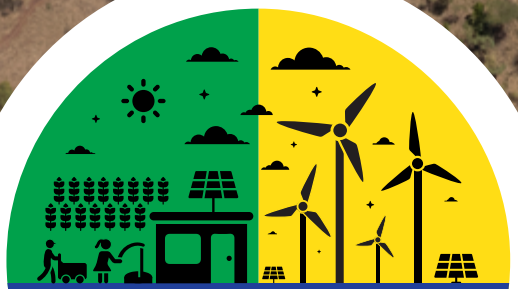
# CONCEPTUAL FRAMEWORK FOR THE JUST ENERGY TRANSITION:

## Localisation, Decent Work, Small Medium and Micro Enterprise, and Sustainable Livelihoods Project



**Just Energy Transition:**
**Localisations, Decent Work, SMMEs, and Sustainable Livelihoods**

INSTITUTE FOR ECONOMIC JUSTICE

COSATU

ACEP Africa Centre for Energy Policy

ACTS

IDRC · CRDI
International Development Research Centre
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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **GPN** | Global Production Network |
| **RE** | Renewable Energy |
| **SMME** | Small, Medium and Micro Enterprise |
| **STEM** | Science Technology Engineering and Mathematics |

# GLOSSARY

We describe this as a tentative glossary because we will also engage labour (through stakeholder workshops) and the governments (through policy scans) to seek their definitions of some of these terms.

| Concept | Definition |
|---|---|
| **Codified knowledge** | Knowledge that can be easily transferred between people, is formalised and can be written/recorded. |
| **Decent work** | Adequate employment which is combined with social protection, workers' rights and social dialogue. Work quality is shaped by capital accumulation strategies, class struggle, and forms of institutional power. |
| **Economic upgrading** | Firm, sector, or national improvements in productivity, the development of new productive capabilities, and the ability to capture more economic value. |

| | |
|---|---|
| **Gender equity** | Often used interchangeably with gender equality. However, it can also be used to frame particular injustices women face in particular industries. It should be understood in relation to existing unequal gender relations of socially reproductive and productive work, as well as forms of discrimination which are unrelated to work/exploitation. Additionally, it should be understood through an intersectional lens. |
| **Global production network (GPN)** | All actors and relationships within global value production chains, as well as including states, organised labour, communities engaged in social reproduction, and horizontally connected firms. |
| **Global value chain** | The vertically interconnected sets of production and distribution firms involved in geographically dispersed production, involving the growing international trade in intermediary goods. |
| **Just transition** | A transition to a just and sustainable economy, which addresses issues of global inequality, democratic governance, decent work, sustainable livelihoods, and gender equity, as well as other forms of marginalisation. |
| **Learning by doing** | The process of gaining new capabilities, and improving existing capabilities, by repeatedly trying and failing or succeeding in real-world activities. |
| **Localisation** | Efforts to establish local manufacturing and assembly, increase local ownership, support local employment, use domestic resources, and supply local markets (Avenyo et al 2023), supported both by the state and the capitalist class. |
| **SMME** | Small, medium, and micro enterprises. These can be defined internally both by the size of their revenue and their employment footprint, and externally by their relationship to larger firms. |
| **Social reproduction** | *"The fleshy, messy, and indeterminate stuff of everyday life … a set of structured practices that unfold in dialectical relation with production"* Cindi Katz (2001a 711). It includes a collection of paid, underpaid or unpaid care work, housework and sex work, which supports current and future generations of workers. |
| **Social upgrading** | The realisation of decent work within GPNs. It can also be linked to improvements in the conditions for sustainable and equitable social reproduction. |
| **Structural transformation** | Changes in the overall structure of an economy, involving a number of macro- and meso-level changes, including sectoral shifts (with a historical emphasis on manufacturing) and changing interlinkages between firms and sectors (Andreoni and Chang 2019). |
| **Systems of innovation** | Multi-institutional systems which develop and refine new productive technologies. These typically involve collections of domestic and foreign firms, universities, and state departments. |

| | |
|---|---|
| **Tacit knowledge** | The know-how and skills which are difficult or impossible to articulate or transfer through written or verbal communication, and which must instead be learnt through experience. |
| **Technology** | The combination of machinery and productive techniques needed to gain new productive capabilities. These include the social techniques of labour management needed for competitive production. |
| **Value** | The social relationships under capitalism which determine the use, distribution, and accumulation of resources and labour, by socially coordinating the production and distribution process between firms and consumers. This can be observed through examining the dual flows of money in one direction and embodied resources and labour in the other direction, throughout the global network. |

# SECTION ONE: **Introduction**

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This conceptual framework is a guide for a wider research project — The Just Energy Transition: Localisation, Decent Work, Small Medium and Micro Enterprise and Sustainable Livelihoods Project — which will investigate the role that economic development around renewable energy technologies can play in creating a more sustainable and just economy in three African countries (South Africa, Ghana and Kenya).

We centre this investigation on the potential for localisation of renewable energy technologies. By localisation, we mean efforts to a) establish local manufacturing and assembly; b) increase local ownership; c) support local employment; and d) use domestic resources and supply local markets (Avenyo et al 2023).

We seek to examine how localisation can act as an engine to drive not just economic upgrading but also social upgrading. 'Social upgrading' refers to social development linked directly to economic development and the "improvements in the rights and entitlements of workers" (Barrientos et al 2011, p324). We situate social upgrading within the broader context of social reproduction, examining the relationship between improvements in paid work and the way in which this is supported by and supports paid and unpaid care and housework. Social upgrading also includes the way in which economic systems can disrupt systemic forms of oppression and exploitation, based on gender, race, age, and national and regional differences between the Global North[1] and Global South. Within the project, we focus on identifying policy interventions that can facilitate the localisation of renewable energy production networks in the selected African countries, in a manner that delivers decent work, gender equity and sustainable livelihoods, while supporting small, medium and micro enterprises (SMMEs).

The wider research project focuses on a range of questions around the current and future potential for employment creation through renewable energy localisation, and its effect on the wider community. We ask a range of questions about current and future renewable energy localisation: How do local firms (particularly SMMEs) gain new capabilities? Are these capabilities gained through adopting existing technologies and productive techniques or developing novel, innovative ones? Are workers paid well? What are their working conditions? Are they allowed both legally and practically to organise? Who gets good jobs, who gets bad jobs, and who gets no jobs? How is this connected to gender, race, age, disability, or other axes of inequality, oppression, and exploitation? How are workers' incomes spent in households and communities?

Within this conceptual framework, we aim to develop a set of useful analytical tools and theoretical frameworks to help us carry out the broader project. We begin by discussing the concept of a just transition (Section 2). We then analyse key concerns through the global production networks (GPNs) framework (Henderson 2002), which gives us a detailed and structured way to examine both domestic and international forces shaping the potential for renewable energy localisation and social upgrading (Section 3). In this discussion, we move beyond a narrow focus on firms, to show how they are dialectically connected to wider social and political forces within households, communities, civil society organisations, trade unions, and states, drawing from a wide collection of heterodox economic concepts and feminist political economy. Finally, we develop a framework to operationalise the concepts developed, in preparation for our research (Section 4).

[1] The global north includes Europe, North America, Japan, Israel, Australia and New Zealand

# SECTION TWO: **Just transition**

# SECTION TWO: JUST TRANSITION

A just transition is a concept historically coined by the labour movement. It has become highly contested and is defined in a range of ways. Each interpretation is shaped by different interests/ constituencies (for example, workers, climate justice activists, businesses, and states), each of whom has their own, sometimes competing, definitions. There are divergences around: 1) the scope of the transition; 2) the depth of the transition; and 3) participation and inclusion in the transition (Congress of South African Trade Unions 2021).

Rather than engaging in these debates, this framework aligns with labour's conceptualisation of the just transition (Congress of South African Trade Unions 2021, International Labour Organisation 2022), as well as highlighting key concerns raised by countries in the Global South (G77+China 2023, Presidential Climate Commission 2022). This approach is consistent with the centrality of decent work and structural transformation in the research project.

Justice, equality, equity, and sustainability are not abstract concepts. They are concrete ways of organising work, life, and nature. Within this research, we will look at four intertwined struggles for justice in the energy transition. Achieving a just outcome from each struggle requires being informed by the current unjust reality, seeing not just its shortcomings, but also the opportunities it presents.

First, there is a struggle for justice between countries. The energy transition takes place in an international economic system shaped by colonialism and neocolonialism, as well as the ongoing struggles for national liberation and sovereignty in the Global South. In this system, far more labour time, energy, and natural resources are used to produce goods and services flowing from the Global South to the Global North than are used for goods and services flowing from the Global North to the Global South (Dorninger et al. 2020).

