

# The Influence of Information Technology on Mining Conflicts in East Kalimantan

**Aristya Windiana Pamuncak**  
Universitas Mulawarman  
aristypamuncak@gmail.com

**Asnawi Mubarak**  
Universitas Muhammadiyah Kalimantan Timur

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**Corresponding Author:**  
Aristya Windiana  
Pamuncak  
aristypamuncak@gmail.com

## **ABSTRACT**

Although information technology (IT) improves operational efficiency and safety, information technology also brings new problems and needs to fully address the legal and environmental issues associated with mining. By facilitating communication, disseminating information, and providing a platform for mediation and dispute resolution, information technology is very helpful in resolving conflicts in East Kalimantan. Information technology significantly impacts conflict resolution in mining by improving communication, facilitating data analysis, and providing better decision-making tools. However, the use of information technology in mining is not free from risks such as cyber-attacks which can disrupt the systems, it leading to costly downtimes and safety hazards and theft of valuable information. This research adopts a descriptive-analytical method, combining literature reviews and relevant experts' opinions.

Moreover, this paper uses normative juridical research methods to discuss how information technology influences mining conflicts in East Kalimantan. The discussion results conclude that Information Technology integration in the mining industry has had significant positive and negative impacts. It is essential to achieve sustainable development in mining by increasing productivity, safety and environmental efficiency because Technologies like autonomous vehicles, automated drilling, and tunnel-boring systems allow for continuous operations without human intervention, leading to higher output and efficiency. However, information technology adoption in mining also presents challenges. The overall impact of information technology in mining is very significant. To ensure technological sovereignty, it offers a safer, more efficient, and more sustainable

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future for the ongoing digital transformation industry, including domestic software development. The results of this discussion show how crucial information technology is to maintain industrial stability and overcome the problem of technological fragmentation and the need for solutions

**Keywords:** Information Technology, Mining Conflict, East Kalimantan

### **ABSTRAK**

Teknologi informasi (TI) membantu efisiensi dan keselamatan operasi, namun juga memunculkan kekhawatiran dan kebutuhan baru untuk mengatasi masalah hukum dan lingkungan pertambangan. TI berkontribusi pada penyelesaian konflik di Kalimantan Timur dengan meningkatkan komunikasi, menyebarkan informasi, dan menawarkan tempat untuk mediasi dan penyelesaian sengketa. Kemampuan komunikasi, analisis data, dan pengambilan keputusan yang ditingkatkan oleh teknologi informasi sangat berpengaruh terhadap penyelesaian sengketa pertambangan. Namun, serangan siber dapat mengganggu sistem, menyebabkan waktu henti yang merugikan, masalah keamanan, dan pencurian data di pertambangan. Studi deskriptif-analitis ini menggunakan tinjauan literatur dan pendapat para ahli. Tulisan ini juga membahas bagaimana teknologi informasi mempengaruhi konflik pertambangan di Kalimantan Timur dengan menggunakan pendekatan penelitian yuridis normatif. Hasil pembahasan menunjukkan bahwa integrasi TI di pertambangan telah memberikan dampak positif dan negatif. Peningkatan produksi, keselamatan, dan efisiensi lingkungan diperlukan untuk pembangunan pertambangan yang berkelanjutan. Adopsi TI di pertambangan juga memiliki tantangan yang sama. TI memiliki dampak besar pada pertambangan. TI memberikan masa depan yang lebih aman, lebih efisien, dan lebih berkelanjutan untuk transformasi digital, termasuk pengembangan perangkat lunak dalam negeri, untuk memastikan kedaulatan teknis. Studi ini menunjukkan betapa pentingnya TI untuk stabilitas industri, fragmentasi teknis, dan solusi.

**Kata kunci** Teknologi Informasi, Konflik Pertambangan, Kalimantan Timur

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## INTRODUCTION

Information technology can influence conflict in mining in East Kalimantan. Information technology influences how conflict develops and resolves. It is essential for conflict management and resolution because adopting communication technology can increase transparency and dissemination of information. This article answers the problem of how information technology influences the mining conflict in East Kalimantan. Information technology can be used to reduce conflict by increasing transparency and communication; its effectiveness depends on proper implementation and addressing the underlying social and regulatory issues.

