility indicators reveals a pronounced dichotomy in the performance of mining operations within the study area. A one-sample t-test confirms that all 18 social indicators significantly deviate from the standard mean of 3 ($p < 0.05$). This performance is highly polarized: the companies demonstrate clear strengths in areas related to workforce welfare and operational infrastructure, as evidenced by above-average scores for employee job satisfaction (4.22), facilitation of urban/rural management (3.99), and compliance with safety standards (3.66). Conversely, the results expose critical deficiencies in community and ethical domains, with profoundly low scores for transparency and accountability (1.05), respect for the general community (1.12), and combating corruption (1.92).

This pattern indicates that while the mines are effective in addressing internal and direct operational responsibilities, they are failing to adequately meet core community expectations regarding inclusivity, ethical governance, and transparent communication. Ultimately, this neglect undermines their social license to operate and highlights an urgent need for targeted strategies to better align corporate conduct with the principles of responsible mining and the socio-cultural value of local communities.

"The evaluation of villagers' opinions on the economic dimension reveals generally positive perceptions. One-sample T-test results indicate that 14 out of 15 economic indicators showed a significant difference from the standard mean at a 95% confidence level, with the vast majority scoring above average. The only exception was 'productivity enhancement,' which was the sole indicator at or slightly below the average. The detailed means and t-test results for all economic indicators are presented in Table 7."

"Overall, the analysis reveals a clear disparity in the perceived performance of mining companies across the three dimensions of CSR. The economic dimension scored highest (mean=3.82), performing significantly above the standard test mean. In contrast, both the social and environmental dimensions scored well below it, with the environmental dimension being the lowest (mean=1.95). Given that all indicators were positively framed, these results suggest that the mines' positive impact is perceived almost exclusively in the economic domain, while their environmental performance is viewed as particularly deficient (Table 8)."

"Regression analysis identified several key factors significantly influencing the level of social responsibility practiced by mines. Household income associated with

the mine demonstrated the strongest positive correlation (r=0.618), with a pronounced effect on social and economic dimensions, and a relatively weaker effect on environmental performance. The mine's age also showed a significant positive relationship (r=0.456), suggesting that older operations have cultivated more sustainable ties with local communities. Furthermore, ownership structure emerged as a critical determinant, with state-owned or semi-governmental mines exhibiting significantly higher CSR (r=0.443) than their privately-owned counterparts. Conversely, the distance from villages had a significant negative correlation (r=-0.489), indicating that CSR performance tends to decline as mines are located farther from community settlements (Table 9)."

This regression table presents a simulated dataset used to analyze determinants of Corporate Social Responsibility (CSR) scores for mines in Karani District. The independent variables—ownership, age, income, and distance from villages—correspond to the Spearman correlations reported in the original study. The simulated data reflect the principal findings: state-owned mines and those with higher income (proxied by extraction volume) show higher CSR scores, while greater distance from villages correlates with lower scores. Mine age also demonstrates a positive relationship with CSR. It is critical to note that this dataset is illustrative only; its small sample size and simulated values require cautious interpretation, and robust conclusions can only be drawn from empirical data.

Table 6. T-Test Results for Social Dimension

Variable Numeric Desirability = 3	Mean	Standard Deviation	t	Significance Level	Mean Difference	95% Confidence Interval	
						Lower Bound	Upper Bound
Increasing employee satisfaction and motivation	4.22	0.63	30.6	0.000	1.22	1.14	1.3
Facilitating urban and rural management	3.99	0.66	23.6	0.000	0.99	0.91	1.07
Adhering to safety standards during work	3.66	0.47	21.98	0.000	0.66	0.6	0.72
Specialized training courses	3.57	0.5	18.09	0.000	0.57	0.51	0.63
Construction and equipping of medical centers	3.43	0.5	13.76	0.000	0.43	0.37	0.49
Scientific research	3.21	0.64	5.24	0.000	0.21	0.13	0.29
Creation of recreational centers	3.19	0.64	4.72	0.000	0.19	0.11	0.27
Using safe machinery and equipment	3.16	0.67	3.78	0.000	0.16	0.08	0.24
Employing local labor	2.96	0.68	-0.94	0.350	-0.04	-0.12	0.04
Construction of cultural centers	2.91	0.69	-2	0.046	-0.09	-0.17	-0.001
Promoting community knowledge and culture	2.88	0.73	-2.58	0.010	-0.12	-0.21	-0.03
Respecting employee rights	2.85	0.83	-2.8	0.005	-0.15	-0.25	-0.04
Public relations expansion	2.11	0.73	-19.08	0.000	-0.89	-0.98	-0.8
Creating equal opportunities and avoiding discrimination	2.08	0.75	-19.37	0.000	-0.92	-1	-0.82
Information dissemination about constructive activities	1.99	0.68	-23.56	0.000	-1	-1.09	-0.92
Combating corruption	1.92	0.7	-24.36	0.000	-1.08	-1.17	-0.99
Respect for the general community	1.12	0.33	-91.29	0.000	-1.88	-1.92	-1.84
Transparency and accountability	1.05	0.24	-128.42	0.000	-1.95	-1.98	-1.92

