

Discussion on technological innovation and management mode of mineral resources integration

Wang Qiu¹, Li Yue¹, Zhiwu Huang²

¹Duyun Natural Resources Bureau, Duyun, Guizhou, 558001, China

²Guizhou Jianhai Geo-Environmental Engineering Co., Duyun, Guizhou, 558001, China

Keywords: Technological innovation; management model; mineral resources integration

Abstract: With the rapid development of the global economy and the growth of resource demand, the technological innovation and management mode of mineral resource integration has become particularly important. The traditional way of mining mineral resources has been difficult to meet the growing demand, so it is necessary to improve the efficiency of resource development through technological innovation to achieve the optimal allocation of resources. The concept of green sustainable development has also prompted the development of mineral resource management mode in a more environmentally friendly and sustainable direction. In this context, the study of technological innovation and management mode of mineral resources integration is of great significance for promoting the development of mineral resources industry and realizing the sustainable use of resources. The purpose of this paper is to discuss the significance of technological innovation, analysis of the current situation and management mode of mineral resources integration, with the aim of enhancing the efficiency of resource development and promoting green and sustainable development.

1. Introduction

The discussion of technological innovation and management mode of mineral resources integration is of great significance. Through technological innovation, the exploration and mining efficiency of mineral resources can be improved, the efficient utilization of resources can be realized, and green sustainable development can be promoted. The integration of mineral resources can promote the transformation of resource utilization and push the industry in the direction of more intelligent and informatized development. Exploring the management mode of mineral resources integration can help establish a multi-party cooperation mechanism and enhance the efficiency and effectiveness of resource integration. Overall, the study of technological innovation and management mode of mineral resources integration has important practical significance and far-reaching impact on promoting the sustainable development of mineral resources industry and enhancing the efficiency of resource utilization^[1].

2. Exploring the significance of technological innovation in mineral resource integration

2.1 Enhance the development efficiency of mineral resources and realize the optimal allocation of resources

The development efficiency of mineral resources directly affects the utilization efficiency of resources and sustainable development. Enhancing the development efficiency of mineral resources and realizing the optimal allocation of resources are important issues that need to be urgently addressed in the current mining field. Through technological innovation, the exploration and mining efficiency of mineral resources can be improved. The introduction of intelligent mining technology can realize the accurate identification and positioning of mineral deposits, improve the accuracy and efficiency of exploration, thus reducing exploration costs and improving the efficiency of resource development. Optimizing the allocation of mineral resources can realize the maximum utilization of resources. Through scientific and reasonable planning and management, the integration and configuration of different types of mineral resources can realize the complementary use of resources and improve the comprehensive utilization efficiency of resources. It can also realize the recycling of mineral resources through the concept of circular economy, reduce the waste of resources and realize the sustainable use of resources. In practice, it is necessary to strengthen technical research and development and talent training, promote the innovation and application of mineral resources development technology, and at the same time establish a sound management system and policy support to provide a guarantee for the optimal allocation of resources. By enhancing the efficiency of mineral resources development and realizing the optimal allocation of resources, we can effectively promote the transformation and upgrading of the mining industry, promote green and sustainable development, and realize the sustainable use and protection of resources^[2].

2.2 Promote the transformation of the utilization of mineral resources and promote green and sustainable development

The way mineral resources are utilized is crucial to environmental protection and sustainable development. Promoting the transformation of the way mineral resources are utilized and promoting green and sustainable development has become an important issue in the development of the current mining industry. The traditional way of mining mineral resources often has problems such as resource waste and environmental damage, and is in urgent need of transformation and upgrading. The introduction of the concept of green mining emphasizes the focus on ecological environmental protection and sustainable use of resources in the process of mineral resources development, and advocates a green, low-carbon and circular development model. In practice, it can reduce the pollution emissions during the mining of mineral resources and reduce the impact on the environment by promoting clean production technology. The comprehensive utilization of mineral resources should be strengthened to realize the recycling of resources, reduce the waste of resources and improve the efficiency of resource utilization. Green mining also needs to strengthen scientific and technological innovation, promote the application of green technology in the field of mining, and improve the efficiency of resource development and environmental protection. Government departments should strengthen supervision, establish a sound system of laws and regulations, guide enterprises to increase environmental protection investment, and promote the development of green mining. By promoting the transformation of the utilization of mineral resources and promoting green sustainable development, we can realize the efficient utilization of resources and the continuous improvement of the environment, and lay a solid foundation for the sustainable development of the mining industry in the future^[3].

