STRATEGIC MANAGEMENT FOR CIRCULAR ECONOMY: THE CASE STUDY OF TAILINGS POND NO. 1, HARGHITA-BĂI, ROMÂNIA

Geanina-Bianca SAVU
PhD Student,
Transilvania University of Brasov, Romania
E-mail: geanina.savu@unitbv.ro
ORCID: 0009-0006-4235-7114

Camelia Cristina DRAGOMIR-PÂNZARU
PhD Habilitat Professor,
Transilvania University of Brasov, Romania
E-mail: camelia.dragomir@unitbv.ro
ORCID: 0000-0002-7537-9217

Abstract: *Mining activities generated large quantities of waste material stored in tailings ponds. In many regions, these sites represent environmental risks for ecosystems and nearby communities, while their management is usually limited to minimal maintenance and monitoring. In the context of the transition toward a circular economy and the growing importance of ESG (Environmental, Social and Governance) policies, these sites can also be reconsidered as potential economic resources. This paper analyse how strategic management tools can help identify sustainable solutions for the reuse of materials stored in tailings ponds. The research is based on an exploratory case study conducted on tailings pond no. 1 in Harghita Băi, Romania. The methodology used includes the analysis of the strategic environment through the application of the STEPLE and SWOT tools, in order to evaluate the factors that influence the management of the site. The results show that the pond contains approximately 2.5–3 million tonnes of kaolin sand and approximately 100,000 tonnes of kaolin, deposited over an area of approximately 16–17 hectares. Kaolin can be used for the development of cosmetic products and spa treatments, but also in agriculture, in the form of products with a photoprotective role for plants. Kaolin sand can be reused in the construction materials industry, including for obtaining cement materials or ceramic products. The conclusions of the study show that strategic management tolls, combined with circular economy principles such as resource recovery and waste reduction, can transform abandoned mining sites from environmental risks into opportunities for sustainable economic development.*

Keywords: *strategic management, sustainability, ESG, circular economy, tailings pods.*

Classification JEL: *Q56, Q57, L21.*

UDC: *005.21:504.062.4:628.3(498)* ***DOI:*** *https://doi.org/10.53486/ser2026.28*

1. Introduction

Mining played an important role during the global industrialization period. For Romania, mining represented one of the main sectors through which the communist regime experienced a phase of expansion during the period of accelerated industrialization, with most mining sites being opened at that time. The opening of these mining exploitation perimeters generated significant transformations affecting the environment, local communities, and especially the economy. In most mining exploitation perimeters, the deposit does not represent 100% the valuable mineral, as it is found in association with other types of materials, in different proportions from one case to another. Thus, in numerous situations, a part of the extracted material is considered waste or residue. This material requires storage, and the practice used over time in mining activities has been the construction of tailings ponds. These ponds are designed for waste storage and to withstand climatic and structural conditions. However, many of these sites are large in both height and

volume and are located near local communities. This is also the case of Tailings Pond No. 1 in Harghita Băi, Harghita, Romania. For over 50 years, this site has been closed and is considered to be an environmental problem. Management practices, in this case, have been limited to carrying out minimal maintenance works.

In many cases, the management of these sites falls to the state, turning them into a financial burden due to annual maintenance, monitoring, and consolidation requirements. The lack of intervention or the inadequate management of these residues can endanger the environment, local communities, and the economy as a whole. In this context, the need arises to analyze tailings ponds from the perspective of ESG (Environmental, Social and Governance) policies. Due to the major risks, the issue of tailings ponds must be effectively addressed through the application of strategic management.

Current research on this phenomenon focuses mainly on technological solutions and industrial processes for the recovery of materials from mining residues, as well as on their impact on the environment. In contrast, the managerial and strategic dimension of the valorization of these sites is analyzed to a lesser extent.

Thus, by integrating the principles of the circular economy into a strategic management strategy, the environmental risks of mining sites can be transformed into valorization opportunities. In this context, the following research question arises: *„What is the optimal solution, from the perspective of strategic management, to minimize the risks generated by these sites and, at the same time, to valorize the opportunities offered by the principles of the circular economy?”*.

The aim of the study is to highlight how strategic management can be used as a tool for integrating the principles of the circular economy into the management of mining sites with risk potential. The main objective of the research is to analyze, through a case study on Tailings Pond No. 1 in Harghita Băi, how the application of strategic management tools can contribute to the identification of directions for the valorization of residual materials in accordance with the principles of the circular economy.

The specific objectives are as follows:

O1. Analysis of the macroeconomic context that influences the management of tailings ponds.

