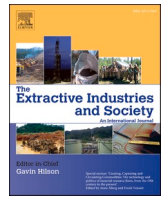


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Original article

Governing the Ungovernable? Conceptualising embeddedness in Ghana's gold mining sector

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ABSTRACT

The term “artisanal” refers to primitive, non-industrial, or pre-industrial handicrafts. Because they contribute less revenue to state agencies, produce lower mineral export volumes, apply less sophisticated technologies, frequently violate mining certification and licensing arrangements and/or evade state oversight, artisanal and small-scale mining (ASM) activities are typically viewed less favourably by host governments than large-scale mining. Despite commitments to render ASM governable, formalisation practices overlook specific dynamics in the sub-sector: notably, the increasing uptake of advanced technologies, its multi-actor nature, and its untold capacity to create employment opportunities and provide adequate raw materials for the domestic jewellery industry. Moreover, unsanctioned mining activities persist despite formalisation efforts. Based on an extensive qualitative study and institutional-level interviews, this article highlights the inevitable complementarities between large-scale mining and ASM. It reveals collaborations between diverse formal and informal actors and institutions that enable and constrain responsible mining in Ghana. It also shows how ASM, and large-scale mining interdependencies maintain each mining scale's operational efficiency and profitability, contributing to this blurring. To grasp the governance challenges in Ghana's gold mining sector, we introduce the “mining-scale embeddedness” framework, focusing on institutional, operational, and actor levels of embeddedness to elucidate dilemmas surrounding gold mining governance.

1. Introduction

The institutional reform efforts to keep Ghana's gold mining sector under effective state control and minimise (potentially) negative impacts have always generated mixed results (Besada and Golla, 2023; Ros-Tonen et al., 2021). Since the 1980s, the World Bank has been a key advocate for the formalisation of artisanal and small-scale mining (ASM) and for restructuring the mining sector in developing nations. Several research studies on gold mining – and, by extension, the wider extractive sector – have also highlighted the importance of formalising the ASM sector (Byemba, 2020; Hilson, 2020). Governments, policymakers, and international aid donors hold that formalisation is necessary to provide security for ASM operators, impose rationality, transparency, order, and apparent state oversight (Mensah, 2021), and foster sustainable development in rural communities (Hilson and Maconachie, 2020). Other mining literature highlights environmental issues, especially water pollution and water-quality degradation, as concerns for the sector's formalisation and sustainability (Arthur-Holmes et al., 2022; Conteh

and Maconachie, 2021; Ofori et al., 2021; Schilling et al., 2021). For instance, an analysis of soil and water samples from three ASM sites in Ghana (Prestea, Akwatia, and Bolgatanga) shows the widespread use of dangerous mercury in mining operations (Clifford 2017). This has led to significant contamination of water bodies in the region. Formalisation discussions in certain parts of Africa have also included concerns about the sector's potential links to conflicts (Verbrugge, 2017), money laundering, and smuggling (Huggins, 2023). ASM was characterised by simple but effective methods and rudimentary tools (Ofosu-Mensah, 2021). However, recently, the industry has significantly increased the use of new technologies such as excavators, changing machines, water pumps, pick-up trucks, tricycles, and fuel tanks. This trend is particularly noticeable in Ghana, where the sector has been recognised for providing direct employment to over 1 million people (Arthur-Holmes and Abrefa Busia, 2022; Hilson and Maconachie, 2017) and sustaining the livelihoods of more than 4.5 million people (McQuilken and Hilson, 2016).

Despite these advances and positive impacts and its generation of

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government revenue, the sector has mostly been portrayed negatively as 'informal' and 'unruly' (Labonne, 2014). Because its activities are mostly hidden from the state's oversight (Zabyelina and van Uhm, 2020) and deviate from the mining operations procedures it has established, regulatory bodies and researchers often classify them as 'undesirable' (Obiri-Yeboah, et al., 2021; Stemm et al., 2021; Kambani, 2003). The mining literature, therefore, tends to portray large-scale mining as the more desirable scale of operation. Due to its substantial capital investments, use of advanced technologies, extensive workforce, and significant production and export-oriented production volumes, it is perceived as easier to control through coordinated, formalised and regulated governance mechanisms (Cano and Kunz, 2022; Cisneros, 2021; Pedersen et al., 2019). In Ghana, formalisation under the Minerals Mining Act of 2006 (as amended by the Minerals and Mining Acts of 2015 and 2019) requires permits from key statutory institutions, including the Minerals Commission, Lands Commission, Environmental Protection Agency (EPA), Forestry Commission, and Water Resource Commission (ICLG, 2023). Such operations are often categorised as part of the 'formal sector' because the participating actors are required to satisfy the stipulated licensure arrangements and conform to the established regulations, policies, and management practices sanctioned by the state (McQuilken and Hilson, 2016). Formalisation is vital for enforcing regulatory compliance, ensuring environmental standards, and fostering transparent taxation, maximising revenue generation and promoting sustainable economic development. A recent study has highlighted that reforms within the mining sectors of various developing nations and the numerous conflicts characterising the sector reflect a 'bias' towards large-scale mining (Hilson, 2019). This is evident in the disproportionate attention given to large-scale mining for generating tax revenues, as it is seen as a promising 'cash cow' for host economies. Additionally, cumbersome and bureaucratic registration processes and high licensing costs have impeded potential operators in the ASM sector from formalising their activities (ibid). Consequently, ASM is perceived as an 'exit option' for individuals seeking to avoid exorbitant fees and stringent state controls (Ofori et al., 2021).

It is worth noting that mining sector governance goes beyond statutory institutions and its formalisation logic. In Ghana, for example, the influence of chieftaincy institutions, which have 'state-like' qualities (Lavers and Boamah, 2016) and are sometimes seen as 'rival institution' to the state in resource governance (Rathbone, 2000; Ray, 1996), further complicates formalisation and governance. This resource governance regime opens a whole range of governance entanglements – among them networking, reciprocal relations, negotiations, compromises, collaborations and various forms of bargaining between state and non-state institutions and institutional actors like chiefs, clan or family heads, family members and local or so-called 'informal' political officeholders in mining communities. This situation usually leads to the violation of mining regulations and laws. Additionally, in Ghana, landowners' cultivation rights under the institution of chieftaincy can conflict with large-scale mining companies' mining concessions under mineral law, further complicating the situation (ICLG, 2023). These dynamics leave 'shadows' in mining governance so that the sector includes diverse actors with competing interests extending beyond state institutions and control in the formalisation processes of ASM and large-scale mining licences.

Most state institution experts and formalisation proponents assume that the informal sector is backward, 'anti-development' and a recipe for many negative consequences (Kuffour et al., 2020; Kervankiran et al., 2016) and make a stark distinction between the formal (large-scale mining) and informal (ASM) sectors in the gold mining industry. Nonetheless, in practice, there are instances where the 'formal' and 'informal' are compelled to coexist to achieve operational efficiency, gain acceptance and ease operations, or avoid conflict and contention (Sauerwein, 2023; Yankson and Gough, 2019). The classification of mining operations into these two scales by researchers, bureaucrats and regulators does highlight their primary differences, but it also fails to

understand their potential complementarities and interdependence. This limits the understanding of how to harness the unique strengths of each scale and work together for convenience and efficiency reasons, contributing to the governance challenges of the sector. It is therefore important to reconsider this debate on the formal-informal dichotomy in the gold mining sector and concomitant governance challenges and responses, such as recent calls in Ghana to regularise or even ban the informal sector.