The Indonesian government aims to shift its energy resources from petroleum to coal by 2025. This goal is part of the government's strategic plan to utilize the country's abundant coal resources for the country's prosperity. It is a prime candidate for coal resource development with large coal reserves, good quality, and strategic location. Economic recovery, environmental concerns, and regulatory pressure affect the industry. Indonesia presents a significant challenge to tackling global climate change because it is one of the countries with the most significant increase in coal-fired power generation capacity globally (Jakob & Steckel, 2022).

The initial focus of this study was on land disputes in East Kalimantan, an area that has experienced significant conflict over palm oil plantations. Pasir Regency was identified as a particularly relevant case study, while the coal mining industry in Kutai was found to have minimal impact. In particular, in East Kalimantan, the proportion of operating plantations engaged in mining activities is estimated to be approximately 60% at the national and international levels. This situation will present unique challenges for both the government and the companies involved. Those residing in proximity to agricultural and plantation operations tend to perceive a diminished level of acceptance and responsiveness from governmental and corporate entities. This perception may potentially lead to a perception of governmental threat to the stability and desirability of such companies. (Hardoko et al., 2016)

Trying to understand conflict is often the most exciting aspect of finding solutions to problems that arise. The way people view life and its problems varies depending on their point of view. It cannot be predicted that different points of view will emerge in interactions between

business, government, and society. Governments and corporations have different opinions about social and political factors than society. It is impossible to avoid differences of opinion on issues affecting several people's lives, and this can benefit all parties involved.

Currently, digital transformation in the mining industry mainly occurs at the significant ownership level, but there is a delay in implementing digitalization due to human resources factors. Maximizing the benefits of digital transformation is essential to create an environment that supports technological advances and provides employee training so they can effectively exploit digital opportunities. Innovative applications and technological information technology (IT) advances have increased mining productivity and efficiency. During blasting, real-time tracking can be performed with RFID technology, increasing safety and operational efficiency. (Zhulai & Zahovailova, 2022)

The implementation of cyber-physical systems in open pit mines enables the real-time monitoring and control of loading productivity, thereby reducing process variability and enhancing overall productivity. Furthermore, the implementation of intelligent drilling, blast optimization software, and GPS-assisted drill rigs has been demonstrated to enhance both the efficiency and safety of coal mine operations. The implementation of high-quality real-time simulation and virtual reality systems for training miners has been demonstrated to enhance the training process and ensure a higher level of preparedness for actual mining conditions. Furthermore, the implementation of cavitation generators in mining operations has been demonstrated to enhance penetration and reduce energy consumption, particularly in the context of fluid pressure oscillations. Furthermore, the implementation of sophisticated monitoring and control systems to mitigate the methane threat has the dual benefit of reducing potential hazards and production disruptions, thereby enhancing overall efficiency (Akhmaddhian et al., 2023). These IT-based innovations and methodologies make the mining industry more efficient, productive and safe. However, tensions may increase if these technologies are not implemented and integrated correctly. For example, it has been found that inappropriate technology and inconsistent information in land information systems (LIS) are two of the leading causes of land disputes in Indonesia, including East Kalimantan. This research shows how information technology influences mining conflicts in East Kalimantan by leveraging digital platforms, harmonizing regulations, and employing multi-channel communication strategies, stakeholders can be more effectively engaged and empowered.

## **RESEARCH METHOD**

This research adopts a normative juridical research method, which concentrates on the study of legal norms, principles, and doctrines with the aim of providing prescriptive insight into how the law should be interpreted and applied. This method relies heavily on secondary sources such as legal regulations, theories, and principles and often uses prescriptive methods to assess the consistency and validity of legal norms (Sudrajat, 2023). Normative juridical research becomes a fundamental aspect of legal science, providing a structured framework for analyzing and interpreting legal norms to ensure justice and legal certainty. The normative juridical approach is also used in doctrinal legal research, which refers to legal standards and emphasizes theoretical and scientific analysis of legal principles (Bohdana et al., 2022).

This article discusses how information technology influences mining conflicts in East Kalimantan. It uses a qualitative research approach to analyze the impact of Information Technology on mining conflicts in East Kalimantan. Qualitative research allows for in-depth exploration of the influence of Information Technology on mining conflicts.