O2. Analysis of the strategic environment of Tailings Pond No. 1 Harghita-Băi from the perspective of environmental, economic, social, and industrial factors.

O3. Formulation of a strategy for the valorization of the resources existing in Tailings Pond No. 1 Harghita-Băi in accordance with the principles of the circular economy.

2. Literature Review

Strategic management emerged as a response to changes in the economic environment that increased uncertainty in the business environment. In strategic management, analytical tools are used to evaluate the internal and external environment, which help in the formulation of organizational strategies (Nijssen & Frambach, 2001). The most commonly used are the STEPLE analysis, which examines macroeconomic factors (Yüksel, 2012)and the SWOT analysis, which evaluates strengths, weaknesses, opportunities, and threats (Helms & Nixon,

2010). Although these analyses were created for the economic environment, they can also be used in the context of the circular economy (Ferasso et al., 2020).

ESG refers to non-financial factors related to social and environmental sustainability, correlated with financial factors, which a company must take into account for more responsible business decisions towards the environment and the community (Foris et al., 2022; Koh et al., 2022). The integration of ESG principles into the organization's strategy allows the combination of short-term profitability with long-term sustainability (Farag, 2025). Mining activities can generate significant impacts on the environment, such as ecosystem degradation, landslides, and water contamination, increasing the need to integrate ESG principles into the management of these activities (Krause & Kretschmann, 2023).

In recent decades, the concept of the circular economy has been integrated into activities aimed at reducing waste and using natural resources efficiently (Geissdoerfer et al., 2017). The circular economy supports the reuse, recycling, and reintegration of materials into production chains (Kirchherr et al., 2017). Studies on the circular economy in the mining sector mainly analyze technologies and processes for recovering materials from mining residues for reuse in other industries. For example, the studies by (Tayebi-Khorami et al., 2019) and (Lèbre et al., 2017) analyze the role of the mining industry in the circular economy and propose resource management models for mining sites.

Other studies focus on technological methods for valorizing mining residues, such as the recycling of mining waste for the production of construction materials or ceramic materials (Farrokhi-Rad et al., 2017; Melashvili et al., 2016). The literature highlights the importance of geometallurgical analyses and technical tools for evaluating the economic potential of mining residues (Bye, 2011; Pineda et al., 2015). Additionally, other studies analyze the circular economy from the perspective of business models and industrial symbiosis (Lewandowski, 2016; Pajunen et al., 2012). In the mining industry, these principles can be applied to the valorization of tailings ponds (Teodosiu et al., 2014).

The mining industry generates approximately 10 billion tons of waste annually, a large part of which is represented by mining residues (Lacy et al., 2020). Studies show that mining residues may contain large amounts of economically valuable materials that can be reused in various industries (Mudd, 2010). Several authors highlight the potential of tailings ponds to be valorized as secondary industrial resources within the circular economy (Lottermoser, 2010). Thus, kaolinitic sand can be used in the construction materials industry and in the production of ceramic materials, being considered a secondary mineral resource with industrial valorization potential (Lottermoser, 2011). The global kaolin market is growing, driven by demand from the ceramics, paper, and construction materials industries (Barnes, 2018).

On the other hand, the improper management of tailings ponds can generate major risks for the environment and communities (Kossoff et al., 2014). This is illustrated in the literature by the collapse of the tailings pond at Stava, Italy, where 268 people died in 1985, leading to stricter management policies (Davies & Martin, 2009). Thus, the integration of circular economy principles into the strategic management of mining sites can transform risks into opportunities for sustainable economic development (Giurco et al., 2014).

However, the literature addresses the managerial dimension of tailings pond valorization in the circular economy only to a limited extent. The lack of an integrated managerial approach can limit the efficiency of applying circular economy principles and ESG policies in the management of mining residues.

In this context, the present study analyzes the case of Tailings Pond No. 1 in Harghita Băi, Romania, using strategic management tools, specifically the STEPLE and the SWOT analysis, to evaluate the strategic environment and identify directions for sustainable resource valorization.

3. Methodology

The chosen methodology is based on an exploratory qualitative approach, which allows the identification and interpretation of the relationships between economic, social, and environmental variables, facilitating the analysis of phenomena insufficiently explored in the literature (Marshall, 1996; Petrescu & Lauer, 2017).

The methodology integrates strategic management tools with the analysis of technical, economic, and industrial data. The study aims to identify factors influencing the management of mining sites and to evaluate the valorization potential of materials in tailings ponds. The research combines qualitative interpretation of the economic, legislative, and environmental context with the evaluation of technical and economic data relevant to resource reuse, in accordance with the principles of the circular economy and ESG standards.

