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# **The Dynamics of Zambia's Copper Value Chain**

**Judith Fessehaie**

Thesis Presented for the Degree of

DOCTOR OF PHILOSOPHY

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# The Dynamics of Zambia Copper Value Chain

Judith Fessehaie

March 2012

The past two decades witnessed the emergence of China and India as major investors in African extractive industries. This, together with the commodity price boom, raises new questions on Africa's industrialisation prospects.

This thesis investigates the dynamics of industries upstream of a mineral sector, in light of changing investment ownership patterns. My aim is to examine whether the new value chain drivers, China and India, are characterised by distinctive value chain governance patterns and whether this impact on the opportunities and constraints for the localisation and development of a mining supply industry. I also analyse the socio-economic context in which these dynamics are embedded to identify historical trajectories and institutional determinants.

Zambia represents an appropriate case-study given the central role of the copper sector in the country's economy and the heterogeneity of the copper industry ownership structure. My findings are based on 77 interviews with European, Canadian, Chinese and South African mining companies, local supply firms, and private and public sector representatives. In addition, archive material was instrumental in contextualising my research questions within post-structural adjustment programme trajectories in the Copperbelt. I adopt a theoretical framework based on the Global Value Chain approach. Additionally, I draw extensively on the international business literature.

I find that Zambia's copper sector is characterised by several value chain governance patterns, which are differentiated by country ownership (traditional investors - North America, Europe, and South Africa - China and India). This thesis argues that nationality-based variations in governance are determined by differential access to capital markets and the state, different experiences with investment in extractive industries, and cultural factors.

Turning to the local supply cluster, I find that two orders of value chain governance are critical in supporting the supply firms' upgrading: value chain governance driven by traditional investors, and the supply firms' backward integration into tightly governed GVCs. The socio-economic context in which these dynamics are embedded is critical. The privatisation process resulted in the withdrawal of the government from interventionist policies, higher performance requirements set by the privatised mines, and an increasingly competitive environment. Consequently, local linkages became characterised by low levels of value addition. In this context, value chain governance became the only mechanism to support local upgrading processes.

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## Abbreviations

AAC	Anglo-American Corporation
BOZ	Bank of Zambia
CNMC	China Non-Ferrous Metals Corporation
CSO	Central Statistical Office
DAs	Development Agreements
Exim Bank	Export-Import Bank
FDI	Foreign direct investment
FNDP	Fifth National Development Plan
FOCAC	Forum on China Africa Co-operation
FPAs	Forward Purchase Agreements
GRZ	Government of the Republic of Zambia
GVC	Global value chain
IB	International Business
ICSG	International Copper Study Group
IFC	International Finance Corporation
IFC SDP	IFC Suppliers Development Programme
IMF	International Monetary Fund
ITC	International Trade Centre
KCCI	Kitwe & District Chamber of Commerce and Industry
KCM	Konkola Copper Mines
M&A	Merger and acquisition
MNEs	Multinational enterprises
MSC	Association for Mining Suppliers and Contractors of Zambia
NEP	New Economic Policy
NFCA	NFC Africa Mining Co
OECD	Organisation for Economic Co-operation and Development
OEM	Original equipment manufacturers
OFDI	Outward foreign direct investment
OLI	Ownership, location endowments, and internalisation
SAFE	State Administration of Foreign Exchange
SASAC	State-owned Assets Supervision and Administration Commission
SOEs	State-owned enterprises

SSA	Sub-Saharan Africa
SX-EW	Leaching and electro-winning refining
TVEs	Town and village enterprises
UNCTAD	United Nations Conference on Trade and Development
USGS	United States Geological Survey
ZCCM	Zambia Consolidated Copper Mines
ZCCZ	Zambia-China Economic and Trade Cooperation Zone
ZDA	Zambia Development Agency

University of Cape Town

# Introduction

## 1.1 Problem Statement

Industrialisation is crucial for Africa - and Zambia in particular - if the poverty and unemployment challenges are to be addressed. Zambia is one of the world largest copper producers, and, in the 1970s and 1980s, developed its industrialisation strategy upstream and downstream this commodity sector. After the privatisation of the copper mines in the late 1990s, Zambia policy-makers pursued in many ways an opposite strategy: diversification away from the mining sector and export development became the mantra of a private sector-development strategy. Whilst trying to reproduce the export-led growth model of the East Asian economies, for Zambia, the path of labour-intensive industrialisation that propelled job creation and technological development in so many countries shows rather bleak prospects. In its domestic market and in third markets, Zambia's cost competitiveness remains drastically low compared to Asian producers, and is likely to remain so in the medium-term. Also, preferences in advanced economies, so far instrumental in sheltering African industries from competition, are fast-eroding. At the same time, commodity sectors have become the key drivers of the good economic performance experienced by Africa in the past years. The commodity price boom driven by Chinese demand, and frenzy investment by Chinese and Indian investors, among others, all over the continent are putting commodities high back in the development agenda of African governments. This raises a number of unanswered questions about the future of Zambia's, and Africa's in general, industrialisation opportunities: what is the role of extractive industries in reinforcing the current de-industrialisation pattern? If state-owned companies have not been successful in promoting industrialisation, can one expect more from the current path of foreign ownership? In this current era of globalisation, can one lump all foreign-owned companies together in terms of their value chain dynamics?

