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A Comparative and Analytical Assessment of Contractors' Problems in Iran's Large Mines with a Special Focus on Copper Mines

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Abstract: Having rich mineral reservoirs, Iran has great potentials for developing this field, especially in copper mines. Mining in Iran has great potentials for helping economy and creating jobs. Studying and solving the problems of contractors and making necessary preparations for them in order to enter the mining industry and making investment in this area are of effective factors in actualizing the vast mining potentials in Iran. Existence of large-scale contractors in mining operations is considered not only an inseparable arm of the domestic large-scale mining body, but is also looked upon as the prerequisite for sustainable economic development. In any way, despite the undeniable benefits and necessity of large-scale mining contractors for working in large-scale mines, some strategic problems such as international sanctions, lack of access to quality mining machineries, lack of access to quality spare parts and up-to-date technologies, worn-out transportation, time-consuming process of finding spare parts due to sanction conditions, currency rate fluctuations, changes in stated inflation trend, etc., result in limiting contractors' activities in the large scale. In this research, in addition to studying the major problems of contractors in large mines of Iran, the most important challenges of large-scale mining contractors, especially in large copper mines are reviewed and support solutions such as making preparations for importing up-to-date and large machineries and spare parts, adaptation of adjustment to inflation rate, making specific price list for mining industry, etc. for the continuity of mining contractors' operations are presented.

Keywords: Mining contractors, Large-scale mining, Copper mining, International sanctions.

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INTRODUCTION

Mining industry is considered as one of the most important industries in the production process, responsible for supplying the consuming materials. Mining industry's direct and indirect contribution to the economy of Iran is more than other industries. In other words, in addition to the thrive in transportation, the gigantic mining activities result in creation of permanent jobs, especially in deprived areas due to the distribution of mines all through the country. Mining has both great conspicuous and inconspicuous effects and added value on the economy of a country which should not be ignored [1].

Despite the existence of convenient reservoirs, investment is not proportionate to the volume of reservoirs; e.g., whilst 4 percent of global copper reservoirs are located in Iran, only 0.13 percent of the copper in the world is produced in the country and ranks 12th.

Normally, mining activities are done rental or outsourcing a section or part of the operation to contractors. In recent years, mine owners have started to outsource the entire operation as 2 sides or even 3 sides contracts due to limitations and shortages; to that many executive activities of many of the large mines are performed just by contractors [2]. In large mines, knowledge and experiences of contractors have tuned into the capital for employers and many large-scale contractors have stayed in mines for a long time.

The need for large-scale and especial machineries in these mines have resulted in contractors to be limited and thus, each contractor acts specifically in an especial field. These factors, in addition to the need for massive investment, result in contractors to somehow become a partner for the employer. On the other hand, the contractor's job is specialized and monopolized, resulting in the contractor to become vulnerable. In this case, if a contractor leaves the mine, not many job opportunities will be able for him/ her; thus, if not supported by employers, contractors will become more vulnerable, resulting in great cost of risk for them. Currency rate fluctuations, whilst a lot of costs are affected by global prices, can easily result in a contractor to move from a margin of profit into sustaining heavy loss. In any way, almost all of the large-scale mining machineries are imported and the initial purchase, spare parts supply, and their technical support require international communications to exist. Currently, such things are impossible due to international sanctions. At the time, support and maintenance of these machineries are performed using used parts, supplied through middlemen with excessive prices for currency transfer. Therefore, it is clear that entering the field of mining cannot be the first option for an enterprise, even the existing ones might decide on leaving this field due to the aforementioned matters and the large amount of investment that this industry requires. Since there are not many large-scale mine contractors, losing the chain of minerals' supply can be considered as the initial outcome.

Existence of large-scale mine contractors is considered not only as an inseparable arm of the large-scale mining domestic body, but also can be assumed as a prerequisite for sustainable economic development. Without having sustainable in flow of raw materials, making investment in all other production sections (which all are considered downstream regarding the mine industry) seems too risky, something which will possibly result in the country to be more depended on others. In fact, the raw materials supply macro-flow will work only in mining. In addition to the sustainability of the flow of raw materials, supplying them with reasonable prices is a necessity for all industries to be present in domestic and international competitive markets. Tasdighi et. al. has studied the main challenges for contractors and investors to enter these projects in Iran for the past 2 decades and have come up with political risks, outcome risks, macroeconomics risks, regulatory risks, financial risks, commercial risks, and security risks as the main ones [3].

METHODS

In this paper, using reconciling and analytical assessment, problems of contractors of mines, especially copper mines are studied; after that, based on considerable experiences of authors, most important challenges of mine contractors are described. Then, some solutions such as providing the possibility of importing up-to-date and large machineries and spare parts, adaptation of adjustment to inflation and preparing a price list specifically for mining industry are proposed in order to sustain the work of mine contractors.

FINDINGS AND ARGUMENT

Iran is located on the global copper belt, passing from north-west to south-east. So far, more than 600 copper indices are identified in Iran. These indices are shown in Figure 1 [4]. Average annual need of ore for producing cathode and concentrate in Iran is 50 million tones, which is mostly provided by large

copper mines of the country. Based on the principle of outsourcing large-scale mines, mine contractors are considered as a partner and a secondary investor which own the knowledge and technical and operational investment, initially entering the project with their human capital and facilities. In large mines, by increasing job benefits, side costs decrease, whilst the profit of mining increases. In these types of mines, the working environment is safer, healthier and more comfortable. Due to existence of research and development departments, as the mechanisation increases, the possibility of increasing the efficiency increases, too. In such mines, environmental damages decrease. The most advantages of large-scale mining in comparison with small-scale mining is summarized in Figure 1.

