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Legal Innovation and AI Integration in the Management of Community Development and Empowerment Obligations by Coal Mining Companies

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Abstract: Coal mining companies in Indonesia are required to implement the Community Development and Empowerment (PPM) program as a form of social responsibility and contribution to local development. However, the implementation of this program is still faced with a number of obstacles such as weak supervision, lack of community participation, and limited transparency. This research aims to examine how legal innovation and artificial intelligence (AI) integration can improve the governance of PPM obligations in a more efficient, accountable, and sustainable manner. This research is a qualitative normative juridical study, which examines legal norms with a descriptive-analytical approach, to understand how the law should apply in the context of the implementation of Community Development and Empowerment (PPM) obligations by coal mining companies and how the integration of technology, especially artificial intelligence (AI), can be accommodated in the legal system. The results of the study revealed that the use of AI technology, such as data analysis, digital reporting systems, and community feedback platforms, is able to increase the effectiveness and transparency of the implementation of the PPM program. On the other hand, legal innovation is needed in the form of regulatory reforms that support technology-based systems and active community involvement. This study concludes that the integration of legal innovation and AI technology can be a strategic solution in strengthening the implementation of PPM obligations by coal mining companies, while encouraging the realization of social justice and sustainable development in mining areas.

Keyword: Legal Innovation, Artificial Intelligence, Community Empowerment.

Abstrak: Perusahaan tambang batubara di Indonesia diwajibkan untuk melaksanakan program Pengembangan dan Pemberdayaan Masyarakat (PPM) sebagai bentuk tanggung jawab sosial dan kontribusi terhadap pembangunan daerah. Namun, pelaksanaan program ini masih dihadapkan pada sejumlah kendala seperti lemahnya pengawasan, kurangnya partisipasi masyarakat, dan transparansi yang terbatas. Penelitian ini bertujuan untuk mengkaji bagaimana inovasi hukum dan integrasi kecerdasan buatan (artificial intelligence/AI) dapat meningkatkan tata kelola kewajiban PPM secara lebih efisien, akuntabel, dan berkelanjutan. Penelitian ini merupakan penelitian yuridis normatif kualitatif,

yang mengkaji norma hukum dengan pendekatan deskriptif-analitis, untuk memahami bagaimana seharusnya hukum berlaku dalam konteks pelaksanaan kewajiban Pengembangan dan Pemberdayaan Masyarakat (PPM) oleh perusahaan tambang batubara dan bagaimana integrasi teknologi, khususnya kecerdasan buatan (artificial intelligence/AI), dapat diakomodir dalam sistem hukum. Hasil penelitian mengungkapkan bahwa penggunaan teknologi AI, seperti analisis data, sistem pelaporan digital, dan platform umpan balik masyarakat, mampu meningkatkan efektivitas dan transparansi pelaksanaan program PPM. Di sisi lain, diperlukan inovasi hukum berupa reformasi regulasi yang mendukung sistem berbasis teknologi dan pelibatan masyarakat secara aktif. Studi ini menyimpulkan bahwa integrasi inovasi hukum dan teknologi AI dapat menjadi solusi strategis dalam memperkuat pelaksanaan kewajiban PPM oleh perusahaan tambang batubara, sekaligus mendorong terwujudnya keadilan sosial dan pembangunan berkelanjutan di wilayah pertambangan.

Kata Kunci: Inovasi Hukum, Kecerdasan Buatan, Pemberdayaan Masyarakat.

INTRODUCTION

The coal mining industry in Indonesia has a significant role in the national economy. However, mining activities often have complex social and environmental impacts, so social responsibility from mining companies is required. One form of this responsibility is through the Community Development and Empowerment Program (PPM), which aims to improve the welfare of the community around the mining area. The implementation of PPM is regulated in various regulations, such as Law Number 3 of 2020 concerning Mineral and Coal Mining, which affirms the importance of the company's contribution to the development of local communities.

Even though regulations have been set, the implementation of PPM still faces various challenges. Rahayu and Yetniwati revealed that "the implementation of social responsibility by coal mining companies through the PPM program has not been running optimally, which is shown by the low absorption of the budget allocated in the Work Plan and Cost Budget (RKAB)". This shows the need for innovation in legal and technological approaches to improve the effectiveness of PPM.

In the digital era, the integration of artificial intelligence (AI) technology offers opportunities to increase transparency and accountability in the implementation of PPM. The application of AI in the mining industry has shown positive results in improving safety and productivity. For example, PT Berau Coal has implemented a "Mining Eyes" system that uses AI technology to monitor the movement of people and heavy equipment in the mining area, thereby reducing potential hazards due to direct interaction. In addition, the BEATS (Berau Coal Green Mining System) application was developed to support the digital supervision and analysis of operational activities, replacing the manual method previously used.