## **RESULT AND DISCUSSION**

### **1. Mining Conflict in East Kalimantan**

In Indonesia, mining activities, including those involving gold, coal, and other minerals, have emerged as a prominent source of conflict. The occurrence of mining conflicts in Indonesia can be attributed to a range of factors, including the need for communities to gain familiarity with the relevant laws and regulations, as well as the aspiration to meet their economic necessities, which are becoming increasingly challenging to fulfill. In certain instances, mining operations are conducted without the necessary authorization. The spectrum of mining-related issues encompasses a range of problems, including illegal mining, environmental degradation, the involvement of law enforcement personnel, a lack of attention and enforcement, and the absence of mining business permits.

One of the primary sources of conflict in East Kalimantan is illegal mining. As reported by the East Kalimantan Mining Advocacy Network (JATAM), there are around 160 illegal mining locations spread across various districts/cities in East Kalimantan. This number has

increased sharply since 2018. The extensive illicit mining operations in East Kalimantan illustrate the lack of state control over natural resources in Indonesia. The company is operating without the requisite permit, and law enforcement officials appear to be failing to take action. Police involvement in illegal mining has become a common problem. A report from LBH Samarinda shows that members of the Samboja Police, Kutai Kartanegara, often threaten residents who report illegal mining. (*Beking Aparat Dibalik Tambang Ilegal Kalimantan Timur: Beranikah Presiden Lakukan Revolusi Kepolisian?*, 2024)

The public and academics have been frustrated with the government's reporting on illegal mining and the lack of action against those involved. They hope the government will be more active in taking action against people involved in illegal mining and disrupting people's lives. In addition, the mining conflict in East Kalimantan has significantly impacted local communities. People who own land used for illegal mining do not benefit from the company's compensation process, and other people living near the mine site also experience disruption due to mining activities (Suahyo, 2021).

Additionally, environmental degradation is linked to mining conflicts in East Kalimantan. A range of challenges have emerged from abandoned mining pits that require effective management. One such challenge is the risk of fatalities due to falling into these pits. Data from the National Human Rights Commission indicates that at least 35 individuals lost their lives as a result of falling into former mining pits between 2011 and 2019. (Kaltim, 2019)

## 2. The Impact of Information Technology on Conflict Resolution in East Kalimantan

Information technology (IT) is vital in overcoming and mitigating mining conflicts in East Kalimantan by increasing transparency, communication and efficiency in various processes. Rapid Information technology developments can help in better management and monitoring of mining activities, which is especially important considering the region's heavy dependence on coal mining and the associated socio-economic and environmental challenges (Silitonga et al., 2023). For example, the use of Geographic Information Systems (GIS) technology can help in better spatial analysis and mining permit planning, reducing land ownership disputes and environmental degradation (Afkarina et al., 2019). Furthermore, information technology can be utilized to develop platforms that showcase agricultural products, thereby offering alternative

sources of income for communities that have been impacted by mining operations. Such a platform has the potential to mitigate economic reliance on mining and associated disputes.

In the mining context, Information Technology (IT) helps resolve mining conflicts by improving communication, transparency and decision-making processes. Information Technology systems can also model how mining projects and host communities interact, allowing companies to anticipate and mitigate possible social conflicts through monitoring and predictive analysis. Information technology can play an essential role in managing and mitigating conflicts frequently occurring in this sector. Here are some ways in which Information Technology can related to mining conflicts:

- a. **Environmental Monitoring and Reporting:** Information Technology systems can monitor environmental conditions in mining areas in real-time. By using sensors and other monitoring technologies, mining companies can proactively identify and address environmental issues that may cause conflict with local communities or governments.
- b. **Transparency and Accountability:** Information Technology-based platforms can increase the transparency of mining operations by providing public access to data and information about mining activities. This platform includes information on environmental impact, regulatory compliance, and economic contribution. This greater transparency can help reduce distrust and conflict between mining companies and local communities.
- c. **Conflict Management:** Information technology can be used to develop conflict management systems that allow local communities to submit complaints or problems online. This system can help ensure that complaints are handled systematically and promptly, which can reduce conflict escalation.
- d. **Improved Communication:** Information Technology enables better communication between mining companies, local communities, and government. Online communication platforms and social media can be used for open and ongoing dialogue, allowing all parties to raise concerns and find solutions together.
- e. **Data Analysis for Conflict Prediction:** Analytics and big data technologies can be used to analyze trends and patterns that may indicate potential conflict. By understanding the factors that contributed to past disputes, mining companies can take proactive steps to avoid similar situations in the future (Jamin et al., 2023).

