Chapter 2. Theorizing the global gold production system

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Abstract: This chapter presents a framework – the Global Gold Production System – for analyzing trends in global gold production, and how these trends are shaping local gold mining practices. While this framework builds on the literature on Global Production Networks (GPN), it also addresses its relative neglect of resource extraction and informal production. We identify three systemic trends in global gold production: rising scarcity, cost pressures, and mounting societal resistance. At the local level, these systemic trends feed into gold mining crystallizations: dynamic and interconnected sets of gold mining practices, in which the factors of production and associated social relations of production crystallize in particular ways. At the same time, these gold mining crystallizations are also embedded in- and shaped by the broader institutional and ecological context.

Keywords: Global Production Networks (GPN); Informal Economy; Gold; Extractive Industries; Mining

This chapter sets the stage by presenting an overview of different explanatory frameworks that attempt to make sense of the globalization of production. We briefly discuss World Systems Theory (WST), Global commodity chains (GCC) and Global value chains (GVC), before going more into depth on Global production networks (GPN). While GPN's conceptual entry points – embeddedness, labor, value and power – are quite conducive to our understanding of global gold production, they also have their shortcomings. In this chapter we propose a modified GPN framework to make sense of the diversity and connectivity in global gold mining; we will label this 'the global gold production system'. At the same time, we argue that an analytical focus on gold production can contribute to closing two important gaps in the GPN literature. The first one is a preoccupation with the role of (lead) firms in the official, formal part of the economy, and an associated failure to accommodate the role of informal production. The second one is an empirical focus on the transformation of raw commodities into (semi)finished products and a concomitant neglect of the 'beginnings' of global supply chains, the point at which the vital inputs to our global economy are extracted from their ecological environment.

1. The globalization of production

While there is a lot of debate about the origins of economic globalization (Hopkins and Wallerstein 1986), many observers situate the start of the current phase of globalization in the 1970s and 1980s. Between the 1950s and the 1970s, key players in international industries were large, vertically integrated multinational corporations (Gereffi 2014). This changed when, under the influence of the International Monetary Fund (IMF), a growing number of countries in the global South shifted from a model based on import-substituted industrialization, to one based on export-oriented industrialization. Expanding industrial capabilities in newly industrializing countries (particularly but not exclusively in Asia and Latin America), together with the de-regulation of international trade and innovations in communication technology, transport and logistics, created new opportunities for the expansion of production across geographical space (Gibbon et al. 2008). Different tasks in the supply

chain—from raw materials sourcing, over assembly and manufacturing, to packaging and branding—could now be carried out wherever costs are lowest.

In their desire to set up production systems that respond to increasingly exacting consumer demands for low-cost and just-in-time delivery (Newsome 2015), lead firms from 'advanced economies' increasingly started to rely on offshoring (moving tasks from domestic to foreign locations) and outsourcing (shifting tasks to external firms) (Gereffi 2005). All the while, to prevent transaction costs from spiraling out of control, this fragmentation of production across production units and across space went hand in hand with new forms of coordination (Bair 2008; Barrientos et al. 2011; De Neve 2014; Gereffi et al. 2005). Instead of directly controlling their supply chains through vertical integration, lead firms increasingly relied on the codification of complex information so as to transmit technical and product-related information to their suppliers. At a global level, we started to witness a trend towards specialization and differentiation, whereby firms in 'advanced economies' increasingly focused on activities with high added-value such as product design, financing and marketing; whereas firms in developing countries became specialized in manufacturing (Gibbon et al. 2008).

In the 1990s and 2000s, global production systems continued to expand, covering a growing number of goods and services (Gereffi 2014). This period also saw the dramatic rise of China and India, which respectively became the 'factory' and 'back-office' of the world. In the wake of the financial crisis of 2008-2009, the global economy entered a new phase, marked by a shift in the power balance towards top manufacturers in China and India, who extended their control over vital nodes in global supply chains, both in the pre-production (design, R&D, purchasing) and post-production stage (logistics, marketing, and branding) (Gereffi 2014: 15). Global production now moved firmly beyond the traditional North-South divide, with a growing number of lead firms based in India and China, and a growing prominence of South-South trade (Horner 2016).

So what does this imply for firms and producers in the Global South? Broadly speaking, the globalization of production has been a highly uneven process, for which outcomes are not only determined by *whether* firms, producers, workers and households are incorporated into global production systems; but also by *how* they are incorporated (Kaplinsky 2000; Hess and Yeung 2006; Milanovic 2016). While participation in the global economy creates obvious employment- and income gains for some (Nadvi 2004), others find themselves in highly vulnerable and exploited positions, testifying to their 'adverse incorporation' into global production systems (Hickey & Du Toit 2007). And while the increase in South-South trade may well create opportunities for small producers across the Global South, because entry barriers into Southern markets like China or India tend to be much lower (e.g. due to more lenient standards), there are obvious risks for a 'race to the bottom', as prices for finished products tend to be lower as well (Horner 2016).

In the following sections, we attempt to synthesize how scholars from different disciplinary backgrounds (prime amongst which are political economy, sociology, and economic geography) have tried to make sense of this globalization of production, by building explanatory frameworks that revolve around metaphors like 'systems', 'chains', and 'networks'. From these frameworks we will select a couple of useful theoretical entry points, while at the same time pointing to important shortcomings. In section 3 we will respond to these shortcomings by highlighting the specific contribution of this volume.

2. Theoretical entry points: systems, chains, and networks

2.1. World Systems Theory

In the 1970s, social scientists started studying the capitalist world-system as a historical system characterized by a specific division of labor, and by successive phases of expansion and contraction. In his seminal book on 'The Modern World System', Immanuel Wallerstein (1974) located the roots of this capitalist world system in the 'long sixteenth century'. The world system he analyzed revolves around the interaction between a core and a periphery, whereby the former exploits the latter by continuously appropriating surplus value. Specifically, the periphery specializes in the extraction and production of primary commodities, which are then processed in the core. This system has allowed core regions to expand their economic, political and military power, to the detriment of the periphery, as epitomized by processes of imperialism and colonialism.

One of Wallerstein's most influential insights was that the capitalist system has always been global in scope, and should therefore be studied on a global scale, a significant step away from the methodological nationalism that underpinned earlier modernization and dependency thinking (Frank 1974). World Systems Theory also drew attention to the international division of labor and the uneven nature of development. Finally, it accounted for the dynamic character of the world system, as countries and regions can shift between core, periphery and semi-periphery, i.e., industrialized countries that are situated in-between the high-profit core and the low-profit periphery (Moore 2000; Selwyn 2011). The different theoretical perspectives that are presented in this chapter all build to varying extents upon the insights produced by World Systems Theory.

