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Reimagining entrepreneurship in the artisanal and small-scale mining sector: Fresh insights from sub-Saharan Africa

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ABSTRACT

This paper shares new insights on the dynamics of entrepreneurship in the artisanal and small-scale mining (ASM) sector, focusing on the case of sub-Saharan Africa. Despite being the region's most important rural nonfarm activity, and generating finance that sustains a sizable portion of its subsistence/smallholder agricultural economy, ASM has barely featured in the business and management literature. It has rather been scholars from other disciplines who have shared opinions on the individuals who pursue work in this sector and why. They are in broad agreement that in sub-Saharan Africa, ASM sites attract, at the one extreme, people who are desperate for income (the “poverty-driven” category) and, at the other extreme, individuals motivated by the possibility of becoming wealthy (the “get-rich-quick” category). These two narratives map, virtually wholesale, on to the necessity-based-opportunity-based typology of entrepreneurship that business and management scholars have interrogated for decades. This paper fuses these narratives with the typology, with the goal of showcasing ASM within an evolving body of literature on entrepreneurship in sub-Saharan Africa. It then draws on a case study of Kéniéba District (Mali), the location of one of the region's more dynamic gold-panning industries, to articulate more clearly the sector's different entrepreneurs.

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1. Introduction

Over the past two decades, artisanal and small-scale mining (ASM) – low-tech, labor-intensive mineral extraction and processing – has cemented its status as the most important rural nonfarm activity in sub-Saharan Africa (Hilson et al., 2021a; Hilson & Garforth, 2012; Hirons, 2011; Kamlongera, 2011; Maconachie & Conteh, 2021). Its ability to create income-earning opportunities in the region in even the most precarious of settings is unrivalled. The emergence of the DELVE Platform, a comprehensive database established

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using funding awarded by the World Bank with the goal of sharing data on ASM,¹ has brought to light how many people the sector employs directly across sub-Saharan Africa (and elsewhere in the developing world). Even when relying on what conservative figures have come available, it is abundantly clear that tens of millions of Africans depend on ASM for their livelihoods in various ways (Table 1).

Widespread documentation of, and media attention paid to, ASM's largely informal state, environmental impacts and questionable health and safety record, however, has overshadowed analysis of the sector's contribution to employment, and its social and economic impacts more generally, in sub-Saharan Africa. This includes research that casts light on the motivations behind why people choose to pursue work in the sector in the first place (see, e.g., Arthur-Holmes & Busia, 2022; Kelly, 2014; Maclin et al., 2017; Stoudmann et al., 2021). For more than two decades, the broad consensus has been that ASM attracts people who are desperate to alleviate personal hardships *and* individuals who seek to accumulate wealth. The crude typology of drivers that has galvanized, depicted by "poverty-driven" on the one hand, and "get-rich-quick" on the other hand, provides a foundation for nuancing these very different motivations, and more broadly, understanding entrepreneurship in ASM (Aizawa, 2016; Banchirigah & Hilson, 2010; Jönsson & Fold, 2011; Osumanu, 2020). In the case of sub-Saharan Africa specifically, Hilson (2010) was one of the first to do so, arguing that the individuals who fall into each of these categories tend to pursue income-earning opportunities in ASM at different points in time: that those looking to "get-rich-quick" – or the so-called *fortune seekers* – tend to be the first to arrive at sites, whilst poverty-driven groups increase in number as operations become more rooted. Hilson and Hu (2022) build on this analysis, further reinforcing the idea that poverty-driven and get-rich-quick types do, indeed, populate sites at different stages of the ASM lifecycle. The authors also very importantly quash attempts made by a handful of scholars (e.g., Bakia, 2014; Cortés-McPherson, 2019;

Table 1. Estimated ASM employment figures in selected African countries.⁸

Country	Country classification (income group)	Data year	Estimated number of people employed directly in ASM	Estimated number of people dependent on ASM	Major commodities mined on an artisanal and small scale
Burkina Faso	Low	2017	1,000,000	6,000,000	gold
Burundi	Low	2014	60,000	360,000	gold, 3T
DR Congo	Low	2007	2,000,000	12,000,000	gold, diamond, 3T, cobalt, copper
Ghana	Lower-Middle	2016	1,200,000	7,200,000	gold, diamond, salt, sand
Guinea	Low	2016	350,000	2,100,000	gold, diamonds
Madagascar	Low	2017	500,000	3,000,000	gold, coloured gemstones
Mali	Low	2016	500,000	3,000,000	gold
Mozambique	Low	2017	100,000	600,000	gold, coloured gemstones
Niger	Low	2021	600,000	3,600,000	gold
Nigeria	Lower-Middle	2017	400,000	2,400,000	gold, industrial minerals
Tanzania	Lower-Middle	2015	1,000,000	6,000,000	gold, coloured gemstones
Uganda	Low	2018	300,000+	1,800,000+	gold
Zambia	Low	2017	35,000+	210,000+	coloured gemstones, gold
Zimbabwe	Lower-Middle	2015	1,000,000	6,000,000	gold, chromite, lithium

Verbrugge, 2015, 2016) who seek to de-legitimize the poverty-driven narrative using selected and isolated examples and/or by showcasing how many of the individuals who others have claimed had initially turned to ASM because of personal hardship are no longer struggling financially. Hilson and Hu (2022) do so by zeroing in on individual miners' "livelihood trajectories", clarifying that the typology has emerged solely as an aid to help explain why people *initially* turn to ASM for work. Attempts to discredit the poverty-driven narrative on the basis of evidence pointing to individual miners having accumulated wealth over time are, therefore, misleading because their new-found circumstances do not change why they decided to pursue work in this sector in the first place.

Pedestrian analysis of the social and economic impacts of ASM, or its livelihoods "dimension", has exposed the sector to such criticism. This is especially true for sub-Saharan Africa, where due to governments continued downplaying of ASM's importance in rural settings, much-needed policy dialogue on the sector's greater inclusion in the region's development and poverty alleviation strategies has failed to galvanize. Any possibility of reopening dialogue on ASM's livelihood dimension in sub-Saharan Africa hinges upon successful cultivation of fresh ideas and insights that are capable of instigating policy change and jumpstarting corresponding technical interventions. One possible move would be to revisit the "poverty-driven"–"get-rich-quick" typology, with the goal of mapping it on to the "necessity-based"–"opportunity-based" framework that has featured at the heart of debates on entrepreneurship in the business and management literature for decades (Baptista et al., 2013; Brown et al., 2001; Stevenson & Gumpert, 1985). Both categories of entrepreneurship resonate powerfully with government and donor officials, particularly those whose responsibilities extend to the small business and finance space. Certain scholars who carry out ASM research have already pointed out the striking similarities between the typology and the framework, despite, ironically, each evolving autonomously in the literature and debated in different policy spaces (see, e.g., Bashwira & van der Haar, 2020; Hilson et al., 2018a; Kinyondo & Huggins, 2020). Fortifying links between the two, therefore, could facilitate more dynamic analysis of ASM across a broader body of scholarship on entrepreneurship. This would also provide the sector with much-needed visibility in policy debates on rural development in sub-Saharan Africa.

Work which points to ASM sites being populated by more than just groups of individuals who extract and/or process minerals using rudimentary implements has provided a much-needed platform to reconceptualize, *a priori*, entrepreneurship in this sector. In the case of sub-Saharan Africa specifically, analysis *beyond the mine site* (e.g., Barreto et al., 2018; Werthmann, 2009) reveals that many of the region's ASM operations are a part of much larger "ecosystems", each of which is comprised of a multitude of complex organizational structures, nodes and labor hierarchies; spawns and is connected to a series of ancillary industries; and is populated by an eclectic group of individuals. The key takeaway from this body of scholarship is that throughout sub-Saharan Africa, ASM offers a multitude of income-earning opportunities to a range of people who arrive at sites at different points in time, and whose motivations for pursuing work in the sector vary markedly. Dialogue focused on the sector's persistent informality and the negative impacts of its operations, however, overshadows these dynamics.

The purpose of this paper is to stimulate and advance discussion on entrepreneurship at ASM sites in sub-Saharan Africa by shifting the focus of debates towards the ecosystems theme. It begins, in Section 2, by interrogating the broader literature on entrepreneurship, with a view towards “locating” ASM within it. Section 3 builds on this analysis to develop a conceptual framework for nuancing entrepreneurship in the region’s ASM sector. Section 4 uses this framework to contextualize findings from ongoing research being conducted in Kéniéba District, the location of one of Mali’s – and indeed, West Africa’s – more dynamic ASM ecosystems. Here, there are abundant entrepreneurial activities; some are linked directly to ASM operations, whilst others are found on the periphery of sites. Section 5 concludes by reflecting on the implications and general merits of examining entrepreneurship at ASM sites in sub-Saharan Africa through an ecosystem “lens”.

2. Reimagining Entrepreneurship at Artisanal and Small-Scale Mines in Sub-Saharan Africa: Remolding and (Re) Applying Core Concepts and Ideas

It seems inexplicable and ironic in many ways that, in light of their similarities and broaching of near-identical core themes, the necessity-based-opportunity-based framework and poverty-driven-get-rich-quick typology evolved in separate bodies of literature. The former has emerged as a useful apparatus in the business and management literature for disaggregating individuals’ entrepreneurial aspirations. As will be explained in this section of the paper, these are, for the most part, interchangeable with the two narratives that comprise the ASM typology: get-rich-quick with opportunity-based on the one hand, and poverty-driven with necessity-based on the other hand.