The energy transition may present an opportunity for Global South countries to address this inequitable distribution of work, resources, and environmental impacts. One way of doing this is through localisation of key elements of the renewable energy production network, ensuring that technologies are transferred to countries in the Global South (Congress of South African Trade Unions 2021; G77 + China 2023). This would enable development and limit the outflow of resources from the Global South, in exchange for technologies monopolised, and finance controlled, by the Global North.

Second, there is the struggle for just, democratic, ecosocialist states (Congress of South African Trade Unions 2021; Presidential Climate Commission 2022). Globally, there has been a significant expansion of formal democratic institutions (Amin 2011). However, power, and particularly economic power, often remains concentrated in elite groups. Democratic control of the state depends on the strength of mass organisation and mobilisation. This research will draw on neo-Gramscian theories of the state as a contested site of class struggle, to understand how its role in a just transition can become more consultative, transparent, and participatory.

Third, there is the struggle for justice in the workplace. Currently, throughout renewable energy production networks, labour conditions and workers' remuneration are often poor, resulting in various forms of worker poverty (van der Ree 2019). Additionally, there are significant intersecting inequalities within the workforce, as remuneration, quality of work, and availability of work are unequally distributed along gendered, racial, and national lines. However, workers in many parts of GPNs are organised, have developed deep understandings of the need for a just transition, and have access to institutional power. A just transition would require a shift towards the creation of decent jobs (International Labour Organisation 2021, COSATU 2021, Presidential Climate Commission 2022). This would entail sufficient job creation, combined with expanded social protection,

workers' rights, and social dialogue (Ghai 2003). It would also require combating discrimination.

This must be done by challenging structures within the socioeconomic systems, which exploit and oppress groups. Here, we draw particular attention to gender equity, which includes both dismantling forms of gender discrimination (Koehler 2016), and addressing specific issues that affect a given gender (most often women) (Payne and Doyal 2010). Additionally, justice in the workplace may involve shifting ownership structures (Congress of South African Trade Unions 2021, Presidential Climate Commission 2022). Social ownership, state ownership and the greater inclusion of small and medium firms may benefit the quantity or quality of jobs created in the sector, though each ownership structure has its own complex set of potential benefits and drawbacks.

Finally, we examine the struggle for justice in households and communities (Presidential Climate Commission 2022, Congress of South African Trade Unions 2021). Existing structures of social reproduction are often shaped by the needs of capital, patriarchal family and community systems. These, as well as other forms of oppression rooted in communities, must be challenged for a just transition. Income must be distributed in a fair way to support the needs of all members of households/ communities. Unpaid care work and housework must be fairly distributed, educational opportunities must be equally supported, and decision-making and household/community power must be challenged and reshaped.

Many conceptualisations of a just transition emphasise job creation in renewable energy GPNs (RE-GPNs), and the potential of this job creation to lead to social upgrading. Rather than assuming that economic upgrading automatically trickles down to social improvements (Barrientos et al. 2011), we examine the real relationships between the productive economy and the reproductive system it is embedded within, and the power relations which shape both realms. We are interested in how income streams from work within RE-GPNs allow for social reproduction and enable the creation of sustainable livelihoods. Examining the extent of economic upgrading and related social upgrading linked to RE-GPNs may show both the opportunities and limitations of visions of a just transition centred on this approach. It may also demonstrate the potential importance of alternative strategies to the realisation of sustainable and dignified livelihoods for communities, and stop forms of oppression from being recreated in the different technological transitions involved. Additionally, these could include redistributing ownership and use rights to key resources, expanded public services, and social protection.

There are three issues in approaches to a just transition which centres on job creation:

a) Whether the economy in question is indeed able to climb up the value chain ladder in order to be able to capture more value in the production process and create stronger spillovers for other industries of interest;

b) Whether sufficient jobs can be created in the process, and whether the jobs created are secure and formal in nature, such that the fruits of value capture and productivity are translated into extending welfare to the working population; and

c) Whether good jobs are created for the most vulnerable.

# SECTION THREE: **Global Production Network**

# SECTION THREE: GLOBAL PRODUCTION NETWORK

## 3.1 OVERVIEW

This research deploys the GPN approach. This approach encompasses a set of heuristic tools used to examine the complex set of actors and relationships which are involved in vertically disintegrated and geographically dispersed production processes (Henderson 2002).

The GPN framework offers a view which links the actions of firms, states, labour, and civil society, and shows the importance of national and international factors in localising new technologies. This makes the framework broader than the global value chains framework, which focuses more narrowly on inter-firm relationships (Henderson 2002)[2].

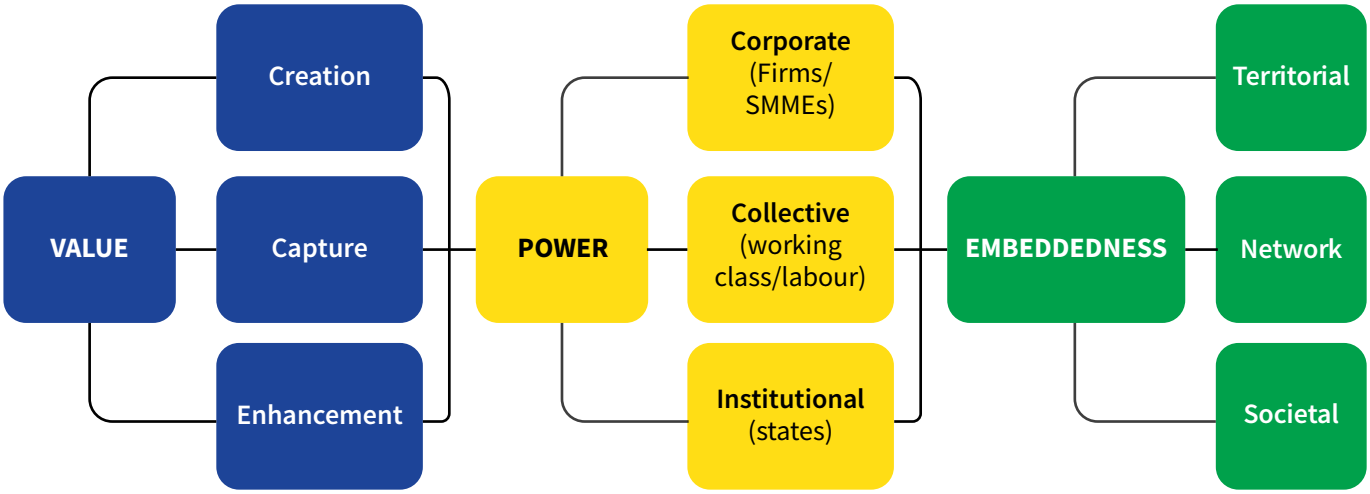
The GPN framework develops three key elements: value, power, and embeddedness:

**Value:** the framework examines the way that value is created, by households, firms and institutions. These patterns of value creation go through constant dynamic changes as actors gain new capabilities, in a process referred to as value enhancement. This value is then captured through profits, interest, rents, wage differentials, and access to cheap goods.

**Power:** these patterns of creation, enhancement and capture of value from GPNs are shaped by multiple different forms of social, political, and economic power. We examine corporate power wielded by firms, collective power wielded by civil society and organised labour, and institutional power wielded by states and international institutions.

**Embeddedness:** within GPNs, firms are tied to the national contexts where they operate; to the specific niches they occupy within the wider international networks, due to their relationships with national and global actors; and to societal communities, such as religious or ethnic groups (Hess 2004). Conceptualising businesses as being bound by these locations is known as embeddedness. These key aspects of the GPN framework are illustrated in Figure 1 below.

**Figure 1:** Key features of Global Production Networks




Source: Authors' construction derived from Henderson et al. (2002) and Hess (2004)

[2] Global value chains form a subset of global production networks, so it is useful to draw on much of the literature discussing global value chains, and incorporate it into our use of the global production networks framework. Further, although the GPN framework draws more explicit attention to other non-chain actors, in practice these are often included in research using the value chains approach, even if they are not addressed with the same degree of attention.

# 3.2 VALUE

## 3.2.1 Value creation and enhancement

Value has been explored through multiple strains of research, which have used different conceptualisations. In defining this concept, this conceptual framework draws from Mezzadri (2021) and Elson (1979). Value creation is the process of organising real resources to produce commodities and enable capital accumulation (Mezzadri 2021). This includes organising paid and unpaid labour and natural resources, in households, firms and states.[3] Making profits in RE-GPNs requires organising workers in production. That depends on social reproduction so that healthy and skilled workers are available, and society is politically stable enough not to disrupt accumulation.

People's living and working conditions are changed by being caught up in these processes of value creation. Working time is lengthened and work is intensified, specialised and mechanised (Elson 1979). Social reproduction is also transformed. Education has been progressively lengthened. The provision of healthcare, childcare, and elder care has been monetised and privatised. Furthermore, care systems are supported by large-scale migration of care workers.