2.2. Global commodity chains

In a 1986 article, Hopkins and Wallerstein first coined the term 'commodity chain', in an attempt to make sense of the increased fragmentation of production in the global economy. Specifically, they understood commodity chains as "a network of labor and production processes whose end result is a finished commodity" (1986: 157). The choice of the chain metaphor suggests a linear sequence of inputs and outputs. Yet as Jennifer Bair (2008) observes, this seems to be at odds with Hopkins and Wallerstein's own conceptualization of the world economy as a 'network' of relationships, or a 'web' connecting productive activities with the social reproduction of human labor power (Bair 2005: 155; Rammohan & Sundaresan 2003).

The 'commodity chain' grew into an important concept for studying the globalization of production thanks to the publication of an edited volume by Gereffi and Korzeniewicz (1994): 'Commodity chains and global capitalism'. Shifting the focus from the world system to inter-firm networks, the Global commodity chain (GCC) approach pays central attention to how exporters in developing countries can 'upgrade' through their participation in GCCs, and to how GCCs are 'governed' (Bair, 2005). 'Governance' has a very particular connotation in this context, referring to the "authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain" (Gereffi 1994: 97). Based on this governance concept, Gereffi made his famous distinction between producer-driven and buyer-driven chains. In producer-driven chains, power is held by large and often transnational manufacturers, who exert control over vertically integrated commodity chains that encapsulate domestic and foreign subsidiaries and contractors. This type of chain is particularly common in capital and technology-intensive industries like the automotive industry. In buyer-driven chains, large retailers and branded marketers and manufacturers set up decentralized production networks in various countries, often in the Global South. In buyer-driven chains, power is held by retailers and marketeers. This model is more common in labor-intensive, consumer goods industries, such as garments or toys.

In its application, GCC has mainly been used as a methodology or a mid-level theory focused on identifying and understanding empirical developments, rather than developing generalizable explanations (Selwyn 2011; Yeung and Coe 2015). It has been criticized for its neglect of grand theory and historical processes (Cicantell & Smith 2009), for its narrow focus on governance and inter-firm relations, and for its concomitant neglect of external actors and institutions (Bair 2008; Henderson et al. 2002; Palpacuer 2008), social relations of production (Rammohan & Sundaresan 2003), labor and class relations (Selwyn 2011), and local/regional development dynamics in the places where global flows 'touch down' (Kelly 2013).

2.3. Global value chains

In 2000, a group of researchers that studied the global organization of production agreed upon the adoption of a new common framework: the 'Global value chain' (GVC) approach (Bair 2005). This framework revolves around three central concepts: governance, value, and upgrading. The understanding of governance evolved from governance as 'driving' (by lead firms) to governance as 'coordination' (in inter-firm networks). Building on findings in transaction cost economics, and particularly Sturgeon's (2002) work on modular networks (which showed that not only vertical integration, but also standardization can significantly lower transaction costs), Gereffi et al (2005) developed a new typology of governance structures in global value chains, ranging from very high to very low degrees of coordination: hierarchies, captive networks, relational networks, modular networks and markets. This has shifted the focus from GVC drivers to modes of coordination prevailing at a particular link in the chain, whereby most empirical attention has gone to the relationships between lead firms and first tier suppliers (Gibbon et al. 2008; Bair 2008).

The second central GVC-notion of 'value' builds on the classical economic concept of rent, meaning any profit resulting from unequal access to resources. Four primary sources of rent can be distinguished (Davis et al. 2018): resource, market, endogenous and exogenous rents. Holders of resource rents have preferential access to land or other natural resource deposits (such as governments who can grant concessions to mining corporations); holders of market rents have (near) monopolistic control over markets; endogenous rents are created by producers through developing better production processes or better forms of organization; exogenous rents are external to the production chain and encompass, among other things, access to infrastructure and a skilled workforce, and government policies. The holder of rent benefits from an absence of competition in a context of scarcity. He must either protect these rents by setting up barriers to entry, or innovate so as to create new rents. In today's GVCs, opportunities for rent creation increasingly reside in the 'intangible' parts of the chain, such as design and branding, rather than in manufacturing (Kaplinsky 2000). Hence, in most GVCs rents are now captured by lead firms in the Global North (and increasingly in the Far East), rather than manufacturers or producers in developing countries.

The third concept, 'upgrading', can be understood as the process through which firms and workers move into higher value added activities. This can occur in different ways: by increasing the efficiency of production (process upgrading); by raising the quality and value of the product (product upgrading); by shifting to activities that add more value (functional upgrading); or by shifting to a different chain (chain upgrading) (Humphrey & Schmitz 2000). The current consensus is that economic upgrading does not necessarily lead to social upgrading, i.e. improved wages, working conditions and labor rights (Barrientos et al. 2011; Rossi 2013). Moreover, opportunities for social upgrading are not evenly distributed. Existing research suggests that they mainly take the form of low-skilled jobs for women, skills upgrading for men, improved working conditions for regular labor, and impaired conditions for casual labor (Bair & Gereffi 2001; Bair 2005; Pickles 2012, Rammohan & Sundaresan 2003; Rossi 2013; Taylor et al. 2015).

Similar to GCC, GVC has faced criticism for lacking a firm theoretical basis. Specifically, the restricted view of governance as coordination precludes a broader conceptualization of power (Bair 2005); the narrow focus on upgrading prevents us from questioning the *terms under which* people become incorporated into GVCs (Bolwig et al. 2010); and the orthodox economic view on rent depoliticizes the discussion around value creation (McGrath 2018). More broadly, the GVC-approach nurtures an 'inclusionary bias', concealing how the broader institutional environment –which includes states, international institutions, and private actors (Raynolds 2012)– perpetuates structural inequalities and actively creates exclusion (Bair 2005).