Opportunity-Based Entrepreneurship: Reclassifying the “Get-Rich-Quick” Miner

The opportunity-based segment of the typology is the more established of the two narratives as entrepreneurship has traditionally been associated with people exploiting chances when they arise. More specifically, as Block and Wagner (2010) explain, “Although entrepreneurial opportunities themselves are objective in nature, their recognition and exploitation by individuals is a subjective process”, and “For entrepreneurship to take place, an opportunity needs to be both discovered and exploited” (p. 156). Fully unpacking *opportunity* in this context promises to be a laborious undertaking, although Stevenson and Gumpert’s (1985) landmark work provides a fairly accessible starting point for understanding the mechanics of entrepreneurship as a process. The authors argue that “companies of all sizes encounter difficulty encouraging entrepreneurship when the individual’s interest and the corporate interest don’t coincide”, as well as provide a glimpse of how this plays out in a firm. They furthermore claim that entrepreneurs are opportunistic, as well as creative and innovative but that efforts to operationalize their visions are often stifled by the “exigencies of hierarchy”. Specifically, the more innovative firms exploit, with a high degree of success, the opportunities that the *promoter* type of manager, who “expects surprises and expects not only to adjust to change but also to capitalize on it and make things happen” (p. 3), identifies.

The idea that some individuals seek “to take advantage of a business opportunity” has since become the foundation of what is now understood to be opportunity-

based entrepreneurship. These people are, put simply, “viewed as entrepreneurs who start a business in order to pursue an opportunity” (Block & Wagner, 2010, p. 155), and are generally more prepared to conduct business than their necessity-based counterparts. Unsurprisingly, the evidence points to those who abandon paid employment in favour of pursuing a new business venture – circumstances which encapsulate the opportunity-based entrepreneur – being better equipped (i.e. they tend to have higher levels of education, have more experience, possess more detailed plans and have access to funding) for the transition than those who do so out of necessity (Baptista et al., 2014). Some of the ASM equivalents in sub-Saharan Africa include the experienced diggers and/or redundant large-scale mine workers in the likes of gold-rich Tanzania, Ghana, and Zimbabwe, who arrive at sites with technical skills. They are portrayed as individuals who *choose* to pursue new opportunities (see, e.g., Bryceson et al., 2010; Hilson et al., 2014; Maponga & Ngorima, 2003). Revisiting Hilson (2010), each fits the mold of the individual ASM operator scholars typically associate with *get-rich-quick* behavior and who again, are among the first to arrive at a prospective site. The behavior of the get-rich-quick small-scale mine operator, who relies on his/her experience, connections, and geological knowledge to pinpoint fresh deposits of gold, diamonds, colored gemstones and other economic minerals, is truly reminiscent of what would be broadly considered by business and management scholars to be associated with opportunity-based entrepreneurship.

A shortage of analysis on get-rich-quick ASM operators – particularly those in sub-Saharan Africa – in the body of literature on opportunity-based entrepreneurship is ironic when considering the sector’s policy treatment. Specifically, whilst donors and regulators routinely acknowledge that a large proportion of the ASM workforce is, indeed, “poverty-driven” (see, e.g., Barry, 1996; UNECA, 2003), most of the sector-specific legislation, policy frameworks and support services designed and implemented by these parties are tailored to opportunistic, get-rich-quick types. In the case of sub-Saharan Africa specifically, this is most visibly reflected by: (1) a series of complex licensing and permitting systems, and associated costly application processes, designed and implemented by host governments for ASM; and (2) the promotion of sophisticated equipment, the distribution and availability of which is typically financed by donors under larger multimillion dollar mining technical assistance projects. Only individuals with experience, connections and capital are likely to be in a position to cover costly permit fees, and to possess the energy needed to navigate and tackle the bureaucracies associated with securing a license to mine on a small scale. Even if an individual is successful with his/her application, there is a chance of it being abandoned on account of there being no mineralized lands available to work because they have been included as part of concessions demarcated to large-scale mining and mineral exploration companies. A number of scholars (e.g., Hilson et al., 2018a; Hinton et al., 2010; Spiegel, 2015; Tschakert & Singha, 2007) have shared stories from countries in sub-Saharan Africa with sizable ASM economies, including Ghana, Niger, Zimbabwe, and Central African Republic, of the struggles endured by prospective licensees who have elected to follow the rules. The obstacles they face are formidable, which explains why today, in sub-Saharan Africa, so few people engaged in ASM possess the requisite permits and licenses, and consequently, why most of the sector’s activities are rooted in the informal economy.

Another reason why the lack of coverage of the “get-rich-quick” ASM operator in the broader body of work on opportunity-based entrepreneurship is so surprising is that both narratives are grounded in similar ideas and rooted, to some extent, in complementary literature. One of the more inexplicable developments is how the bodies of literature linked to both broach the theme of “pull” and “push” almost identically. These motivations, pitched and disaggregated as aspirations behind why individuals pursue business interests, have been at the heart of entrepreneurship literature since the early-1980s. Shapero and Sokol (1982), and Gilad and Levine (1986) are among those credited with laying the groundwork for contemporary debates on “push” and “pull” factors in the context of entrepreneurship. The former coined the “entrepreneurial event”, which, they argued, can precipitate initiative-taking, a consolidation of resources and risk-taking. The authors contest that displacements, sudden developments and negative information typically spawn *entrepreneurial events* and the specific courses of action taken in response are shaped by perceptions of desirability and feasibility. The latter explicitly interrogate and differentiate between “push” and “pull” factors of entrepreneurial motivation:

... the “pull” theory, postulates that the existence of attractive, potentially profitable business opportunities will attract (“pull”) alert individuals into entrepreneurial activities ... Proponents of the “push” theory argue that people are pushed into entrepreneurship by negative situational factors such as dissatisfaction with existing employment, loss of employment, and career setback ... [p. 46–47]

Subsequent work (e.g., Amit & Muller, 1995; Dawson & Henley, 2012; van der Zwan et al., 2016) has sought to further disaggregate these drivers by weighing in more closely on what governs individuals’ choices to pursue self-employment and the extent to which the move is compulsory. As Kirkwood (2009) explains, broadly, “People have various motivations for becoming an entrepreneur”, notably on the one hand, “Push factors [which] are characterized by personal or external factors”, and on the other hand, the “pull factors [which] are those that draw people to start businesses – such as seeing an opportunity” (p. 346).

In the context of ASM in sub-Saharan Africa, “push” and “pull” have been identified and disaggregated for similar reasons. At approximately the same time the theme first surfaced in entrepreneurship literature, it began to be included in works focused on subsistence agriculture and rural livelihoods in sub-Saharan Africa. It was initially used (see, e.g., Reardon et al., 1988; Haggblade & Hazell, 1989; Haggblade et al., 1989) to contextualize motivations behind peoples’ movement from agriculture into the nonfarm economy, with scholars differentiating between – once again, mirroring the general entrepreneurship literature – “necessity” or “involuntary distress reasons for diversifying” and “choice” or “voluntary and proactive re diversifying” (Ellis, 2000, p. 55). Scholars would later build on this work by zooming in on ASM – again, the most important rural nonfarm activity in sub-Saharan Africa today – into which, it was reported, masses of people were being *pushed*, due to what Banchirigah and Hilson (2010) refer to as “agricultural poverty”. As most rural families in sub-Saharan Africa engage in some capacity in agriculture at a household or subsistence level, large shares of the region’s ASM labor force are “farm hands” whose movement into the sector is attributable to what is commonly referred to as *distress-push* diversification.

Development scholars (e.g., Barrett et al., 2001; Buchenrieder, 2005; Möllers & Buchenrieder, 2005) distinguish this from more opportunity-based situations, which they commonly refer to as “demand-pull” diversification.

Necessity-Based Entrepreneurship: Re-Casting the Poverty-Driven Miner

At the other extreme is, as indicated, “necessity” entrepreneurship, a term first coined in the Global Entrepreneurship Monitor (GEM)² in 2001 (Brewer et al., 2014; Reynolds et al., 2005). As indicated, it was introduced to distinguish voluntary pursuit of an opportunity from entrepreneurship dictated by a lack of alternative employment opportunities (Block & Wagner, 2010). The broad consensus among scholars who carry out research on necessity-based entrepreneurship is that, in line with the theme of being *pushed*, the motivations for engagement tend to be “negative” (Dawson & Henley, 2012), such as unemployment, redundancy, or a shortage of job prospects (Kirkwood, 2009). There is broad agreement among business and management scholars that necessity-based entrepreneurs generally have higher levels of neuroticism and lower levels of general self-efficacy than their opportunity-based counterparts (van der Zwan et al., 2016), are typically not in a position to plan carefully, and have less time and fewer capital/knowledge-based resources at their disposal (Block et al., 2015).