The research design is of an exploratory case study type, applied to Tailings Pond No. 1 in Harghita Băi, Romania, owned by the company FAM MIHOC S.R.L. The exploratory case study method allows the analysis of a phenomenon through the use of multiple data sources that can be correlated (Yin et al., 2018). At the same time, the case study can contribute to the development and redefinition of the theoretical framework by formulating explanations based on empirical observations (Eisenhardt, 1989).

Several strategic management tools were used, adapted to the principles of the circular economy and the requirements for compliance with ESG policies. The external environment was analyzed using the STEPLE model, while the internal environment and resource valorization potential were evaluated through SWOT analysis. At the same time, empirical studies and theoretical frameworks highlighting the applicability of strategic management in the circular economy, in the context of ESG alignment, were analyzed.

The data required for the analysis were obtained from multiple sources. These include documents and technical information regarding the site of Tailings Pond No. 1 in Harghita Băi, Romania. The analysis included drilling data, topographic studies, and chemical analyses on the type and quantities of materials, as well as the characteristics of kaolin deposits in the Harghita Băi area and the quantities of kaolin and kaolinitic sand stored in Tailings Pond No. 1. Additionally, market studies regarding the industrial uses of kaolin and kaolinitic sand at the global and national levels were analyzed. Economic data were used, including a financial report and a research and development project related to FAM MIHOC S.R.L. In addition, the data were supplemented with public information regarding the conduct of mining activities in Romania and the management of tailings ponds.

4. Results and Discussion

4.1 Case study: Tailings Pond No. 1 Harghita-Băi, România

Starting from the 1950s, in the Harghita-Băi area of Romania, the mining exploitation of kaolin from a depth of approximately 60 meters was opened by Întreprinderea Minieră Harghita, a state-owned company during the communist regime. The mine extracted

approximately 220,000 tons of kaolinized rock annually, processed for use in the ceramics, paper, and industrial materials industries.

As a result of ore processing, the resulting residual materials were deposited in tailings ponds. Tailings Pond No. 1 in Harghita Băi was constructed in 1966 by damming the Hoților stream and was used for the storage of waste materials resulting from kaolin processing. The dam of the tailings pond has a height of approximately 14 meters and was constructed using the upstream raising method, utilizing the material deposited on the beach. The tailings pond has an area of approximately 16-17 hectares and a designed capacity of about 4 million tons of material, of which approximately 2.5–3 million tons are already stored. The material is mainly composed of kaolinitic sand with a grain size ranging between 0.42 and 3 mm, as well as local accumulations of kaolin mass resulting from the decantation process. After the closure of the mining exploitation, the site remained inactive for over three decades, being considered primarily a site with potential environmental risk.

4.2 STEPLE analysis of the Tailings Pond No. 1 Harghita-Băi, România

Table 1. STEPLE analysis of Tailings Pond No. 1 Harghita Băi, România

Social factors - Location in a tourist resort → local interest in environmental remediation. - The local community seeks to reduce environmental risks. - At the national level, attention to tailings ponds remains limited. - Public interest in sustainability and environmental protection is increasing.	**Technological factors** - Modern technologies are used for the recovery and processing of minerals. - Current equipment contributes to the reduction of operational costs. - Activity monitoring is carried out through digital systems. - Mining residues can be reused as industrial raw materials.
Economic factors - Existing deposits have value for sustainable industries. - Increasing energy costs influence the extraction process. - High kaolin prices in the EU → higher profitability. - Mining restrictions can generate new opportunities.	**Political factors** - EU strategies support the circular economy and the use of secondary resources. - Political instability influences the business environment. - Fiscal policies and royalty levels affect competitiveness.
Legal factors - Mining Law No. 85/2003 regulates the exploitation of resources. - Directive 2006/21/EC imposes strict management requirements. - Authorization procedures are managed by A.N.R.M.P.S.G.	**Enviromental factors** - Abandoned tailings ponds pose risks of soil and water pollution. - The rehabilitation of mining sites is a priority. - Resource valorization → contributes to reducing volume and risks. - Sustainable management → ecosystem protection.