2.4. Global production networks

Responding to two major shortcomings of the GCC and GVC approaches –the neglect of spatial dynamics and the institutional context– followers of the 'Manchester School' of economic geography have developed the Global production networks (GPN) approach (Bair 2008; Coe et al. 2008). Defining production networks as "the nexus of interconnected functions and operations through which goods and services are produced, distributed and consumed" (Henderson et al. 2002: 445), this approach draws central attention to the 'territoriality' of global production. More precisely, GPNs are 'embedded' in national and regional economies, which are in turn shaped by their broader institutional context (ibid.). Other salient features of the GPN-approach include increased attention for the position and agency of labor, and a broadened understanding of value and power. Before discussing these four key features (embeddedness, labor, value, power) in more detail, two terminological shifts need to be clarified: from chains to networks, and from commodity to production.

As indicated above, the idea of a 'network' already featured in Hopkins and Wallerstein's (1986) and Gereffi and Korzeniewicz' (1994) definitions. However, a 'relational turn' in economic geography re-conceptualized networks as the fundamental structure of all production, distribution and consumption processes (Hess & Yeung 2006; Coe et al 2008). As Dicken and Malmberg (2001) assert, all firms are networks in themselves. This renewed and broadened understanding of networks opens our eyes to multiple spaces and actors, including those who are strictly speaking outside GCCs and GVCs. As opposed to the linear chain metaphor, the network concept also highlights the non-linear nature of global production (Henderson et al. 2002; Coe et al. 2004). At the same time, it embodies a fundamental tension between place (the horizontal dimension) and flows (the vertical dimension). Jennifer Bair (2008) ascribes this tension to the irreconcilable theoretical roots of new economic sociology (focusing on the micro-level and embeddedness) on the one hand, and GCC/GVC (focusing on the macro-level and inter-firm networks) on the other hand.

Turning to the shift from 'commodity' to 'production', Henderson et al. (2002: 444) explain why they refrain from using the term commodity. A characteristic of a commodity is that it is standardized so that it can be traded on the market. The term is used to refer to raw materials and primary agricultural products. It seems to be ill-fit to capture the diversity in today's manufactured goods. Moreover, the research on commodities has been dominated by orthodox economics, which has obscured the "social circumstances under which commodities are produced and consumed" (ibid.). The authors argue that the term production allows for a broader analytical focus on these social processes involved in the production of goods and services and the reproduction of knowledge, capital and labor power (idem).

2.4.1. Embeddedness

Embeddedness is a core concept in the GPN-literature. It can be understood in terms of 'territorial embeddedness', 'societal embeddedness' and 'network embeddedness' (Bair 2008; Henderson et al. 2002: 452; Hughes et al. 2008). It gained prominence after Granovetter (1985) claimed in his influential article that all humans are social actors whose behavior is shaped by the social environment (particularly the social networks) in which they are embedded.

The strong emphasis on territorial embeddedness originates in GPN's foundation in economic geography, which studies the spatial organization of economic activities and 'territorial economies' (comprising all the economic activities taking place within a geographic boundary, Dicken and Malmberg 2001). In addition, there is recognition that the history and institutions within a particular territory shape 'vertical flows' of goods, services, capital, technology and knowledge. Territorial embeddedness thus draws attention to the ways in which global production networks, and more specifically the different nodes at different scales, are 'anchored' in specific places with their own history and institutions, and how these places in turn influence network dynamics.

The notion of societal embeddedness highlights that 'vertical flows' also intersect with social institutions such as gender, class, ethnicity or caste. Moreover, GPNs are shaped by cultural ideas, values and discourses: from discourses about ethical consumption and sustainability values shaping consumers' decisions (Hughes et al. 2008) to stubborn ideas about female empowerment and docility, which influence the supply of female workers to factories in Bangladesh and Pakistan (Munir et al. 2017). The awareness of such imaginaries influencing actors' decisions at every scale in the production network has prompted consistent calls by GPN scholars to bring in a 'critical cultural political economy' perspective (Brooks 2013; Coe et al. 2008; Jessop 2010; Hess & Yeung 2006; Hughes et al. 2008; Munir et al. 2017; Sayer 2001).

The third notion, that of network embeddedness, focuses more on relations between network actors, regardless of their location in specific places. It relates to the density and stability of relations in the network and the degree to which network actors trust each other, like in the case of diaspora trade links or industrial clusters, where long term and personal relationships shape things such as the exchange of information, access to financial resources, degrees of trust, and the availability of sanctions (Brooks 2013; Dicken & Malmberg 2001).

The greatest challenge for the GPN-approach is to reconcile an analysis of institutions and actors at different scales, with an analysis of economic activities that take place within particular territorial boundaries. Several scholars have struggled with this tension between the 'vertical' and 'horizontal' dimensions of global production, as epitomized in the 'firm-territory' nexus, or in the 'strategic coupling' of GPNs and regional economies (Coe et al. 2004; Coe & Hess 2013; Dicken & Malmberg 2001). For Bair (2008), the embeddedness concept is problematic because there is an inherent contradiction between the global scope of GPN analysis and the local orientation of the embeddedness paradigm (see also Hess & Yeung 2006). It is precisely here that this book hopes to contribute. A similar tension can be found in the primary focus of GPN research on the formal economy and – when discussing territorial embeddedness – on formal state institutions (Henderson et al. 2002). Despite GPN's rightful critique on the narrow inter-firm focus of its predecessors, GPN-scholars have found it difficult to include informal institutions and informal production relations in their analyses.

2.4.2. Labor

Labor offers a particularly useful entry point for studying embeddedness (Kelly 2013; Carswell & De Neve 2013), because "labor–while certainly not immobile–is place-based to a much greater extent than capital. Labor markets therefore are highly variegated and reflect the different livelihood strategies of individuals and households" (Coe & Hess 2013: 7). In the GCC/GVC-approach, labor was generally considered to be nothing more than a factor of production, and a passive victim of processes like globalization, outsourcing, cost reduction, flexibilization and casualization (Barrientos et al. 2011; Bolwig et al. 2010; Coe et al. 2008; Coe & Hess 2013; Cumbers et al. 2008; Selwyn, 2007 and 2011; Smith et al, 2002). The GPN-approach pays more central attention to labor, drawing on insights from labor process theory (Taylor et al. 2015) and labor geography (Coe & Jordhus-Lier 2010; Herod 1997) to study processes of labor control and the agency of ordinary workers.