Some researchers have looked into cases of both sectors exploiting the same mining concession (Aubynn, 2009; Holley et al., 2022), but how their embeddedness and the interwoven nature of their operations contribute to governance challenges in the sector is yet to be explored, at least in Ghana. Instead of relying on a one-dimensional approach separating formal and informal mining governance, the study explores how their entangled relationship and intertwined operations impact mining governance. Additionally, it investigates the various actors involved in the gold mining sector and how they are embedded in the mining chain. Building upon the concept of embeddedness, our research has identified three typologies of what we call 'mining-scale embeddedness' – institutional, operational, and actor-levels of embeddedness – which this paper will explore to explain the persistent governance challenges in the gold mining sector. It is essential to understand that these levels of operations are not separate entities working independently; they are interconnected and work together. We highlight the importance of these relationships within the mining industry, as they form the foundation for host governments, donors, and stakeholders to create strategies for establishing a more sustainable governance system in the gold mining sector.

This paper, therefore, attempts to explain why so-called 'illegal' mining operations have persisted and why the intended benefits of mining sector formalisation have had only minimal impact (or even proved counterproductive) despite years of institutional reforms, political commitments and unambiguous intentions to pursue responsible mining in Africa. To put the question more provocatively: What might have rendered 'unruly' (but potentially beneficial) mining operations ungovernable and unsustainable? How do the existing categorisations of mining operations benefit decision-makers? Whose interests does this organising logic serve?

To answer these questions, the paper is structured as follows. First, we briefly discuss mining sector reforms and governmental initiatives in Ghana aimed at regulating the gold mining sector, which remains a relevant issue. Subsequently, we examine the concept of 'embeddedness' and its significance for Ghana's mining activities. We investigate how this concept can be incorporated into mining-related endeavours and could be used to address the challenges encountered in mining governance. Next, we provide a succinct overview of the employed data collection methods and case studies. An empirical assessment uses field data to analyse the interactions among the diverse actors participating in mining activities. These findings are then situated within the "mining-scale embeddedness" framework to provide a comprehensive understanding of the complex dynamics in mining governance. Finally, we discuss the paper's contribution to ongoing debates in mining governance, the light it sheds on the challenges surrounding mining governance in Ghana and the valuable insights it offers into continuing difficulties in effectively rendering the sector governable.

2. Ghana's gold mining sector formalisation in retrospect

Formalisation has meant different things and processes in Ghana in different historical periods. For example, in the colonial era, large-scale gold mining formalisation required acquiring a concession from natives and filing a notice of validation in court, which within six months would result in a Certificate of Validation (CV) of the concessionaire's right to mine (Maxwell, 1928 as cited in Ziaba, 2022). However, concessions are now granted by the Minerals Commission. Before the operation, several other steps are also required, including the acceptance of the chief of the

host community, approval by the EPA, and agreements to pay taxes and royalties to designated institutions, etcetera.

Ofosu-Mensah (2021) traces the evolution of the ASM sector in Ghana from the pre-colonial period to the present-day. During the colonial period, individuals seeking to engage in ASM gold mining were required to apply to the chief governing the land they intended to mine (pp. 63). Later, the Ordinance of 1900 and Concession Ordinance of 1939 were adopted, with Section 24 of the former prohibiting any person from prospecting without a licence and Section 34 of the latter restricting prospective African mining enterprises to the use of indigenous mining technologies (Ofosu-Mensah, 2021, pp. 69). During this period, the Mercury Ordinance of 1932 also banned Africans from using mercury in ASM operations (Hilson, 2002). Following independence, the Mineral Acts of 1962 (Acts 126) declared all minerals the property of the Republic of Ghana vested in the president on behalf of and in trust for its people (Ofosu-Mensah, 2021). During this timeframe, the National Liberation Council (NLC) was instituted to establish a new relationship between the state and private business. It subsequently implemented liberal market reforms, including the Ghana Business Act of 1969 (Aryeetey and Owoo, 2015, pp. 260). This act restricted the involvement of foreign nationals in specific sectors of the economy, including the mining sector.

In the 1980s, the International Monetary Fund (IMF) and World Bank pressed developing nations to liberalise their economies, including the extractive sectors, to ensure collaboration and bring about development. As a result of negotiations with these agencies, Ghana's Economic Recovery Programme (ERP), a type of Structural Adjustment Programme, affected the mining and other sectors in the country (see Konadu-Agyemang, 2018) through the enactment of new laws, including the 1986 Minerals and Mining Law (PNDC Law 153), the Mercury Law, the Precious Minerals and Marketing Corporation Law as well as the 1984 establishment of the Minerals Commission.

The formalisation of the ASM sector also included the introduction in 1989 of the Small-Scale Gold Mining Law (PNDC Law 218) (Hilson et al., 2007). Despite initial praise for this step, ASM continued to expand and draw more participants, which led to the establishment of a task force in 2016 and the "Fight Against Illegal Mining" campaign (Hilson and Maconachie, 2020). This initiative aimed to eliminate illegal mining's negative impacts, like environmental degradation and social conflicts, and promote proper mining practices through a formalised structure (Ofori et al., 2021).

During the 2016 presidential campaign in Ghana, the New Patriotic Party (NPP) candidate vowed to regulate the ASM sector if elected and promised to launch initiatives to help ASM operators, especially 'galamsey'¹ operators, to continue their activities in geological mining areas. After assuming office in 2017, however, the government launched "Operation Vanguard" and deployed the military, the police, and immigration agents against them. This move generated scepticism about the new president's commitment to his campaign promise and sparked nationwide debates and petitions from social groups and NGOs urging immediate action. Some activists doubted the president's sincerity, viewing his words as politically motivated, which complicated finding an effective resolution (Hilson, 2017). The ban on illegal mining became a political issue, with ASM communities vowing to defend their rights and oppose any government interference with their operations. They even threatened to vote out the NPP. Despite six years of Operation Vanguard, the problem persists. President Nana Addo Dankwah Akufo

¹ Galamsey is a term used for both 'illegal' mining activity in Ghana and the people who engage in it.

Addo has been willing to stake his election and presidency on this issue and expressed his determination to combat galamsey (Myjoyonline.com, 2022). However, in a recent engagement with the National House of Chiefs² and Municipal and District Chief Executives,³ he made the following categorical statements:

Since I took office on 7 January 2017, nearly six years ago, I have made it a central feature of my presidency to lead in the effort to rid our country of this menace. Indeed, it was an important aspect of my inaugural speech of that day. It has not been easy, and we have not gotten the immediate result that I was looking for (Myjoyonline.com, 2022, October 5).

Government officials and other Ghanaian politicians have also shared their views on the quick quest to abandon ASM. Peter Amewu, a former Minister of Lands and Natural Resources, noted that legalising ASM is a gradual process and that phasing out of galamsey activities, initially expected to occur within five years, has been a challenge (Hilson, 2017). The CEO of the Mineral Commission of Ghana, Martin Ayisi, has also recognised the difficulty of banning and governing the ASM, acknowledging that "the sector is too resourceful to be out-rightly banned" (MyInfofogh, 2023). Despite all these governmental efforts to render the mining sector in Ghana governable, the problem persists.