The application of AI in the legal sector is also starting to receive attention. Fitri and Kurniawan in their research discussed "the prospects and challenges of the application of AI in land dispute resolution in Indonesia, highlighting the potential of AI in improving the efficiency of legal document analysis and decision prediction". This shows that the integration of AI in the legal field can be an effective tool in supporting law enforcement and surveillance processes.

Based on the description above, the integration of legal innovations and AI technology in the management of PPM obligations by coal mining companies is relevant to be researched. This approach is expected to increase the transparency, accountability, and effectiveness of the PPM program, thereby providing greater benefits to the communities around the mine and supporting sustainable development.

METHOD

This research is normative legal research with a qualitative approach. Normative legal research aims to analyze law as a norm written in laws and regulations and court decisions, as well as in the doctrine or opinions of legal experts. According to Soerjono Soekanto, normative legal research is "legal research conducted by examining literature materials or secondary data as the main basis in answering the legal issues being studied".

1. Types of Research

The type of approach used is qualitative normative juridistic, which means that this study examines legal norms with a descriptive-analytical approach, to understand how the law should apply in the context of the implementation of Community Development and Empowerment (PPM) obligations by coal mining companies, as well as how the integration of technology, especially artificial intelligence (AI), can be accommodated in the legal system.

2. The data sources in this study consist of:

a. Primary Legal Materials, namely laws and regulations such as:

- Law Number 3 of 2020 concerning Amendments to Law Number 4 of 2009 concerning Mineral and Coal Mining,
- Regulation of the Minister of Energy and Mineral Resources (ESDM) No. 25 of 2018 concerning Mineral and Coal Mining Operations,
- Decree of the Minister of Energy and Mineral Resources No. 1824 K/30/MEM/2018 concerning Guidelines for the Implementation of PPM.

b. Secondary Legal Materials, namely scientific literature such as books, journals, legal articles, research results, and legal expert opinions.

c. Tertiary Legal Materials, such as legal encyclopedias, legal dictionaries, and legal indexes.

3. Data Collection Techniques

The data collection technique is carried out by the library research method, which is the collection of data and information through searching the relevant literature and legal documents. This method is used to obtain a theoretical and normative basis in explaining legal phenomena. As stated by Johnny Ibrahim, "literature study is the main technique in normative legal research, because the main source of research is textual legal material".

Data analysis is carried out qualitatively, by interpreting and constructing the meanings of various legal norms, expert opinions, and relevant field practices. The goal is to formulate a legal model that is able to integrate AI technology in the management of PPM obligations in an effective, fair, and sustainable manner.

RESULT AND DISCUSSION

The management of Community Development and Empowerment (PPM) obligations by coal mining companies in Indonesia is a legal instrument designed to ensure that mining activities are not only oriented towards economic benefits, but also towards social justice and environmental sustainability. In practice, the implementation of PPM often faces fundamental problems, such as weak supervision, lack of transparency, and lack of optimal public participation. In the midst of this complexity, there is a need to carry out legal innovations to strengthen the governance of the mining sector.

One of the innovative approaches that is starting to receive attention is the integration of digital technology, especially artificial intelligence (AI), in the planning, implementation, and supervision system of the PPM program. This approach not only addresses the challenges

of the effectiveness and efficiency of PPM implementation, but also encourages the renewal of the legal paradigm towards a more adaptive, responsive, and data-based direction. Therefore, this discussion will systematically outline the legal obligations of mining companies in the implementation of PPM, governance issues in the field, and the relevance and urgency of AI-based legal innovations in supporting sustainable mining and social justice.

1. Legal Responsibility of Mining Companies in Community Development and Empowerment

In the context of Indonesian mining law, coal mining companies have a legal obligation to implement the Community Development and Empowerment Program (PPM). This provision is regulated in Law Number 3 of 2020 which is an amendment to Law Number 4 of 2009 concerning Mineral and Coal Mining. Article 108 of the Law requires Mining Business License (IUP) holders to prepare and implement the PPM program in a planned, directed, and sustainable manner.

The PPM program aims to improve the welfare of the communities around the mining area as well as create harmonious relationships between companies and local communities. According to Maria SW Sumardjono, "the principle of social justice in mining law requires that business activities that utilize natural resources also contribute to the social development of the surrounding community".