These are some of the issues that this thesis is founded on and investigates. The general objective of this study is to investigate the implications of emerging Chinese and Indian investment in Africa's extractive industries for local industrialisation and

upstream linkages development. To do so, this thesis explores the dynamics of Zambia's copper value chain in light of its copper mines' heterogeneous ownership structure. In particular, I focus on the impact of lead commodity firm ownership, in terms of investor country of origin, on processes of localisation, development and upgrading of upstream industries. In order to investigate the relationship between ownership and local upstream linkages' trajectories, firstly I compare how different mining companies govern their respective value chains with respect to supply chain management. By doing so, I identify important divergent and convergent patterns between Chinese, Indian, South African, and Western investors. I conclude that not just one but many value chains exist in the Zambian copper mining sector. Then I turn to local upstream industries, investigating how their insertions in the above mentioned value chains affect their trajectory, and I identify other contributing explanatory variables. The study is conducted within the theoretical framework of Global Value Chain (GVC) research.

I attach great importance to the socio-economic context in which Zambia's value chain dynamics occur. I draw on secondary data, archive material and data collected through interviews to define the trajectory of upstream industries in the Copperbelt from the 1970s, when the copper mines were nationalised, onwards. Obviously, I also contextualise the study within the copper price boom that characterised the industry from 2003 to 2008, and the price collapse in 2008/2009, when fieldwork took place.

## **1.2 Outline of the Thesis**

The thesis is organised as follows:

### *Chapter 1: Introduction*

In the first chapter, I situate this study within the broader literature on commodity-based economic development and on the emergence of China and India as major global Foreign Direct Investment (FDI) players. The literature on natural resources generally modelled a range of micro and, mostly, macroeconomic effects of natural resources on economic growth. My discussion is limited to the treatment of linkages

to the natural resource sectors in selected, influential economic work. It should also be highlighted that, whilst most of this work referred to natural resources and commodities, I have a specific interest in extractive industries. For this reason in this and following chapters, with few exceptions, I do not review the literature on soft commodities or oil. In introducing the phenomenon of growing Asian FDI, I briefly discuss the historical evolution of ownership of extractive industries multinational enterprises (MNEs).<sup>1</sup> I conclude by formulating the research questions addressed in this thesis and outlining the methodology adopted.

### *Chapter 2: Elements of a conceptual framework*

This chapter presents the theoretical framework of the thesis. It introduces the origins and key concepts of the GVC approach, including governance, upgrading and local governance. Whilst GVC literature is particularly rich in empirical research, I focus the review on two areas: extractive industries-based GVCs, and the relationship between firm ownership and governance. I highlight the gaps in GVC empirical research with regards to both areas. A summary section concludes and presents the implications of the literature reviewed for this research.

### *Chapter 3: Business dynamics of China' and India's outward foreign direct investment*

In this chapter I turn to the burgeoning empirical research conducted by international business scholars. After briefly introducing the internationalisation theory informing their research, I present the dynamics of Indian and Chinese outward FDI. I review these countries FDI policy regimes, their market reform processes, and the empirical findings on the drivers of Chinese and Indian outward FDI. In particular, I focus on the critical issue of how distinctive Chinese and Indian investment is compared to traditional sources of investment. This literature was instrumental in informing the analysis of value chain governance by Chinese and Indian MNEs.

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<sup>1</sup> I use MNEs throughout this thesis to refer to companies which control production in more than one country.

#### *Chapter 4: Copper value chain: Global and Zambian perspectives*

This chapter examines the copper value chain in its global dimension and within the Zambian context. In the first part, I disaggregate the dynamics of the copper GVC in light of the copper price boom, current trends in supply and demand, and the characteristics of, and linkages between, key lead commodity firms and supply firms. In this latter aspect, I analyse the evolution of ownership patterns and technological change in the industry, and how this shaped production organisation, economic rents, and China's comparative advantages in the extractive industries. The second part of the chapter presents the structure and performance of Zambia's copper sector. In particular, I discuss the entry of a heterogeneous group of firms in the mining sector in the post-privatisation period.

#### *Chapter 5: Breadth and depth of Zambia's upstream linkages to copper mining*

This chapter analyses the socio-economic context of Zambia copper value chain, and draws heavily on primary data. Firstly, I focus on the evolution of upstream industries in two historical phases: the nationalisation period, from 1969 to the late 1990s; and the post-privatisation period, from the late 1990s to late 2000s. I then map the current value chain with respect to upstream linkages, discussing the impact of the 2008/2009 price crisis. Lastly, I analyse the extent and patterns of linkages externalisation and the current policy framework affecting upstream linkages localisation.

#### *Chapter 6: Firm ownership and value chain governance*

Chapters six and seven present my empirical findings on the relationship between firm ownership and upstream linkages development. In this chapter, I analyse how firm ownership of the lead commodity firms affects governance in terms of outsourcing strategies, selection of participant firms, value chain parameters, their enforcement and buyer-supplier relationships. I mainly focus on Chinese and Indian ownership in a comparative perspective with North American, European, and South African mining companies, with a separate discussion on small-scale mines.