3. Theoretical underpinning

3.1. Seeking to govern the ungovernable

Mining, like other key economic activities, is organised through institutions that are, in turn, anchored in broader political frameworks and cultural systems of significance. Within the growing body of research examining the intersection of economic activities and society, "embeddedness" has emerged as a powerful concept for characterising the synergies among individuals, institutions and structures (Dequench, 2003; Bourdieu, 2005; Krippner and Alvarez, 2007). Since it was introduced by Polanyi first in 1944 (Krippner, 2001; Olofsson, 1995) and Granovetter (1985), its application to market dynamics within organisations has gradually evolved, drawing on insights from various social sciences to understand the complex webs of relationships that underlie institutional, organisational, corporate, and societal ties within economic endeavours. Embeddedness has evolved to encompass social relationships, referred to as social embeddedness (D'Cruz et al., 2021), network embeddedness (Granovetter, 1985; Uzzi, 1997), organisational embeddedness (Peltokorpi et al., 2015), entrepreneurial embeddedness (Hite, 2003), or cognitive, cultural, structural and political embeddedness (Zukin and DiMaggio, 1990), among other terms.

In *The Great Transformation*, Polanyi employed the concept of embeddedness to illuminate how social structures profoundly influence how economic settings function and the activities that transpire within them (Polanyi, 2002). Polanyi observes that economic life extends beyond mere transactional exchange to permeate the very fabric of society, as people engage in various exchanges and activities within their shared geographic and social context (ibid.). Furthermore, Granovetter (1985) builds on Polanyi's notion of embeddedness by using the concept of social embeddedness to place economic endeavours within a socio-rational backdrop. His exploration of the concept posits that the

² The National House of Chiefs is an important institution that represents the collective voice and interests of traditional leaders and chieftaincy in the country. It serves as an advisory body to the government and other state institutions on matters related to traditional governance, cultural heritage, and customary law.

³ Municipal and District Chief Executives (MDCEs) are Ghanaian government officials responsible for overseeing the administration and development of specific geographic areas known as municipalities and districts. They are appointed by the President and serve as local representatives of the central government in these regions.

decisions and actions of economic entities within the economic sphere are influenced by the social networks in which these entities are situated. He contends that economic activities cannot happen outside societal frameworks and processes (Granovetter, 1985). Therefore, examining economic relations and activities without considering social factors – particularly social relationships – renders any analysis incomplete. According to Granovetter (2018), the social context influences economic outcomes, although the reverse is also plausible: economic relations can contribute to forming social or personal relationships. Embeddedness, as scholars like Uzzi (1997) describe it, is a puzzle whose solution could provide invaluable insights into not only organisational dynamics but also the functioning of markets themselves (Uzzi, 1997, p. 22). The core principle of embeddedness suggests that actors are intertwined with ongoing systems of social relations, that considering them in isolation is fundamentally unrealistic or superficial (Granovetter, 1985). This interconnectedness extends to entrepreneurship, where social contacts and linkages profoundly shape the entrepreneurial process and create a fabric of social interaction that cannot be ignored (Hite, 2003).

3.2. Conceptualising embeddedness in Ghana's gold mining sector

The embeddedness concept is crucial to understanding mining governance and research but has not been explored in these fields. Embeddedness, as used here, refers to the interconnectedness and interdependence of individuals, organisations, and social structures within a specific context. It emphasises that actors and their actions are not isolated but deeply influenced by the social, economic, institutional and cultural environments they operate in (Coe and Yeung, 2015). This concept is crucial to understanding how behaviours, decisions, and outcomes are shaped by the relationships and institutions surrounding them (D’Cruz et al., 2021). Whether formal or informal, mining operations are mediated by governance institutions and structures. In other words, large-scale mining and ASM are social structures embedded in various environments. The “mining-scale embeddedness” framework is significant in the gold mining industry. Within the mining sector, a complex network of interactions and relationships exists between various actors, including government entities, chiefs, stakeholders, mining companies, equipment suppliers, logistics providers, gold buyers, and members of mining communities (Yakovleva et al., 2022; Yakovleva and Vazquez-Brust, 2018; Ntiri et al., 2023). Additionally, it is part of a broader socio-economic and cultural milieu, all of which collaboratively shape the operational dynamics of mining. For instance, companies seek government approval to engage in mining activities involving institutions and local community representatives. Beyond official consent, community members’ approval is crucial, especially for traditional mining practices from which they expect benefits and active involvement. This creates a network of stakeholders in the mining sector who each pursue their own goals and interwoven operations, making for complex dynamics within the mining industry.

It is important to note that one thing is embedded in another because they have interests. Within the ‘mining-scale embeddedness’ framework, we portray how relational and power dynamics within the mining sector and its related activities can complement and conflict with one another (D’Angelo and Pijpers, 2018). This occurs when different actors or institutions possess unique resources, expertise, or capabilities to address specific mining governance challenges. For example, local communities may possess deep knowledge of the local environment and its vulnerabilities, while governmental bodies wield the authority and regulatory capacity to enforce environmental protections. Embeddedness dynamics can also be intertwined, with actors and institutions mutually influencing each other’s decisions and actions. This occurs through ongoing negotiations, interactions, and collaborations among institutions, actors, and stakeholders. For instance, mining companies may need to negotiate with local communities to gain social acceptance to access and exploit mineral resources (Adonteng-Kissi and

Adonteng-Kissi, 2017). Similarly, mining companies may negotiate deals with artisanal small-scale miners to ensure they work together in various ways (Sauerwein, 2023).

Large-scale mining companies recognise that without the cooperation and support of local communities, their presence among them is threatened (Adonteng-Kissi and Adonteng-Kissi, 2017 pp. 196; Adonteng-Kissi, 2015). In Ghana, there have been documented instances where mining companies reluctantly permitted artisanal miners to operate within certain areas within their concessions. Aubynn (2009) and Tescher (2013) illustrate this dynamic using one well-documented case involving a Gold Fields Ltd company concession in Damang, Western Region. In this instance, the company adopted a “live and let live” approach towards local galamsey operators, allowing them to continue their activities as long as they did not disrupt the company’s operations. Similarly, Hilson and Garforth observed over 30,000 galamsey operators on another concession owned by the company known as Rex, (Hilson and Garforth, 2013, pp. 352). In the Brong Ahafo region of Ghana, Newmont Ghana, a subsidiary of an American-based corporation, exhibited a ‘lenient’ stance towards galamsey operators conducting mining activities within its concession in Kenyasi (ibid). While the companies’ precise motivations for allowing these operators to engage in mining activities on company concessions remain ambiguous, it could be posited that they aimed to mitigate potential confrontations and conflicts in those areas. In addition, this coexistence could stem from agreements reached due to the persistence and resilience in conducting illegal mining activities these galamsey operators demonstrated within mining company concessions (Teschner, 2013, pp 335). For instance, Hilson and Garforth (2013) describe the outcome of long-standing tensions between local communities in Obuasi and the Anglo-Gold Ashanti mining company, which led to the formation of the Obuasi Municipal Artisanal Miners Association comprising 10,000 miners. They established a ‘collaboration’ with the mining company through negotiated agreements that permitted them to conduct galamsey activities within its concession. (Hilson and Garforth 2013, pp. 352). In another context, Hilson et al. (2020, pp. 7) point out that opportunities for negotiating collaborations may arise during periods of exceptionally low gold prices.