Value enhancement refers to the dynamic processes which shape value creation (Henderson 2002). These include the ways in which firms learn, the role of states in supporting localisation through industrial policy, and the restructuring of social reproduction that is linked to localisation.

This organisation of life around value production is not uniformly either positive or negative. It can sometimes result in increasing productivity and social upgrading. However, these value relations can produce numerous forms of adverse inclusion, where participation in value creation produces or reproduces poor and dangerous forms of livelihoods for workers and communities (Mies 2014, Elson 1999). Further, value relations can result in exclusion (Werner 2016). Under capitalism, for production to take place, it must be profitable and competitive, not just socially useful. Competitive production has often been extremely concentrated in only a handful of countries at any one historical period (Shaikh 1979), and within countries it is often highly concentrated in certain areas, such as special economic zones, leaving large regions underdeveloped. This means certain workers, and even regions, are unable to participate in value production, as they are not competitive. Thus, some regions and workers are both excluded from value chains in some ways and adversely included in others.

A recent study of a set of 58 countries across 13 industries, between 1970 and 2008, found a positive relation between GPN participation and productivity growth in the formal manufacturing sector, but did not find any evidence for positive employment impacts (Pahl and Timmer 2020). Other studies in cross-country settings found a reallocation of labour towards sectors with low productivity and decreasing employment in sectors with higher productivity (Rohit 2023). In some cases, more skilled workers can benefit from value enhancement while less skilled (and often more socially marginalised) workers either do not benefit or face social downgrading through precarity and casualisation (Barrientos et al. 2011). However, the impacts are not homogenous in all contexts. For example, employment conditions have varied between very exploitative and abysmal in the context of, say, Bangladesh's textile industry (Kabeer 2019), while they have been positively impacted by value chain integration in Senegal's horticulture sector (Fabry et al. 2022).

### 3.2.1.1 The household and community

At the basis of value creation is *social reproduction*, "the fleshy, messy, and indeterminate stuff of everyday life … a set of structured practices that unfold in dialectical relation with production" (Katz 2001a: 711). This includes a collection of paid, underpaid or unpaid care work, housework, and sex work which supports current and future generations of workers. For capitalism, this is not just about producing people capable of working. It is about producing people who will work hard enough, long enough, well enough and for little enough, that their work can make a profit for capital owners. This workforce is not produced as a homogeneous group, but

[3] Although production has always happened, throughout history, its organisation around commodity production and capital accumulation (that is, around value creation) is a particular historical form which emerged (unevenly) during capitalist development (Amin 1973).

as a racialised, gendered, and often migrant workforce, allowing greater exploitation and hindering worker organisation (Elson 1999). The degree to which social reproduction is organised directly in the interests of capital accumulation is historically determined by capitalist development and class struggle.

Using a feminist Marxist lens to analyse GPNs, three important and interrelated focuses emerge. Firstly, the organisation of social reproductive work, which supports workers within GPNs. Secondly, the degree to which work/micro-entrepreneurship within GPNs supports at least some aspects of social reproduction and creates opportunities for sustainable livelihoods. Third, the gendered nature of productive work, the way this relates dialectically to reproductive work, and the extent to which it supports or prohibits gender equity.

Women typically face a double burden, taking on far more social reproductive work within the household, while also participating in paid work outside the home (Mezzadri 2021). This limits women's ability to engage in paid work, participate in public life, and access education (Elson and Pearson 1981). Women are often excluded from better paid work and worker organising, and adversely included in the economy in more precarious and less formalised jobs (Mies 2014; Elson 1999). The limitations placed on women in RE-GPNs varies with different systems of social reproduction (Baruah 2017).

Further gendered differences in access to education and skills development for RE-GPNs also forms a prominent barrier to gender equity (Baruah 2017). This shortage includes both technical skills and business skills. However, the gendered gap in technical skills varies globally. For example, it is much lower for numerous countries outside of the West, with women forming a much larger section of the skilled engineering workforce in China, India, and much of the former USSR than in the US or many European countries (Baruah 2017).[4] IRENA (2019) identifies a range of issues which can partially explain aspects of the gendered skills and wage gaps. These include cultural attitudes around the gendered perception of STEM careers; biases for hiring and career opportunities; hostile male-dominated work cultures; lack of female leadership, role models and mentors; and unequal responsibilities for unpaid household and care work.

Value enhancement can allow workers, households and communities to have access to new possibilities for social reproduction, which can support more fulfilling and dignified livelihoods. Sometimes, value enhancement leads easily to social development, for example through improved working conditions and worker safety as a result of changing technologies and methods of production (Barrientos et al. 2011; Selwyn 2013). More generally, economic upgrading can be necessary at times to make social upgrading sustainable (Mashilo and Webster 2021). However, value enhancement does not automatically lead to social upgrading, and often worker and community struggle are required to ensure that communities gain from its effects (Selwyn 2012).

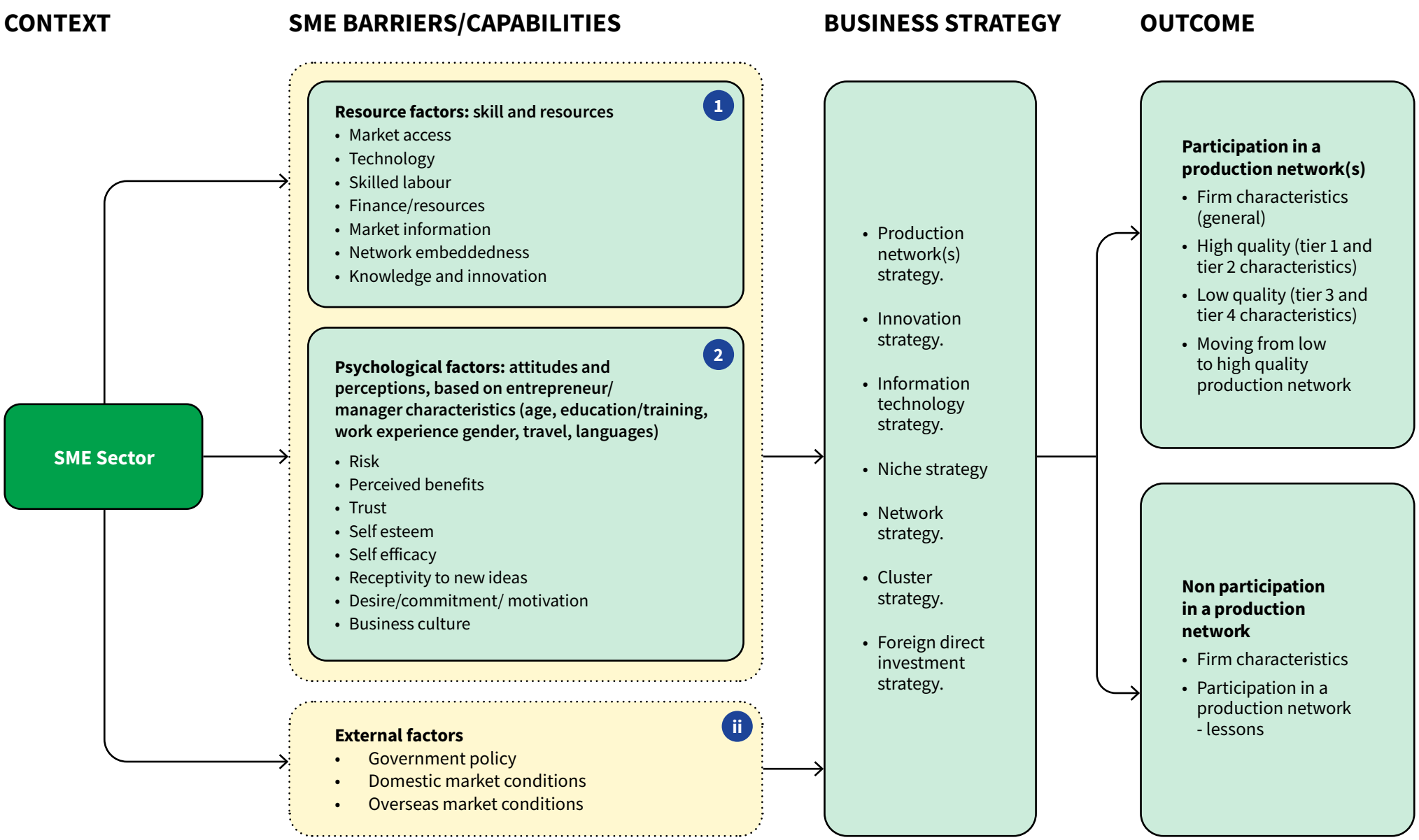
### 3.2.1.2 The firm

The firm is the basic form in which production is organised to create value. While significant amounts of commodity production take place within the household, or are coordinated by the state, the firm is the dominant institutional form controlling production. Here, a firm is defined as "both an administrative organisation and a collection of productive resources" (Penrose 2009 p 28). The firm's main purpose "is to organise the use of its 'own' resources together with other resources acquired from outside the firm for the production and sale of goods and services at a profit" (Penrose 2009 p 28). The firm is also the key site of both the labour process and labour struggle.