### *Chapter 7: Dynamics of the local supply chain*

This chapter focuses on the trajectory of local upstream linkages to copper mining. On the basis of firm-level data, I discuss the determinants of the trajectory of local supply firms. To do so, I explore how value chain governance by Chinese, Indian, North American, European, and South African mining buyers promotes localisation and upgrading processes. I also explore other value chain dynamics impacting on supply firms' performance, in particular their backward integration into GVCs. Lastly I unveil institutional weaknesses related to suppliers' horizontal cooperation, the quality of social capital, and the role of the government.

### *Chapter 8: Conclusion*

In this chapter, I present a summary of the research findings, I formulate policy recommendations and elaborate on this thesis' contribution to the literature.

## **1.3 Situating the Study**

### **1.3.1 Post - Second World War scepticism on natural resources and industrialisation**

In the aftermath of WWII, economic thinking on commodities was mainly preoccupied with the developmental prospects of natural resource-rich countries in Latin America and, to a less extent, Asia and Africa. Declining prices for raw materials and foodstuff compared to manufactured products since the inter-war period generated support for the idea that primary commodity producers were somehow disadvantaged compared to industrialised countries (Toye and Toye, 2003). This idea ran against two prevailing views at the time. Firstly, that natural resources would generate the capital required to stimulate growth in underdeveloped economies within a Harrod-Domar growth model. Secondly, that specialisation in products of static comparative advantages would increase economic growth, as predicted by Ricardian comparative advantage theory.

The first theorisation of the negative impact of commodities on economic development was elaborated by Prebisch and Singer in 1950. Their contributions,

which became known as the Prebisch-Singer thesis, originated from an observed decline of the net barter terms of trade of primary-commodity exporting countries between the 1870s and the 1930s. Prebisch's (1950) contribution focused on differential factor markets in primary and secondary sectors.<sup>2</sup> Whilst linkages were not at the core of Prebisch's work, a conviction transpired that commodity sectors were somehow inferior in terms of technological advancement, noting that "technical progress seems to have been greater in industry than in the primary production of peripheral countries" (p. 8).

It was Singer (1950) who elaborated on the issue of externalities and linkages of commodity production.<sup>3</sup> Because of the *enclave* nature of the commodity sector, he argued, the growth-effect of foreign investments was minimal. In his words:

I would suggest that if the proper economic test of investment is the multiplier effect in the form of cumulative additions to income, employment, capital, technical knowledge, and growth of external economies, then a good deal of the investment in underdeveloped countries which we used to consider as 'foreign' should in fact be considered as domestic investment on the part of the industrialised countries. (p. 475)

At best, investment in commodity sectors could result in higher levels of revenue through royalties and other taxes. At worst, it diverted scarce domestic entrepreneurial activity and savings away from the manufacturing sector. If the manufacturing and commodity sectors had comparable positive externalities, the diversion of investment towards commodities would not be problematic. Singer,

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<sup>2</sup> In industrial countries, technological progress resulted in productivity gains which raised entrepreneurs' and workers' income. During a positive business cycle, demand for primary products rose, increasing primary commodity prices more sharply than industrial prices. During a negative business cycle, the rigidity of the labour markets in industrialised countries pushed wage and cost cutting pressures towards the less unionised periphery and primary sectors (Prebisch, 1950).

<sup>3</sup> Another central tenet of Singer's (1950) contribution concerned the structural unbalances underpinning the decline in the net barter terms of trade. These included the uneven distribution of the gains from technological progress, which benefitted only workers in industrialised countries, whilst reducing the resource-intensity of manufacturing output and the differing income elasticity of goods, and low for food but high for industrial goods.

however, argued that, unlike commodities, manufacturing gave rise to *growing points* (p. 477). Essentially, these consisted of high scope for technological progress, skills development and education, “inventiveness” and Marshallian externalities (p. 476). In subsequent decades, the view that manufacturing was, in variously defined ways, superior to commodities was espoused by a number of scholars as a self-evident fact. At the policy-level, the Prebisch-Singer thesis had immense resonance, and drove the resource-rich developing countries’ industrialisation agenda. Sachs and Warner (1995) argued that the critical error of this agenda was that it was realised through import-substitution rather than export-promotion policies.

Hirschman’s seminal work on linkages provided the first general and widely influential theorisation of linkages (1958, 1981). At first, he focused on production linkages (1958). A new lead industry induced a *backward linkages effect*, driven by input-provision, or derived demand, and a *forward linkages effect*, based on output utilisation. Subsequently, the linkages typology was extended to include revenue linkages, accruing from taxation, and consumption linkages (Hirschman, 1981). Consumption linkages arose when income earned in the commodity sector induced the growth of domestic industries for consumer goods. The concept was originally developed by Innis and the Canadian staple theorists (Buckley, 1958; Innis, 1930; Watkins, 1963).<sup>4</sup>

According to Hirschman (1981), production linkages were more conducive to economic growth than revenue linkages. Indeed, he shared Singer’s scepticism concerning governments’ will and ability to collect taxes from commodity sectors and their capacity to invest productively.<sup>5</sup> Manufacturing of final products and intermediate inputs, in Hirschman’s view, had more potential for backward linkages effects than commodities because it promoted the expansion of other industries, which, in turn, created higher demand and upgrading incentives for the former, in a

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<sup>4</sup> The staple theory explained variations in the institutional development of Canadian provinces as a function of the type of natural resource endowment (Watkins, 1963).