How different mining groups interact with each other can have a big impact on decisions and the outcomes of mining operations. By recognising how small-scale and large-scale mining is connected and how different people and organisations interact, we can better understand the challenges of governing the mining industry. This connection and interdependence between small-scale and large-scale mining, as well as the people and groups involved in the mining chain, is what we refer to as ‘mining-scale embeddedness’.

4. Cases and methodology

This paper discusses the results of a research study that forms a part of a larger investigation into mining activities, activism, and their influence on the socio-cultural changes in Ghana’s gold mining communities. The most recent stage of the study was conducted between February and April 2023, involving fieldwork in Prestea and Ahafo North, both located in the southwestern region of Ghana. Prestea was chosen for a previous research phase (from July to August 2018) due to its historical significance as a mining hub of both large-scale mining and ASM operations, although the latter currently predominates. Ahafo North was selected to represent a newer mining area characterised by increased large-scale mining activities within an evolving landscape of ASM operations. The two sites display analogous characteristics contributing to the persistent challenges in gold mining governance. The uniqueness of the Ghanaian gold mining industry lies in its distinctive array of institutions, including government agencies, chieftaincy entities, market institutions, and stakeholders such as community members, financiers, and political interests. Collectively, these entities play a crucial role in mediating among the industry’s various actors and have a

significant impact on its governance.

The study employed a two-staged approach to gathering data and used qualitative methods, including in-depth interviews, focus-group discussions, informal conversations and observations. Fifty-seven participants took part in the study, twenty-seven from Prestea and twenty-two from Ahafo North, and eight institutional or stakeholder interviews. Interviews were primarily conducted in the Akan language (specifically Asante Twi), although institutional or stakeholder representatives sometimes chose to be interviewed in English. These methods were complemented by field notes, which are considered essential in research findings as they offer a detailed, context-rich record of observations that adds depth to qualitative data and serve as a tool for reflecting on the nuanced insights and impressions they capture, enriching the overall understanding of the research context (Phillippi and Lauderdale, 2018). The initial stage focussed on key informant interviews with mining settlement residents, particularly elders who could offer first-hand accounts of mining development in the past. These interviews aimed to illuminate the historical background of mining activities, the involvement of formal and informal institutions in the mining chain, and the current state of mining activities in the region. Subsequent fieldwork involved exploring the community-level actors engaged in mining, representing both large-scale mining and ASM, ensuring that interviews were conducted with miners from both sectors and gathering perspectives from local community members and farmers to understand the broader impact on the communities.

We conducted interviews at the institutional level and specifically focused on the Minerals Commission, Lands Commission, and EPA, the agencies responsible for land and resource governance in Ghana. Additionally, we conducted interviews with customary institutions and non-state entities, such as the chieftaincy institution. These interviews aimed to unravel the intricacies of mining-related policies and initiatives, as well as their implications for mining communities. Insights from these officials shed light on regulatory frameworks, institutional mechanisms, community development initiatives, and overall mining operation management and revealed national-level policies' local-level implications for the towns under examination. These particular methods and participants representing diverse actors within the mining production chain were crucial for triangulating the themes of this paper. This approach to selecting these methods aligns with the theoretical sampling process during field research (Luker, 2009).

The data we gathered in interviews, FGDs, and notes was meticulously transcribed to accurately capture shared perspectives. These transcripts were later reviewed with participants during informal discussions to ensure their viewpoints were not misrepresented. We chose reflexive thematic analysis as our main tool for data analysis due to its flexibility and practicality (Braun and Clarke, 2021). This approach allows an organisation of analysis that is not constrained by pre-existing coding frameworks (Braun and Clarke, 2021, 2006). We then organised the textual transcriptions tabularly and assigned codes, facilitating our identification of themes by examining links, associations, and patterns within the data through repeated readings. As previously noted emergent themes enabled the development of our three typologies of mining-scale embeddedness. We supplemented our primary data with secondary sources, including documents provided by participants to substantiate claims, materials from the Lands and Mineral Commissions, and articles from Google Scholar. The paper also incorporates direct quotations from informants to enhance the clarity of analysis and draws on media sources to add depth and nuance to its explorations. This multifaceted approach has enhanced the depth of analysis and interpretation in the paper, offering valuable insights for potential sustainable development strategies and enhanced mining sector governance.

5. The mining-scale embeddedness framework

This section presents and discusses our study's findings, which are organised based on three levels of mining-scale

embeddedness—institutional, operational, and actor—that reveal the extent and origins of the entanglements that characterise gold mining operations and mining governance in Ghana (see Table 1 below).

5.1. Institutional level of embeddedness

Mining companies often engage in negotiations and deals with the chieftaincy institution and the local community. These negotiations, although they may conflict with the legal and regulatory framework for mining operations, are considered necessary for maintaining peaceful operations by various stakeholders. Yakovleva and Vazquez-Brust (2018) employ salience and institutional analysis to gauge the strategies employed by multinational enterprises (MNEs) in managing informal gold mining governance in Ghana. They highlight the significance of informal rules within rural communities, particularly the influence exerted by traditional chiefs at the operational level. This influence grants access to mineral resources and underscores the irreplaceable role of these traditional institutions in mining governance (Yakovleva and Vazquez-Brust, 2018, pp. 56). A critical question for understanding this phenomenon is which institution has the power to control and manage land? Even though the Republic of Ghana's constitution recognises the previous statutory allocation of land and resources to the state, it also acknowledges the role of traditional institutions in land deals. Scholars such as Andrews (2018) and Mensah (2021) also note conflicts between statutory and customary laws on land deals in Ghana. Particularly in the rural regions favoured for mining concessions, individuals, extended families, or traditional leaders hold a significant portion of land as fiduciaries for their communities (Adu-Baffour et al., 2021). According to the Ministry of Land and Natural Resources, approximately 78 per cent of the country's area (including forest reserves) is held by customary landowners or allodial titleholders such as clans, stools, and families (Adu-Baffour et al., 2021). As the CEO

Table 1
The three typologies of mining-scale embeddedness.

Name	Definition	Examples
Institutional-level Embeddedness	Interconnected institutions in the mining formalisation and production chain that establish rules, norms and regulations that shape and govern interaction and behaviour in the mining sector.	Statutory institutions include the Lands Commission, Mineral Commission, EPA, customary institutions (like chiefs), local community members, family heads, clan heads, and mining companies (as market institutions).
Operational-Level Embeddedness	Interconnected activities in the mining production chain that rely on each other for efficiency and effectiveness and shape mining operations through power dynamics, negotiations, and shared goals.	Government institutions, mining companies, customary institutions, community members, and stakeholders.
Actor-level Embeddedness	There are various entities and individuals involved in the mining industry, each playing a specific role in the mining process. Their activities intertwine, impacting governance and dynamics as they exercise power and pursue intentions in the mining sector.	The local mining community, mining company workers, government institutions, stakeholders, financiers, EPA, Lands Commission, Mineral Commission, Chiefs, Forestry Commission, Water Resource Commission, Land Evaluation Board, NGOs, government officials, primordial groups, investors, gold buyers, people who sell gold mining tools and equipment.