3. Analysis of the current status of technological innovation in the integration of mineral resources

3.1 Application of intelligent mining technology to improve the efficiency of mineral resources exploration and mining

The application of intelligent mining technology is of great significance in the field of mineral resources today. With the continuous progress of science and technology, intelligent mining technology has become one of the important means to improve the efficiency of mineral resources exploration and mining. Through the introduction of advanced sensors and monitoring equipment, intelligent mining technology realizes real-time monitoring of the internal environment of the mining area and the quality of the ore, which greatly improves the accuracy and efficiency of exploration and mining. Combined with data analysis and artificial intelligence algorithms, intelligent mining technology can quickly process huge amounts of exploration data and help mining enterprises better understand the structure and distribution law of ore deposits, so as to guide the mining work and reduce the waste of resources. Intelligent mining technology can also realize automated control and intelligent operation, which improves production efficiency and safety, and reduces labor costs and accident risks. In general, the application of intelligent mining technology not only improves the efficiency of mineral resources exploration and mining, but also promotes the mining industry to digitalization and intelligent development, providing an important support for the sustainable use of resources and green mining.

3.2 Application of Data Mining and Artificial Intelligence in Mineral Resource Management

The application of data mining and artificial intelligence technology in mineral resource management has revolutionized the mining industry. Data mining technology analyzes and mines the data of a large number of mineral resources exploration, mining, production and other links, revealing the laws and trends hidden behind the data and providing a scientific basis for decision-making. Through data mining, mining enterprises can more accurately assess the reserves, quality and distribution of mineral resources, optimize resource allocation, and improve exploration and mining efficiency. Data mining can also help enterprises to predict the demand of the mineral market, formulate reasonable production plans, reduce business risks and improve market competitiveness^[4].

The application of artificial intelligence technology in mineral resource management is also becoming increasingly widespread. The intelligent decision-making system based on artificial intelligence can automatically analyze and process a large amount of mineral resource data through learning and optimization algorithms, providing intelligent decision-making support for managers. Artificial intelligence technology can help enterprises establish an intelligent scheduling system for mine production, realize the intelligent operation of equipment and the rational use of resources, improve production efficiency and reduce costs. Artificial intelligence can also be applied to the field of mine safety management, through the monitoring and early warning system, timely detection of potential safety hazards, to ensure production safety.

Taken together, the application of data mining and artificial intelligence technology brings great opportunities and challenges for mineral resource management. With the continuous progress of technology and the continuous expansion of application scenarios, mining enterprises will be able to better utilize data resources, improve management level and achieve sustainable development. Strengthening the research and application of data mining and artificial intelligence technology in mineral resource management will become an important way for mining enterprises to enhance their competitiveness and achieve sustainable development.

4. Exploration of technological innovation management models for mineral resources integration

4.1 Role and challenges of information-based management systems in mineral resources consolidation

Informatization management system plays a crucial role in mineral resources integration. Informatization management system can realize comprehensive monitoring and management of mineral resources, including data collection and analysis of various aspects of resource exploration, mining, processing and transportation. Through real-time monitoring and data analysis, managers can more accurately understand the reserves, quality and flow of resources, so as to formulate more scientific and reasonable resource integration strategies and improve the efficiency of resource utilization. Informatization management system can realize the sharing and exchange of resource information, and different departments can share data and information in real time, avoiding the problems of information silo and information asymmetry, and improving the decision-making efficiency and synergy. Informatization management system can also realize the whole process of resource integration tracking and monitoring, managers can always understand the progress of integration, timely detection and resolution of problems to ensure the smooth realization of the integration goals. Informatization management system also faces some challenges in mineral resources integration. The construction and operation cost of the informationization system is high, requiring a large amount of capital and human resources, which may be unaffordable for some small and medium-sized mining enterprises. The security and stability of the informationization system is an important issue, which may lead to significant losses once the system is attacked by hackers or malfunctions. Strengthening information security protection and system stability is an urgent issue in the development of informationization management system. The application of informatization systems also requires employees to have a certain level of technical skills and operational capabilities, and training and education are needed to give full play to the benefits of the system^[5].