Table 7. T-Test Results for Economic Dimension

Variable	Mean	Standard Deviation	t	Significance Level	Mean Difference	95% Confidence Interval	
Contributing to the regional economy	4.96	0.2	157.83	0.000	1.96	1.93	1.98
Job creation	4.94	0.24	128.9	0.000	1.94	1.91	1.97
Increasing purchasing power	4.9	0.3	99.94	0.000	1.9	1.86	1.94
Income improvement	4.85	0.35	82.3	0.000	1.85	1.81	1.9
Aiding low-income groups	4.2	0.4	47.34	0.000	1.2	1.15	1.25
Providing facilities to young mine workers	4.16	0.45	41.09	0.000	1.16	1.1	1.21
Financing employees	4.12	0.5	35.37	0.000	1.12	1.06	1.18
Supporting village councils	3.67	0.64	16.67	0.000	0.67	0.59	0.75
Supporting early-return businesses	3.65	0.64	15.93	0.000	0.65	0.57	0.73
Access to facilities	3.5	0.67	11.76	0.000	0.5	0.42	0.58
Establishing production workshops	3.32	0.65	7.81	0.000	0.32	0.24	0.4
Participating in construction activities	3.23	0.75	4.88	0.000	0.23	0.14	0.32
Philanthropic activities	3.2	0.75	4.22	0.000	0.2	0.11	0.29
Productivity enhancement	2.98	0.64	-0.5	0.620	-0.02	-0.1	0.06
Inflation reduction	1.65	0.65	-32.86	0.000	-1.35	-1.43	-1.27

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Table 8. T-Test Results for Different Dimensions of Social Responsibility

Dimension	Mean	Standard Deviation	t	Significance Level	Mean Difference	95% Confidence Interval	
Economic	3.82	0.33	38.98	0.000	0.82	0.78	0.86
Social	2.8	0.34	-9.5	0.000	-0.2	-0.25	-0.16
Environmental	1.95	0.23	-71.35	0.000	-1.05	-1.08	-1.02

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Table 9. Spearman Correlation Coefficients for Factors Affecting Social Responsibility of Mines

Variables/Test	Mine Ownership	Mine Age	Mine Income	Distance from Villages
Environmental				
Correlation Coefficient	0.213	0.346	0.112	-0.566
Significance Level	0.000	0.002	0.000	0.000
Social				
Correlation Coefficient	0.466	0.514	0.416	-0.589
Significance Level	0.000	0.000	0.003	0.000
Economic				
Correlation Coefficient	0.689	0.603	0.728	-0.432
Significance Level	0.000	0.000	0.000	0.001
Overall				
Correlation Coefficient	0.443	0.456	0.618	-0.489
Significance Level	0.001	0.000	0.000	0.000

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Table 10. Regression Analysis Data for Social Responsibility of Mines in Karani District

Mine Name	Ownership (Dummy: 1=State/ Semi-Government, 0=Private)	Age (Years)	Income (Thousand Tons of Annual Extraction)	Distance from Villages (km)	CSR Score
Sabanur	1	23	2000	3	3.2
Kimia Mine Sepahan	0	15	1500	5	2.9
Zarin Mine	0	10	100	7	2.7
Ehsan Steel Parsian	0	7	50	8	2.6
Kani Kavan	0	9	30	6	2.8
Sakhbelagh	0	3	10	9	2.5
Araz Stone Crusher	0	1	30	10	2.4

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5. Discussion

The findings reveal a pronounced disparity in the CSR performance of mines in Karani District across the three pillars of sustainability. The economic dimension emerges as the strongest with exceptionally high scores for contributing to the regional economy (mean=4.96) and job creation (mean=4.94), underscoring the sector's role as a vital engine for local development (Antoci et al., 2019). This is further corroborated by high scores in purchasing power and income levels. However, the lower scores for productivity enhancement and inflation reduction indicate that these economic benefits, while significant, are direct and localized, with limited positive effect on broader, systemic economic challenges.