As the scale of the mine increases, consequently, capacity of machineries increases too; whilst at the same time, quantity of equipments and human resources decrease and level of expertise increases. Obviously, performing large activities with small-scale machineries result in exponential rise of the quantity of machines, many more human resources and backup equipments and increases all relevant equipments and logistics. These will cause the managing, preventing operational and technical interference to become excessively difficult and with poor quality.

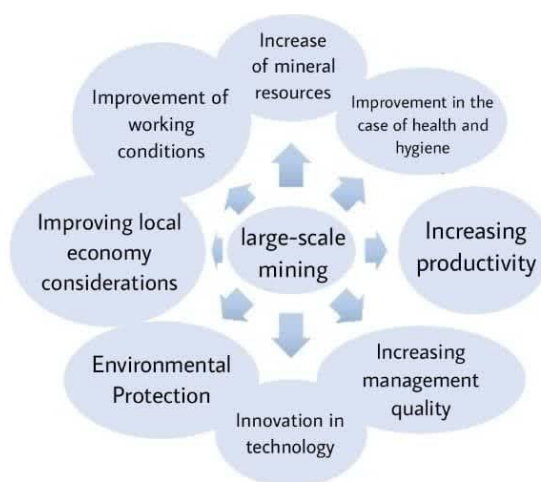


Figure 1. Main advantages of large-scale mining

Many researches have been done on studying and assessing the success and failure factors of projects performed by both private contractors and the government. In all these cases, researchers have emphasized on the necessity of private contractors and investors in performing fundamental projects of countries through different methods, which result in increasing the success rate. In the field of mining, the World Bank has asked private sector to enter into such projects and also private mining companies to collaborate with government; believing that collaboration between enterprises, civil society and the government can have a win-win outcome for everyone [5].

Mine exploitation is a costly, time-consuming process, needing long-term investment. Based on the experience of the authors of this paper, there are not many large-scale contractors in Iran which have strong structure (expert human resources, high level of technical and experimental experience, organized and swift maintenance system for machineries and equipments, internal and external connections for acquiring spare parts, consulting and technical and engineering services and sufficient investment (ownership of various large-scale machineries, strong logistics, large current working capital) in order to take necessary actions in large-scale mines.

Shortage of investments made in mine exploration, exploitation of new mines, low-tech and depreciated machineries, bank problems, absence of international firms, limitations in providing sufficient financial resources, especially through financial market, lack of deposits for infrastructural projects, debility of regulations and public section including lack of guarantee for government's promises, political, economic and social instabilities caused by inflation, monetary policies, budget deficit, currency rate fluctuations, macroeconomic instability, international sanctions, debility of private sector, interference of government in private sector activities, lack of balance of power, absence of strategic plans, not having a common

approach for partnership and foreign investment have resulted in Iranian mines to not be developed and thus, Public-Private Partnership plans in mine and mining industry have failed despite all potentials. For example, about the currency rate fluctuations, from 2013 to nearly the end of 2016, inflation and currency rate experienced a calm atmosphere with little changes; even after 2013, the currency rate experienced a small fall; but after 2016, the situation has been fluctuating, sometimes with sharp and sometimes with slow changes. Totally, a drastic increase has happened to the currency rate. In Figure 2, currency changes from 2011 to 2019 are shown.



Figure 2. Changes in inflation and currency rate from 2011 to 2019

CONCLUSIONS

The current research is done in order to study, analyze, and assess strategic problems for large-scale contractors of large copper mines of Iran, which are the largest in the country. Based on the three elements of joining small-scale mine complexes, mining operation in large scales, and using giant equipment, price of the final product decreases and efficiency increases, whilst its competitiveness improves. Two of the most important strategic problems of large-scale contractors in large mines of Iran include international sanctions and government's policy for banning the import of heavy mine machineries. In addition to that, currency rate fluctuations are another problem which large-scale contractors face; in this case, a major section of the costs of mine contractors are in other currencies, whilst the income of contractors is calculated and paid in Rial. Based on official statistics, inflation rate has always been larger than currency rate fluctuations, which, in long-term contracts, causes sever loss to them. Currently, international sanctions and the drastic weakening of national currency have resulted in investments in other fields to be more profitable and safer rather than in mines; thus, large-scale mine contractors are encouraged to exit the mining activities field.

REFERENCES

- [1] Safarzadeh, E. (2014). "Estimating the rate of return on investment in the mining sector and comparing it with other major economic sectors of the country". Vice President of Infrastructure Research and Production Affairs, Office of Energy, Industry and Mining Studies, Research Center of the Islamic Council.
- [2] Faraji-Kalarijani, H., and Jalali, S. E. (2019). "Presentation of the model of public-private partnership in mining projects". Ph.D. Thesis of Shahrood University of Technology.
- [3] Tasdighi, B., Azizkhani, F., and Mehri-Perko, V. (1385). "Private sector investment challenges in Iran". Research Council, 52: 31-54.
- [4] National Iranian Copper Industries Company. (2021).
- [5] A World Bank group flagship report. (2019). DOING BUSINESS 2019, Training for Reform.