Source: Authors' fieldwork (2023).

of Ghana's Minerals Commission, Martin Ayisi, has stated, securing a mining permit from the Minerals Commission is not sufficient. Approval from the chief and community members is essential, and if they decline, the company must negotiate with them for permission to operate in the community.⁴

Research and regulatory bodies and institutions tend to encourage such negotiations (see also [Sauerwein, 2023](#); [Aubym, 2009](#)). For instance, one mining company 'permitted' community members to engage in ASM activities on their concessions (that is, turned a 'blind eye' to them), with the knowledge of governmental mining-related institutions such as the EPA. One community member noted that "the EPA knows about our galamsey activities, and the mining company is conscious of our operations on their concession". Research has emphasised that illegal activities in the mining sector perpetuate this governance situation, especially regarding ASM. They stem from negotiations and agreements between large-scale mining companies, community members, and ASM operators. This occurs due to the latter's persistence and resilience in their engagement in illegal mining ([Hilson and Garforth, 2013](#); [Aubym, 2009](#)). Some company officials have confirmed allowing them to mine on their concession for 'political reasons' and to please the community (see also [Antwi-Boateng and Akudugu, 2020](#)). One EPA officer noted:

We recognise the challenges mining companies confront with ASM operators engaging in potentially illegal activities. Despite understanding environmental harm, we sometimes feel 'powerless' to act due to certain agreements and political reasons, leaving us with no viable options but to sometimes accept the situation. But we are trying our best to stop galamsey activities in the country (Interviews, March 2023).

Similarly, a company worker noted that:

The ASM operators working on the mining company's concession are a complex issue that cannot be explained. I would say it has been the culture here, and it would be difficult to break such a practice as it also serves as a source of livelihood for the community members (Interviews, April 2023).

[Granovetter \(1985\)](#) observes that business transactions such as those between a seller and a customer (and even social interactions) facilitate the exchange of opinions, leading to a mode of satisfaction between the involved parties. He attributes this ease of communication to the business entities' embeddedness within social relationships. This mode of exchanging opinions to reach a satisfactory middle ground between parties in a business transaction extends to activities in a mining setting. In this context, economic life transcends simple transactional exchanges, such as trading land for compensation. It permeates the very fabric of society as individuals engage in various interactions and activities to protect their interests – as can be deduced from the quote above. Community members who own land through a chieftaincy institution negotiate with mining companies and institutions. This often requires compromises to ensure peaceful coexistence, even if such practices deviate from the standardised state regulations governing the more 'formalised' large-scale sector.

During our study, we discovered a case of a mining company exploring a concession in the Ahafo North area where some community members had already started engaging in illegal mining activities. Notably, some community members and elders in the catchment area mentioned that the company has seen and was aware of some of these practices, but there is nothing they could do. The company had yet to commence 'actual' mining operations at the location and was thus 'lenient' towards the community members' activities on their concession. These complex entanglements reveal the willingness of these institutions to accommodate others, despite being aware of the potential impacts of their activities on governance and the mining sector. Upon further inquiry into the motives behind illegal mining in the two areas, individuals cited financial constraints preventing them from registering

and obtaining concessions from mineral commissions. They also mentioned the arduous nature of the permit acquisition process, which they had heard about from others as a discouraging factor. An ASM operator in Prestea remarked

We lack the funds to license our concessions, and even if we did, we have heard that the permit application process is too cumbersome and costly for us to afford (Interviews, April 2023).

Like Operation Vanguard, in which the government used security forces to combat illegal mining while also safeguarding the interests of large-scale mining companies (see [Section 2](#) and also [Hilson and Maconachie, 2020](#)), this task force was set up to coordinate governmental bodies such as the EPA and Minerals Commission and large-scale mining companies. It aimed to report illegal activity and monitor ASM activities. However, our study revealed that ASM operations continue on large-scale mining concessions due to connections among chieftaincy, the market (mining company) and governmental institutions. In other words, ASM operators occasionally received intelligence about upcoming operations from their chiefs, friends, and other connections in the mining companies and government institutions. A forty-five-year-old member of one ASM group in Prestea remarked:

We are well connected. We receive information from our chiefs or individuals within government institutions about upcoming operations. Consequently, we adjust our activities, sometimes conducting mining at night and vice versa, or temporarily pausing operations until they finish their activities in the area (Interviews, April 2023).

Another respondent said, "Sometimes, we get this information from our acquaintances within the mining company." The point was that connections existed between institutions and their actors. Thus, it is clear that addressing only the ASM operators is insufficient, given how deeply their activities are intertwined with interactions among multiple institutions – including the large-scale mining sector.

In addition, and as noted earlier, the institution of chieftaincy significantly influences land and resource governance. It has, therefore, been a key institution that the government and its institutions turn to when addressing challenging situations within the sector. Its enduring significance in shaping the daily lives of some Ghanaians underscores its importance ([Asori et al., 2023](#)). As a result, governmental institutions often depend on chiefs to aid resource and environmental governance by helping to enforce environmental laws and curb illegality ([Tenkorang, 2023](#)). In Ahafo North, chiefs were pivotal in resolving initial community resistance to the mining company's operations. Collaborating with the EPA, they organised forums to educate community members about the significance of mining activities in the area. Chiefs and elders emphasised the company's role in initiating corporate social responsibility (CSR) efforts in the region, even before officially commencing exploratory mining activities. During the research, we observed CSR projects such as building toilet facilities, libraries, schools, and chiefs' residences and drilling wells. Although CSR projects consistently disappoint community expectations ([Adonteng-Kissi, 2015](#)), these development initiatives, alongside negotiations facilitated by the chieftaincy institution representing community members, underscore the contributions made by large-scale mining companies (as market institutions) to the development of their host regions. Such projects, which are strongly encouraged by the government and its agencies, promote a certain form of coexistence between large-scale mining companies and their host communities. This interdependence among stakeholder institutions generally reveals collaborative efforts in pursuing shared interests.

5.2. Operational-level embeddedness

Understanding the political economy of mining sectors is crucial in determining whether ASM and large-scale mining can coexist or result in conflicts ([Huggins, 2023](#)). The potential for an interface between ASM and large-scale mining has sparked an academic debate particularly concerned with the conflicting nature of these two scales. [Bainton et al.](#)

⁴ See more details at <https://www.youtube.com/watch?v=Ho3WbC11aOU>

(2020) highlight that the successful coexistence or interface between ASM and large-scale mining is connected to project size, project life-cycle, geological accessibility, and geographical accessibility. However, Hilson et al. (2020) worry that, even if collaborations between the two can be sustained for a while, they may not offer a viable long-term solution. Hilson et al. (2020) point out that when the productivity of ASM activities in a particular area yields a lower output of a specific resource (and thus less income), or when there is a decline in its market price, large-scale mining companies can benefit from and seek out partnerships or cooperation with ASM operators. However, the situation changes if the region holds significant resource reserves that lead to a substantial increase in production. Then, the large-scale mining companies are more inclined to evict ASM operators to secure exclusive control over a lucrative resource such as gold. Additionally, Yakovleva and Vazquez-Brust (2018) further highlight a Ghanaian governmental official's observation regarding the cooperative relationship between MNEs and artisanal miners. They note a case where a mining company permitted artisanal miners to operate in a low-grade section of its concession. This integrated approach, they argue, helped regulate conflict and involved artisanal miners in safeguarding the concession against new entrants. Rather than confrontational measures, the company opted for cooperative arrangements with informal miners, fostering mutual trust and collaboration in operations. (Yakovleva and Vazquez-Brust, 2018, pp. 56).