<sup>5</sup> The development potential of production linkages depended on the net output of backward or forward industries, and on the probability that such linkages developed in the first place (Hirschman, 1958, 1981).

“pincer cum feedback effect” or virtuous cycle (Hirschman, 1958, p. 117). The mineral and oil sectors, on the other hand, worked as enclave industries, with weak backward linkages effects. In a well-known case study of Zambia, Baldwin (1966) supported Hirschman’s case.

Hirschman’s lead industries bore similarities to Rostow’s leading sectors: they both argued the need for key industries to catalyse broader investment and productive processes. Whilst Hirschman saw the difference between the two in the “more operational” manner in which he looked at linkages (1981, p. 63), it is argued here that this difference was more substantial. According to Rostow (1959), commodity sectors could directly and indirectly promote broad-based economic development. Indirectly, productivity gains in the commodity sectors enabled the capital accumulation and income growth required to undertake the “take off”.<sup>6</sup> Moreover, primary commodity sectors had direct growth-enhancing effects, catalysing technological innovation and promoting input-supplier and output-utiliser industries. This had been the case for oil, timber, silk, pulp and agricultural processing (meat, dairy) (Rostow, 1956). Yet, such leading sectors had to operate in conjunction with high, productive investment rates and conducive political, social and institutional systems. In other words, “the leading sectors in the drive to maturity will be determined, then, not merely by the pool of technology but by the nature of resource endowments; and it may be shaped to a degree, as well, by the policies of governments” (Rostow, 1959, p. 8). Institutional weakness, he argued, explained the enclave nature of commodity production in today’s Democratic Republic of Congo (DRC), Nigeria, Zimbabwe and other economies which, notwithstanding high capital formation rates and resource endowments levels, did not take off (Rostow, 1956).

Rostow’s contribution differed from Hirschman’s view in two respects. Firstly, for Rostow, commodity production was not structurally inferior in terms of linkages and externalities. Like North (1955), he argued that the primary sector was as good a source of growth as the secondary sector. Secondly, he highlighted the role of

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<sup>6</sup> Rostow defined “take off” as the period, spanning two to three decades, which enabled economies to achieve self-sustained economic growth (1956, p. 25).

policies in determining the enclave nature of commodity production. This argument was echoed by Weisskoff and Wolff (1977) in their influential study of Puerto Rican industrialisation between 1948 and 1963.<sup>7</sup> Hirschman's view, conversely, was more deterministic on backward linkages and contemplated the role of policies only with regard to fiscal linkages.

The enclave thesis was adopted by dependency theory, which analysed the role of commodities within broader historical, institutional and political frameworks (Girvan and Girvan, 1973). Oil and mining industries, dependency theorists argued, operated as enclave industries, defined in terms of low share of returned value (local purchases, wages and taxes) over total sales (Girvan and Girvan, 1970). Their views on commodities ascribed the lack of linkages development to several factors: high capital/labour ratio, vertically integrated MNEs and centralised procurement systems, and, more importantly, foreign ownership, which resulted in capital repatriation and disadvantageous sourcing strategies. This view did not take into account domestic policies and suggested that interventions on ownership structures would address the linkages problem (Ross, 1990). The enclave argument was investigated in a collection of studies edited by Mikesell in 1971. Linkages effects were calculated as a net foreign exchange effect, that is the value of exports (or output, in absence of domestic consumption) plus net investment, less dividends and interests transferred abroad and payments for imported goods and services (Mikesell, 1971b).<sup>8</sup> The studies challenged the enclave thesis, but concluded that backward linkages were generally weak. Retained values ranged from 60 to 70 percent of the export value, constituted mainly of taxes and payments to the host country (50 to 75 per cent of retained value). Domestic purchases of capital and material constituted less than 10 percent of retained value; only in Chile this share was higher than 20 percent, due to the local content policy (Mamalakis, 1971). In general, the under-development of upstream industries was ascribed to policy failures (Mikesell, 1971b).

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<sup>7</sup> Weisskoff and Wolff (1977) concluded that "growth which occurred through export-oriented industrialization has hardly proven an alternative to the kind of dependence noted in classic plantation or mineral exporting enclaves of the early twentieth century" (p. 625).

<sup>8</sup> Equally, retained value could be calculated as the sum of domestic wages, purchases of nonfactor inputs, taxes and other transfers (such as corporate social responsibility projects) (Mikesell, 1971b).