Most of these characteristics apply to a sizable segment of the ASM workforce in sub-Saharan Africa. The sector’s association with personal hardship was first acknowledged publicly in May 1995 at the World Bank-hosted conference, *The International Roundtable on Artisanal Mining*. Here, delegates openly acknowledged that, “to a large extent, informal mining is a poverty-driven activity” (Barry, 1996, p. 1). Several scholars have since weighed in on the idea that ASM is, indeed, poverty-driven, populated by individuals whose circumstances mirror those of necessity-based entrepreneurs. Initial investigations into the links between the growth of ASM and poverty (Weber-Fahr et al., 2001; Andrew, 2003; Hentschel et al., 2002; Sinding, 2005; Buxton, 2013) reinforced ideas exchanged at the *International Roundtable*, and claims that the sector’s rapid growth is the result of it absorbing a growing number of otherwise-jobless individuals.

Assessments of ASM in sub-Saharan Africa specifically have cultivated an image of a landscape scarred by poverty in which the sector has, very crucially, provided a livelihood to masses of unemployed men and women (Dondeyne et al., 2009; Dreschler, 2001; Hilson, 2016). Again, only conservative employment estimates are available but a series of qualitative studies carried out over the years (see, e.g., Aizawa, 2016; Ferring et al., 2016; Mawowa, 2013) have generated detailed profiles of ASM operators/groups in sub-Saharan Africa which also point to there being a causal relationship between individuals’ personal circumstances and their choice of work. Today, what is widely considered to be the region’s body of poverty-driven ASM operators is eclectic in its composition: it is not only comprised of individuals whose presence at sites is attributable to “agricultural poverty” but also people made redundant in the public sector, as well as across the primary, manufacturing and services industries, a direct consequence of the structural adjustment lending³ widespread throughout the region in the 1980s and 1990s (Banchirigah, 2006). Some of these miners continue to struggle,

trapped in a vicious cycle of poverty characterized by, *inter alia*, low levels of investment, an inability to accumulate earnings and a dependency on rudimentary technology (Hilson, 2012; Labonne, 2014; Wilson et al., 2015). Others, however, have managed to accumulate wealth, positioning themselves to progress along a more sustainable livelihoods trajectory – cases which, as noted, are often misconstrued as being opportunity-based entrepreneurship (Hilson & Hu, 2022).

Building ASM into scholarly debates on entrepreneurship is a critical next step if the poverty-driven-get-rich-quick typology is to receive the cross-disciplinary exposure and spotlight it deserves. Doing so, however, requires nuancing further a body of literature on entrepreneurship that has been shaped almost exclusively by research carried out in, and experiences from, developed world settings. Although business and management scholars have shown a willingness to extend these debates to developing countries, rarely have they looked comfortable doing so. These scholars have tended to rely on sweeping generalizations such as “In general, pull factors have been found to be more prevalent than push factors” (Kirkwood, 2009, p. 346) and “Necessity entrepreneurs ... represent a substantial proportion of entrepreneurial activity around the world, accounting for more than half of all entrepreneurs in developing countries, and roughly one-fifth in developed countries” (Nikiforou et al., 2019, p. 2166) to frame their work. They continue to do so despite a *detailed* understanding of context – namely, the availability of resources, the presence of various actors, the types of activities being undertaken, firm characteristics and the nature of institutions – being so crucial when it comes to articulating and mapping the growth trajectories of entrepreneurs (Williams, 2014).

Poor knowledge of the local context and an unwillingness to adapt foundational ideas in part explains why scholars have struggled to diagnose entrepreneurship accurately in sub-Saharan Africa, where the circumstances fueling the growth of small businesses are often unique even among developing countries. Bridging this gap requires a commitment to studying closely the dynamics of the informal economy, which accounts for 70 percent of the region’s employment (and up to 90 percent of rural nonfarm unemployment) and generates 55 percent of its GDP (IMF, 2017; UNECA, 2015). These figures correspond very closely to the makeup of region’s ASM sector, at least 80–90 percent of which is found in the informal economy (World Bank, 2020). Outside of a small collection of studies (e.g., Hilson et al., 2018a, 2018b; Hilson & Maconachie, 2020), however, the entrepreneurial trajectories of those operating at ASM sites in sub-Saharan Africa have received minimal attention in the literature. The next section of this paper seeks to bridge this gap by developing a conceptual framework that helps to contextualize entrepreneurship at ASM sites in sub-Saharan Africa. It begins by examining the broader picture on informal sector entrepreneurship in the region, and subsequently connects this analysis to experiences in its ASM sector specifically. Broaching the theme of “ecosystems” raised at the beginning of this paper, the analysis, very importantly, broadens discussions on necessity-based-opportunity-based (and corresponding poverty-driven and get-rich-quick) entrepreneurship in ASM (in sub-Saharan Africa) to include the ancillary economic activities that surface in and around sites. A greater appreciation of the context in which ASM has emerged and now flourishes in sub-Saharan Africa is essential if the suite of entrepreneurial activities on display at sites is to be accurately diagnosed.

3. Conceptualizing Entrepreneurship at ASM Sites in Sub-Saharan Africa: Embracing the Ecosystem Theme

In the absence of adequate demographic, site and geological data on ASM, sweeping generalizations are frequently made about the sector's operators and activities. The DELVE Platform was launched specifically to address this problem but at the time of writing, it had only been active for three years. Data on ASM are accumulating on the DELVE Platform but it will take some time before information infiltrates and ultimately has a lasting impact within the donor and policymaking circles where important decisions for the sector are made. The key is generating data that showcase, in depth, the sector's livelihoods dimension and which are capable of challenging the views that policymakers continue to cling to and have difficulty discarding. For sub-Saharan Africa, this will require crafting storylines that stack up against powerful images that depict ASM as a sector which causes significant environmental degradation; has a poor health and safety record; is populated by individuals who encroach on to the concessions of companies to work; and attracts a series of foreigners – most recently, Chinese “gold seekers” and workers – who have caused additional problems (Crawford & Botchwey, 2017; Rustad et al., 2016; Thornton, 2014).

A radical conceptualization of entrepreneurship in ASM would go a long way toward rewriting the narrative. In the case of sub-Saharan Africa specifically, it would help to illuminate, once again but with renewed emphasis and a sense of purpose, ASM's livelihoods dimension, which has long been obfuscated by extensive media coverage of the sector's negative aspects. Before elaborating further on the ecosystems theme, it is instructive to first provide a snapshot of the main features of the informal economy in sub-Saharan Africa in which such a large proportion of the region's ASM sector is found.

Context: Connecting the Dots

There appears to be a fair degree of generalizability from the conclusions drawn by scholars about the nature of entrepreneurship in the region's informal sector on the whole. Not only do those operating in ASM in sub-Saharan Africa exude similar attributes to those of the typical informal sector entrepreneur working in the region but they also seem to have near-identical livelihood trajectories and face similar challenges in their quests to accumulate wealth.

The entrepreneurial behavior on display at most ASM sites in sub-Saharan Africa mirrors analysis of the nature of activities found in the region's wider informal economy. What are its most salient features? The first is, unsurprisingly, that most entrepreneurship in the region's informal sector is of the necessity-based variety. There is now broad agreement among business and management scholars that “Necessity entrepreneurs are strongly associated with the informal economy, representing a large percentage of economic activities in developing societies and countries” (Ligthelm, 2013, p. 60). A similar pattern persists among the region's ASM operations: as indicated, most people found in the sector are unlicensed and fall into the category of poverty-driven.

Analyzing legacies and the individual livelihood trajectories of those engaged in ASM is important in this context because, as indicated, there are scenarios in which individuals who were initially driven to the sector because of poverty manage to accumulate

funds over time and, in the process, stabilize themselves financially. Too often, however, are these trajectories mistaken for “get-rich-quick” or opportunity-based entrepreneurship: an individual’s economic status does not change what pushed him/her into the sector in the first place, nor should it change what type of entrepreneur they are, as their circumstances have shaped their livelihood trajectories. This untenable position is not without precedent as some business and management scholars (e.g., Adom & Williams, 2012) have expressed similar views about entrepreneurship in sub-Saharan Africa more generally, although as has been the case with ASM, the rationale appears to be the same. These individuals, explain Adu-Gyamfi et al. (2023), albeit rather superficially, “may graduate from being necessity-driven to opportunity-driven entrepreneurs” on the basis that they “may gain experience and business knowledge and begin to venture into innovation-driven activities” (p. 173).

A second salient feature of informal sector entrepreneurship in sub-Saharan Africa is that, despite accounts of individuals being able to move beyond a subsistence level, most struggle to innovate. This is, as Spring and McDade (1998) explain, owed to there being “little capitalist penetration, a legacy of the colonial institutions that used Africa as a source of raw materials and new markets but not as a place to invest” (p. 8). Specifically, it is difficult for those driven to the region’s informal economy out of necessity to accumulate wealth, reinvest and reorient their livelihoods because of a lack of coordinated support, the result of a “persistence of institutional voids, understood as the absence of market-supporting institutions, specialized intermediaries, contract-enforcing mechanisms, and efficient transportation and communication networks” (George et al., 2016, p. 377). The evidence suggests that “informal firms face numerous problems, for example, in accessing credit and benefiting from government programs because of their unregistered status” (Amin, 2010, p. 10). In the case of the region’s ASM sector, the story is much of the same due to similar policy treatment. As already explained, governments across sub-Saharan Africa have tended to implement complex licensing frameworks for ASM. They have elected to follow the lead of Ghana, the first country in sub-Saharan Africa to fully legalize small-scale mining, in 1989. In doing so, however, licensing schemes have been instituted, the application procedures for which are bureaucratic and require applicants to make costly payments when completing various paperwork, thus impeding formalization of the sector. In line with *A Strategy for African Mining* (World Bank, 1992), the World Bank’s landmark blueprint for mining sector reform in sub-Saharan Africa, host governments have implemented regulatory and policy frameworks for ASM that appear more in line with the capabilities of the get-rich-quick, opportunity-based operator – a point raised earlier in this paper. It states that:

There is no good reason to create differential access to mineral rights for different classes of mining investor. A state mining enterprise should compete on the same terms as a privately-owned company, foreign on the same terms as national, large companies under the same broad rules as small ones. [p. 22]

Few ASM operators, therefore, have secured licenses, and of those who manage to navigate the bureaucracy and make costly application fees, most continue to struggle to secure bank loans, mobilize capital, access and acquire technology, and obtain geological data. In short, the requisite permits and licenses have failed to change their circumstances, which, on the surface, differ minimally from those of the burgeoning contingent

of miners who choose to work informally. Inappropriate policy and licensing frameworks have, in effect, *created* the informality that today defines ASM in sub-Saharan Africa. Rarely have the region's policymakers owned up to how they have been responsible for pushing ASM down this unsustainable path.