***Source**: author's own researches*

However, studies conducted between 1999 and 2001 highlighted that the materials stored in the tailings pond have valuable industrial properties. The analyses confirmed the possibility of obtaining several types of kaolin, including colloidal kaolin and washed kaolin used in the ceramics industry. At present, estimates indicate the existence of approximately 100,000 tons of pure kaolin and over 3 million tons of kaolinitic sand. Due to the natural aging of the material over several decades, the kaolin exhibits favorable characteristics for industrial uses, especially in ceramics, construction materials, agriculture, and cosmetic products,

while kaolinitic sand can be valorized in the construction materials industry and in the production of ceramic materials, being used as a raw material for the manufacture of bricks, ceramic tiles, or other cement-based products.

The results of the STEPLE analysis are included in Table 1, providing an overview of the social, technological, and economic dimensions that influence the valorization of resources from Tailings Pond No. 1 Harghita Băi, România.

The STEPLE analysis shows that the external environment exerts pressures and opportunities on the management of Tailings Pond No. 1 in Harghita Băi, România. Political and legislative factors, especially European policies on the circular economy, green transition, and ESG standards, facilitate the reuse of secondary mineral resources and the reduction of environmental risks. On the other hand, economic and technological factors represent the basis for integrating materials from the tailings pond into industries such as ceramics, construction materials, agriculture, and the cosmetics industry. To highlight the relationships between external factors and the process of sustainable valorization of resources from Tailings Pond No. 1 Harghita Băi, the authors propose a conceptual framework based on the STEPLE analysis and on the principles of ESG and the circular economy (Figure 1).

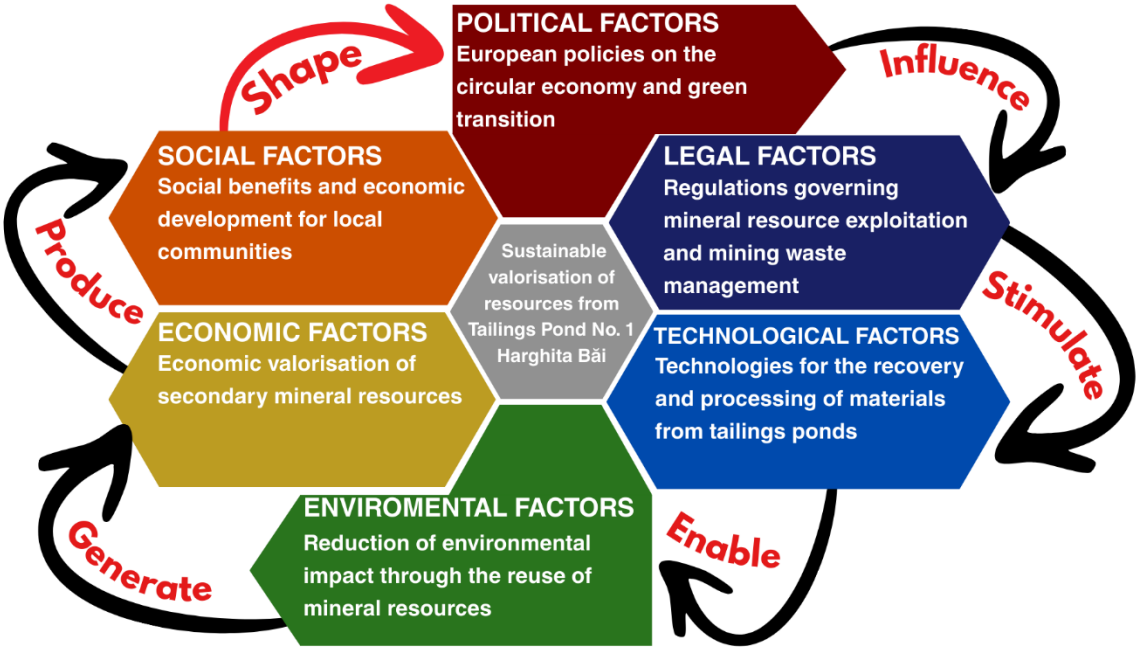

Figure 1. Conceptual framework linking STEPLE factors with the sustainable valorisation of resources from Tailings Pond No. 1 Harghita Băi, România
***Source**: author's own researches*

The proposed model is based on the premise that European policies on the green transition, circular economy, and ESG standards, together with regulations on the management of mining waste, create pressure on the market for the development of more sustainable technologies. In this context, the political and legislative framework not only regulates extractive activities, but also creates the need for technological adaptation to meet new environmental and safety requirements.

The development of these technologies allows the controlled exploitation of resources from tailings ponds, reducing geotechnical risks and environmental impact through the application of circular economy principles. The valorization of secondary mineral resources generates economic benefits through job creation, reducing dependence on costly imports, and lowering production costs for industries that use these raw materials. At the same time, these economic effects contribute to the revitalization of the local community, considering that Harghita Băi is a mountain resort where the reduction of waste volume and the rehabilitation of mining sites will have a positive impact on the environment and local development. Finally, the resulting social benefits positively influence future political decisions, supporting initiatives aimed at the sustainable valorization of resources and environmental protection.