The Dutch disease model became a widely influential explanation of the poor performance of resource-rich countries. The basic formulation of the Dutch disease model (Corden, 1984; Corden and Neary, 1982) postulated that a boom in the resource sector (or in any tradable sector of the economy) affected other tradable sectors and the non-tradable sector.<sup>9</sup> The Dutch disease model dealt with the relative allocation of factors and prices within the domestic economy, not with linkages *per se*. At the same time, the model consolidated the view that industrialisation and resource abundance were incompatible. There were at least three problems with this view. Firstly, Davies (1995) questioned that a structural adjustment of resources towards the extractive industries had growth-reducing effects *per se*. Unless one assumed that natural resources were a worse source of growth than other sectors, a sectoral reallocation of resources just reflected adjustment to a new equilibrium. Secondly, the full employment and domestic capital assumptions of the Dutch disease model often did not hold in developing countries (Mikesell, 1971a; Myint, 1958; Ross, 1999). Last, monetary and fiscal policies as well as industrial policies could address some of the problems caused by the Dutch disease, but often developing countries failed to adopt them (Mikesell, 1971b; Ross, 1999). These considerations implied that constraints on local industrialisation processes often had more to do with policy formulation and implementation than with resource endowment. Gelb (1988) reached a similar conclusion after reviewing the experience of six oil-producing countries. He argued that the oil booms in 1973 and 1979 not only failed to translate into higher economic growth, but left countries worse off in the long-term. Underlying this was a combination of bad policies and Dutch disease effects.

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<sup>9</sup> In models with different specifications of sectoral production functions and factors mobility between tradable and non-tradable sectors, the de-industrialisation effect was not inevitable (Corden, 1984; Corden and Neary, 1982). Corden and Neary also acknowledged that their model was based upon limiting assumptions such as full employment, lack of international capital mobility and no policy intervention on spending and exchange rates.

### 1.3.2 The resource curse and its critique

In the 1990s, new empirical research on the relationship between commodities and economic growth emerged. Using cross-country regression analysis of 97 countries for two decades, Sachs and Warner (1995, 1997) found that resource abundance, measured as the ratio of primary commodities exports to GDP, was negatively correlated to GDP growth.<sup>10</sup> In their 1997 revised paper, they found that a 100 percent increase in the share of primary exports in 1970, the initial resource endowment, implied a reduction in GDP annual growth rates in the following two decades of between 1.51 to 0.62 percentage points. Results were found to be significant after controlling for several variables and for alternative measurement of resource abundance (ratio of mineral production to GDP, share of primary exports in total exports and log of per capita land area).

Testing their own version of the Dutch disease model, Sachs and Warner (1995, 2001) found it to be the main channel for the resource curse. Firstly, they found services output to be higher than manufacturing output in resource-rich countries, confirming their hypothesis that the natural resource sector pulled capital and labour into the non-tradable sector. Secondly, resource abundance slowed real value-added growth in the manufacturing and services sector and the merchandise export sector (Sachs and Warner, 1995). To counter Dutch disease effects, countries adopted growth-reducing, protectionist policies. Subsequent studies corroborated the key findings of the resource curse, identifying a variety of channels (Gylfason, 2001; Gylfason, Herbertsson, and Zoega, 1999; Isham, Woolcock, Pritchett, and Busby, 2005; Mehlum, Moene, and Torvik, 2006). Political economists offered an additional perspective on the resource curse, focusing on rent-seeking behaviour - the “factional oligarchy” or “predatory state” (Auty, 2001b, p. 844), which translated into growth-reducing economic policies, slower economic recovery, and propensity to civil conflicts (Auty, 2001a, 2001b; Auty and Gelb, 2001; Collier and Heoffler, 2004; Ross, 1999). Some authors argued that this held particularly true for point resources

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<sup>10</sup> In the 1995 paper, their base year was 1971 and the period 1971-1989. In the 1997 paper, their base year was 1970, the period 1970-1990.

(minerals, oils) and some plantation crops (Isham, Woolcock, Pritchett, and Busby, 2005; Woolcock, Pritchett, and Isham, 2001).

Critically, the resource curse proponents espoused the assumption that manufacturing was a better source of growth than commodity sectors, be it for higher spillover or learning by doing effects (Matsuyama, 1992; Sachs and Warner, 1995). The possibility that commodity sectors could promote linkages and knowledge-intensification processes was ignored, or discarded; for example:

Insofar as high-skill labor and high-quality capital are less common in primary production than elsewhere, this may help explain why natural resource abundance and the associated preponderance of primary production and primary exports tend to impede learning by doing, technological advance, and economic growth. (Gylfason, 2001, p. 856)

Sachs and Warner's and their colleagues' empirical results were mostly criticised for the use of primary export-intensity as a proxy for resource abundance (Rosser, 2006). Wright and Czelusta (2004) argued that a comparative advantage in natural resources, interpreted by Sachs and others as resource abundance *per se*, might simply reflect absence of other competitive sectors. In fact, countries characterised by large natural resources sectors and advanced non-resource sectors would not be captured by the definition of resource abundance used in the literature. Yet, natural resources, in these cases, were positively correlated to economic growth. A series of empirical studies indeed found that the resource curse was not robust to different specifications of the natural resource variable and different econometric techniques (Bravo-Ortega and de Gregorio, 2007; Lederman and Maloney, 2007; Maloney, 2007; Manzano and Rigobón, 2007; Stijns, 2005). Some studies used both cross-sectional and panel data regressions (Bravo-Ortega and de Gregorio, 2007; Lederman and Maloney, 2007; Maloney, 2007; Manzano and Rigobón, 2007). In particular, Lederman and Maloney, unlike Sachs and Warner, used a proxy for natural resources based on international trade theory, that is net exports of resources per worker, as an average, and adopted it consistently for the sample (2007). Stijns (2005) used mineral and oil reserves and production data, and land per capita. These studies found that the under-performance of some countries was determined

by export concentration, capital market imperfections, low levels of human capital, and weak knowledge systems. Finally, Davies (1995) analysed the long-run performance of mineral and non-mineral economies in terms of GNP per capita levels and social indicators, such as the Human Development Index, and found that mineral economies were not worse off. While oil producers performed best, nonfuel economies still outperformed non-mineral economies in most cases, which led him to conclude that “mineral economies as a group are not cursed, have not performed poorly in the long run, and have not been decimated by the Dutch disease that may or may not in practice accompany mineral booms” (p. 1777).