4.2 Mineral Resources Integration and Management Practices under the Multi-Party Cooperation Model

In today's mineral resources integration management, the multi-party cooperation model is gradually becoming an important trend. The practice of mineral resources integration management under the multi-party cooperation mode aims to maximize the benefits of resource integration through the joint efforts and collaboration of all parties. The multi-party cooperation mode can integrate the resource advantages of all parties and realize resource sharing and complementarity. Different enterprises, institutions or departments have different resources and technical advantages, and through cooperation, they can realize the optimal allocation of resources and improve the overall efficiency. Multi-party cooperation mode is conducive to reducing integration costs and risks. In the process of resource integration, it is often difficult for a single enterprise to bear all the costs and risks, while multi-party cooperation can share the risks, common investment and reduce the economic pressure in the integration process. The multi-party cooperation model can also promote technological innovation and experience sharing. Cooperation between different units can promote technology exchange and experience sharing, and promote the development and progress of the whole industry. Through joint R&D and innovation, the integration management level can be improved and the industry can be promoted to a higher level. There are also some challenges in the integration management of mineral resources under the multi-party cooperation mode. Partner selection and establishment of cooperation mechanism is a key issue. There are differences in

interests and different management modes between different units, so how to establish cooperation mechanisms, clarify cooperation goals and coordinate the interests of all parties is a complex and critical issue. Information sharing and protection is also a challenge. Under the multi-party cooperation model, information sharing is essential, but how to ensure information security and protect the commercial secrets of all parties is an issue that requires serious consideration. Managers need to have a high level of coordination and communication ability, and be able to effectively coordinate the interests of all parties to promote the smooth progress of cooperation. In summary, the practice of mineral resources integration management under the multi-party cooperation model is conducive to the optimal allocation of resources and the reduction of integration costs, but it also requires overcoming various challenges in cooperation in order to maximize the benefits of resource integration.

5. Conclusion

The discussion of technological innovation and management mode of mineral resources integration is to promote the progress and development of the field of mineral resources development. Through the in-depth exploration of the significance of technological innovation, the analysis of the current situation and the management mode, we can draw some conclusions. Technological innovation is of great significance in mineral resources integration, which can enhance the efficiency of resource development, realize the optimal allocation of resources, and promote green and sustainable development. The current application of new technologies such as intelligent mining technology, data mining and artificial intelligence has brought new opportunities and challenges for mineral resources development, which need to be constantly explored and innovated. In terms of management modes, the construction of information management systems and the practice of multi-party cooperation modes play an important role in promoting the integration of mineral resources, but they also face a number of challenges and dilemmas that need to be resolved.

References

- [1] Dai ZW. From "Regime Embeddedness" to "Regime Integration": New Trends in the Relationship between Grassroots Power and Rural Society in China [J]. *Journal of China Pudong Cadre College* 2024, 18(01):99-107.
- [2] Zhou P, Ma L. Research on "Going Global" Strategy of Environmental Protection Industry under the Background of Green "Belt and Road"--An Empirical Study Based on SWOT-AHP Model [J]. *Operation and Management* 2024, (01): 186-192.
- [3] Shi Y. Study on the Optimization Path of Environmental Public Goods under the Perspective of Economic Law--Centering on Environmental Public Interest Litigation [J]. *Journal of Beijing University of Chemical Technology (Social Science Edition)* 2023, (04):54-70.
- [4] Ren SY. Characterization and development mode of reservoirs in Taikoyu metamorphic subduction hills in the Bohai Bay Basin [D]. *Jilin University* 2023.
- [5] Cai HY. The impact of labor cost on the pattern of outward foreign direct investment[D]. *Nanjing University of Posts and Telecommunications* 2023.