4.3 SWOT analysis of the Tailings Pond No. 1 Harghita-Băi, România

The SWOT analysis is presented in a summarized form in Table 2. It presents the existing advantages and opportunities, as well as the vulnerabilities associated with the management of the tailings pond, are presented.

Table 2. SWOT analysis of the Tailings Pond No. 1 Harghita-Băi, România

Strengths	**Weaknesses**
- Large quantities of kaolin and kaolinitic sand in the tailings pond - The materials have good quality → can be used in industry - Compact storage, making exploitation easier - Location in an area with tourism potential - No heavy metals, therefore safe for use	- Lack of technological infrastructure required for processing - Existing cracks → potential risk of instability - Degraded access road - No recent maintenance works have been carried out
Opportunities	**Threats**
- Possibility of use in multiple industries (ceramics, construction, etc.) - Controlled exploitation can reduce the volume of residues - EU policies → support the circular economy - Possible access to European funds for environmental remediation	- Increasingly strict environmental regulations - High costs for exploitation and environmental remediation - Unstable energy and fuel prices - The raw materials market is quite volatile - Competition from other suppliers exists

***Source**: author's own researches*

The results of the SWOT analysis show that Tailings Pond No. 1 in Harghita Băi has significant potential for the valorization of secondary mineral resources, but this potential is conditioned by the need for strategic and investment interventions. Strengths, such as the significant quantities and quality of kaolin and kaolinitic sand, support the formulation of an SO strategy, aimed at integrating these resources into industries such as ceramics, construction, agriculture, and cosmetics. At the same time, the identified opportunities, particularly European policies supporting the circular economy and access to funding, support the formulation of a WO strategy, focused on the development of the technological infrastructure necessary for resource recovery and processing.

Considering the weaknesses, such as the lack of infrastructure and site instability risks, a WT strategy was formulated, aimed at ensuring the safety of the site through consolidation, monitoring, and maintenance works. Finally, in response to the identified threats, a ST strategy was developed, focused on the controlled exploitation of resources and the gradual reduction of the tailings pond volume, in compliance with environmental regulations.

4.4 Strategic implications and conceptual model of the Tailings Pond No. 1 Harghita-Băi, România

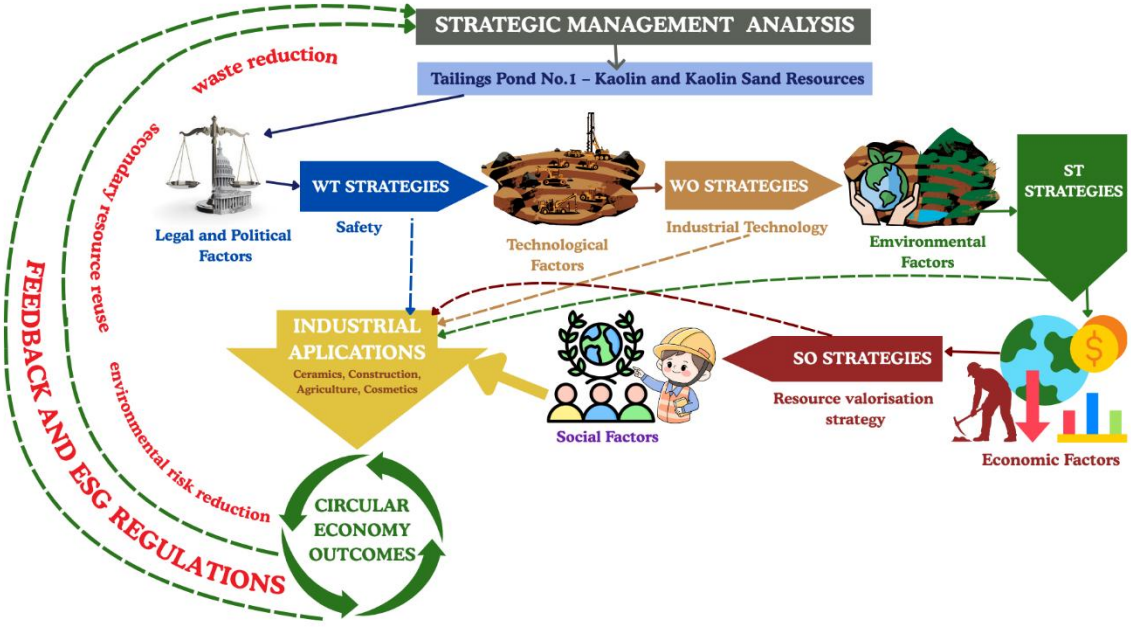

Figure 2. Conceptual model of strategic management for the valorisation of resources from Tailings Pond No. 1 Harghita-Băi, România