Firms create value through their access to, and ability to use, different resources: "finance, technology, skilled labour, markets and market information, network embeddedness and knowledge, and innovation" (Thanh et al. 2009 p49; see also Harvie et al. 2010). Firm resources, including knowledge and unique labour skills, are firm-specific and cannot be easily transferred between firms or obtained by firms from the market (Penrose 2009). Additionally, firms are constrained by external factors such as government policy and domestic and foreign market conditions. These external and internal factors create the context which shapes firms' business strategies. These strategies then determine their participation or non-participation in GPNs. These dynamics can be based on firm size. Figure 2 is an illustration of a framework comprising the internal and external factors that combine to produce SMMEs' corporate strategy, with particular outcomes on production network participation.

[4] Education and skills development may also result in other types of intersecting inequality for example skill development for renewable energy sectors in may be deficient in more rural and poorer areas of the global South.

**Figure 2:** Small and medium enterprises' capabilities and barriers




Source: Harvie, Narioka and Oum (2010)

In our research, we focus particularly on value creation within SMMEs. Globally, renewable energy production networks are dominated by large, vertically integrated, multinational firms, although a range of SMMEs exist throughout the network. SMMEs often struggle to maintain competitiveness in many areas that depend on significant economies of scale to contain costs. SMMEs continue to exist as sites of initial innovation, in market niches and in lower profit activities (Starosta 2009, Penrose 2009). SMMEs are often considered to have a wide range of developmental advantages. However, they are not necessarily capable of, or optimal for, solving developmental problems (Castel-Branco 2003).

Firm upgrading requires learning. Learning can involve innovating as well as adopting existing production capabilities from other firms. Innovation capabilities are needed to develop new products and processes (Khan 2019). For new products or processes to be diffused in a society they need to be appropriate for the context (Rogers 2003). This creates opportunities to innovate with specific target audiences, a process which has been called frugal innovation (Weyrauch and Herstatt 2017, Hossain 2018). For example, Ockwell et al. (2014) discuss how existing solar technologies were unsuitable for poorer sectors of the Kenyan market, and a range of cheaper, pico solar technologies[5] were developed in response to earlier failures to market larger home solar units.

However, Khan (2019) warns against an excessive focus on innovation in examining value enhancement in developing countries. Instead, he argues that organising existing production, and the continual localisation of new technologies developed elsewhere, should form a greater focus for firm-level learning. This can be seen as a process of diffusion and adoption.

Zanello et al. (2016) outline six characteristics of developing countries that affect the diffusion of innovation. The first is the nature of the innovation (that is, whether the innovation is high-tech or low tech). The second is whether it needs to be adapted to local needs and whether the skills and tools are available to modify it. The third is the availability of communication channels, including transmission of knowledge and physical goods, which are shaped by infrastructure, regulation, and cultural understandings. The fourth is how knowledge is spread between firms. This can differ based on how economies are structured, with developing countries often having fewer large firms that facilitate exchange between skilled personnel and more small firms that can share skills through forming clusters. The fifth is the structure of institutional arrangements, which, for developing countries, can include political instability, weak law enforcement, and underdeveloped innovation systems[6]. The sixth is factors internal to the firm, such as financial resources and skills.

Firms gain new capabilities in two interrelated ways. The first is through codified knowledge and skills training. This is knowledge that can be more easily transmitted to others. The second is through experience. This is knowledge that cannot be easily transmitted to others, it must be learnt in production by learning through doing (Andreoni and Chang 2019, Penrose 2009). Experience is not just a way for individuals to learn but also a way for organisations to learn collectively. Managerial experience, as well as teams' collective experience, is often firm-specific (Penrose 2009, Khan 2019). Additionally, skills such as marketing are not directly transferable between countries, but must be adjusted to local conditions and co-developed with local actors (Devy et al. 2022). The two forms of knowledge are interdependent. The ability to gain both codified knowledge and experience is subject to a range of possible market failures, it can be supported by state investment in education along with other industrial policy measures (Lall 2000).

High productivity, innovation, availability of finance, willingness to take risks, and foreign ownership are all unsurprisingly linked to SMME upgrading in GPNs (Thanh et al. 2009). However, size also had a significant effect on upgrading, suggesting that the larger SMMEs were more able to upgrade (Thanh et al. 2009). Many SMMEs are survivalist and do not engage in significant value enhancement, while a few are high-growth firms (Harvie et al. 2010). Additionally, value enhancement through economic growth is often more closely linked to new SMMEs entering the market, rather than growth within SMMEs (SMMEs are characterised by a process of constant churning, creation of new firms and dying of old ones).

Additionally, finance plays an important part in supporting value enhancement, as firms often need to turn to financial markets, or state institutions, to invest. However, financial markets are often cautious about investing in ambitious and risky projects of value

[5] Pico solar technologies include smaller solar devices such as lanterns, cell phone chargers, and radios.

[6] Innovation systems involve firms, universities, and state departments and are discussed in greater detail in the section on embeddedness.

enhancement in developing countries and are motivated only by limited private benefits (rather than the positive externalities) which may result from localisation. For example, in the South African renewable industry, financing has often limited the inclusion of local firms and manufacturers, as investors prefer the lower risk profiles of established foreign firms (Baker and Sovacool 2017). Additionally, SMMEs often face more expensive credit options as they are less able to spread risk, this places them at a disadvantage to larger firms (Penrose 2009).

In our research we will examine firms' value enhancement by looking at how they gain new codified knowledge through hiring and formal skills training. We will also look at whether individual staff or teams become more productive or learn important lessons through experience. Finally, we will question what external factors have enabled or limited this value enhancement by firms.

### 3.2.1.3 The state

Like firms, states are directly (by owning firms) or indirectly (through incentives, regulations, and taxes) involved in value creation within GPNs in both the Global North and Global South (Whiteside et al. 2023). For example, despite sustained pressure by International Financial Institutions (IFIs) on African countries to privatise, liberalise, and unbundle their energy sectors (this means to separate generation from distribution and transmission), most energy companies in Africa remain state-owned (Hermanus and Kamanzi unpublished). This positions the state as a key actor in direct value creation. Indirectly, states can act to insulate some private firms from the full force of competition by protecting local markets, providing stable demand[7] and cheap inputs, and de-risking private investment (that is, subsidising private lending, or controlling financial and political risks faced by private sector firms) (Gabor 2021, Horner 2017).

In successful capitalist development, the state has historically played a very large role in value enhancement. This is because private sector actors are often unable or unwilling to take on the risks and complexities of larger, more ambitious projects of value enhancement, with significant positive externalities (Andreoni and Chang 2019). Additionally, protection is important as it enables firms to learn by doing and gain experience by developing and practising production in a domestic context, before reaching true global competitiveness.

New capacities are costly, time-consuming and sometimes risky to develop — not all investment in new capacities is guaranteed to pay off. Thus, states engage in a wide range of policies, commonly known collectively as industrial policy, to support domestic value enhancement and localisation. These measures often include subsidies, developmental finance, provision of basic infrastructure, funding education, coordinating industrial development, and a range of forms of protection, including tariffs on imports, quotas, and local content requirements for state procurement.[8]

## 3.2.2 Value capture

Value capture refers to the uneven way in which value is distributed in GPNs. There is an uneven, contradictory, and contested set of social entitlements to the value created within RE-GPNs. These are connected to established social relations, many of which appear to be the natural results of inevitable economic laws. These naturalised social entitlements include profits, rents, interest, wage gaps, and taxes, in addition to patriarchal distributions of resources within households and communities. These forms of value capture are linked to actors' participation in value creation and enhancement within RE-GPNs, but their exact level is determined as much by class struggle as by pure market laws. These entitlements can appear in monetary form or as entitlements to concrete things like leisure time, safe working environments, and electricity. Depending on what entitlements are prioritised, these can result in high inequality and poverty, or contribute to more equitable forms of development.

Value capture is connected to value production and social reproduction in complicated (dialectical) ways. Economies and societies are underdeveloped in the Global South, to protect existing forms of value capture from the Global North. Geographies of production, technological choices, labour conditions including

[7] Local content requirements have been a dominant policy in the localisation of renewable energy manufacturing both in South Africa and in a range of other countries, including Brazil, India and China (Hansen et al. 2020).