A first critical insight is that labor power is indeterminate, so that capitalists need to organize, supervise and discipline labor in order to convert labor power (the capacity to work) into actual work (Selwyn 2013; Taylor et al. 2015). Labor control is established not simply through coercion, but also by capitalists "attend(ing) to the conditions under which labor is reproduced (through housing, training and education, welfare provision, etc)" (Cumbers et al. 2010). Mezzadri (2010) points to a disarticulation between the global scale at which production is organized, and the local scale at which labor is controlled. More specifically, she argues that labor control is (deliberately) released by states and capitalists and transferred to local production sites, where it becomes embedded in social institutions related to age, gender, caste and geographical provenance. Focusing on such local production sites, the question about 'informality' (see below and chapter 4) looms large. Yet apart from Alessandra Mezzadri and Nicola Phillips (2011) few GPN scholars have explicitly addressed questions about informal labor.

GPN scholars have dealt with questions of labor agency (Arnold 2013; Azmeh 2014; Carswell & De Neve 2013; Coe et al. 2008; Cumbers et al. 2008; De Neve 2014; Riisgaard 2009; Selwyn 2011, 2013; Thompson et al. 2015). While certainly constrained, labor agency can arise from workers' structural or associational power. Structural power stems from workers' "position in the production process and their ability to disrupt it" (Selwyn 2011: 16). It may take the form of marketplace bargaining power (occupying a strategic position in the labor market due to, for example, the possession of vital skills or the possibility to exit wage labor and survive on non-wage income sources), or workplace bargaining power (occupying a strategic position in the production process and having the possibility to disrupt production). Associational power is "a product of workers' collective organization" (idem). Selwyn's own research in the Brazilian grape sector (Selwyn 2007) illustrates how workers have used their structural and associational power, exercising collective agency during 'export window' periods that are crucial for Brazilian grape exports to Europe, to successfully extract some concessions from the big farms (Selwyn 2007). In their study on the garments industry, Carswell and De Neve (2013) show that workers not only have their own needs and aspirations, but that workers' decisions also shape GPNs by constituting, for example, a very diverse, mobile and fluctuating labor force.

At the same time, we should not remain blind for how wider social and cultural structures constrain labor agency (Arnold 2013; Coe et al. 2008; Coe & Hess 2013; De Neve 2014). This is noticeable in the work on gender, which shows how cultural ideas about women as having 'nimble fingers' or being naturally docile produces certain ideas and values about female workers, constraining them into jobs of low pay and low status (Harriss-White 2009; McGrath 2018; Munir et al. 2017). Building on this insight, Phillips (2011: 385) contends that firms do not merely seek 'cheap' labor; they seek labor that "has particular characteristics conducive to a specific mode of its utilization".

2.4.3. Value

Turning to 'value', GPN has attempted to reconcile two notions of value, both of which were born in very different theoretical traditions: the Marxist concept of surplus value, and the classical economic notion of rent (see Coe et al. 2004; Henderson et al. 2002; Hess and Yeung 2006). While 'rent' has been explained above, 'surplus value' merits a little more explanation. The central premise of the labor theory of value is that capital exploits labor by paying workers less than the value of what they produce, after having forced them into a position in which they are compelled to sell their labor power (Harriss-White 2006). It asserts that the real value of a commodity can be objectively measured by looking at the socially necessary labor time (the time needed under average working conditions and average productivity) contained in its production. For capitalists, labor power (laborers' ability to work) is the prime commodity. But the socially necessary labor time to (re)produce labor power is much lower than the time that laborers actually work for the capitalist. The surplus value that is thus generated, is captured by the capitalist and used for capital accumulation.

In their seminal GPN article Henderson et al. (2012) call attention to three processes: value creation, value enhancement and value capture. While value creation refers to the labour process (through which labor power is converted to actual labor) and various forms of rent, value enhancement relates to the GVC notion of upgrading, as in firms and producers moving to higher value-added activities. Value capture is concerned with distributional issues: who benefits and who loses from the value that is created? This may depend, among other things, on firm ownership or on government policies. In this sense, the latter question also touches upon issues of power.

2.4.4. Power

The GPN-approach has restored 'power' as an important dimension in the global organization of production. While the power of lead firms was a key feature of the GCC-approach (e.g. buyer-driven versus producer-driven chains), the governance typologies that emerged from the GVC-approach tended to depoliticize global production, by zooming in on inter-firm coordination. The shift back from 'governance' to 'power', McGrath (2018) claims, was borne out of a realization that governance always implies the exercise of power. Inspired by actor network theory' (ANT), several authors have drawn attention to the agency of different actors in governing GPNs (Henderson et al, 2002; Hess & Yeung, 2006). Dicken et al (2001) claim that it is not sufficient to study the embeddedness of power in a network. Instead, we also need to look at how power is exercised by particular actors, at human intentionality. In what they have named 'GPN 2.0', Yeung & Coe (2015: 29) hope to develop a dynamic theory of the causal drivers of GPNs, by paying closer attention to firm strategies. Apart from corporate power, however, Henderson et al (2002) also make a case for studying institutional (states, international organizations) and collective (labor unions, employers' organizations, NGOs) power – which brings us back to the notion of embeddedness.

3. Closing the gaps: informality and mineral production

All four approaches provide us with important theoretical, conceptual, and analytical entry points for making sense of global gold production. Of the four approaches, we believe the GPN-approach is best suited to help us respond to this book's main concern - understanding the diversity and connectivity in global gold mining - not least because it aims to understand how gold mining is 'embedded' in - and shaped by the socio-institutional environment. However, while it already goes some way in addressing some of the shortcomings that characterized its predecessors, the GPN-literature still faces important challenges. This book contributes to addressing two of these: the neglect of informal production, and the disregard for the 'beginnings' of global production, notably the extraction of raw materials from

nature. In order to 'close these gaps' and expand the GPN framework we will draw on structuralist approaches to informality, and critical insights on value, territoriality and materiality.

3.1. Informality

Broadly speaking, we can distinguish between three major theoretical approaches to the informal economy: the dualist, legalist, and structuralist approach (Chen 2008; Phillips 2011; Verbrugge 2015). The dualist approach treats the informal economy as a separate and marginal sphere of economic activity, which provides a safety net for those excluded from meaningful formal employment. The expansion of the informal economy is assumed to be counter-cyclical: it contracts at times when the formal economy expands, and it expands in times of crisis, when the formal economy contracts.