Expanding on the above, ASM operations contribute to the extraction of minerals and thus serve as valuable indicators for the large-scale mining companies that help them identify potentially productive areas. Specifically, our research revealed how, by closely observing and monitoring the activities of the ASM sector, mining companies could gather valuable insights about areas that were potentially rich in gold. This information aids companies in making informed decisions about where to allocate their resources for further exploration and subsequent extraction. Essentially, the ASM sector acts as a sort of exploratory front line that assists mining companies in narrowing down locations with high gold potential and minimising the risks associated with blind exploration.⁵ One ASM participant provided a particularly insightful account of the dynamics of their relationship with a mining company. According to this participant, such operations occurred within a designated area in its concession. Once the ASM miners extracted gold, they typically sold it to buyers with whom they alleged might know some mining company workers or had connections. However, they noticed that if they consistently sold significant amounts of gold to such individuals, they would be notified that the company had completed mining in their current location. This required them to relocate and allowed the company to take the opportunity to begin mining there itself. One forty-two-year-old artisanal operator told us that:

We operate within the mining company's concession. When we get the gold, we sell it to agents who may also have connections with the company's workers. Upon reaching a sales threshold, they signal the end of their mining and target our location, prompting relocation. To counter this, we strategically avoid selling all our gold to them (Interviews March 2023).

Although this alleged narrative might not be the main reason for the relocation of ASM operators from a company's concession, as confirmed by a company worker, their motive might simply coincide with the mining company's prompting and relocation of ASM operators. In any case, the point is that large-scale mining companies seek cooperation with ASM operators in gold mining.

Another topic repeatedly raised by the majority of ASM operators –

⁵ Blind exploration generally refers in the extractive sector to the initial phase of exploration for natural resources, such as minerals, oil, or gas, where geological and subsurface information is limited or insufficient. During this phase, companies or people engage try to identify potential resource-rich areas without detailed geological data.

which emphasises operational-level embeddedness in the mining production chain but, despite its impact on mining governance, is often overlooked – is the purchase of tailings from ASM operators. While our research did not directly observe any such purchases by an internationally owned large-scale mining company in Prestea, we discovered an interesting dynamic between a large-scale mining company now managed locally by the Ghana National Petroleum Corporation (GNPC) and the Government of Ghana. This company, which was initially incorporated as a UK-based company called Samax Limited and did business as 'Prestea Sankofa Gold Limited',⁶ initially purchased the rights to over one hundred years of large-scale mining tailings, it now also extracts additional gold from ASM tailings. We found that ASM operators are only able to extract about 30 per cent of the gold from ore due to their limited technological capabilities and access to chemical reagents. Prestea Sankofa Gold Limited took advantage of this situation to extract the remaining 70 per cent left in the ASM tailings. This collaboration enables the mining company to supplement its gold production significantly. An ASM operator acknowledged the dynamic and mutual benefit of this collaboration.

The company relies on our tailings to extract more gold. They buy our tailings, as we can only extract 30 per cent of the gold from the rock, per their investigations. So, they have a vested interest in our operation, as they do not have to spend much on it. We do the dirty work for them, but they get the most money (Interviews, March 2023).

Our findings correlate with those of Murao et al. (2002) on tailing trades between diverse actors in the mining sector in the Philippines. It is crucial to acknowledge that while both large-scale mining and (licensed) ASM derive benefits from this exchange, which Bansah et al. (2018, pp. 253), who focussed on licensed ASM companies, refer to as "mutualism", the narrative from our research draws attention to how the purchase of tailings from both licensed and non-licensed ASM operators by large-scale companies could encourage gamemsey activities and exacerbate their environmental impacts. Consequently, environmental activists and some conventional media outlets in Ghana have urged the government to enhance governance in the sector.

Road access is another crucial element in ensuring the effectiveness of mining activities. During our fieldwork, participants highlighted how mining companies have reshaped⁷ roads leading to ASM sites, making it easier for them to access their tailings, gold, and other related activities. An ASM operator recalls how such developments have not only facilitated tailings purchase but have also spurred transportation development in their community. He emphasized that

In Bondaye here, there have been instances since I started as an ASM operator where mining companies, like Prestea Sankofa Gold Limited, for instance, have reshaped our roads. This not only improved our transportation system but also, I believe, facilitated convenient access to purchase our tailings (Interview, March 2023).

This symbiotic relationship between large-scale mining and ASM opens new governance issues, as both parties have vested interests in each other's operations. However, it is worth noting that mining companies benefit the most from this arrangement, which leads to a comingling of regulated and unregulated practices at the operational level.

5.3. Actor-level embeddedness

Understanding the gold mining process can be a complex task. Within the framework of mining-scale embeddedness, several actors play essential roles in the production process, reflecting the concept of

⁶ "Sankofa" which originally comes from the Twi language, is now used by all Ghanaians to mean "go back for it". The idea is that the company (Prestea Sankofa Gold Limited) goes back to old mine tailings and extracts gold from it using new technologies.

⁷ Reshaping of roads includes widening lanes, adjusting curves, and leveling the surfaces of the streets.

actor-level embeddedness. This means that several more actors are involved in the process for each ASM miner or “galamsey” operator we observe engaged in mining activities. We refer to these as “invincible-invisible actors.” Their mining activities may not be directly visible on-site, but they are crucial in the production process. It is worth noting that we do not overlook the actions of other influential individuals directly involved in mining activities. These invincible-invisible actors could be what [Hausermann et al. \(2018\)](#) refer to as “front men” and “big men” and [Hilson et al. \(2019\)](#) as “local authorities”, “mayors” or what has been known in Ghana as “mining kingpins” ([Myjoyonline.com, 2022b](#)). These people hold influential positions in society – chiefs, local government authorities, politicians, bureaucrats – and foreign individuals serving as financiers. During one discussion with the Asantehene,⁸ media representatives had sent delegates to request his assistance in ensuring proper governance of galamsey activities within his territory. He acknowledged the importance of addressing the issue but asked:

What about the impoverished galamsey worker who lacks the financial means to purchase the necessary equipment, such as trucks and gold-crushing machines? Who provides these resources to the galamsey workers? They claim to apprehend these galamseyers, but who gains possession of the mined gold if caught? Numerous individuals are involved in this ASM practice, and there is more to this than people think.⁹

Our research reveals miners establishing and invoking associations or connections with influential figures to aid their galamsey activities. For instance, ASM operators reported receiving permission from a chief and financial support from some large-scale mining company workers (who also had galamsey mining pits) and some government officials (who procured mining equipment for them). When asked how they acquired their equipment, one thirty-two-year-old galamsey miner explained that:

Our boss [owner of the mining pit], affiliated with the mining company, supplied our galamsey machines. Politicians also assist colleagues, promising unwavering support amidst challenges like Operation Vanguard and military involvement, ensuring confidence to work without fear (Interviews, March 2023).