### **1.3.3 Commodity-centred knowledge-intensification processes**

Much of the criticism on resource-based development paths rested on the proposition that natural resources sectors offered lower opportunities for learning, technological sophistication, and linkages development. The historical experience of resource-rich countries, nevertheless, showed that natural resource sectors could be the source of productivity growth, technological innovation, forward and backward linkages, as much as any other sector, provided the existence of good institutions and investment in human capital and knowledge (de Ferranti et al., 2002; North, 1955; Rostow, 1956). Good institutions were also critical for the emergence, in the same resource-rich countries, of non-traditional industrial and services sectors (de Ferranti et al., 2002). In fact, there was no evidence that the positive externalities of *learning by doing* applied to manufacturing but not to natural resources sectors (Davies, 1995; Stijns, 2005). Bartos (2007) argued that technological breakthroughs and productivity gains in the US mining industry had been comparable to other manufacturing sectors, with the exception of high-tech sectors. On the contrary, it should be expected that local learning and technological intensification processes were deeper in natural resources exploitation because this required specific, localised knowledge and problem-solving (Lorentzen, 2008). That the policy variable could be the main determinant of the success or failure of resource-rich countries to industrialise was also conceded by prominent proponents of the resource curse (Auty, 2001a, p. 316-317; Auty and Gelb, 2001, p. 142).

Most research on linkages focused on the manufacturing sector (Halbach, 1989; Javorcik, 2004). Whilst not focusing on linkages, Davies (1995) reported that post-war mining activities showed output, income, and employment multipliers ranging between 1.5 and 2.5. This was far above the multiplier coefficient used to define an enclave, amounting to 1, which was most common through the early 20<sup>th</sup> century. More recently, multiplier effects of copper mining in Chile were estimated in a range of 1.28 and 1.80, mostly inputs demand from business services sectors, utilities, retailing, manufacturing and transport and communication (UNCTAD, World Bank and ICMM, 2007). Moreover, there was a consensus that, with time, linkages also tended to develop in less advanced developing countries, though economic policy at an early stage could speed up such process (Halbach, 1989; Morris, Kaplinsky, and Kaplan, 2011b; UNCTAD, 2001; Weisskoff and Wolff, 1977).

Economic historians provided important contributions to understanding the process of industrialisation spurred from commodities. Reviewing the experience of resource-rich Nordic countries, Blomström and Kokko (2007) argued that, from the 1850s onwards, Sweden witnessed an export boom of cereals and sawn wood and, later, pulp, paper and iron ore. In the early stages, access to foreign knowledge and capital was important, but technology transfer was made possible by previous investments in dynamic domestic knowledge clusters. These allowed Sweden to move from technology absorption and adaptation, to technological innovation and progressively higher value-added activities. A network of private sector-led research institutes, universities and companies, characterised by high density of linkages in the form of joint research programmes and collaborations, was instrumental in creating and disseminating new knowledge of both a commercial and an academic nature. Public investment in skills development dated back to the early 19<sup>th</sup> century, and became increasingly specialised and oriented to meet the needs of the industry, which contributed financially to such investment. A similar story characterised Finland and underlined Nokia's successful move from pulp and paper milling into cellular technology. By upgrading materials, products and processes, Scandinavian resource-based industries maintained their competitiveness against low-cost producers, demonstrating that "raw-material-based production is not only a temporary stage in economic development, but can instead be a sustainable element

of an advanced industrial structure” (Blomström and Kokko, 2007, p. 214). Moreover, a number of industries related to resource extraction developed in parallel: specialised machinery, engineering products, transport services and equipment (Blomström and Kokko, 2007; de Ferranti et al., 2002). Scandinavian industries producing aircrafts, luxury cars and designer furniture were initially developed as upstream industries to natural resource sectors.