The legalist perspective gained prominence with Hernando De Soto's (2000) seminal work on the informal economy. For De Soto, the informal economy is populated by micro-entrepreneurs that lack formal property rights due to a variety of fiscal and regulatory barriers that prevent their entry into the formal economy. In many developing countries, De Soto claims, these legal barriers ware deliberately erected by a 'mercantilist elite' that uses the powers of the state to safeguard its privileges (de Soto 1989). To use the terminology of the GVC-approach, this elite relies on 'endogenous rents', in the form of privileged access to government policies. Legalistic approaches became closely associated with appeals for liberalization and de-regulation, and a minimalist state whose key tasks revolve around the protection of private property. Yet both the dualist and the legalist approach tend towards an essentialist understanding of the informal economy, by treating it as a sphere of marginal activity, or as a hotbed for entrepreneurialism. Moreover, they fail to consider the possibility of linkages between the formal and the informal economy.

Engaging with some of these shortcomings, structuralist approaches (the seminal work is Portes et al. 1989) draw attention to the role and position of informal labor in the capitalist production system, to the functional linkages that connect the informal to the formal economy, and to the role of the state in enabling processes of *informalization*. These processes of informalization are a recurrent and systemic response to crises of accumulation in the capitalist economy (Tabak & Crichlow 2000). More precisely, to counter declining profit rates, employers revert to the exploitation of a cheap and flexible informal workforce. This allows them to avoid "the costs of social security obligations and other substantial overhead costs of formal sector operation" (Meagher 1995: 260). Indeed, as noted in the introduction to this chapter, (lead) firms are not only offshoring parts of the production process to low-cost destinations, but are also outsourcing tasks to smaller firms, and in some cases even to home-based production units that make abundant use of cheap, flexible, and often informal labor. The resulting gains in competitiveness and productivity are "appropriated as profit by large firms and employers, and are not passed on to workers in the form of improved wages and conditions" (Phillips 2011: 384). Instead, we have seen the growth of a "parallel workforce" (Phillips 2011; Barrientos 2013) that works alongside more permanent workers, and is facing the prospect of heightened insecurity and precarity (Harriss-White 2010; Laha 2008). The exploitation of informal labor can occur directly, with companies in the formal economy hiring workers "off the books", or indirectly, with companies outsourcing or subcontracting tasks to companies that straddle the border between the formal and the informal sector. According to Biles, outsourcing and subcontracting even form "the primary means of linking the formal and the informal economy" (Biles 2009: 224). Central attention has also been drawn to the role of middlemen and informal employers in recruiting and disciplining informal labor, acting as a vital "link between providers of capital in the form of raw materials or semi-products" and "workers whose labor adds value to them" (Breman 1999: 455). Finally, structuralist approaches draw attention to the role of the state in facilitating processes of informalization. As noted by Meagher (1995: 265), "ambiguous and inconsistent policy, and policy that is difficult to enforce, represent an

implicit encouragement of informalization". In her work on the Indian garment sector, Mezzadri (2010) argues that the state has supported informalization processes, not only through over-regulation and a lack of enforcement capacity, but also through formal policy choices that favor domestic SMEs –which typically rely on informal labor– over large-scale industrial firms.

By distinguishing between informal workers and employers, structuralist approaches already go some way in overcoming the essentializing tendencies that are evident in dualist and legalist approaches. Moreover, they draw central attention to the intricate ways in which the informal economy is functionally integrated into the global capitalist economy (Philips 2011).

3.2. Mineral production

Paradoxically, increased attention for the long and complex supply chains of manufactured goods has led researchers to forget about the earlier stages of such chains –those involving the extraction and initial processing of primary commodities (Bridge 2008). For this reason, Ciccantell and Smith (2009) have argued for a 'lengthening' of GVCs, and for investigating the extractive industries that provide the global economy with raw commodities like oil, gas and minerals. More broadly, the different theoretical perspectives outlined in the preceding section have little consideration for how production relates to –or preys on– the natural environment. As Bridge (2008: 77) contends, there is a strong case to be made for "thinking about production not as value creation but as a process of materials transformation in which environmental change and the organization/ disorganization of matter and energy are integral rather than incidental to economic activity". The move away from using the term 'commodity' (in WST and GCC) to 'production' (in GPN) may in fact have contributed to concealing the material beginnings of chains. On the other hand, 'commodity extraction' only refers to the point where ores are dug up from the earth. It masks the complexity of actors and processes involved in transforming raw ore into copper, tin, gold, or crude oil into petroleum. When referring to the gold production system, importantly, the term 'production' alludes not only to mining, but also to the exploration, processing, refining, and recycling of gold. In the remainder of this section, we tease out some of the particularities of global mineral production, and how it differs from other forms of production. This discussion will be structured based on the four key features of global production networks that were identified above, highlighting how for each of those a focus on mineral production can enrich our understanding.

3.2.1. Embeddedness

In a rare attempt to apply a GPN-perspective to an extractive industry (oil), Bridge (2008) identifies 'territoriality' and 'materiality' as the most prominent features of extractive production networks. Territoriality refers to the notion of territorial embeddedness that was discussed earlier, i.e., the way in which resources are "embedded in the proprietorial, institutional and cultural-political structures of the nation-state" (idem: 413embedded). While territorial embeddedness is a key feature of all GPNs (see above), natural resources are embedded in state structures to a much larger extent than other commodities, because states are the sole proprietor of the mineral reserves on which extractive firms rely. As a consequence, mining corporations need to negotiate with governments over access to the resources, as well as over the distribution of rents (see below).

Materiality, meanwhile, refers to the material properties of mineral resources (e.g. their depth, size, and location), and how these shape possibilities for extraction. Geological 'fixity' is indeed one of the defining characteristics of mineral resources, and results in mining companies having a limited number of location choices. In this sense, the geographical expansion of (gold) mining is at the same time driven and constrained by the availability of profitable deposits, as will be explained in Chapter 3.

A focus on mineral production therefore draws our attention to material, geographical and ecological conditions shaping global production networks, in a more explicit way than GPN studies have done so far. To be sure, the idea that nature imposes limits on economic processes is not new (Bunker 1996; Boyer 2015). Activities like agriculture and cattle herding have always depended upon physical, biological and climatological factors such as rainfall, the availability and fertility of land, and the gestation time for animals. Yet at the same time humans have been pushing these limits by developing new technologies and relying on ever more intense appropriation techniques. Under the neoliberal model nature is increasingly being commodified; natural resources are privatized, monetized and traded on the market (Castree 2003). More recent work in political ecology has therefore shifted the focus towards the conditions and processes of valuation – as in resources taking on specific forms of value - and nature commodification (Boyer 2015).