A final point worth noting on informal sector entrepreneurship in sub-Saharan Africa concerns what is commonly referred to as the “missing middle”, specifically how there is a “relatively small large-scale sector and relatively large small-scale sector” and “in-between [there] is a small = medium-scale sector” (Spring, 2009, p. 15). This is owed to the firms that fall into this category being too large to qualify for support from the micro-finance institutions found in the region but not formal enough to access funding from banks and the shallow financial markets typically found in developing countries (Beck & Cull, 2014). Only a small percentage of businesses in sub-Saharan Africa, therefore, manage to scale up their operations to become a self-sufficient small – and medium-scale enterprise which falls into the category of “missing middle” (Anderson-Macdonald, 2013). A similar pattern persists in the region's ASM sector. Here, the problem is two-part, the first being – and a point already broached – that individuals and groups of miners struggle to access the finance needed to mechanize and innovate. Shortages of capital and equipment have routinely been identified by small-scale miners over the years as major barriers to increasing production, reinvesting funds and scaling up operations (see, e.g., Buxton, 2013; Hentschel et al., 2002). The second part concerns government policy, specifically how the orientation of licensing frameworks for ASM, foremost as they relate to the *categorization* of operations, impedes mechanization of the sector. This is visible in countries such as Mozambique, Liberia and Sierra Leone, where, respectively, transitioning from a *Senha Mineira* to a *Certificado Mineiro*, Class C License to a Class B License, and Artisanal Mining License to a Small Scale Mining License, is near-impossible because of the fees that must be paid and bureaucracy needed to be navigated in order to do so. At the same time, however, making this transition is essential if holders of the former category of license are to make any headway in acquiring new technology, hiring labor, and ultimately increasing their production (Hilson et al., 2021b; Hilson & Maconachie, 2020), as holders of a *Senha Mineira*, Class C License and Artisanal Mining License are prohibited from using heavy machinery.

The same applies in countries where ASM “corridors” exist. These are territories established specifically for ASM and are often the only areas where the sector's activities are permitted to take place. In some cases, they provide security of tenure, incubating activities in areas which – at least in theory – are off-limits to large-scale exploration and mining companies. This is the case in Senegal, where citizens must be in possession of an authorization card (valid for one year, and renewable for a yearly fee) in order to engage in ASM. Activities can only take place in corridors which holders of a mining permit, typically a large-scale company, designate. Yet, despite this security of tenure, card holders still struggle to increase production because they are prohibited from using machinery in corridors, and often fail to secure viable terrain from the outset, since “mining companies only establish ASM corridors in the areas of their concession that have minimal gold; thus the areas to which the activities of cardholders are restricted are seen as having very low potential for ASM” (Crawford et al., 2016, p. 29). In neighboring Mali, holders of a Gold Washer's Card face similar circumstances, confined to working in corridors where they are also prohibited from using machinery; even deployment of basic metal

detectors can lead to arrests. Here, companies such as Barrick Gold and B2Gold, with assistance from the World Bank under the US\$20 million *Governance of Mali's Mining Sector* project (World Bank, 2019a), are also being relied upon to identify corridors. Whilst many of these areas, similar to Senegal, are not necessarily seen locally as the most viable, in the DR Congo, the setup is far more precarious. As Geenen (2012) explains, in DR Congo, officials at the Ministry of Mines demarcate artisanal mining zones (AEZs), which are “determined and proclaimed by Ministerial Decree upon advice of the provincial mining administration”. But they do so with the knowledge that the law allows them “to close down the AEZ ... if a “new deposit necessitating large-scale exploitation has been discovered”, which means that “in practice, large-scale actors can always have the upper hand” (p. 325). In DR Congo, therefore, in addition to being prohibited from using heavy machinery in AEZs, ASM operators lack even basic security of tenure.

From these cases, in sub-Saharan Africa, what should be considered the “missing middle” in the ASM sector is the gap created by policies which stifle operators’ ability to innovate and, consequently, to increase their production and mobilize finance. With these licensees being confined, under these circumstances, to a particular level of production, it has become difficult to distinguish them, on the basis of mechanization levels and the general layout of their sites alone, from informal operators.

(Re)conceptualizing Entrepreneurship at ASM Sites: Focus on sub-Saharan Africa

Given ASM’s growing importance as a source of livelihood in rural sub-Saharan, it is inexplicable that the sector has failed to feature in broader scholarly debates on entrepreneurship in the region. This oversight is not entirely unexplainable, however, given how agriculture – a sector in which, as mentioned, poverty has induced movement into ASM across sub-Saharan Africa – itself has struggled to make its mark in the entrepreneurship literature on the whole (Dias et al., 2019; Wale & Chipfupa, 2021). At the same time, ASM’s glaring absence from the literature on entrepreneurship in sub-Saharan Africa could be viewed as an opportunity to formulate a new agenda for research moving forward. Research that focuses not only on the livelihoods of the individuals engaged in mineral extraction and processing activities directly but also the people populating the multitude of additional income-earning activities found in the wider ecosystem, whose presence and work are so crucial to the success of the sector, should be prioritized.

There is justification for such a move, given the direction research on ASM communities in sub-Saharan Africa is trending: the work being carried out by scholars in disciplines such as development studies, anthropology and geography is increasing illuminating the complexities of individual sites as well as revealing the extent to which the sector is entrenched in rural economies in all corners of the region. This body of work has unearthed details about the locations and dynamics of the networks and supply chains the sector’s activities are connected to; the types of ancillary industries they spawn; and backgrounds of the individuals who populate them. Whilst not packaged as entrepreneurship *per se*, this growing body of scholarship implicitly points to the typical ASM site in sub-Saharan Africa being a multilayered *ecosystem*, as well as provides a glimpse of where income-earning opportunities, and ultimately, pockets of entrepreneurial energy, can be found. Every ASM site in the region has unique attributes but

there is some degree of generalizability that can be gleaned from this body of literature about entrepreneurship and income-earning activities in the broader ecosystem it is a part of.

The first relates to the types of auxiliary activities and opportunities that typically emerge at ASM sites across the region, a subject which scholars have reached similar conclusions about. The bulk of analysis produced to date draws attention to the more visible activities that surface within localities surrounding ASM operations. A case in point is Kejetia in Northern Ghana which, as Long et al. (2013) report, “resembles a small town, and gold mining takes place among mud-block homes and a variety of small businesses, including food vendors, pito (millet beer) brewers, seamstresses, petty traders, and mechanics” (p. 201). Similar work undertaken in Northern Guinea provides details of the composition of the burgeoning markets found alongside ASM communities across the country. Here, some people engage in mining activity as well as moonlight as vendors, selling easy, convenient foods (Nordhagen et al., 2021). Moreover, all ASM sites here have “site markets” that offer a small selection of products, notably “unprocessed and uncooked food products including legumes and nuts, fruits and vegetables, eggs, and dairy”, whilst at other locations, people engage as “non-food vendors, offering products ranging from electronics, motorcycle parts, and medications, and non-food services, such as laundry services and motorcycle repair” (Zhang et al., 2020, p. 9). At several other ASM sites in sub-Saharan Africa, individuals display what many would consider to be even greater business acumen. In Burkina Faso, for instance, individuals reinvest monies they earn as “pit owners” to finance the construction of houses, which they subsequently rent to colleagues working on-site (Werthmann, 2009). Similarly, in Ghana, there are people who have identified business opportunities within the burgeoning informal ASM activities that take place after nightfall (Bansah et al., 2018). The most popular pursuits involve the leasing of “excavators and lighting systems to facilitate mining and evade the security forces that typically swamp the informal ASM sites during the day” (p. 467). These entrepreneurs make up a small portion of the country’s vibrant indigenous ASM equipment supply trade, which is presently dominated by rudimentary *ChangFa* machines⁴ dispensed by merchants linked to the depot in the gold-mining locality of Tarkwa (Teschner, 2012).