2. Weaknesses of PPM Governance and Supervisory Challenges

Although it has been regulated in regulations, the implementation of PPM in the field often faces obstacles, especially in terms of accountability, transparency, and community involvement. Based on Rahayu and Yetniwati's research, one of the main problems is the low realization of the PPM budget and the lack of active participation of the community in program planning and evaluation (Rahayu and Yetniwati, *Social Responsibility of Coal Mining Companies through the Community Development and Empowerment Program*, Jambi: University of Jambi, 2021, pp. 221–230).

In addition, the manual reporting system used by companies to local governments and the Ministry of Energy and Mineral Resources is often unable to provide a real-time and comprehensive picture of the progress and impact of PPM. The lack of data disclosure causes inequality between reports and facts in the field.

3. Legal Innovation through Digitalization and Integration of AI Technology

To answer these challenges, legal innovation through the integration of artificial intelligence (AI) is important in strengthening PPM governance. AI can be used to monitor mining activities in real-time, analyze program effectiveness, and provide automated feedback based on community data.

According to the Ministry of Energy and Mineral Resources, "an example of the implementation of AI in the mining sector can be seen in the use of the *"Mining Eyes"* system by PT Berau Coal, which uses AI technology to detect the movement of heavy equipment and humans to prevent work accidents".

In addition, the BEATS (*Berau Coal Green Mining System*) application system is also used to replace the manual reporting system and speed up the environmental and social audit process. This approach is in line with Satjipto Rahardjo's idea of progressive law, which is "a law that is not solely fixated on text, but adaptive to reality and the development of the times".

4. Regulatory Reform and Digital Legal System

In order for the use of technology in PPM management to run effectively, it is necessary to carry out legal reforms that open up space for AI-based digital surveillance systems. According to Jimly Asshiddiqie, "the modern legal system must be able to

respond to technological changes by creating regulations that are flexible and adaptive to innovation".

The establishment of a law-based national platform for PPM reporting and evaluation, which integrates big data and AI, will increase transparency, strengthen regulatory accountability, and encourage broader public participation. This is also in line with the principle of public information disclosure as stipulated in Law Number 14 of 2008.

Considering the legal dynamics and challenges of implementing the Community Development and Empowerment Program (PPM) in the mining sector, it appears that conventional approaches are no longer adequate to simultaneously address the complexity of social, environmental, and regulatory needs. Therefore, the integration of artificial intelligence (AI) technology is not just an alternative, but a necessity in the framework of proactive and progressive legal innovation.

The use of AI in PPM management can drive the transformation of the legal system from a manual administrative one to a digital system that is data-based and responsive to social dynamics. AI can play a strategic role in analyzing people's needs, mapping socio-economic impacts, and providing real-time monitoring and evaluation instruments that can be accessed by the public and other stakeholders.

In line with Satjipto Rahardjo's idea of *liberating law*, the law needs to continue to move according to the rhythm of changing times and technology, and put substantive justice as the main goal. Therefore, AI-based legal innovations in the management of PPM obligations are not only relevant, but also important for realizing transparent, accountable, participatory, and sustainable mining governance. Reforming the legal system that is inclusive of technology will strengthen the role of law *as a tool of social engineering* in bringing justice and prosperity to the communities around the mining area.

CONCLUSION

The management of Community Development and Empowerment (PPM) obligations by coal mining companies has a strong legal foundation, but still faces serious challenges in terms of transparency, accountability, and community participation. The manual implementation of PPM tends to be ineffective in answering the demands of openness and efficiency of reporting, which has an impact on weak supervision and low public trust.

The integration of artificial intelligence (AI) technology into the mining legal system presents a great opportunity in strengthening PPM governance. AI enables real-time monitoring and evaluation of programs, as well as providing a database that is openly accessible to stakeholders. This approach is in line with progressive legal principles that demand legal reform to be more responsive to social and technological developments.

Thus, legal innovation through digitalization and the use of AI not only supports the effectiveness of the implementation of PPM, but also strengthens the function of law as a tool to realize social justice and mining sustainability.

With the above conclusion, it can be suggested 1. For the Government, it is necessary to immediately formulate derivative regulations that technically regulate the technical use of AI technology in the planning, implementation, and supervision of PPM programs, including data interoperability standards between agencies, 2. For mining companies, they are encouraged to adopt AI-based digital systems in PPM management, including through the development of transparent reporting platforms involving local community participation and independent monitoring, 3. Legal education and research institutions are expected to actively develop technology-based legal models that are adaptive to the digital era, as well as provide research-based policy recommendations to support the transformation of mining law in Indonesia.

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