[8] Development driven by SMMEs may require many of the same features and supportive policies as larger firms. For example, Castel-Branco, (2003) argues that an interest in SMMEs as developmental agents rose at a time when industrial policy was being critiqued, dismantled, and limited but that there is no reason development driven by SMMEs would require less industrial policy support than other larger firms.

marginalisation and discrimination, and the distribution of unpaid care work are all shaped by struggles over value capture. Thus, different forms of value enhancement are vital to disrupting existing harmful patterns of value capture. However, the effort to establish more equitable forms of value capture is not reducible to value enhancement, it also involves struggles to change existing entitlements to value, as it is currently produced.

Within our research, we focus on the forms of value capture which could undermine or enable a just transition. The nature of value capture in RE-GPNs is a subject of ongoing study. Therefore, we draw on earlier critical studies on GPNs, dependency theory, feminist economics, and ecological economics (see Warlenius et al. 2015; Hornborg 2019) to establish rough expectations of how value capture may shape RE-GPNs, as well as how progressive struggles over value capture can be most effective in fighting for a more just transition.

One important form of value capture to examine is interest paid to financial capital from productive firms, states, and consumers within RE-GPNs. This is linked to economic financialisation, which is supported by policies including financial liberalisation as well as derisking (Gabor 2021). This form of value capture often has a regressive effect, as wealthy income groups and Global North countries typically provide more financial capital. Additionally, derisking shift risk from private investors to states and indirectly taxpayers or paying users of state provided services and infrastructure.

Some of the value capture within RE-GPNs may take the form of high technological rents for research and development, which appear as high profits for firms in the Global North (Starosta 2009).[9] These rents may be maintained by legal monopolies such as patents, or by limiting developing countries' ability to competitively adopt technology through industrial policy. Additionally, technological rents may also shape the relationship between SMMEs and larger firms, as larger firms are more likely to control key technologies. These larger firms can extract rents from SMMEs by buying cheap inputs from them, or selling expensive outputs to them, or both.

Within national electrical systems, some of the value captured may appear in the form of more or less subsidised electricity for industrial and commercial use. Historically, energy has been heavily subsidised (often regressively, with larger firms and wealthy households benefiting more from general electricity subsidies) (Huenteler et al. 2020). Increasingly, states are facing pressure from international institutional lenders to remove general electricity subsidies and replace them with excessively targeted subsidies (Ledger and Rampedi 2022, Huenteler et al. 2020).

One particular area of interest for our research is the value capture relationship between African countries and China, in RE-GPNs. While forms of value capture between African countries and the Global North have played a larger role in historical research in dependency/world systems theory, the pattern of value capture between China and African countries forms a newer area of interest. It remains to be examined by this study whether patterns of value capture are those typical of imperialism, neocolonialism or sub-imperialism, or whether they reflect more positive visions of South-South cooperation between China and the African countries studied, within the limited area of renewable energy GPNs.

### Decent work and value capture by workers and communities

In analysing value capture by workers, we will make use of the decent work framework (Ghai 2003). Decent work can be observed through a number of measurable standards, but the realisation of the standards is driven by a collection of enabling workers' rights which are harder to measure and compare. Measurable standards include wage levels, unionisation rates, measures of workforce diversity, working hours, and regularity of work. Enabling rights include those which improve workers' bargaining power, such as rights to association and collective bargaining.

Decent work can be separated into four pillars: employment, social protection, workers' rights, and social dialogue (Ghai 2003). Employment covers the availability of remunerative labour, which provides sufficient income to escape poverty. Social protection includes protection against

[9] Technological rents can be challenged by localising important technologies.

a wide range of potential dangers for workers, including unemployment, sickness, maternity, disability, and destitution in old age. Workers' rights include health and safety as well as basic restrictions on child labour and coerced work. Social dialogue is centred around unionisation and collective bargaining, although it can include a wide range of other institutions including cooperatives and worker involvement in other government decision-making processes.

Wage gaps and different working conditions may be partially explained by productivity differences, but they also reflect high levels of discrimination and marginalisation, due to gender, race, age, location, and more (Starosta 2009). We also look at the distribution of income within households and communities linked to RE-GPNs to determine the degree to which this reproduces existing unequal relations, such as gender inequality and child or elderly poverty.

GPN integration can create many paid work opportunities for women which did not exist before. However, many of these may be low-paying and hazardous (Salido et al. 2016). For example, women are over-represented in informal work, and their jobs are often associated with a higher risk of poverty (Chen 2012). Many women are found among unpaid family workers, industrial outworkers (working from home rather than from a production site), and casual wage workers (Ibid). In Sub-Saharan Africa the feminisation of informality is especially pronounced with 89.7 percent of employed women working in the informal economy (ILO 2018).

Although these patterns are true for women as a group, it is also important to recognise how women from poorer backgrounds migrants and women from specific races and/or ethnicities are particularly vulnerable to exploitative jobs (Rao et al. 2021, Stevano 2022). Crucially, higher vulnerability for certain groups of women is often interconnected with more pressing or challenging social reproduction conditions.

One particularly informal part of RE-GPN which appears to be somewhat feminised is *last-mile* sales (that is, the sales and maintenance of micro solar technologies in remote areas which are not accessible to more conventional retailers). Despite efforts to include women through participation in last-mile sales, many poor women would prefer more stable wage employment to the burden and risk of entrepreneurship (Baruah 2017).

## 3.3 POWER

In this research we are interested in how power is used in RE-GPNs. We look at power held by firms (corporate power), by social organisations (collective power), and by states and international institutions (institutional power). We seek to examine how power within these networks can either recreate or disrupt existing patterns of exploitation, inequality, and poverty. We particularly focus on how power relations support or hinder local value enhancement, and the ways in which this is linked to, or delinked from, social upgrading. However, while power shapes value creation, capture and enhancement, the opposite is also true. The structure of value creation, capture and enhancement form key sources of power. As developing countries master new productive capacities, they gain a far greater ability to bargain internationally, and as workers gain new skills in more sophisticated production processes, they are often in a better position to bargain for higher wages. This power and value are deeply connected and co-create each other.

### 3.3.1 Corporate power

Corporate power emerges from firms' direct control over the productive process and key technologies, as well as the monetary capital which can be used for political organisation and lobbying. Often, within GPNs, some

firms are able to wield significant power over others through controlling key technologies or markets; these are often referred to as 'lead' firms. Additionally, firms are often able to wield power over up or downstream firms (the firms they buy from or sell to), depending on the firm's relative size, control over technologies, and location (Baker and Sovocool 2017).

Additionally, corporate power is wielded collectively through institutions which further the class interests of the capital class as a whole, or factions of the capitalist class. We will examine how corporate power can drive or limit local value enhancement and social upgrading. In terms of social upgrading, industries or industry organisations can internally create and enforce commitments, such as paying living wages, ensuring decent working conditions, and supporting forms of wider community-orientated corporate social responsibility. However, such initiatives appear to be relatively ineffective, and many involve only voluntary, rather than mandatory, compliance (Barrientos et al. 2011). Corporate power can also be used to undermine labour organising or state attempts to regulate corporations in order to promote social upgrading.

In developing countries particularly, there can be a danger of both too much and too little corporate power, which is linked to domestic firms' control of local productive capacity and monetary capital. If domestic corporations have too little power, they cannot gain favourable terms with international corporations, or become competitive and engage in significant value creation and enhancement, or capture much value domestically. However, if they have too much power, they can dominate other domestic interests and the domestic state.

Certain firms in GPNs are constrained by their own low profits and low productivity, reducing their capacity for social upgrading, irrespective of labour power, but this is not true of all such firms in the Global South. A study on the South African auto industry by Mashilo and Webster (2021) found that low-decent-work firms tend to also be challenged with poor economic performance, reduced volumes and cancelled contracts. High-decent-work firms were also characterised by better economic performance. However, these firms engaged in social upgrading only when it was absolutely necessary to expand production and accumulation, and high profits were not directly linked to eventual social upgrading.

Within the GPN literature SMMEs are often seen as in particularly precarious and dominated positions. Consequently, workers within SMMEs have little bargaining power, as the firms they are employed in have little bargaining power (Rainnie et al. 2013). However, SMMEs are heterogeneous, both in their internal relations and in their relations to larger firms, and the totality of the capitalist system (Barrett and Rainnie 2002). While some SMMEs in GPNs exist on the frontiers and peripheries of capitalism, relying on and enforcing control of the most vulnerable and exploited groups of labour, others exist in strategic locations within GPNs and are able, at least temporarily, to gain value from innovation and be sites for labour gains (Rainnie et al. 2013).

## 3.3.2 Collective power

Collective power refers to all power held by a wide set of collective organisations within GPNs (Henderson 2002). We draw particular attention to collective power held by organised labour. We also examine how this power can be enhanced by forming coalitions between trade unions and other civil society organisations. Finally, we look at the important role of gender in the formation of collective power.