Similarly, US emergence as an industrial power at the turn of the past century was propelled by resource abundance (Wright, 1990). Between 1879 and 1940, American manufactured exports were highly resource-intensive in petroleum products, meat and poultry packing, primary copper products and steel works. At the same time, the US was a leading producer of copper, petroleum, iron ore, zinc, phosphate, molybdenum, lead, tungsten and many other minerals. Such leadership in mineral extraction did not simply derive from geological endowments, but was endogenously determined (David and Wright, 1997). From the mid-1800s, public and private investment in geological exploration and mining education boomed, coupled with significant technological innovations in mineral extraction, refining, utilisation and transportation. This can be best illustrated with the example of copper (David and Wright, 1997). Technological advances in drilling and blasting in the 1870s and 1880s were followed a decade later by two major metallurgic innovations: the adaptation of the Bessemer process to copper converting and the introduction of electrolysis for copper refining, which allowed an almost complete recovery of metal content from the ore. In the 1900s, the application of the Jackling method and the oil flotation concentration process lowered the threshold of economic viability of existing deposits, de facto expanding the US resource base. Conversely, Chile, a world leading copper producer in the 18<sup>th</sup> century, was overtaken by the US the following century, as it lacked the new technologies to increase productivity and faced declining ore quality (Maloney, 2007; Wright and Czelusta, 2004, 2007). While resource-rich Scandinavia, Australia and US were investing in universal literacy, advanced technical skills and scientific research early in the 19<sup>th</sup> century, Latin America did so only at the end of the century (Maloney, 2007).

In recent times, Australia's booming mineral sector and Norway's oil sector supported sustained economic growth and technological progress both within the sector and in related industries: metal and steel products, industrial equipment, chemicals and mining softwares (David and Wright, 1997; Wright and Czelusta, 2007). In Scotland, upstream industries to the oil and gas sector operated on a global scale. A study showed that half of the sampled firms exported up to 50 percent of their turnover, whilst another third of the sample exported an even higher share (Raines, Turok and Brown, 2001). They exported to markets as diverse as East Asia, Russia, Central and South America, the US and Western Europe. These firms were based on high skills and specialist technologies, and moved up the value chain into full packages services. The same sector in Trinidad and Tobago failed to promote linkages and knowledge intensification processes because of policy failures in human resources, knowledge systems and linkages development (Mytelka and Barclay, 2004).

The historical experience of resource-rich countries suggested that "the broad lesson is that what matters for resource-based development is not the inherent character of resources, but the nature of the learning process through which their economic potential is achieved" (Wright and Czelusta, 2007, p. 184-5). Whilst it is generally understood that the opportunities for resource-based industrialisation and knowledge intensification for developing countries were not the same as those for 19<sup>th</sup> and 20<sup>th</sup> century US, Canada and Scandinavia, recent studies found pockets of technological and entrepreneurial dynamism around commodities in a few developing economies.<sup>11</sup> Reviewing case studies in Latin America and Africa, Lorentzen (2008) found important knowledge-intensification efforts around natural resources, built on previously accumulated knowledge. Some resulted in successful technological innovation and lateral migration: sugar-based biodegradable plastic production in Brazil, grain-sorting machineries in Costa Rica, hydro-hydraulic technologies in South Africa. In other cases, technological intensification efforts failed to find commercial

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<sup>11</sup> Sachs and Warner (2001) argued the experience of US, Canada and other resource-rich countries that developed in the 19<sup>th</sup> century was not easy to imitate because they had lower resource to GDP intensity than developing countries and proximity to resources, which was important for industrialisation in the past, is now irrelevant. Wright and Czelusta (2007) agreed that proximity was no longer an advantage, but argued that resource extraction per se was knowledge-intensive.

application, but nevertheless formed an important learning process for the institutions involved.

South Africa's mining input cluster developed from historically high investment in skills and R&D and fierce suppliers' competition coupled with effective horizontal and vertical cooperation in technology (Walker and Minnitt, 2006). Over time, the cluster built important niche competencies and expertise, particularly in the engineering, metal products, electrical and non-electrical machinery sectors. Complex geological conditions of gold processing, deep-level mining and, subsequently, platinum mining pushed deep forms of product and process innovation and adaptation. As a result mining capital equipment and related services became highly competitive, both in the domestic and international markets, often operating at the technological frontier (Kaplan, 2011).

Even in less industrialised countries in sub-Saharan Africa, there was evidence of linkages development from commodity sectors. Investigating various resource-rich countries, Morris, Kaplinsky, and Kaplan (2011a) found different extents of linkages development, in particular backward linkages. The extent and depth of linkages varied considerably: South Africa and Nigeria upstream industries were fairly advanced, whilst Ghana and Zambia were at a somehow intermediate level, with low local value addition taking place. Angola and Tanzania were at early stages, but in Angola the level, range and depth of skills development around the oil sector was fast-growing. In general, the study concluded that commodity sectors offered significant opportunities for linkages development for a wide range of industries. These opportunities were positively determined by a set of factors: a conducive policy environment, infrastructure development, local content policies, supportive corporate strategies by oil and mining companies, and skills and technology investment.

#### **1.3.4 The rise of Asian investment and the commodity price boom**

More optimistic findings about the relationship between commodity and linkages development have significant implications for developing countries. If indeed the

experiences of resource-rich countries, past and new, was not as bleak as portrayed by the resource curse literature, there were good reasons for developing countries to move away from the traditionally suspicious view of extractive industries, which were seen as perpetuating old colonial patterns of international trade (Myint, 1958), towards a more strategic approach to commodities and linkages development. This shift was increasingly advocated by researchers and policy-makers alike (African Union, 2009; Warner, 2005; Wise and Shtylla, 2007; UNIDO, 2005; UNCTAD, 2001). Yet, these perspectives had to take into account two historical changes taking place in the last decade: the rise of China and India, and the arrest in the decline of the terms of trade for commodity producing countries (Farooki and Kaplinsky, 2011).