***Source**: author's own researches*

To highlight how strategic management can be applied in the process of valorizing the resources existing in Tailings Pond No. 1 in Harghita Băi, the authors propose a conceptual framework based on the integration of STEPLE and SWOT analyses in the context of circular economy principles and ESG standards. The model starts from the influence of external factors on strategy formulation and implementation. In the first stage, external legal and political factors, such as European policies on the green transition, circular economy, and ESG standards, together with regulations on mining waste management, generate pressures on the extractive sector to adopt more sustainable practices. In this context, strategic management requires, first of all, the adoption of a strategy oriented towards the safety of the tailings pond (WT strategy), which involves reducing the risks associated with site instability through consolidation works, monitoring, and maintenance of the existing infrastructure.

The application of this strategy creates the necessary conditions for the intervention of technological factors, which allow the development of technical solutions and specific installations for the controlled exploitation of resources from the tailings pond. In this context, the WO strategy is implemented, oriented towards the development of the technological infrastructure required for the recovery of mineral materials stored in the tailings pond. The development of these technologies allows the monitoring of works carried out on the site, the management of tailings pond safety, and the installation of technological systems intended for the separation and valorization of secondary mineral resources. Once these technological infrastructures are developed, the application of the ST strategy becomes possible, mainly influenced by environmental factors.

The ST strategy involves controlled exploitation through the gradual removal of material (1 meter/year), reducing environmental and geotechnical risks. Through this approach, the

existing secondary mineral resources are valorized, contributing to the reduction of the volume of mining residues and the mitigation of environmental risks. At this stage, economic factors also intervene, stimulating the valorization of kaolin and kaolinitic sand resources through their integration into various industrial value chains. The SO strategy aims at the economic valorization of these mineral resources through their use in industries such as ceramics, construction materials, agriculture, and the cosmetics industry. The valorization of these resources can generate economic benefits by reducing dependence on costly imports, lowering production costs, and developing new economic activities. In turn, these economic benefits generate positive social effects, contributing to the revitalization of the local community in the Harghita Băi area.

The reduction of the volume of mining residues and the gradual rehabilitation of the site have a positive impact on the environment and local economic development, through job creation and the stimulation of related industrial activities. The integration of recovered resources into various industries leads to results specific to the circular economy, such as the reuse of secondary mineral resources, the reduction of mining waste, and the mitigation of environmental risks. These results generate a feedback mechanism towards the institutional and political environment, contributing to the consolidation of ESG policies and the development of strategies oriented towards the sustainable management of mineral resources.

4.5 Discussion of results and managerial implications

The analysis shows that the tailings pond should be viewed as a strategic asset rather than an environmental liability. The analysis of the present study reveals, overall, that the tailings pond should be viewed from a strategic management perspective as an important asset on which the purpose, mission, and overall strategy of the company can be founded. This perspective is supported by existing studies highlighting the economic potential of mining residues within the circular economy (Giurco et al., 2014; Lottermoser, 2010). Additionally, other studies emphasize that the integration of strategic management tools contributes to the identification of sustainable solutions for the valorization of mining sites and the reduction of environmental risks (Ferasso et al., 2020).

Viewing the tailings pond as an economic activity, the analysis of the external environment revealed both positive and negative attributes. Thus, in line with objective *O1*, opportunities consist of political and legislative support for initiating resource valorization activities at this site, interconnected with the need to counter environmental risks through technological, social, and economic components. In this regard, the STEPLE conceptual framework shows how external factors can be used to counter threats and demonstrate that the site can be transformed into a sustainable business.

The main advantage of this tailings pond is that it consists of materials that can be reused in various industries, such as kaolin and kaolinitic sand. These deposits are in the form of finished products, allowing their reuse without additional processing. Another advantage is the large quantity of deposits, which are safe for use even in industries for human use due to their low heavy metal content. These aspects indicate that the site is more a deposit of secondary mineral resources than a tailings pond containing mining waste, as it is currently considered and managed. Weaknesses relate to risks associated with site stability, the need for essential technologies, and external factors such as strict policies and economic fluctuations. As outlined in *O2*, four strategies were developed addressing environmental, economic, social, and industrial components.