We examine four types of power which can be used by labour to advance social upgrading (Mashilo and Webster 2021). Structural power comes from workers' key placement within wider economic systems. Associational power is the power derived from workers' organisations, both formal/institutional and informal. Societal power comes from wider social engagement beyond labour. Institutional power comes from the ability to lobby or control institutions. We will discuss labour's access to institutional power in the broader discussion of all forms of institutional power below. These four types of power are often used in combination, for workers to capture the gains from value enhancement, to ensure social upgrading.

Different forms of integration and value enhancement in GPNs can have both positive and negative effects for workers' structural power. Process upgrading often involves automation and deskilling, which is often linked to social downgrading. Product upgrading, which can increase quality, sophistication, and time sensitivity of final products can require greater skills and give workers more bargaining power (Barrientos et al. 2011). Notably, Mashilo and Webster's (2021) study showed that worker power only has significant effects for local firms which

were able to create and capture significant amounts of value as well as engage in value enhancements. Without these firm-level gains worker power was less able to ensure social upgrading.

One example of increased structural power can be found in the integration of Brazilian grape growing into GPNs (Selwyn 2008). Here, increasing quality demands, and more difficult scheduling required for international markets, strengthened labour's structural power, as even short strikes could dramatically affect earnings. This contrasted with production for local markets, which was much less sensitive to labour organisation. Similar patterns can also be seen in the auto and logistics sector, where firm reorganisation into GPNs works to discipline labour in some ways, but also creates key leverage points and vulnerabilities which organised labour can take advantage of (Selwyn 2008). Within the South African auto sector, workers in component firms supplying lead-firms were able to use their structural positions to protect decent work and resist the increasing use of labour brokerage through a strike. The strike exposed the vulnerability that the whole GPN had to a work stoppage within one plant that supplied an important component (Mashilo and Webster 2021). This structural power was increased by the scheduling of supply within the production network which worked on a just in time basis.

Associational power may be limited by GPNs, where workers are often more dispersed than in more Fordist production processes. However, organised labour has made many gains within different GPNs (Mashilo and Webster 2021). Gender, (as well as other identity categories linked to marginalisation and oppression), plays an important role in developing collective power. Labour organising in GPNs has been linked to improved rates for part-time work and performance bonuses, and various benefits such as childcare for workers (Selwyn 2007). This links workers' power to the realisation of gendered labour rights (better part-time work and childcare have significant gendered effects, even if responsibility for unpaid care work should be distributed more fairly within households and communities) and improvements in work and livelihood conditions. It also shows that focusing on greater participation of women in full-time work may not be the only or best way to further gender equity, and that a focus on creating decent part-time jobs (and better organising of part-time workers) may play a vital role in sustainable development (Baruah 2017). Women also play key roles in community organising around labour struggles, even when not directly employed (Benya 2009). Thus, a gender analysis of work and social reproduction, as well as intersectionality more generally, are not just abstract tools for studying oppression, but vital ways to inform strategic organising, and build labour's associational power.

Societal power can also play an important role. Activists and civil society organisations can play a role in pressuring firms to adopt high labour standards (Barrientos et al. 2011). Additionally, strong links between worker organisations, environmental activists, and consumer groups concerned about the price and availability of energy and the prevalence of energy poverty, can help form a more powerful block driving a just transition, and prevent different progressive stakeholders from being pitted against each other.

### 3.3.3 Institutional power

To understand institutional power, we use a neo-Gramscian lens which understands the state and international institutions as sites of class contestation, rather than unified actors (Glassman 2011). Significant forms of class contestation can take place between labour and capital and between different factions of capital. State power can be used to violently suppress labour to protect capital (Glassman 2011).

For labour, can access institutional power by pushing for new laws and labour protections; the ability to use the legal system to guard current labour protections; and the ability to advance labour's interests in a just transition in international agreements. An example from South Africa is seen in the struggles against labour brokerage in the auto sector where unions successfully lobbied the ruling party to place limits on labour brokerage (associational power and societal power), and subsequently defended progressive interpretations of these limits within the court system (institutional power) (Mashilo and Webster 2021). We argue that labour may need to draw on a combination of all of these forms of power to ensure economic and social upgrading in the RE-GPN, and to support a just transition (Barrientos et al. 2011).

One additional point of contention within the GPN literature is the growing role of transnational, multi-stakeholder initiatives, which focus on (often voluntary) corporate social responsibility as a mechanism to fill the "governance gap" created by the inability of states to control GPNs. Hess (2021) argues that these often complement rather than replace state power, and that state power has often existed in more diffuse as well

as concentrated forms. Glassman (2011) further notes that various international institutions and regulatory frameworks including trade agreements, international development banks, and so on, can act to project the national interests of certain countries rather than being fully autonomous.

## 3.4 EMBEDDEDNESS

Although at a superficial level value creation is controlled within the boundaries of the firm, or state-owned enterprise, this forms a small part of the wider organisation of real resources in the economy by the wider network of interconnected firms and state-owned enterprises (Pitelis 2009). Embeddedness refers to the ways in which the broader contexts surrounding firms affect the ways that they create, capture, and enhance value.

Within the GPN framework, Figure 1 described embeddedness as separated into three categories. The first is network embeddedness, which refers to the position of the firm within the network of different actors comprising the GPNs. The second is geographical embeddedness which focuses on how firms become tied to specific locations. The third is societal embeddedness, which refers to the firms social position based on history and culture. We examine societal embeddedness through linking social reproduction to value and power within the framework above.

The international character of GPNs does not make them disembodied spectres detached from national economic systems. Rather, it means that they are embedded in a number of national economic systems and institutions, even if they have some capacity to disembed from various countries. Further, the distinctions between these national and subnational geographic regions are not vestigial precapitalist anachronisms to be gradually eroded by the forces of capitalist globalisation. Rather, particular and differentiated regional institutions are dynamically reproduced within capitalism as a core part of it, even if some national institutions represent limits to capital. For example, special economic zones (and their proliferation) represent the modern creation of specific legal zones with their own unique institutional structure and regimes of labour control, and cheap social reproduction (including controls on migration) (Neveling 2015).

Firms normally innovate or learn in collaboration with other firms, educational and research organisations, and parts of the state, both for novel innovation and for adaptation of existing technologies (Lall and Pietrobelli 2005; Devy et al. 2022; Ockwell et al. 2014; Baker and Sovacool 2017). One way in which firms can benefit from wider systems of innovation is through the transfer of individual learning into firms, as a result of training programmes either with educational institutions or other firms. Additionally, various forms of technology imports play a significant role, including through imports of capital goods, foreign direct investment and licensing. However, as production is organised within firms (and interlocking networks of firms), firm-level learning is central. That is, firms and schools, universities and state departments (as collective units) must learn to work together in wider systems, to coordinate collective production. This must happen by learning through doing, within systems of innovation (Lall and Pietrobelli 2005).

This means that local firms, international firms and research institutions within developing countries must establish long-term patterns of working together, not only to innovate, but also to continually adapt existing technologies to local conditions in competitive ways. The development of such intermediate capabilities requires highly functional systems of innovation. One major concern here is that, while close collaboration between universities and the private sector can facilitate the adaptation of existing technologies and applied research, such collaboration is often weak in developing countries, or missing altogether.

Focusing on embeddedness may be particularly important for understanding SMMEs, as they often cannot achieve significant economies of scale internally, and rely on their embeddedness in larger productive networks to produce competitively. Thus, SMMEs exist within a set of complex relations with larger firms, the state, and the capitalist totality.

Rainnie et al. (2013) suggest four major ways in which SMMEs exist in relation to larger firms. Each type of SMME positioning can be associated with different forms of pressure, based on the type of network within which they are embedded. First, 'dependent' SMMEs operate in close coordination with larger firms, for example as subcontractors. The actions of these SMMEs may be restricted by the larger firms that they depend upon. Second, 'dominated' SMMEs compete with large firms, based on higher than average rates of exploitation which larger firms cannot maintain. These SMMEs

depend on advantages gained from geographic and social embeddedness, such as access to informal labour markets. Third, 'isolated' SMMEs operate within small markets, which large firms are not interested in. This positioning allows these SMMEs to have more freedom. And fourth, 'innovative' SMMEs exist in innovative niches they have created, although these innovations may later be captured by larger firms. Consequently, innovative SMMEs may start with more freedom, but may move into one of the other categories if they do not grow into larger firms.

One common solution to promoting SMME-led development, while enabling the gains from economies of scale, is clustering, where a range of firms are located together. These firms may be vertically or horizontally connected and may also be connected to larger firms or other institutions, such as universities (Karaev et al. 2007). This allows for significant external economies of scale to emerge, and can increase the competitiveness and ability of SMMEs to upgrade (Thanh et al. 2009).