A second key takeaway from this body of literature is that there has been some effort made to weigh in on who has pursued particular activities. A large share of this work zeros in on women, who, based on the findings shared by scholars, seem to gravitate toward, and flourish in, some of the more menial trades that emerge alongside ASM sites. In Northern Guinea, for example, Stokes-Walters et al. (2021) report that women “fill largely supportive roles at the mining sites – pulling excavated material out of the shafts using buckets, washing and sorting removed material, and transporting material to sites for further processing or eventual sale” (p. 3). Mugu et al. (2020) reported much of the same in Kenya, where women’s work in ASM was observed to be confined to “low end activities”, including “vending food, credit, and carrying and cleaning of ores in the mining sector”. This phenomenon, explain the authors, is attributable to “The formal education level of women in ASM ... [being] low, and a majority of them don’t have valid mining permits”, which is why, they claim, “they are forced to work in low paying tasks in the mining sector subject to exploitation from traders” (p. 21–22). Female entrepreneurs at many ASM sites in Ghana are also heavily concentrated in trades such as food provision, water supply and mobile phone credit sales. When they

do decide to engage in ASM, most choose to work as general laborers (e.g., as head porters or as ore washers) in exchange for a fee for their services (see, e.g., Arthur et al., 2016; Arthur-Holmes, 2021). Work undertaken in Eastern Africa suggests that this could be the result of there being a gendered division of labor in the sector. Research undertaken in Rwanda, Uganda and DR Congo (e.g., Buss et al., 2017; Danielsen & Hinton, 2020; Rutherford & Buss, 2019) certainly suggests that the differentiated labor on display and what has been diagnosed as women having “lesser” roles at sites are manifestations of the norms and cultural values of local societies. Whilst the subject of gendered relations in ASM in West Africa has received comparatively less attention, recent studies carried out in countries such as Ghana (Arthur-Holmes, 2021) and Sierra Leone (Ibrahim et al., 2020) suggest that similar developments may be playing out here as well.

This body of work, however, fails to provide clues on entrepreneurship *type* (although admittedly, it did not set out to ascertain this). Throughout sub-Saharan Africa, those who pursue income-earning activities at ASM sites – whether they are directly engaged in operations themselves or involved in ancillary activities – do so for different reasons. Without careful consideration of an individual’s personal circumstances, therefore, it is challenging, if not impossible, to place him/her in either the necessity-based or opportunity-based category of entrepreneurship with any conviction; the fact that most people in the region find work in the informal economy makes this undertaking even more challenging. From the examples available, it appears that the women engaged in menial trades in the likes of Kenya and Guinea are more aligned with the former, whereas the individuals who acquire property in Burkina Faso and subsequently rent it and those leasing machines in Ghana are closer to the latter. But these conclusions are impossible to reach – nor should they be drawn – without greater appreciation of individuals’ livelihood trajectories, including knowledge of the factors that shaped their decisions to pursue employment in the ASM ecosystem in the first place, and when they arrived at sites. Guided by a conceptual framework developed from analysis presented in this section of the paper (Figure 1), the discussion that follows shares findings from ongoing research

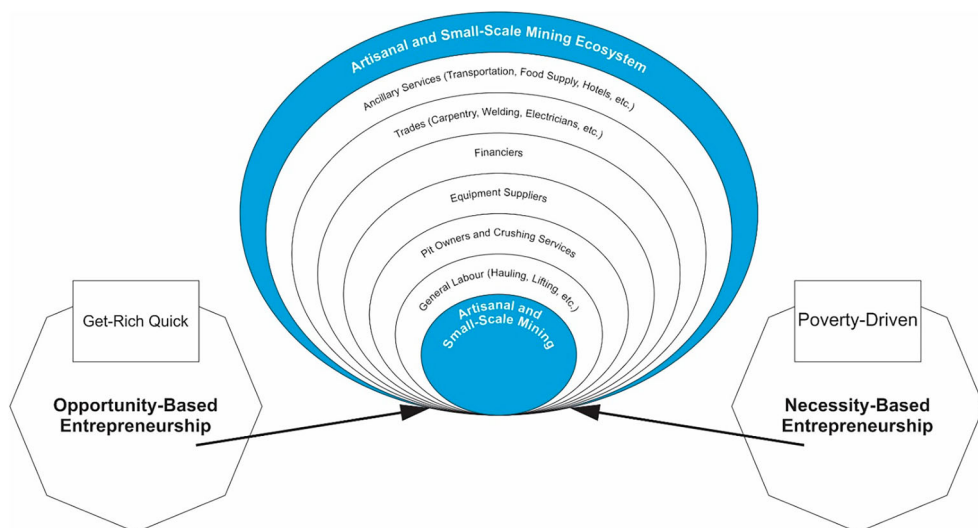


Figure 1. Conceptualizing entrepreneurship in ASM ecosystems in sub-Saharan Africa.

being carried out in Kéniéba District (Kayes Region), long one of Mali's most important ASM hubs. The aim is to provide an extended analysis of entrepreneurship in the region's ASM sector and, emphasizing the theme of ecosystems and, focusing on individuals' livelihoods and personal histories, to lay the bedrock for future research in this area.

4. The Case of Kéniéba, Mali

Background and Overview

Experiences from Kéniéba District (used here interchangeably with Kéniéba Cercle) in Mali (Figure 2) are used here to reinforce and build on many of the points raised thus far in this paper about entrepreneurship at ASM sites in sub-Saharan Africa. In recent decades, Kéniéba Cercle has become an epicenter of gold production in West Africa. It currently hosts three large-scale gold mines: Fekola, Tabkoto and Loulo-Goukoto, each of which is operated by a foreign multinational (B2Gold, BCM International and Barrick Gold, respectively). Kéniéba Cercle is also home to thousands of ASM operators, who work a range of alluvial and eluvial gold deposits, either in groups or on their own. Precise workforce figures are unavailable for Kéniéba itself but according to data retrieved from a census conducted in 2019, within the wider Kayes Region where the cercle is located, there are an estimated 298,307 men and women engaged in ASM here. This figure is

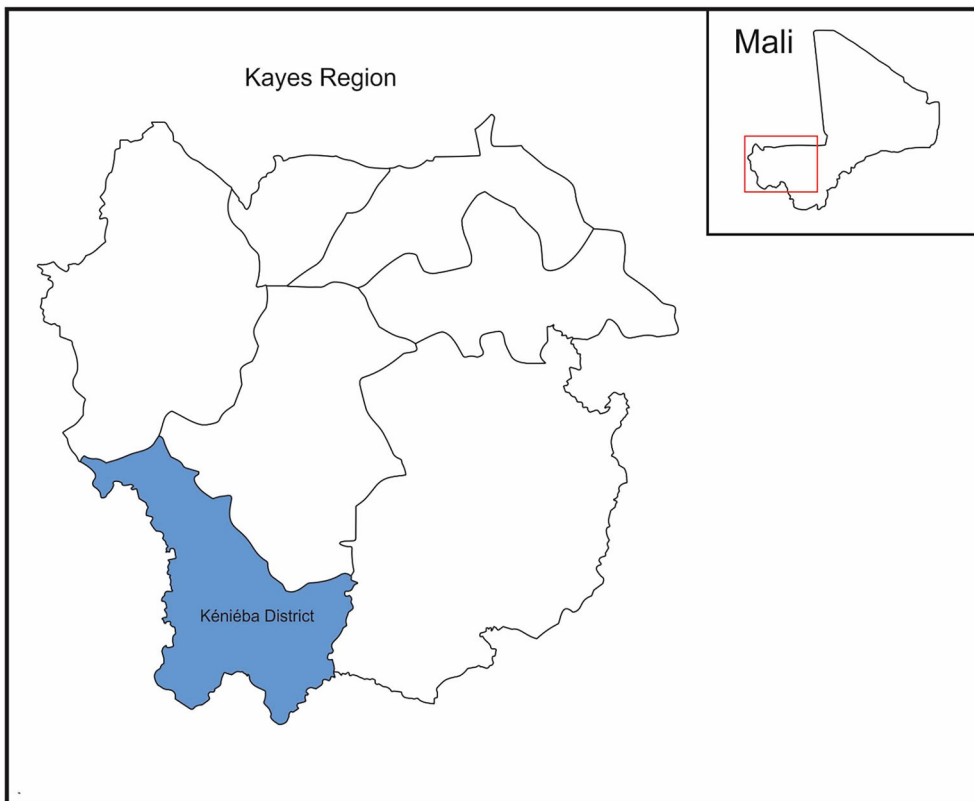


Figure 2. Location of Kéniéba District (Cercle).

likely an underestimate, however, given the continuous influx of people to Kéniéba and more broadly, Kayes, for the sole purpose of engaging in ASM. They do so here and elsewhere in Mali because, it has been shown, earnings from ASM tend to be much higher than other income-earning activities (Boukaré, 2020).

According to Bathé (2016), the majority of people found working at ASM sites in Mali can be placed into one of two groups. The first comprises those with farming backgrounds and includes both individuals who reside locally and those who migrate to sites from elsewhere. Crippled by poor earnings generated from sales of crops cultivated from rainfed harvests, these people typically pursue work in ASM communities off-season to address concerns related to food security. The second group includes all migrants from within and outside of the country, an eclectic group who arrive solely to make money. They bring with them technical expertise and equipment such as crushers and metal detectors, as well as mercury and cyanide – agents that facilitate rapid gold extraction and production.