In a recent study in Ghana, [Hausermann and Ferring \(2018\)](#) also discovered an example of our notion of actor-level embeddedness, showing how influential figures (typically including powerful Ghanaian business leaders, government officials, and even foreign investors) establish political protection for local and foreign investors. They do this through personal connections, even though foreign investors are legally excluded from artisanal mining. These connections provide the necessary capital and resources for local Ghanaian residents to secure mining concessions for their operations. This research sheds light on how one regional Ministry of Agriculture official described the effects of mining on farming and also revealed how mining activities hindered legal actions against individuals who mined illegally or failed to comply with established regulations. These miners were often supported by influential figures, and little was done even when they were arrested by local law enforcement. This lack of action stemmed from instructions or directives received from higher authorities, such as high-ranking police officials, urging the release of the culprits due to their association with influential or politically connected individuals from the mining sector ([Hausermann and Ferring, 2018](#), p. 1020).

⁸ The prominent and respected chief of one of the largest Ghanaian ethnic groups.

⁹ See more details at <https://www.youtube.com/watch?v=mSrrt6WrFOk>.

In addition, Professor Kwabena Frimpong-Boateng’s¹⁰ well-regarded report on ‘illegal mining’ in Ghana places a central emphasis on unmasking the extensive engagement in the mining sector of politicians, governmental actors, and other influential people in society referred to as “big men”. The report offers instances of effective measures taken by task forces to confiscate equipment employed in illegal mining activities. Nonetheless, interruptions occurred in their enforcement processes when they received calls from political party affiliates and government officials asserting ownership of the equipment at mining sites, even though they were not directly involved in the mining activities. For instance, the report specifically mentioned an operation in Bepotenten where their task force had successfully seized seven excavators, but “as usual so-called big men started calling [. . .] who claimed ownership of the excavators” (Modern [Ghana, 2023](#), pp 13).

The discussions above align with [Granovetter’s core principle of embeddedness \(1985\)](#), which emphasises that actors are intricately woven into complex systems of social relations and economic activities, in this case, mining. Viewing these actors in isolation is perhaps problematic because it fails to provide a complete understanding of the phenomenon being studied. Many actors are deeply involved in the mining sector, and neglecting their operations and activities in the mining industry would hinder addressing the associated challenges effectively unless these activities are considered in the governance processes.

Another set of external stakeholders with significant interest in this activity, although not directly involved in the production chain, includes suppliers of machinery and equipment to galamsey operations, gold buyers and the local jewellery industry. This complexity arises from the participation of various influential individuals who are driven to sustain their businesses. While our research did not specifically interview individuals belonging to these groups, their interest in the continued operation of the mining sector became evident during our conversations with galamsey operators. For instance, one fifty-two-year-old miner mentioned sometimes obtaining mercury for gold extraction from prominent market vendors who supplied them with sieves for separating ore from rock and other essential equipment and chemicals. These market vendors play a crucial role in helping “galamsey operators” sustain their operations, as they, too, have a vested interest in their work. Local gold buyers also exhibit a keen interest in the activities of ASM operators as a source of their livelihood. This exemplifies the embeddedness framework outlined in this paper and illustrates how these actors’ complementary operations help them achieve their objectives (intentionality), how their actions interact among multiple parties (relationality), and how these interactions lead to intended outcomes (causality) (see also [Svarstad et al., 2018](#)).

6. Foregrounding existential gaps in mining research and our contribution

The continuing push to formalise the mining sector in Ghana and throughout sub-Saharan Africa, indicates that such policies have not yet fully addressed its complexity or contexts. This brings us to our question posed at the beginning of this paper: Why has “illegal” ASM persisted, and mining sector formalisation had little or no impact (or even been counterproductive) despite years of institutional reforms, political commitments and unambiguous statements of the intention to pursue responsible mining in Africa? Or put more provocatively: What might have rendered ‘unruly’ (though potentially beneficial) mining

¹⁰ Professor Frimpong-Boateng is a former minister of Environment, Science, and Technology and Innovation and key member of the Inter-Ministerial Committee on Illegal Mining (IMCIM) established by the Ghanaian government to address and mitigate galamsey activities in the country. See <https://www.modernghana.com/news/1226663/report-on-the-work-of-the-icim-so-far-and-the.html>

operations ungovernable and unsustainable? What benefits do the categorisations of mining operations afford decision-makers, and whose interests does this organising logic serve? Our study acknowledges that addressing the persistent challenges in ASM-sector governance requires critically analysing the various actors involved or interested in the sector. First, there is an assumption that individuals prioritise activities that offer economic incentives to ensure their sustenance while often overlooking their negative environmental consequences (Ayambire et al., 2024; Osei et al., 2022). Consequently, people see nothing wrong with livelihood-sustaining activities like ASM. Such tension between economic incentives and environmental concerns is a central debate in the logic of formalisation. Even once miners or mining companies have been formalised, space remains for actors in the sector to deviate from complying with improvements to mining practices (Martinez et al., 2023; Veiga and Marshall, 2019). Research has indicated that with the simultaneous expansion of both ASM and large-scale mining and their coexistence in recent decades, mining companies and ASM communities increasingly interact in various locations (Veiga et al., 2022; Verbrugge and Geenen, 2019). While they coexist peacefully in some places, conflict and violence have also been observed (Aubynn, 2009; Kemp and Owen, 2019). Yankson and Gough (2019) explored one such gap in the mining sector in Ghana, where a formalised large-scale mining company and informal ASM operators co-existed on the same mineral-bearing land. The researchers concluded that low levels of public disclosure by large-scale mining companies, governments, and financial institutions due to fears of discouraging investors or presenting investment risks characterise the sector, a lack of transparency that could contribute to the ongoing governance challenges in Ghana and could be juxtaposed to the ‘bias’ that characterise the mining sector (Hilson, 2019). Meanwhile, Sauerwein (2023) studied the village of Hire in Cote d’Ivoire, where, after years of complex interactions, a mining company and artisanal gold miners in this area have partnered. The company now accepts the presence of the (illegal) artisanal miners on its concession and is fully committed to facilitating the formalisation of their operations. In return, the artisanal miners have become responsible for reporting any other miners who encroach upon the company’s concession.