The authors aimed, through the formulation of management strategies, to integrate both the negative and positive aspects of the mining site. To support this approach, a conceptual model was proposed, showing that the application of STEPLE and SWOT analyses facilitates the sustainable valorization of resources from Tailings Pond No. 1 in Harghita Băi. The results indicate that the strategic process should begin with site stabilization and safety, continue with the development of technological infrastructure, and lead to the controlled exploitation and economic integration of secondary mineral resources. Thus, objective *O3* was achieved. Moreover, the findings support the idea that strategic management can transform a site perceived as an environmental liability into a sustainable economic activity.

5. Conclusions

The results show that effective tailings pond management depends on appropriate strategies based on internal and external analysis. These factors are identified using strategic management tools such as STEPLE and SWOT analyses, which are adaptable to the specific context of a tailings pond. As shown by the research, strategic management must be tailored to the specific context, as reflected by the conceptual frameworks developed to outline how this passive asset can be transformed into a sustainable business. The case study shows that resource valorization reduces environmental risks and supports local economic development. The proposed strategy follows a phased approach, starting with site safety, continuing with technological infrastructure development, and leading to controlled exploitation and economic valorization of materials. Finally, the results show that the tailings pond can be viewed as a sustainable business, not just an environmental liability.

From a theoretical perspective, the research contributes to the literature by integrating strategic management tools into the analysis of tailings pond valorization, a field currently studied mainly from a technological perspective. From a practical perspective, the results provide recommendations for developing sustainable management strategies for mining sites, highlighting their potential to reduce environmental risks and support local economic development.

However, the study also has certain limitations. It is based on a single case study, which may limit the generalization of the results to other mining sites. In addition, the analysis is primarily strategic and conceptual, without including detailed economic evaluations of costs and profitability.

Future research could extend the analysis through comparative studies on other tailings ponds and by developing economic and technological feasibility analyses for the valorization of secondary mineral resources. It could also examine the long-term impact of these strategies on the environment and regional economic development.

6. References

Barnes, G. E. (2018). Workability of clay mixtures. *Applied Clay Science*, *153*, 107–112. https://doi.org/10.1016/j.clay.2017.12.006

Bye, A. R. (2011). The First AusIMM International Geometallurgy Conference 2011 : conference proceedings. In D. Dominy (Ed.), *Case studies demonstrating value from geometallurgy initiatives* (p. 348). AusIMM.

Davies, M., & Martin, T. (2009). Tailings and mine waste '09 : proceedings of the thirteenth International Conference on Tailings and Mine Waste, 1-4 November 2009, Banff, Alberta, Canada. In David. Sego, M. Alostaz, & Nicholas. Beier (Eds.), *Mining market cycles and tailings dam incidents* (pp. 3–15). University of Alberta Geotechnical Center.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review*, *14*(4), 532–550. https://doi.org/10.5465/amr.1989.4308385

Farag, M. I. H. (2025). Sustainability as a Management Strategy: Integrating Environmental, Social, and Governance Practices into Business Administration. *Management Science Advances*, *3*(1), 20–44. https://doi.org/10.31181/msa31202630

Farrokhi-Rad, M., Shahrabi, T., Mahmoodi, S., & Khanmohammadi, Sh. (2017). Electrophoretic deposition of hydroxyapatite-chitosan-CNTs nanocomposite coatings. *Ceramics International*, *43*(5), 4663–4669. https://doi.org/10.1016/j.ceramint.2016.12.139

Ferasso, M., Beliaeva, T., Kraus, S., Clauss, T., & Ribeiro-Soriano, D. (2020). Circular economy business models: The state of research and avenues ahead. *Business Strategy and the Environment*, *29*(8), 3006–3024. https://doi.org/10.1002/bse.2554

Foris, T., Tecău, A. S., Dragomir, C.-C., & Foris, D. (2022). The Start-Up Manager in Times of Crisis: Challenges and Solutions for Increasing the Resilience of Companies and Sustainable Reconstruction. *Sustainability*, *14*(15), 9140. https://doi.org/10.3390/su14159140

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Giurco, D., Littleboy, A., Boyle, T., Fyfe, J., & White, S. (2014). Circular Economy: Questions for Responsible Minerals, Additive Manufacturing and Recycling of Metals. *Resources*, *3*(2), 432–453. https://doi.org/10.3390/resources3020432

Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis – where are we now? *Journal of Strategy and Management*, *3*(3), 215–251. https://doi.org/10.1108/17554251011064837