Few individuals encountered during research conducted between 2020 and 2022 in Kéniéba Cercle, however, fall squarely into either category of entrepreneur identified by Bathé (2016). This is a testament to the lengthy history of Kéniéba Cercle's artisanal gold panning sector and the eclectic nature of its operations, which have lured people with markedly different backgrounds from numerous places, including the districts of Bafoulabe and Kayes, which border it from the north; the Republic of Guinea to the south; Senegal to the west; the district of Kita to the east; and the country capital of Bamako. According to conservative estimates compiled by the government over a decade ago and subsequently reported in the commune's Economic and Social Development Plan, Kéniéba District, which covers approximately 16,400 km², has a population of 197,050 people, although today, due to the aforementioned migration, this figure is likely significantly higher. Kéniéba District comprises 12 communes, most of which host ASM activities: Kéniéba (capital), Dabia, Sagalo, Sitakily, Baye, Dombia, Kassama, Dialafara, Faléa, Faraba, Kourokoto and Guénégoré. Whilst gold has been exploited commercially in Kéniéba District for centuries, dating back to the pre-colonial period, it is only in recent decades that its production has risen precipitously.

Migration into Kéniéba District from surrounding areas began to rise steadily in the 1990s. As Brottem and Ba (2019) explain, since the construction of a bridge over the Bafing River and a paved highway, Kéniéba has become better-integrated into national/regional transportation and commercial networks, connecting it to Bamako and neighboring Senegal. Before this, gold production was severely constrained due to a shortage of technology, poor accessibility to sites and limited marketing opportunities. By the beginning of the millennium, however, the impact of this bridge and highway was evident, as migration into Kéniéba District, fueled by gold mining, had intensified. These "high levels of in-migration", explain the authors, have resulted in "the construction of improvised camps and more established settlements becoming mini boomtowns", despite deteriorated agricultural activity, long the main source of income in Kéniéba (p. 55). Keita (2001) painted a detailed portrait of the economic impacts gold panning in a better-connected Kéniéba District was having, locally, early on:

On the local level, the economic effects include more intense commercial activity in the regions engaging in these activities. That is why we can see the establishment of numerous

businesses like bakeries, shops and jewellers ... A more important volume of financial transactions also translates into an increase in local business activity, due to traditional gold washing, in the town of Kéniéba. At the family and individual level, farmers move to traditional mining to supplement resources because of decreasing agricultural incomes due to slumps in sales or to bad crops caused by drought. Traditional mining contributes to improvements in the living standards of many people and increases their incomes. Another illustration of this increase in family and individual incomes can be seen in Kéniéba where many families survive and pay their hospital fees thanks to money obtained by sales of gold ... In any case, we can assert that the great number of traders on mining sites tends to add to this impression of income increase. It is also true that traders only move to places where the financial resources of populations enable them to "do good business". Rising numbers of motorcycles, bicycles and radio cassettes in these zones is material evidence of this income increase. [p. 11]

Today, Kéniéba District is the location of a vibrant and dynamic ASM ecosystem which, in recent decades, has grown in stature, its expansion fueled by much higher gold prices. Research conducted by the authors in Kéniéba District has captured in detail the range of dynamic employment opportunities ASM creates in Mali. In Kéniéba District, the full breadth of entrepreneurship found in a typical ASM ecosystem in sub-Saharan Africa is on display. In addition to pursuing direct employment at mines themselves, people have migrated to these villages to trade, establish catering businesses and provide services (e.g., as carpenters, blacksmiths and mechanics).

To the casual observer, Kéniéba District is unlikely to stand out. Like most ASM sites in sub-Saharan Africa, it has sprawling markets, teams of mine workers, and numerous supply shops, restaurants and stalls selling mobile phone credit. Kéniéba District is, however, the location of exceptionally high numbers of migrants, although most of the ASM work they carry out is predominantly manual, without machinery. Whilst metal detectors, crushers and generators can be found throughout Kéniéba District, as the use of machinery in this sector is prohibited by government (arrests are common when people are caught using equipment), there is not a culture of equipment supply for the sector on a scale comparable to the likes of neighboring Burkina Faso and Ghana. Under Mali's Mining Code (Ordinance No 99-032-P-RM), artisanal mining is only permitted to be carried out in designated areas called artisanal gold mining corridors or *couloirs d'or-paillage*. Individuals or groups must first obtain a "Gold Washer's Card" from the corresponding authority – in this case, the mayor of Kéniéba District – which is valid for one year and can be renewed (Keita, 2001). Central government is generally not involved in regulating gold washing activities; all responsibility lies with the mayors, as well as other influential local figures such as village chiefs and *tombolomas* (traditional/village guards or police).

The research carried out thus far provides a glimpse of ASM livelihood dynamics in Kéniéba District. Since 2020, 225 people have been interviewed, repeatedly, in these communities, with the goal of broadening understanding of the motivations behind why people choose to pursue work in ASM here, as well as how the income they earn impacts their livelihoods. The bulk of research undertaken to date has been quantitative, aimed at gathering data, at specified intervals, that shed light on spending patterns in communities. Alongside this, however, a smaller qualitative component has featured, targeting approximately 10 percent of the surveyed population, carried out with the intention of soliciting in-depth perspectives on individuals' experiences in Kéniéba's ASM

communities. Analysis of the testimonials collected provide a glimpse of the types of entrepreneurial activities individuals identify and ultimately pursue across the ASM ecosystem, and how this work has impacted their lives.

A Glimpse of Entrepreneurship in Kéniéba District's ASM Ecosystem

All 24 individuals who agreed to participate in the qualitative component of the research indicated shared one thing in common: that their decision to pursue work in Kéniéba District's ASM Ecosystem was strictly out of necessity. Over a period of two years, each was interviewed repeatedly,⁵ in Kéniéba, guided by a survey instrument, the design of which was informed by the Financial Diaries methodology developed by Collins et al. (2009). Financial Diaries, the (collected) information within which are compiled over a specified time period, are used to generate longitudinal datasets that help shed light on how poor households cope with shocks and stresses and manage their earnings. The Diaries template was adapted to include questions capable of eliciting supplementary qualitative data that illuminated peoples' motivations for engaging in work in Kéniéba District's ASM Ecosystem, and their future aspirations. These data were gathered at specific points over a two-year period (2020–2022), as indicated.

The discussion that follows shares details retrieved from 10 of these 24 life histories. These are accounts of individuals who have not worked/are no longer working, full-time, in ASM; they are now enterprising businesspeople scattered in and around the Kéniéba District Ecosystem, engaged in a variety of income-earning activities. Consistent with previous work that has drawn attention to the ancillary industries found scattered across the region's ASM sites, findings from this research magnify the many entrepreneurial opportunities that typically emerge in the sector's ecosystems. Each of the 10 necessity entrepreneurs profiled here have unique livelihood trajectories; some have managed to establish successful businesses and strive to achieve more, whereas others have struggled. The analysis shares findings gathered through repeated engagements that took place with these 10 individuals between 2020 and 2022. It zooms in on their histories, personal circumstances and beginnings, in the process highlighting the diversity of entrepreneurship found at many ASM sites in sub-Saharan Africa.⁶

The Mine Sites

The mine sites themselves do, of course, create income-earning opportunities for many individuals driven to take up manual work but who, after stabilizing themselves financially, are looking to achieve more. In both the Ghana and Tanzania ASM setups, both formal and informal claimholders often lease sections of their plots to individuals who are commonly referred to as "pit owners" (see, e.g., Mwaipopo et al., 2004; Poignant, 2023; UNDP, 2016). These individuals typically hire their own laborers (in essence, people who "pit owners" once were) and pay them a daily wage or in ore.

In Mali, a similar setup exists, although it is entirely informal, and is brokered by the local chief (as again, according to the law, no machinery is allowed to be used in ASM). **Yagare**, a mother of six, claims to have made such an arrangement. She "owns" three gold mining pits – although technically, she is working them illegally, without formal authorization – at the Diambaye site, where her 27 employees deploy eight rope

pullers to haul ore to the surface for washing. She has used the earnings generated from this work to purchase a crushing machine (illegally), which has been operating for two and a half years. The growing number of crushing units surfacing at the site, however, is cutting into her profits, and during a more recent conversation, she expressed concern over the site (Diambaye Djoura) being included as part of a concession recently awarded to a large-scale mining company. She anticipates a forced departure and consequent loss of investment pumped into the three pits but is confident of being able to continue using the crushing business and if not, would be willing to relocate elsewhere to do so.