Despite the absence of legally binding frameworks for coexistence between mining companies and ASM in Ghana and the broader trend of limited provisions in most mining economies, mining companies face a dilemma. They must choose between operating extra-legally to foster partnerships, coexistence, and peace with ASM operators on their concessions or adhere to the law and reject ASM operations, which could lead to opposition and conflict with community members (see also Cuvelier, 2023; Rodríguez-Novoa and Holley, 2023). This paper has argued that mining companies are caught in many entanglements and face the predicament of feeling compelled to act against regulations or laws due to circumstances beyond their control. They cannot neglect their relationships with local communities if they want to succeed (Adonteng-Kissi and Adonteng-Kissi, 2017; Adonteng-Kissi, 2015). Disputes over their operations and efficiency will arise if they do not engage and work with these communities. This often means that mining company managers face complex choices about practices that seem necessary to achieve optimal operation, regardless of anyone’s personal preferences. However, these actors are reluctant and often compelled by the imperative of profit maximisation. Consequently, practices that the company would typically disallow or resist may find acceptance or compromise. While these actions do not justify evading or violating regulations, they do reveal the stark truth that both mining companies and individuals frequently face circumstances that force them to take less-than-perfect paths, even unintentionally. Moreover, our study points out how traditional approaches to mining governance that rely solely on state procedures no longer suffice for local communities, which now desire a more significant role in decision-making and more active participation in mining operations. This shift has been driven by persistent disappointment among community members due to unfulfilled development promises from mining companies and the

government. As a result, non-state actors now play a more significant role in mining governance (Prno and Slocombe, 2012).

The sector also attracts governments due to its revenue inflows and influential figures, often referred to as “mining kingpins,” who are linked with large-scale mining companies, ASM operations, chieftaincy institutions, and the political or financial realms within the sector. The government and these individuals stand to gain more than the artisanal miners themselves, so their interests are closely linked to the success of the operations. Even within large-scale mining concessions, the involvement of an ASM operator in illegal mining attracts these actors, showing the difficulty of governing a sector where powerful covert players mediate the functions of the ASM and large-scale mining domain. In formalisation logic, it is commonly assumed that addressing the predominantly ‘illegal’ ASM sector would enhance sustainability and governance within the broader mining industry (Adjimah et al., 2022; Cisneros, 2021). However, this paper presents a compelling argument that an exclusive focus on the ASM sector regarding governance issues remains superficial, as the activities associated with it are intricately interconnected with and influenced by the operations of some large-scale mining endeavours and other actors or stakeholders linked to the operation chain. Consequently, this narrow approach effectively discards both the problem and its potential solutions, neglecting the inherent interdependence between these scales. This highlights our conceptualisation of mining-scale embeddedness according to institutional, operational, and actor levels. These typologies elucidate the intertwined activities of large-scale mining, ASM, and the institutions and various actors linked to the gold mining sector.

It is crucial that every form or level of embeddedness possesses the potential to both enable and constrain. This complexity arises because governmental institutions and market entities (such as large-scale mining companies) might collaborate with chieftaincy institutions to ensure peaceful coexistence in communities and contribute to community development and responsible mining. However, chiefs may also have personal interests, like wanting mining pits of their own or for community members, even if these overlap with mining company concessions at the operational level. Such actions may contradict governmental regulations and hinder efforts to govern the sector effectively. The mining industry is complex, with large-scale mining companies and artisanal and small-scale mining (ASM) operators coexisting in the same sector. While large-scale mining companies have the potential to promote responsible mining practices, they can also bypass regulations and collaborate with ASM operators to allow mining on their concessions. This can perpetuate illegal activities and make it difficult for governmental institutions to enforce sustainable mining practices or formalise activities in the mining sector. Additionally, financiers or mining kingpins linked to ASM operations can facilitate the ongoing activities of the sector, which may constrain governing institutions from fully achieving their governance objectives due to their connections and influence within society. As such, attempting to regulate one sector in isolation is untenable, as these actions and consequences of both ASM and large-scale mining and the diverse actors associated with the sector are deeply entangled. The ‘legal’ and ‘illegal’ facets are inextricably linked, necessitating comprehensive governance measures encompassing both spheres. To regulate illegal activities, equal attention must be devoted to governing the large-scale mining sector and others connected to it.

7. Conclusion

This paper contributes to the debate over continuous calls for the formalisation of the gold mining industry, particularly the ASM sector in Africa, by analysing the governance dilemmas in Ghana’s mining sector. Specifically, the paper attempts to draw attention to what might have rendered ‘unruly’ (though potentially beneficial) mining operations ungovernable and unsustainable. What interests do categorisations or scaling of mining operations afford decision-makers, and whose interests does this organising logic serve? The paper has shown that

several factors blur the organising logic of mining operations and hinder the intended policy outcomes. These challenges include the entangled operations of ASM and large-scale mining companies, the accommodating stance of large-scale mining companies toward local communities engaging in activities on their land due to persistent illegalities and agreements, clandestine manoeuvres by different actors in the mining production chain and the involvement of invincible-invisible brokers across different mining scales. Furthermore, ASM's influence on local economies and the considerable number of people relying on the industry and its networks, rising youth unemployment rates, its rapid financial returns, the ease of gaining access without licensing, the bureaucratic hurdles in licence acquisition, and the flexibility afforded to mine operators by customary authorities all offer it room for manoeuvre and continue despite efforts for formalisation. In particular, the study highlights a critical issue with the weak assumptions underpinning the dichotomy between ASM and large-scale mining, especially its formalisation logic, by revealing how entangled their operations are, which blurs the line between the 'formal' and 'informal' sectors. To some extent, this ensures peaceful coexistence and operational efficiency and avert conflicts in host communities. These connections challenge the assumptions behind their distinct classification and prompt an examination of whose interests this categorisation serves. The study underscores that such categorisations often serve the interests of promoting modernisation narratives or formalisation agendas of governments to facilitate large-scale private sector investments (see, for example, [Hilson, 2019](#)).

The presence of numerous actors mediating the mining sector, from registration through operations, implies that its governance mechanisms no longer solely rely on state institutions or the government ([Prno and Slocombe, 2012](#)). As [Eckerberg and Joas \(2004\)](#) suggest, these now involve a combination of horizontal and vertical approaches so that governance and power do not merely flow from governmental institutions to various actors within the mining chain. It also includes 'non-state actors' – including community members, chiefs, and financiers – who influence the governance process ([Prno and Slocombe, 2012](#)). By introducing the concept of "mining-scale embeddedness," and its three-pronged manifestations within the mining production chain, this study has underscored the intricate dynamics of embeddedness across various levels, highlighting its potential to facilitate and hinder responsible mining practices. Collaboration among governmental, market, and chieftaincy institutions can foster community development and peaceful coexistence, but it may also conflict with regulations, hindering effective governance. Large-scale mining companies may collaborate with ASM operators, benefiting from cheaper production costs but perpetuating illegal activities. Similarly, the involvement of 'mining kingpins' in ASM operations can sustain the sector and impede governance efforts. Such complexities underscore the challenges in enforcing sustainable mining practices and effective sector governance. It elucidates how 'informal' practices intersect with, sustain, and constrain licensed operations across different mining scales. This notion lays the groundwork for regulatory strategies by shedding light on the interactions among various institutions within the mining sector, the array of actors linked to the mining production chain, and their comingled operations. Future research should engage with these levels of embeddedness to understand different forms of collaborations that enable activities or conceal them from state oversight, a prerequisite, we believe, for formalisation practitioners to discover a 'sustainable approach' to conceptualising governance challenges for gold mining and the extractive sector in general.

CRediT authorship contribution statement

Augustine Gyan: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Andrea Behrends:** Supervision, Conceptualization.

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