3.2.2. Value

Centring on mineral production helps us to comprehend two important critiques that have been formulated on the GPN understanding of value, which is grounded – as mentioned above – in the Marxist labor theory of value and the orthodox economic view on rents. These critiques, on the non-exogeneity of rents and the subjectivity of value, have also been forged in a critical piece by McGrath (2018).

First of all, she argues that some rents (e.g., infrastructure, business environment, government policies, but also resource rents) are conventionally understood as exogenous. Yet if governments and financial institutions are indeed part of GPNs - as GPN scholars would assert - qualifying these rents as exogenous is incorrect. Instead of seeing access to resources as an externality that shapes producers' unequal access to resources, governments, banks and other powerful actors actively *produce* exclusionary access by giving access to some, and taking it away from others. Hence, resource rents are the result of political decisions not to create value, but to *transfer* value to firms (idem: 511). This is quite obvious in the case of mining concessions given out to transnational companies (Emel & Huber 2008). Large-scale, industrial extraction of minerals actually reveals very clearly how value can be created by enclosure and dispossession, as is exemplified in numerous cases around forced displacement and resettlement, protests by indigenous peoples, and clashes between industrial corporations and artisanal miners (Conde 2017). While enclosure is commonly used a means to create value (it also happens via technological innovation and intellectual property rights, for example), the case of mineral extraction is peculiar because of the non-renewable character of minerals. While value can certainly be enhanced by the use of more efficient technologies, or the use of cheaper labor (see chapters 4 and 5), the only way to *create* value is to discover and take control of new mineral deposits (see chapter 3). In this sense enclosure is "a primary competitive logic in extractive industries in the way that improving labor productivity is for labor-intensive manufacturing sectors" (Bridge 2008: 415).

Second, despite what the labor theory of value and the theory of rent claim, value cannot be determined in an objective way. It depends on individual tastes and preferences as well as on cultural appraisals and moral judgements. In his 2008 article, Gavin Bridge mentions that natural resources are not only embedded in states, but also in "national systems of cultural meaning and signification" (2008: 413). This points to a broader observation, namely that natural (mineral) resources are not 'naturally resources', but are also "socio-political constructs" (Baglioni & Campling 2017: 8) or "cultural appraisals about utility and value" (Bridge 2009: 1219). This is particularly apparent in the case of precious metals like diamonds or gold, which have limited use value but a very high exchange value

(Ali 2006). Hence, what qualifies as resources may vary across time and space, and what one group values as a resource is not necessarily the same as for another (Bridge 2009, see work in political ecology such as Robbins 2012). The paradoxical conclusion of these observations on embeddedness and value is that mineral resources are both static (fixed in space, with possibilities for extraction conditioned by their materiality) and dynamic (as socio-political constructs and cultural appraisals) (Baglioni & Campling 2017). What is true for value is also true for labor, which is similarly valued in ways that are shaped by broader cultural and social repertoires. Rammohan & Sundaresan (2003: 905) summarize it as follows: labor is not 'born cheap' in the periphery, it is 'socially priced', having a lower price in the case of female or low-caste workers. The following section will elaborate on labor in mineral production.

3.2.3. Labor

It is labor that transforms natural resources into commodities with exchange value. Yet according to some authors labor - and more specifically the social relations of exploitation out of which natural resources are produced – is necessarily concealed in the material form as well as in the socio-cultural associations surrounding these resources. Baglioni & Campling (2017: 6) for example refer to Hartwick's (1998: 430) work on gold to illustrate how mining companies and jewelers "powerfully and successfully charge gold with strong meanings of love, commitment and economic power, omitting how in South Africa miners work in cramped tunnels, deep in water and breathing dirt-laden air".

This volume places a heavy focus on labor, and in part 2 especially on artisanal miners' labor, as this is central to the 'gold mining crystallizations' we aim to describe and comprehend. In chapter 4 we develop the argument that global gold mining is increasingly relying on flexible, cheap and informal labor. This is evident both in the case of industrial mining – where corporations have evolved from vertically integrated firms to loosely structured networks of subcontractors and suppliers making more use of informal labor – and in the case of ASGM – which has always relied on the exploitation of cheap and informal labor. A focus on informal labor can thus help to fill in the gap identified above

3.2.4. Power

As mentioned, a GPN approach entails consideration for corporate, institutional and collective power. In terms of corporate power, recent years have seen a consolidation of power in the hands of 'diversified' major mining companies, joined in recent years by state-owned mining companies from a number of newly emerging economies (Humphreys 2015). Yet as will be discussed in more detail in chapter 5, the situation in gold mining is different, in the sense that it also boasts a considerable number of smaller and less-capitalized junior mining firms that are active in the risky exploration segment of the industry (Dougherty 2013), as well as ASGM, which now produces up to a fifth of the global gold supply. At the same time, the process of consolidation in the mining industry has gone hand in hand with a trend towards outsourcing. While the mining industry was long considered to have a low propensity for outsourcing because it requires high investments in capital, technology and obtaining concession rights, mining companies are now outsourcing a wide range of activities, from specialized services and support functions to full-blown mining activities (see chapter 4). Taken together, trends towards consolidation and outsourcing are transforming many of the major mining companies into loosely integrated networks composed of different mines and different equipment- and service suppliers. As a result, many of these mining companies are struggling to maintain a degree of intra-firm coordination, so as to make sure that they are more than a 'sum of their parts' (Humphreys 2015).

Institutional power in mineral production networks is situated in various organizations at the local, national and international level. Most attention has gone out to the relations between mining corporations and national governments, or, to a lesser extent, between ASGM and governments (as in the debates around formalization, see chapter 4). This is understandable given the unique territorial embeddedness of mining operations, as was noted above. Nevertheless, mineral production networks are also significantly shaped by international institutions such as the World Bank (directly as a moneylender for many mining operations, indirectly through their influence on national policies) or ethical regulators such as the Extractive Industries Transparency Initiative or the London Bullion Market Association's (LBMA) responsible gold guidance (see chapter 5). At the subnational level institutional power is located in local government as well as in customary, indigenous or social institutions. Sources of collective power, finally, can be found in the collective organization of labor. As will be further documented in chapter 4, labor unions have been traditionally strong in the mining industry, although their power has been significantly weakened in recent decades.