Sankun's story is slightly different. She moved into ASM, migrating from neighboring Guindinsou village (located in the mountains, also in Kéniéba District but in an area which geologically, cannot support gold washing) at a young age, also out of desperation. But as a number of her relatives were also involved in ASM at the time, she found herself in a rare position to solicit advice from very experienced people about potential directions for investment. After accumulating enough income, she decided to invest in pit development early-on, supporting teams of diggers. She claimed during a recent consultation that she employs 30 people during the rainy season and nearly double this amount during gold "rushes", as well as possessing five crushers (illegally). The proceeds from Sankun's production are used to pay the diggers she employs, for washing and processing. Whilst seen today by many of her colleagues as a successful mining entrepreneur, Sankun has not forgotten the circumstances that drove her to Kéniéba in the first place, nor has she stopped working to expand her enterprise. She underscored these points during an interview conducted early on in the research:

It is not easy to invest in ASM as a single mom. You must be very strong when you have children. We are obliged to provide food and everything for them ... ASM is our primary source of income, [and] as we have no farming land in Kéniéba, we import everything. Only mangoes and leaves are grown here in town. I myself, I am from the mountain area; not from Kéniéba [town]. The so called "mountain people" are well-organized and hardworking. The community is organized in such a way that some are devoted to agriculture and others are devoted to ASM. People from Guindinsou village, up in the hill in Kassama are using the money from ASM to pay for marriage and other household expenses. No one gets marriage money from farming. Kéniéba was originally based on the hill, people moved down to create this town because of gold.⁷

Sankun's unwavering commitment to continue growing her business appears to be due to a combination of recognizing her very difficult beginnings as well as the direction in which she sees the district trending. On the latter point, Sankun explained in a more recent consultation that "Kéniéba is divided between mining companies, and we do not know how the situation will be in 10–20 years". There seems to be a sense of urgency, therefore, to maximize revenue in the short term, including safeguarding existing assets. This explains why Sankun and her partner registered a business, *Cooperative Faso Demeton*, and at the time of writing, were working to obtain formal authorization to undertake ASM, although it is unclear how, in an area without designated gold washing corridors, this will be possible.

Issaka, who worked in Dabaran village for four years as an artisanal miner, has a different take on Kéniéba's future. The 22-year-old father of one explained during a recent interview that "this business has become a very large-scale business and in less

than a few years, given the turnover and the obligations towards the workers I employ, I do not see it being abandoned, [but] on the other hand we want to extend the activities to other centers". It may be a case of Issaka being oblivious to or choosing to ignore the large-scale mine development being planned in the area. The likely explanation for Issaka's positive outlook is his general appreciation for what he has managed to accomplish in such little time after being driven into ASM because of hardship. Issaka reportedly used some of his savings early on to purchase a crushing machine, and subsequently acquired five more; all are being used at the site illegally. He claims that he generates US\$120 daily from these crushers (30–30 bags at US\$5–US\$6 each), employing a team of four. Although he has not formally obtained a Gold Washer's Card, Issaka claims he pays taxes to the mayor's office.

The circumstances facing most aspiring entrepreneurs currently working directly in the district's mine pits, however, mirror closely 36-year-old **Aminata's** situation. Aminata, who is a mother of six and married to a farmer, entered ASM in a desperate attempt to earn income to help cover household expenses. She, like many of her colleagues, are currently in transition, hoping to move out of mining altogether after opening a shop at the site. Attempts to open the shop and fortify its commercial foundation stalled during the COVID-19 pandemic, when ASM activities decreased considerably. But the necessity entrepreneurship angle in the cases of Aminata and several of her colleagues is slightly more nuanced: continued low earnings from ASM work, which she ironically pursued because of hardship endured as a result of being a part of farm household, led her to branch out even further into retailing. When she is not hauling ore at the site, she is selling small items to other miners, with the goal of accumulating enough revenue to open the shop.

Equipment Suppliers

The literature offers few clues on the demographics of the individuals (gender, age, ethnicity, educational level, etc.) who supply equipment to ASM sites. In countries such as Ghana, foreigners tend to supply and distribute equipment, in this instance, Chinese merchants, who supply *ChangFa* crushers, pumps and generators to miners who are desperate to increase their yields (Hilson & Hu, 2022). Across Ghana, there are also countless locals who work in partnership with the Chinese, distributing as well as servicing equipment. The Mali model is slightly different because, as indicated, the use of machinery is prohibited by those in possession of a Gold Washer's Card. This, however, has not deterred individuals from becoming mine equipment suppliers in Mali; there are many people today patrolling sites who offer various small pieces of machinery on a rental basis or for sale.

Aly is one such individual. The 28-year-old, who is married with one son, is based at the Sangare Djoura site, where he sells small equipment, spare parts for crushing machines, and replacement mill motors. Desperate for income, Aly explained in an interview that he moved to the site from Bamako to work with his brother, and after several months, had accumulated enough money to co-manage the business. It was initially Aly's brother who had obtained authorization to open the shop, brokering an agreement with the chief of the village of Loulo and the *tombolomas*. The brothers pay a tax, annually, to the mayor of Kéniéba District, and from the commercial activity observed, there could be sales amounting to US\$1000–US\$2000 per week at the

shop. He recently launched an equipment purchase scheme, which he operates from his shop: artisanal miners take loans and pay when they sell their gold, which is usually on Tuesdays. Aly claimed that his business is now valued in the range of US\$20,000, although there was no evidence in support of this. Overall, Aly is pleased with his decision to move to Kéniéba, as the journey has had a transformative impact, economically, on his life.

One of the most successful equipment suppliers in Kéniéba District is **Abdoulaye**, who claims to have been working here as a “retailer” since 1988. He also considers himself to be one of the pioneering investors in Kéniéba’s ASM sector. He stated in an interview conducted early on during fieldwork that “I was the first trader to bring crushers, mills, tractors, agriculture equipment, vehicles spare parts and many more materials”. Abdoulaye now employs six people, full-time, and boasted that his shop can generate upward of US\$2000–US\$4000 per month in sales during the gold rush period (typically, November to May), although during the wet season, when many miners return to agriculture because of heavy rains, his profits are said to be considerably less. Abdoulaye sees himself as one of the “honest” merchants in the district, paying competitive salaries to his employees (upward of US\$1000 per month), and a communal tax in the range of US\$80 per year. He also stressed that his turnover exceeds US\$100,000 annually, and that he declares all of this to the government (indicating that others do not in a bid to avoid paying tax).

What is often lost amongst Abdoulaye’s financial achievements is that he, too, fell into the category of necessity entrepreneur at one point. But aside from being a successful merchant, he is today seen as a pillar of the community. He reportedly donates approximately US\$1200 a year to the local health center, and is a breadwinner of a large family, explaining during a recent consultation that “20 people rely on me for food, health care, clothing, and my family expenses are about US\$6000 per month”. His revenues are generated solely from ASM clients, and without the sector, he explained, bankruptcy would be imminent. He complained about the high transport costs of bringing items in from Bamako to Kéniéba: the articles sourced are expensive and often, he is out of stock because logistically, it takes a considerable amount of time to both source them and coordinate their delivery. Theft has also become a problem; he claimed he had been robbed the night before a recent interview.

Support Service Providers: Mining and Ancillary

The balance of the necessity-based entrepreneurs consulted fall into the broad category of “support service providers”. Of course, this category could be nuanced further but the stories shared here capture quite clearly the breadth of support services, both mine-related and ancillary, that have surfaced across Kéniéba District’s ASM ecosystem. **Lassina**, aged 34 and father of five, runs a welding business in Sangare Dioura. Following the advice of friends, Lassina, desperate to generate income to support his large family, set up a welding operation here after the *tombolomas* approved. He invested his modest savings in basic equipment and today, earns an estimated US\$100 – US\$150 weekly fixing crushers, motorcycles and milling machines. He explained that sourcing welding equipment can be challenging but nevertheless sees opportunities working with diverse groups of miners at sites, explaining in a recent interview that “as long as there is activity on the site, I will stay in business, because this work is interdependent

of ASM". There are many others who provide essential mine services in Kéniéba, a list that includes carpentry, transport and pit design.

The ancillary services that have surfaced here are even more wide-ranging and unpredictable. **Djene** opened a grocery store at the ASM site in Sakola Village. Previously, she worked as a hauler, as part of a group of women, at the site of Sangare Dioura, where she used her earnings to help cover family expenses. Her earnings dipped dramatically during the pandemic, however, at a time when the government restricted movement at ASM sites throughout the country. She explained in a recent interview that "The cost of food products rose while our gold production decreased at the same time". Djene's decision to open her shop was made out of desperation to secure revenue needed for her household. Women such as Djene have had to rely on savings generated from gold mining to open small grocery stalls.

Fatoumata is one such stall owner, working at the site located in Ponkôfè Djoura village. The 57-year-old and mother of four explained in an interview that in the past, she worked as a customs officer. Following a serious traffic accident that left her with crippling injuries and disabilities (memory loss, chronic pain, etc.), she lost her job and her husband ended up leaving her. Fatoumata decided to move to Kéniéba District to find work in ASM and as a restaurateur. She now invests in five pits, and supplies workers with food. She indicated that she earns US\$200 daily (although there is no concrete evidence in support of this claim), a combination of monies generated from returns on investment in pits and food sales. Fatoumata indicated that she has used the monies she has earned in Kéniéba to finance the construction of a house in Bamako; she is now building a second. Restaurateurs such as Fatoumata generate significant income in ASM ecosystems such as Kéniéba because (mine) operators have no time to prepare their meals. Fatoumata is one of a number of women who have moved to Kéniéba in desperate search of employment, and who have subsequently pursued business interests linked to food supply.

The story of **Hatouma**, a 33-year-old single mother of six, mirrors that of Fatoumata. She, too, pursued work in Kéniéba District's ASM Ecosystem, following the advice of her relatives, all of whom work in pits. Hatouma immediately moved into food selling, opening a stall at the site in Dialafara Village. She has little interest in mine work itself, having sensed an even greater opportunity to maximize earnings selling food, alongside her children, to labourers. Hatouma explained in a recent interview that her business was compromised during the pandemic: a drastic dip in the price paid for gold locally led to reduced ASM activity and, consequently, fewer purchases at her shop. Restrictions made it difficult to source food supplies and, at times, pay for them, because of the rise in prices. She continues to struggle, and complained, during another recent communication, about the lack of support provided by the government to entrepreneurs such as herself.