## 3.5 DEVELOPMENT STRATEGIES WITHIN GPNS

Within the historical literature on development (value enhancement) two different theoretical approaches on embeddedness emerge, combined with different policy recommendations for development. The first approach emphasises network links, such as buyer-seller relationships (for example Devy et al. 2022). Here, particular attention is placed on the upstream and downstream firms, as well as the lead firm, within the value chain. These specific connections are viewed as key enablers of, or limitations to, the development of local firms, and creating and strengthening these connections is viewed as being central to supporting development. The second approach, in line with older developmental state literature, pays far greater attention to geographical and network embeddedness within national and regional production networks, as opposed to GPNs (Andreoni and Chang 2019). This approach is linked to an industrial policy approach which attempts to gain advantages by developing a wider set of interlinked industries and institutions, which all merge together into a wider structural transformation of an entire national/regional economy. We examine both approaches to embeddedness, before discussing the ways in which the two have been combined. Finally, we examine the specific way in which embeddedness shapes the development of SMMEs.

### 3.5.1 Vertically specialised industrialisation

Strategies for value creation which depend heavily on network embeddedness often focus on vertically specialised industrialisation, where local firms attempt to gain an advantage by focusing on small slices of international value chains. Here firms use their position within GPNs to enable them to specialise in a very small area of production, while other firms within the chain coordinate the other aspects of production. This would be impossible without value chain integration as otherwise domestic firms would have to oversee a much wider set of productive activities.

However, it is unclear that vertical specialisation will make local participation in global production any easier. Morris et al (2022), for example, emphasise the need for policy interventions that aim to exploit follower sourcing (where lead firms persuade their suppliers to establish local plants), as a mechanism to create local second- and third-tier suppliers, instead of policy interventions that attempt to develop domestic first-tier suppliers that compete with preferred first-tier suppliers of original equipment manufacturers (OEMs). However, OEM-preferred, first-tier suppliers often have their own preferred suppliers down the value chain, so they may exclude local suppliers.[10] Additionally, China looms large as a potential competitor in almost all areas of manufacturing, and it is not clear that selecting a small vertical slice of the value chain will allow African countries to challenge this. Therefore, specific state interventions are needed to build nascent firms. Otherwise, these new firms are unlikely to be incorporated into the value chain.

This vertical specialisation is accompanied by a focus on value enhancement through network upgrading - the ability of firms to both enhance and capture value by moving into upstream or downstream activities within the value chain. Here, the firm's knowledge of a particular node of the value chain, and its close connection with upstream or downstream firms, is meant to enable it to

[10] First tier firms supply OEMs with components. Second tier firms have no direct relationship with OEMs and supply first tier firms with subcomponents. Third tier firms supply second tier firms and may produce basic goods and raw materials used in the value chain.

upgrade along the value chain. Chain upgrading often results in a complete shift in the employment patterns of the firms involved, creating some higher-paid jobs, but also, potentially, greater precarity for unskilled workers (Barrientos et al. 2011). Within this approach, learning and value enhancement is often linked directly to formal training from lead and upstream or downstream firms.

However, training programmes alone are insufficient for the development of firm competencies, as achieving learning by doing requires a set of industrial policy interventions that can protect the firm while it accumulates the requisite competencies. For example, Devy et al. (2022) discuss a process of global value chain upgrading for the Kenya solar firm, Solinic. A key intervention for process upgrading was a training programme, administered by the Dutch parent company. In this case, although a local plant was established, it was soon abandoned in favour of importing. Thus, it is unclear if successful learning actually took place.

Technology transfer from lead or upstream firms is another key interest of this understanding of embeddedness. There have historically been some successful instances of technology transfer, down value chains, as more developed countries have transferred low value-added industries to less developed countries. For example, Khan (2019) describes how technologies in the textile and garment manufacturing sector were transferred from South Korea to Bangladesh. However, there have been challenges establishing similar types of technology transfer to African countries in the renewable energy (RE) sector. Lead European firms closely guard their knowledge and are unwilling to pass it along the value chain (Murray 2017; Baker and Sovacool 2017). They may even curtail the room for industrial policy to aid African firms in gaining new capabilities in this area. Financial markets tend to favour safer, turn-key solutions. Further, the wind industry is highly vertically integrated, and local companies set up to meet local content requirements are run by international firms. Knowledge is not transferred and no local experience is developed in design (Hansen 2017).

A focus on chain embeddedness can be combined with some degree of industrial policy, although it is generally linked to less ambitious industrial policy attempts, using selected and relatively limited policy instruments. Makgetla (2023) discusses how recent South African industrial policy has focused on vertically specialised industrialisation to gain competitiveness relatively quickly and easily. This is combined with a focus on government procurement as a policy instrument, in place of other more traditional industrial policy tools, such as tariff protection, due both to critiques of earlier policy tools and their limitation by international agreements. However, Newman and Takala-Greenish (2014) argue that focusing on these aspects of embeddedness with international firms tends to overemphasise the developmental potential of greater integration within global value chains, and underemphasise the importance of greater domestic linkages and a more diversified local industrial structure. In contrast, the authors argue that integration into global value chains has played a relatively limited role in historically successful development projects (even in export-led examples), and that its advocates often exaggerate this role.

Within RE-GPNs, the use of limited industrial policy, aimed at vertically specialised industrialisation has had limited success (Hansen et al. 2020). The use of local content requirements, unsupported by other industrial policy, has not supported the significant development of local industry, as only relatively low value-added components of the production networks, such as final assembly, have been localised. Further local content requirements are often evaded in practice. Additionally, the coordination of state-led demand, through the intermediary of private sector power producers, has led to particularly erratic demand for local products in the sector (IEJ 2021).

## 3.5.2 Structural transformation

A focus on local and regional networks shows different possibilities for value enhancement. This means understanding how firm learning is rooted in larger (national) systems of innovation and production (Edquist 2010). A focus on local geographic embeddedness also helps us see how these industrial capabilities are often not isolated capabilities formed within single industries, but rather are connected in patterns of economic development which can transform entire national economies. This pattern of interconnectedness means significant economic upgrading frequently requires structural transformation, where a wide collection of changes must occur in conjunction with one another in a national economy, to gain competitiveness in important new sectors (Andreoni and Chang 2019).

One example of the importance of local integration, as opposed to a focus on global value chains, can be found in the study by Bhamidimati et al. (2021) of Kenya's

solar value chain. Here, although the authors claim their concept of upgrading is one derived from the global value chains literature, the forms of upgrading discussed focus more on deeper integration into local value chains, rather than further integration into global value chains. For example, the authors find that many companies have moved from distribution and sales to installation and maintenance of solar systems, or diversified into supplying different sectors of the local solar market. Although these developments do entail forming new linkages for imports, and gaining training from a number of international partners, the opportunity for expansion remains in a more protected, lower value, local niche, rather than in deeper integration into a hyper-competitive international market.

Another example can be seen in the South African auto sector, which Mashilo and Webster (2021) note has potential for economic upgrading from delinking rather than linking to GPNs. They offer an example where a firm was able to upgrade by shifting from selling parts as intermediate goods to foreign manufacturers to selling parts as spares for the local and international markets. In comparison, other high-decent-work firms which had not delinked argued that they faced increasing downward pressure on working conditions from monopsonistic lead firms.

## 3.5.3 Combinations and compromises

It is important to understand how to advance structural transformation (economy-wide social and economic upgrading), given the growing significance of GPNs and influence of lead firms, and the limited domestic state power and policy room. Here a number of potential industrial policy strategies emerge as potential ways to best utilise GPNs to promote domestic development. These all try in their own way to account for the increase in GPNs, the reduced policy instruments available to many countries, and the perceived failures of earlier import substitution industrialisation strategies.

Additionally, although many countries aim to imitate export-oriented industrialisation strategies, which have been perceived as being very successful (Makgetla 2023), these also have limitations and drawbacks. Relatively few countries have actually succeeded through this strategy, although for those that have, such as South Korea, their success has been impressive. As more countries adopt the same strategies, competition increases and benefits decrease. Further, many export-led strategies have required periods of intense labour exploitation to build competitiveness (Makgetla 2023).

One strategy that has emerged from this attempt at developing using both GPNs and developing local networks is in-and-out industrialisation. This is where countries participate in wider networks, selectively ensuring that mature industries can be disciplined into international competitiveness, but protecting infant industries, and creating sheltered spaces for new capabilities to develop (Andreoni et al. 2020). In practice, there is a significant overlap between localisation and other forms of industrial policy. Further historically successful industrialisation has always involved a combination of a wide variety of industrial policy strategies at different times, (including export-led industrialisation, import substitution industrialisation, localisation, mineral beneficiation, and some level of continued commodity dependence) (Makgetla 2023).