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Koh, H.-K., Burnasheva, R., & Suh, Y. G. (2022). Perceived ESG (Environmental, Social, Governance) and Consumers' Responses: The Mediating Role of Brand Credibility, Brand Image, and Perceived Quality. *Sustainability*, *14*(8), 4515. https://doi.org/10.3390/su14084515

Kossoff, D., Dubbin, W. E., Alfredsson, M., Edwards, S. J., Macklin, M. G., & Hudson-Edwards, K. A. (2014). Mine tailings dams: Characteristics, failure, environmental impacts, and remediation. *Applied Geochemistry*, *51*, 229–245. https://doi.org/10.1016/j.apgeochem.2014.09.010

Krause, S., & Kretschmann, J. (2023). *Innovation opportunities through circular economy in mining – proactive handling of ESG factors and sustainability-oriented regulation* (pp. 7–26). https://doi.org/10.2991/978-94-6463-318-4_2

Lacy, P., Long, J., & Spindler, W. (2020). *The Circular Economy Handbook*. Palgrave Macmillan UK. https://doi.org/10.1057/978-1-349-95968-6

Lèbre, É., Corder, G., & Golev, A. (2017). The Role of the Mining Industry in a Circular Economy: A Framework for Resource Management at the Mine Site Level. *Journal of Industrial Ecology*, *21*(3), 662–672. https://doi.org/10.1111/jiec.12596

Lewandowski, M. (2016). Designing the Business Models for Circular Economy—Towards the Conceptual Framework. *Sustainability*, *8*(1), 43. https://doi.org/10.3390/su8010043

Lottermoser, B. G. (2010). Introduction to Mine Wastes. In *Mine Wastes* (pp. 1–41). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-12419-8_1

Lottermoser, B. G. (2011). Recycling, Reuse and Rehabilitation of Mine Wastes. *Elements*, *7*(6), 405–410. https://doi.org/10.2113/gselements.7.6.405

Marshall, M. N. (1996). Sampling for qualitative research. *Family Practice*, *13*(6), 522–526. https://doi.org/10.1093/fampra/13.6.522

Melashvili, M., Dreisinger, D., & Choi, Y. (2016). Cyclic voltammetry responses of gold electrodes in thiosulphate electrolyte. *Minerals Engineering*, *92*, 134–140. https://doi.org/10.1016/j.mineng.2016.03.012

Mudd, G. M. (2010). The Environmental sustainability of mining in Australia: key mega-trends and looming constraints. *Resources Policy*, *35*(2), 98–115. https://doi.org/10.1016/j.resourpol.2009.12.001

Nijssen, E. J., & Frambach, R. T. (2001). Towards Strategic Issues: The Swot(I)-Analysis. In *Creating Customer Value Through Strategic Marketing Planning* (pp. 81–91). Springer US. https://doi.org/10.1007/978-1-4757-3277-1_5

Pajunen, N., Watkins, G., Wierink, M., & Heiskanen, K. (2012). Drivers and barriers of effective industrial material use. *Minerals Engineering*, *29*, 39–46. https://doi.org/10.1016/j.mineng.2011.12.008

Petrescu, M., & Lauer, B. (2017). Qualitative Marketing Research: The State of Journal Publications. *The Qualitative Report*, *22*(9). https://doi.org/10.46743/2160-3715/2017.2481

Pineda, D., Plackowski, C., & Nguyen, A. V. (2015). Surface properties of enargite in MAA depressant solutions. *Minerals Engineering*, *71*, 180–187. https://doi.org/10.1016/j.mineng.2014.10.008

Tayebi-Khorami, M., Edraki, M., Corder, G., & Golev, A. (2019). Re-Thinking Mining Waste through an Integrative Approach Led by Circular Economy Aspirations. *Minerals*, *9*(5), 286. https://doi.org/10.3390/min9050286

Teodosiu, C., Friedl, A., & Urbaniec, K. (2014). Conference report 7th International Conference on Environmental Engineering and Management ICEEM07. *Journal of Cleaner Production*, *67*, 291–292. https://doi.org/10.1016/j.jclepro.2013.12.015

Yin, R. K., Calvin, Y., & Mali, G. (2018). *61 A BOOK REVIEW: CASE STUDY Title: Case Study Research and Applications: Design and Methods (6 th ed.)*. https://doi.org/http://dx.doi.org/10.1563

Yüksel, I. (2012). Developing a Multi-Criteria Decision Making Model for PESTEL Analysis. *International Journal of Business and Management*, *7*(24). https://doi.org/10.5539/ijbm.v7n24p52