In summary, the 10 stories shared in this section of the paper provide a glimpse of the breadth of income-earning activities that typically surface at an ASM site in sub-Saharan Africa over time (Figure 3). The Kéniéba District ASM Ecosystem is by no means exceptional when compared to other locations, although it does have its unique particularities. The next section of the paper reflects critically on the analysis presented thus far, as well as shares ideas on how the subject of entrepreneurship in the region's ASM sector should be analyzed moving forward.



Figure 3. A snapshot of the Kéniéba District ASM Ecosystem.

5. Concluding Remarks

This paper had two major objectives. First, it sought to illuminate the dynamics of entrepreneurship in the ASM sector, with the explicit goal of stimulating research on this neglected subject. Poor coverage of this topic is especially surprising in the case of sub-Saharan Africa, a region of the world where, as explained, ASM is the most important rural nonfarm activity and in a number of localities, generates earnings which sustain agricultural production. For decades, social scientists have studied closely the people who pursue work in ASM communities across the region, broadly concluding that their movement into the sector is either attributable to personal hardship on the one hand, or a calculated decision, on the other hand. These two drivers have been neatly packaged in ASM parlance as “poverty-driven” and “get-rich-quick”, respectively.

But inasmuch as each narrative encapsulates radically different motivations, a closer inspection of the individuals present at sites reveals that the people who fall into either group also tend to have very different profiles (personal circumstances, earning potential, demographic traits, etc.). Generally, these dynamics become much clearer when the evolution and expansion of an ASM site are examined longitudinally, which usually reveals that the more opportunistic risk-takers who fall into the get-rich-quick category of operator tend to arrive initially, their energy and labor leading to the discoveries of viable mineral deposits. Over time, as the site becomes more established, demand for labor increases and additional opportunities to earn income emerge, a phase which attracts not only more opportunistic mine merchants but also waves of people, hailing from all segments of society, who are driven to the sector because of personal hardship; these individuals, labelled as poverty-driven, are desperate to find work to support themselves and their families.

There are striking similarities between the poverty-driven-get-rich-quick ASM typology and the necessity-based-opportunity-based framework that has long been at the heart of scholarly debates on entrepreneurship. This is despite the two evolving autonomously and in different bodies of literature altogether, with minimal overlap. Further examination reveals that those who fall into the category “get-rich-quick” fit, almost identically, the

profile of the prototypical opportunity-based entrepreneur. The same applies to the “poverty-driven” category, an eclectic group of individuals, all of whom move into ASM for the same reason: because their survival depends on it. Whilst many of these people have taken up work as general laborers, and will continue to do so, others move to sites with the intention of eventually working for themselves. These individuals fit the profile of the necessity-based entrepreneur, the role and impact of whom has been generalized in the business and management literature over the years. The grafting of the poverty-driven-get-rich-quick typology on to the necessity-based-opportunity-based entrepreneurship framework is seen here as a key to facilitating the ASM sector in sub-Saharan Africa receiving the scholarly attention it deserves.

The poverty-driven/necessity-based entrepreneurship dimension of this equation, however, leads to the second objective of the paper, which was to not only jumpstart research, in the business and management discipline, on entrepreneurship at ASM sites in sub-Saharan Africa but also to do so using an ecosystem lens. As the case of Kéniéba District’s ASM Ecosystem reveals, there are opportunities for self-employment at mine sites themselves as well as – and more visibly – within the multitude of ancillary industries that emerge in and around sites. These – largely-subsistence – income-earning entrepreneurial ventures range from food catering, through trades such as welding and carpentry, to finance. Several studies conducted in ASM communities across the region to date capture these dynamics quite illustratively, but few associate these employment opportunities with necessity entrepreneurship. When doing so, it becomes clear that each individual with entrepreneurial aspirations who has moved into ASM out of necessity has a unique livelihood trajectory.

Experiences from Kéniéba District reinforce this point. Here, there are a number of areas *beyond the site* capable of providing immediate economic relief to individuals in desperate need of income. What needs to be ascertained in Kéniéba District and elsewhere moving forward, however, is precisely *when* individuals pursue these entrepreneurial ventures. Are their livelihood trajectories similar to that of **Lassina**, who moved to the district for the sole purpose of using his welding skills to repair equipment, and immediately focused on providing this service, or are they closer to the journey taken by **Issaka**, who labored at sites for several years before deciding it was necessary to invest in pits of his own? Both are examples of necessity-based entrepreneurship, although the livelihood trajectories of each is markedly different, shaped by the individual’s ambitions and needs. Others, such as **Abdoulaye**, whose achievements obfuscate his humble beginnings and initial struggles, and how his decision to move to Kéniéba District was made purely out of need, also fall into this category of necessity-based entrepreneurship.

What ongoing research being carried out Kéniéba District underscores is how nuanced a picture necessity-based entrepreneurship can become in the region’s ASM communities. Each of the 10 life histories examined yields insights about a unique livelihood trajectory: if all were mapped on to a timeline, it would quickly become apparent that, upon arriving at sites, *different* people engage in necessity-based entrepreneurship at *different* points. The main concern moving forward, however, is how far removed policymakers and donors seem to be from these dynamics, foremost the idea that ASM sites are ecosystems that attract a range of people, each of whom is associated with his/her own livelihood trajectory and pursues work in different areas. Importantly, technical assistance targeting the region’s ASM sector has been ramped up in recent decades, with considerable funding

ringfenced for activities aimed at supporting its livelihoods “dimension”. For example, referring once again to the Mali case, under the US\$40 million World Bank *Mali Governance of Mining Sector* project (2020–2025), US\$12.4 million has been pledged for “Maximizing the local development impact of mining”, a list of objectives that include “supporting economic empowerment of women, who represent 50 percent of the ASM workforce” (World Bank, 2019b, p. 21). Whilst commendable, the pledge made to pursuing work under this project with the goal of “supporting economic empowerment of women” that sheds light on the different areas of work available to them at sites, their motivations for pursuing it and where opportunities for entrepreneurship lie, lacks nuance. Women have moved into districts such as Kéniéba because they are desperate to earn money; they now covet support in the activities *in which they are now engaged*. Yet, from the diagnoses of Mali’s ASM sector shared by the Bank, it is apparent that a radically different approach to “empowerment of women” is being planned, which includes a push to remove them from sites altogether. The approach has been shaped by assumptions and unfounded views such as “women are relegated to low-pay occupations”, work “mainly in the crushing and washing of waste rock, or for cooking and cleaning” and “while working side by side with men on gold digging, cultural tradition dictates that women turn over all gold to their husbands, who remain the sole owners of family assets” (p. 6). The World Bank, as well as other donors such as the European Union, GIZ, the Global Environmental Facility, the UK Department for International Development and various branches of the United Nations, has, over the years, adopted a similar approach to supporting ASM livelihoods in other African countries, including Ghana, Tanzania, Zimbabwe, Mozambique and Burkina Faso (see, e.g., Hentschel et al., 2002; ILO, 1999; UNECA, 2003; World Bank, 2019b, 2021). The results have also been underwhelming; the work undertaken has failed to adequately unpack the livelihoods dimension of ASM, consequently spawning inappropriate interventions.

The adoption of a more holistic, ecosystems-focused approach, capable of unearthing the truths about ASM, could be a gamechanger for the sector in Mali and elsewhere in sub-Saharan Africa moving forward. At a minimum, it would illuminate the many different economic activities that emerge alongside, and which are inseparable from, ASM, and zoom in on the types of people pursuing work here. A more complete picture of entrepreneurship at sites, captured through an ecosystem lens, would go a long way toward rewriting the narrative on ASM’s economic indispensability in sub-Saharan Africa moving forward.

Notes

1. See ‘DELVE: A Global Platform for Artisanal & Small Scale Mining Data’, <https://delvedatabase.org> (Accessed 3 May 2023).
2. Established in 1999, the GEM is recognized as the world’s foremost study on entrepreneurship. See ‘Global Entrepreneurship Monitor’, www.gemconsortium.org/about/gem/5 (Accessed 4 April 2023).
3. Structural adjustment loans were administered widely by the IMF and World Bank in the 1980s and 1990s, mostly to sub-Saharan Africa. To qualify for these loans, prospective borrowing countries were required to meet a number of conditionalities, including devaluing their currency, liberalizing trade, “rolling back” the state and regulating, and privatizing assets (Crisp & Kelly, 1999).

4. A label given locally to the brand (*Changfa* being the company name) of a suite of technologies manufactured for use in ASM and which are widely used in Ghana today.
5. All interviewing was carried out in Bambara (the most commonly spoken local language in Mali) and French (the country's official language), transcribed, and later translated into English.
6. Ethical clearance for this research was obtained from the University of Surrey. As a requirement, the names of each of the 10 individuals profiled here were anonymized.
7. Sankun is divorced although at the time of her first interview, she was about to remarry.
8. Data extracted from "World Bank Country and Lending Groups", <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>, and "The Artisanal and Small-scale Mining Knowledge Sharing Archive", <http://artisanalmining.org/InventoryData/doku.php/country;country> (Accessed 4 June 2023).

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