## 3.5.4 Industrial policy for SMMEs in GPNs

Rutherford and Holmes (2008) examine both the potential and the limitations of clustering as an industrial strategy for SMME upgrading within GPNs. They draw attention to the types of industrial policy and protectionism which are required for clusters to succeed. These have historically included tariff barriers, import substitution, and international agreements guaranteeing minimum demand levels. However, they also focus on the potential weaknesses of clustering approaches to truly challenge the unequal power relations between lead firms and SMMEs within GPNs. They focus on how asymmetric power relations within GPNs, particularly with regards to finance, formal R & D benefit from industrial policy. These factors all tend to favour larger firms, increasing their power over SMMEs, even within industrial clusters.

# SECTION FOUR: **Operationalising the conceptual framework**

# SECTION FOUR: OPERATIONALISING THE CONCEPTUAL FRAMEWORK

In this analysis, we have woven together Marxist, feminist, and ecological theories to explore the concepts of value, power, and embeddedness in RE-GPNs. We developed a dialectical framework showing how value creation, capture, and enhancement shape social and political relations and how these social and political relations in turn shape value creation capture and enhancement.

We did this to develop a deeper understanding of how to realise a just transition, examining the way oppressive and unequal systems may be recreated or disrupted within the RE sector. We also looked at the complex way in which international systems, states, firms, and households fit into existing unequal systems, and how struggles at each of these sites play an important role within the just transition. We focused particularly on the possibilities and limitations of a potential development path towards a just transition, where localisation of new technologies within selected African countries is linked to domestic labour and social organising, which links value enhancement to social upgrading.

Based on the conceptual framework set out in this working paper, we propose an 'assessment matrix' that can be used for guidance, to operationalise the theoretical concepts developed into a clearer guide for the empirical research to be conducted. This is developed in the tables below.

**Table 1:** Criteria for selecting RE product in the production network

| Key questions | Key approaches to consider |
|---|---|
| **What proportion of value does the RE product generate?** | Use a value-added approach to determine high and low value areas within the value chain. (A product with a high-value intensity will crucially fit the second principle of decent work (that is fair wages) through value capture). |
| **Is the RE product part of government RE policy?** | The know-how and skills which are difficult or impossible to articulate or transfer through written or verbal communication, and which must instead be learnt through experience. |
| **What is the degree of price volatility of, and competition with, the product (that is, how clearly and stably is production of the concrete product related to the production of value)?** | Diversify the product basket to avoid heavy reliance on exporting mineral commodities that are then refined and employed in manufacturing processes only in other countries. |
| | Diversify the set of buyers to avoid facing monopsonist pricing. |
| | Evaluate gains from other South-South partnerships, to avoid competitive pressures from other economies in the region. |

| | |
|---|---|
| **What is the degree of spillover of the RE product, from within the network production process, to other sectors in the country?** | Evaluate the gains from developing a specific node of the production network. These should include not only the immediate gains, but also two other forms of gain:<br>a) technological spillovers, from investing in specific nodes of the value chains, onto other sectors of the economy (for example, capital goods manufacturing can have spillovers on other sectors by developing technology used in other sectors); and<br>b) backward and forward linkages of the specific node of value chains with other sectors (for example, a sector can have an indirect impact on employment generation in another, complementary sector). |
| **What is the employment intensity of the product?** | Estimate the quantity of jobs that may be created by different activities within the value chains, both directly and indirectly. This can help establish the amount of potential employment creation, which is an important part of the first pillar of decent work, though it does not account for work quality. |
| **What are the prospects for SMME participation in the production of the particular product?** | Meet the objective of ensuring SMME participation in the production network. Prospects can be assessed by:<br>• Identifying the existing SMMEs participating in the value chain; and<br>• Examining the way SMMEs could potentially link to larger public and private actors as well as clusters. |

**Table 2:** Global creation of value

| Key questions | Key approaches to consider |
|---|---|
| 1. **What is the scale of value created in RE GPNs?**<br>2. **Who is producing that value?**<br>3. **How has that value been distributed?** | Identify trade balances for RE technology, to identify the country source of our final RE technology. |
| | Map the production network of the RE technology purchased, and trace its consumption in the three countries. |
| | Use the value-added approach, to measure value at each node. |
| | Use the value-added approach to estimate the price of production, amount of profit and wage levels, energy costs, and other resource costs that contribute to value. |
| | Establish how this is connected to value capture, and calculate the extent to which the three countries contribute, if at all, to value creation in this RE production network. |

**Table 3:** Global distribution of value: role of firms / SMMEs

| Key questions | Key approaches to consider |
|---|---|
| **1. What is the role of local medium-sized firms in value creation and capture, along the RE production network?**<br>**2. What are the opportunities and challenges faced by local firms, and in particular medium sized firms, in building the capabilities necessary to create and capture value in the RE production network?**<br>**3. How does the relationship with larger firms shape the potential for local medium-sized firms to create and to capture value?**<br>**4. To what extent have the value capture strategies adopted by local SMME firms been effective in capturing value?**<br>**5. What value capture strategy can existing local firms adopt?** | Map and identify local medium-sized firms in the RE production network. Use the value-added approach to determine the amount of value created and captured by local SMMEs in the RE production network. |
| | Conduct desktop, semi- structured interviews and firm-level surveys, based on Harvie et al.'s framework (See Figure 2), to establish the internal and external factors that hinder/support the capabilities of SMMEs along the RE production network. Internal factors include market access, technology, skilled labour, finance, market information, network embeddedness and knowledge, innovation, and management competencies. External factors include government policy, domestic and foreign market conditions, and systems of innovation. These should be conducted with SMMEs, government, finance, large firms, labour and affected communities. |
| | Conduct semi- structured interviews and firm-level surveys, based on Rainnie's (2013) framework, to establish how the relation with large firms hinders/supports local SMME firms' capabilities to create and capture value in the RE production network. |
| | Given the above analysis, and an assessment of successful international cases, identify an appropriate strategy. This could include a combination of a production network strategy, a niche strategy, a network strategy, a cluster strategy and an FDI strategy. |

**Table 4:** Global distribution of value: decent work

| Key questions | Key approaches to consider |
|---|---|
| 1. **What is the relative extent of RE global and national production networks and their compatibility with decent work and social upgrading?**<br>2. **To what extent does collective power in the RE global/national production network support/undermine social upgrading in renewable production networks?** | Examine the interplay between decent work and social and economic upgrading that was analysed through the works of Barrientos et al (2011), Selwyn (2008) and Mashilo and Webster, (2021) in production networks. |
| | Use surveys to establish the degree of decent work and social upgrading within a selection of firms. |
| | Combine this with a set of in-depth interviews, to help understand the economic upgrading strategies of the firms and their compatibility with social upgrading |
| | Use focus groups, complemented by in-depth semi-structured interviews, with labour to examine the extent to which the four types of power (structural, associational, societal and institutional) are used to advance social upgrading. |

**Table 5:** Global distribution of value: social reproduction and gender equity

| Key questions | Key approaches to consider |
|---|---|
| 1. **How is social reproduction organised and connected to local production within RE GPNs?**<br>2. **How is productive work gendered within RE GPNs?**<br>3. **What opportunities and policies exist which could further gender equity within RE GPNs?** | Conduct desktop analysis of the public and private provisioning of social reproduction, which includes care (for example health and safety, social security, the creation of early-childhood education institutions and provision of nutritious food to workers and their families). |
| | Invest in public infrastructure that can ease space and time constraints, such as roads and affordable transportation. |
| | Create or revive forms of de-commodified and socialised social reproduction, such as community-run spaces for children and youth, communal kitchens, and spaces for entertainment. |
| | Conduct semi-structured interviews, firm-level surveys and time use surveys to establish factors that may contribute to gendered inequalities in productive work in the RE GPN. For example, social gendered norms about women's participation in the RE production network; gendered difficulties of travel/migration for work in the RE sector; gendered segmentation of part-time versus full-time work and its implications for wages and social upgrading benefits (maternity leave, pension); gendered skills shortages and their relation to the role of women in social reproduction; gendered wage inequalities. |

**Table 6:** Global distribution of value: the role of the state

| Key questions | Key approaches to consider |
|---|---|
| **1. To what extent have state policies been effective in supporting value creation and capture of value through localisation policy and supporting the inclusion of SMMEs in RE production networks?**<br>**2. To what extent have state policies been effective in supporting decent work, and social upgrading of RE production networks?**<br>**3. To what extent have state policies been effective in supporting gender equity in RE production networks?** | Draw from Werner (2021) the distinction between four key roles which states may play within GPNs: facilitator, regulator, producer, and buyer.<br>Draw from Schindler et al. (2022) the addition of de-risking the state to understand the role of the states in Ghana, Kenya and South Africa in the RE production network.<br>Undertake a policy scan to understand the policy regimes governing each area of inquiry.<br>Conduct firm surveys and in-depth semi-structured interviews to understand the impact of these policies on firms and labour. |

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