4. Theoretical-analytical framework: the global gold production system

In the final part of this chapter, we develop a theoretical and analytical framework that can help us make sense of the seemingly disparate trends that we are witnessing in global gold mining. While this framework, which we dub the 'global gold production system', builds on insights that emerge from the different theoretical perspectives outlined in section 2, it also integrates our own efforts in section 3 to address the relative neglect of informality and of mineral production.

4.1. Terminological clarifications

Our choice for the term 'system' –rather than chain or network– is not haphazard. Compared to 'chain', which refers in a rather narrow sense to a sequence of nodes and chain actors, the term 'network' expresses non-linearity and broadens the analysis to include multiple actors at different scales, even those not directly involved in the production chain. Yet a network lacks clear boundaries, and may therefore miss analytical precision. 'System', on the other hand, assumes some kind of bounded entity. The fact that a system is bounded does not mean that it is static and immobile –for instance, as we will discuss in chapter 3, the global gold production system critically relies on geographical expansion. It allows us to describe the global gold production system as a living entity: if one of its component parts is affected or touched, other components will react to it. Furthermore, and in line with World Systems Theory, the term system serves as a stark reminder that we need to consider the capitalist system as a whole.

We also wish to clarify our use of the terms 'gold production' and 'gold mining'. 'Gold mining' encompasses all activities to extract and process gold that take place inside- and in the immediate surroundings of the gold mine, which can be an underground or an open pit, a tailings dump, an alluvial site or a riverbed. In practice, this often includes gold processing activities as well. The primary empirical focus of this book lies on gold mining, which will show in the gold mining crystallizations described in part 2. Yet gold moves through several other nodes before it reaches global markets, and it might even end up being recycled, as will be discussed in chapter 5. Incorporating *all* these nodes, the term 'gold production' is much broader then gold mining. It has the double advantage of being multi-scalar – connecting the mine to global actors and activities – and of drawing attention to the social relations of production and reproduction that accompany gold mining, processing, trading and refining.

<FIGURE 2.1 ABOUT HERE>

Fig. 2.1.: The Global Gold Production System (authors' own elaboration)

4.2. Gold mining crystallizations

At the heart of our framework are *gold mining crystallizations*. These can be defined as dynamic and interconnected sets of gold mining practices, in which the factors of production (land, labor, capital and technology) and associated social relations of production that crystallize in particular ways – in figure 2.1 this is symbolized by the triangles, circles and squares in the middle, which, like atoms or molecules, organize in a structure known as a crystal. These gold mining crystallizations can be located in and around mines, which may be underground, open-pit or alluvial, and are embedded in a particular ecological and institutional environment. Indeed, the anatomy of gold mining crystallizations is not merely a localized reflection of structural trends in the global gold production system, but is the inherently unstable product of an interplay between trends in global gold production (the upper part of the framework), the institutional context (upper circle, what Bridge (2008) refers to as 'territoriality'), and the ecological context (lower circle, what Bridge (2008) refers to as materiality).

As several chapters in part 2 will illustrate, gold mining crystallizations can be studied empirically by paying attention to, amongst others, the different types of gold mining activities and the interactions that exist between them; the different actors involved in gold mining, and by extension in gold processing and -trade; the ways in which labor is organized, recruited and controlled; the types of costs and revenue-sharing arrangements; land tenure arrangements and associated royalty arrangements; the use of technology; and so forth. These empirical realities can only be fully understood in relation to the other components in the figure, from local ecological and institutional realities, to structural trends in global gold production. Crucially, such an empirical analysis of gold mining crystallizations can also engage with questions of labor agency, i.e., how ordinary workers are not only shaping mining practices and the distribution of risks and benefits, but ultimately even the global gold production system as a whole. However, because of our overarching focus on the way in which the global gold production system touches ground in particular contexts, more emphasis will be given to the structural conditions shaping labor practices, and relatively less to labor agency. Moreover, the empirical focus will be on activities and labor in and around the mines, while tasks further down the supply chain such as trading, refining, and recycling will be largely left out of the chapters in part 2.

4.3. Trends in global gold production

The upper part of the figure captures a number of structural challenges and responses in global gold production. In terms of challenges, we identify scarcity, cost pressures, and resistance. While scarcity has always been a challenge for gold miners, it has become more apparent in recent years and decades, as epitomized by decreasing average ore grades and declining ore quality in most major gold mining destinations (Mudd 2007). Despite a steady increase in exploration budgets, the rate at which new gold discoveries are being made has notably decreased. Moreover, there have been no more 'world class discoveries' that can change the fate of the gold mining industry, like the Witwatersrand gold fields in South Africa or the Carlin Trend in Nevada (WGC, 2018). Many of the newly discovered gold deposits also have a highly complex mineralogy, and are more difficult and more expensive to explore, extract, and process (Mooiman et al. 2016). A growing number of observers agree that we are rapidly approaching the point of 'peak gold', when maximum gold production is reached (Kerr

2012). In a special report marking its 30-year anniversary, the World Gold Council concluded that "The general trend in mine supply is most likely down. Although the industry can sustain production around current record levels for the next few years, global mine supply looks set to enter a period of secular decline over the long term" (World Gold Council 2018). Increased scarcity, and the need to target deeper and more complex deposits, have been a major factor underlying increases in production costs. Finally, resistance to mining is challenging gold production in significant ways, as is discussed below and in chapter 3. The global gold production system has historically responded to these challenges in three major ways: through geographical expansion (chapter 3), through informalization, i.e. an increased reliance on cheap and flexible informal labor (chapter 4), and through technological innovation (chapter 5).

These structural challenges and responses stand in constant interaction. For instance, as will be described in more detail in chapter 3, while the global expansion of gold mining may temporarily address the problem of scarcity, it can also contribute to rising cost pressures, and may generate new forms of resistance. Similarly, while informalization may address the problem of rising (labor) costs, it can also generate opposition from these workers.

4.4. The institutional context

In addition to being scarce, gold is fixed in space, so that gold miners have to go wherever it can be profitably mined. Here, they need access not only to stable and secure property rights, but also to a trustworthy workforce. With the upper circle in figure 1, we wish to draw attention to how gold mining crystallizations, including access to land, labor, capital and technology, are shaped by the multi-scalar institutional environment. We understand institutions as the 'rules of the game' that determine who has 'access' to gold –which is understood here broadly as "the ability to benefit from" (Ribot & Peluso 2003). It is important to recognize that the relationship between institutions and gold mining crystallizations works in both directions: the institutional environment is not only shaping who has access to gold and who can participate in its production, but gold mining also has an impact upon institutional trajectories. Whether or not this contribution is positive has been the subject of intense debates in the literature on the so-called 'resource curse' (for an overview see Rosser 2006).