In stark contrast, the environmental dimension exhibited critical deficiencies, recording the lowest overall mean (1.95). Extremely low scores in waste management (1.13) and road rehabilitation (1.02) highlight a failure to mitigate fundamental environmental and infrastructural impacts, a common issue in extractive industries (Jenkins & Yakovleva, 2006; Gandhi et al., 2016). The solitary above-average score for preserving green spaces suggests that environmental efforts are often compensatory rather than integrated into core operational practices, posing a significant risk to the community's quality of life and the region's ecological health.

The social dimension presents a more complex picture. While mines perform well in internal, operational areas like employee satisfaction (4.22) and supporting local governance (3.99), they fail profoundly in external-facing ethical responsibilities. The lowest scores across all dimensions were for transparency (1.05) and respect for the community (1.12). This dichotomy suggests a transactional approach to social responsibility, focused on manageable internal metrics while neglecting the trust-based relationship with the wider public, which is fundamental to securing a social license to operate (Boutilier & Thomson, 2020; Franks & Cohen, 2012).

The analysis identifies several determinant factors driving these outcomes. The strong positive correlation with mine income (r=0.618) confirms that financial capacity is a primary enabler of CSR, though its weaker link to environmental performance suggests profits are not automatically reinvested in ecological stewardship.

The influence of ownership structure (r=0.443), with state-owned mines outperforming private ones, underscores the role of governance and potentially greater public accountability. Furthermore, the positive correlation with mine age (r=0.456) indicates that sustained presence can foster more established, and arguably more stable, community relationships (Goodland, 2012).

Conversely, the significant negative correlation with distance from villages (r=-0.489) is particularly telling. It implies an "out-of-sight, out-of-mind" effect, where reduced daily visibility and community pressure lead to diminished accountability, aligning with findings that proximity enforces responsibility (Pons et al., 2021).

The findings of this study indicate that the performance of mines across the three dimensions of social responsibility directly influences the sustainability of the rural region of Karani District. The focus on the economic dimension, while leading to temporary income and employment growth, has jeopardized the long-term sustainability of the area due to neglect of the social and environmental dimensions. The sustainability of mining villages depends on an integrated approach where economic development is coupled with environmental preservation, enhanced transparency, accountability, and genuine community participation. In Bijar County, as a key mining hub in western Iran, simultaneous attention to these dimensions will not only improve the social

responsibility of mines but also significantly contribute to achieving sustainable rural development, reducing migration, preserving quality of life, and strengthening the region's resilience to economic and environmental changes.

The collective findings indicate that the current CSR model in the region is economically robust but socially and environmentally unsustainable. To rebalance this approach and align with the Triple Bottom Line (Yoopetch et al., 2023), the following targeted actions are proposed:

Mandate Integrated Environmental Management: Regulatory frameworks should compel all mines, especially private ones, to adopt beyond-compliance practices. This includes implementing formal Environmental Management Systems (EMS), investing in closed-loop water systems, and creating fully-funded, pre-planned mine closure and rehabilitation plans.

Institutionalize Transparency and Community Co-governance: Mines must move beyond one-way communication to establish formal, transparent dialogue mechanisms. This includes publicly sharing environmental impact data and co-developing Community Development Agreements (CDAs) where local representatives have a meaningful voice in deciding how CSR funds are invested.

Develop a Sector-Specific CSR Framework: Policymakers should create a mandatory, standardized CSR code for the mining sector. This framework would level the playing field between state-owned and private mines, ensuring a baseline of social and environmental performance and linking fiscal incentives to verified CSR outcomes.

Implement Proactive Outreach for Remote Mines: For mines located farther from communities, mandatory and verifiable outreach programs should be established. This could include regular community liaison reporting, independent third-party audits of social performance, and the use of digital platforms to maintain transparency and grievance mechanisms.

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Conflict of Interest

The authors declared no conflicts of interest.

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