The sources consulted do not directly address the use of information technology in the management of mining conflicts. However, the application of information technology in this context has the potential to serve as an innovative solution to overcome some of the challenges faced by the mining industry, particularly in the context of social and environmental conflicts.

TI also supports a legal pluralism approach, which has been proven to provide substantive justice in labour conflicts in the mining sector by accommodating various legal perspectives and ensuring fair resolution (Kyselov, 2019). Information Technology can support the implementation of Integrated Sustainable Development Programs and ongoing audit processes, which are essential to conflict resolution frameworks in mining projects. Information Technology can assist in negotiation and mediation, where negotiated mediation techniques are used to individualize repairs and effectively manage disaster care.

In mining management in East Kalimantan, several information technologies have been used to increase efficiency, transparency and environmental management. The following are some of the information technologies recorded in use:

- a. Operational Digitalization; PT Kaltim Prima Coal (KPC) has launched the Membara Digitalization Project, which aims to address the challenges of the digital era. The project includes using smartphones as work tools to speed up processes, increase transparency and enable faster response to repairs. The process of digitalization enables organizations to enhance their operational efficiency and effectiveness. The digitization of data pertaining to land ownership, mining permits, and environmental impact assessments enables the project to furnish all stakeholders with transparent and accessible information. Such clarity may also assist in the reduction of disputes over land ownership and resource allocation, by facilitating the clarification of legal rights and responsibilities.
- b. PROPER Program; The East Kalimantan Provincial Environmental Service uses the PROPER Program (Company Performance Rating Assessment Program in Environmental Management) to encourage mining business actors to commit to preserving the environment by complying with regulations. This Program involves using information technology for performance evaluation and monitoring of wastewater

effluent compliance. (*Penyerahan Peringkat Kinerja Perusahaan Dalam Pengelolaan Lingkungan Hidup (PROPER) Tahun 2022-2023*, n.d.)

- c. Use of Waste Water Treatment Technology; In the context of environmental impact management, information technology is used to sort and process wastewater and determine wastewater discharge permits. This technology includes using information systems to monitor and control water pollution (Jamin et al., 2023).
- d. **Technology-Based Education Development;** Civil Engineering, Muhammadiyah University of East Kalimantan, integrating information technology in education to support the mining industry. This Information Technology Education includes the use of the latest computer programs in Civil Engineering relevant to mining activities.
- e. **Utilization of Digitalization Technology in Coal Conservation;** Ministry of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018 targets the implementation of mineral and coal conservation, which involves digitalization technology for planning and managing coal recovery.

This information technology plays a vital role in modernizing and improving mining practices in East Kalimantan while assisting in environmental management and regulatory compliance (Wahid et al., 2017). Information technology is a crucial element in the modernization and enhancement of mining practices in East Kalimantan, facilitating environmental management and regulatory compliance.

- a. In East Kalimantan, Indonesia, mitigating conflict between indigenous and foreign workers in coal mining was facilitated through descriptive qualitative research, This approach helps identify sources of conflict and develop mitigation strategies (Hardoko et al., 2016).
- b. Information Technology has played an important role in advocacy and litigation strategies social movements use to influence mining policy, such as provincial regulations mandating coal mine reclamation and post-mining cleanup (Kartodihardjo et al., 2016) .

Overall, the integration of Information Technology in the conflict resolution process in East Kalimantan has shown promise in improving transparency, communication and governance, thereby reducing some conflicts related to the mining sector.

## CONCLUSION

Information technology has the potential to address challenges in the mining industry, enhance product quality, and enhance production safety through digitalization and automation. In order to effectively manage the mining industry, it is imperative to implement digital transformation strategies that facilitate the recovery and monitoring of mine production at all stages, including before, during, and after mining operations. Information technology plays a pivotal role in the resolution of mining conflicts, facilitating enhanced communication, transparency, and decision-making processes. Furthermore, information technology systems can be utilized to elucidate the interrelationships between mining projects and communities. This enables corporations to proactively identify and mitigate potential social conflicts through the implementation of monitoring and predictive analysis.

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