In most countries, underground resources are owned exclusively by the state, so that governments can hand out mining concessions to companies in exchange for ground rents, which usually take the form of mining royalties (Emel & Huber 2008). As will be discussed in more detail in chapter 3, most countries have put in place investor-friendly mining laws in an attempt to attract foreign investment (Bridge 2004), although recent years have seen a widening political backlash against these 'pro-mining policies', including the appearance of new types of 'resource nationalism' across the world (Koch & Perreault 2019).

While most attention in the literature has been devoted to analyzing formal policy frameworks, Fisher (2008) has rightly noted that in many environments, mineral resource governance is the unstable product of complex interactions between state- and non-state forms of governance (see also Geenen 2015; Verbrugge & Adam 2016; Garrett et al. 2009). For instance, formal systems of land and mineral tenure may become entangled with informal and customary land tenure systems (Meinzen-Dick & Mwangi 2009; for illustrations from the mining sector see Geenen & Claessens 2016; Verbrugge et al. 2015). Still others have drawn attention to how gold mining practices and the social relations of production that accompany them are shaped by socio-cultural institutions such as kinship (Nyame & Grant, 2014), gender (Cuvelier 2011), or ethnicity (Bolay 2014). Although most commonly studied in ASGM, similar dynamics have been described for industrial mining labor (Geenen 2019) and for informal gold trade (Geenen 2013).

4.5. The ecological context

Turning our attention to the lower circle, attention must be devoted to how the material properties of gold and its ecological context shape possibilities for extraction and processing. Within this circle, we place the geophysical properties of gold itself, as well as the geological composition of gold deposits and the ecosystem of which they are part, including soil, water, forests and air.

First of all, gold deposits have a few particular characteristics that distinguish them from other minerals. For instance, gold is distributed more diffusely than other minerals, and may appear in various forms and sizes: from hypothermal, epithermal, lode and sediment-hosted deposits that can be kilometers wide and deep, to eluvial and alluvial deposits that are located closer to the surface (Darling 2011). Moreover, gold is geologically scarce and has a high value-to-volume ratio, so that even a small deposit can generate windfall profits. According to Dougherty (2013), these material characteristics have created an industry that is characterized by relatively low barriers to entry. While complex and deeper deposits can only be mined through large-scale, capital-intensive industrial mining activities, near-surface deposits can be extracted with minimal use of technology and infrastructure, which makes them accessible to smaller 'junior' companies (Dougherty 2013) and ASGM-operators (Le Billon 2004). At the same time, technological innovations may push the limits if what is possible and what is profitable, as will be further detailed in chapter 5.

Second, the geophysical properties of gold itself have a significant influence on how extraction and processing are organized. In order to extract the gold concentrate from the ore, for instance, techniques such as cyanidation or mercury amalgamation are commonly used. This has far-reaching implications for surrounding ecosystems, as mercury or cyanide are released in the air and in the water, constituting risks for the environment as well as human health. Another defining feature of gold is that it can be processed and mixed relatively easily. Initial processing (grinding, mercury amalgamation or cyanidation) often – although not in all cases – takes place at or in the immediate surroundings of the mine itself. When gold leaves the mine site in the form of *doré* bars – produced by industrial mining companies or traders/exporters in the case of ASGM gold – the origin of the gold is usually very difficult to trace. As a result, the value chain of gold is much "leakier" than that of many other minerals (Young 2015). Another important observation is that after initial processing, gold is typically around 90 percent pure, meaning that a relatively large share of the value added stays in the country, which is different for commodities such as cocoa or coffee.

Finally, while the scarcity and exhaustibility of gold deposits are defining features of the ecological environment, as outlined above, gold as a material is indestructible. In fact, gold held in above-ground stocks (such as in investment bars, jewellery or electronics) may be reintroduced in the production system at any moment, through an almost unlimited number of recycling circles (Bloomfield 2017, see chapter 5). In this way, gold that is recovered from e-waste, for example, may be recycled and in the process acquire new value (Wong 2015). Following this reasoning a case could be made for not only 'lengthening' the value chain as argued above, but also 'closing' it so that the last nodes in one chain become inputs for another chain (Bair 2008).

Concerning the environmental impact of gold mining, by far most attention has gone out to mercury pollution (Spiegel & Veiga 2010), which even translated into an international convention on the reduced use of mercury (Minamata Convention, UN 2017). Other problems that have been documented, although to a much lesser extent, are deforestation and soil erosion (especially in the Amazon, CINCIA 2018) and silica dust (Gottesfeld et al. 2015).

The ecological dimension is not merely of interest to us because we are studying extractive activities, but we believe (along with authors such as Bridge 2008) that adding an ecological dimension to the

GPN-approach is long overdue. The fact that both circles overlap is a recognition that social, political, economic and cultural institutions are interacting, in a contingent and nonlinear way with the ecological environment. The contingency of these processes gives its unpredictable shape to the gold mining crystallizations in the inner circle, yet the building blocks of these crystallizations are similar everywhere, and include not simply the types of gold mining activities, but also technology, land and labor arrangements and associated cost and revenue-sharing arrangements.

5. Conclusion

This chapter set out build a theoretical-analytical framework to make sense of the increased diversity and connectivity in global gold mining that was documented in chapter 1. The global gold production system, as succinctly presented in figure 1, might look ambitious in its scope, but helps to make precise arguments about how to explain some of the phenomena we are witnessing, from gold rushes in Malawi, over contract mining in Colombia, to semi-formalized medium-scale mining in the Philippines. Its explanatory power lies in how it connects global, structural trends in global gold production, to local 'gold mining crystallizations', which are themselves embedded in an institutional and an ecological environment. While it may be useful (and arguably relatively easier) to empirically study these 'gold mining crystallizations' as such, it is even more helpful to consider them as part of a system in which the different components interact in a contingent and nonlinear way. The first part of the book will deal with trends in global gold production (i.e. global expansion, informalization and technological innovation in response to scarcity, costs, and resistance), while a rich and diverse set of 'gold mining crystallizations' will be described in the second part. Apart from building the 'global gold production system' as a sort of modified GPN framework, this chapter also argued that an analytical focus on gold production can enrich the GPN literature by including informality and ecology. We will return to this theoretical contribution in the concluding chapter of the book.

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