Early investments in developing countries' commodity sectors were driven by increasing demand for raw materials and consumer demand for tropical food in the industrialised countries (Dunning and Lundan, 2008b; Jenkins, 1987; Radetzki, 2008). The transport revolution which saw the application of steam power to land and water transportation in the second half of the 19<sup>th</sup> century opened up to the global market what had until then been domestically or regionally traded commodities. In the 19<sup>th</sup> century, large, vertically-integrated US and European MNEs slowly replaced the chartered trading companies, which used to buy from indigenous producers. As the oil and mining sectors became more and more capital and technological intensive, their market structure became increasingly concentrated and dominated by an oligopoly of MNEs, which absorbed smaller production units (Dunning and Lundan, 2008b; Girvan and Girvan, 1970; Mikesell, 1971a). By pursuing vertical integration into production, distribution, and marketing activities, these MNEs secured exclusive and reliable access to raw materials, controlled the quality of supplies, and reduced transaction costs. Whilst mostly self-sufficient until WWI, after this date, US MNEs invested heavily in hard and soft commodities in Canada, Latin America and the Caribbean (Dunning and Lundan, 2008b). Standard Oil did so most aggressively, with 55 foreign enterprises by 1907. By the end of the 19<sup>th</sup> century, US MNEs also dominated the Chilean copper industry. European firms invested mainly in their colonies: Turner Brothers in asbestos mines in Zambia, Lever in vegetable oil plantations in Solomon Islands, Belgian Congo and Liberia, Cadbury's in cocoa

plantations in Gold Coast. Royal Dutch Shell and Anglo-Persian Oil Company (now British Petroleum) by the early 1900s invested in 3 continents.

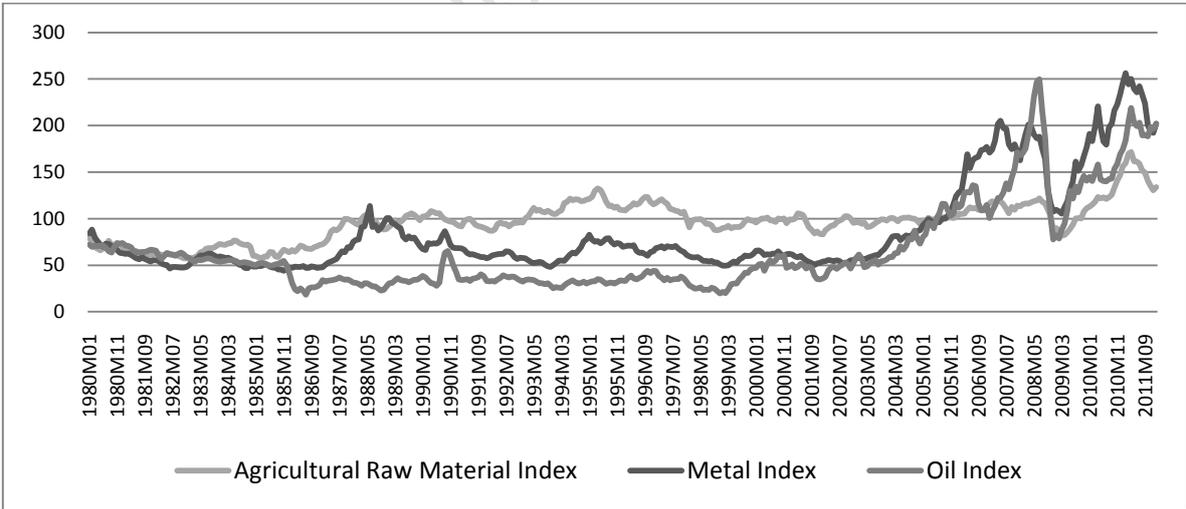
After WWII, MNEs investment boomed, mostly in the form of intra-developed countries FDI flows. Dunning and Lundan (2008b) produced historical estimates of FDI stock in 1914, 1938 and 1960. During this entire period, developed countries were the exclusive source of world FDI. The US overtook Europe as major FDI source, and FDI stocks were concentrated for two thirds in natural resource sectors in developing countries. In developing countries, agricultural soft commodities shifted largely under the ownership and control of domestic private firms and government bodies, whilst foreign MNEs retained control of hard and energy commodities, which required large economies of scale and high technological, organisational and financial capabilities (Buckley and Casson, 1976). Production of oil, iron ore, manganese, copper, bauxite, tin, lead and zinc was dominated by American, British, Belgian and French firms (Mikesell, 1971a). US MNEs accounted for 90 percent of Chile's copper output and 83 and 99 percent of Peru's ore and smelted copper production respectively.

In the 1960s and 1970s, a wave of nationalisation of oil and mining assets swept through the developing world (Mikesell, 1971a; Radetzki, 2008). Concerned with the appropriation of rents by European and US MNEs and their marketing practices, developing countries' governments pushed for divestments by MNEs and increased their own participation through nationalisation and production sharing agreements. By the 1990s, as the nationalisation experience failed to deliver higher economic growth (Crowson, 2001; Radetzki, 2008), developing countries embarked on a series of structural adjustment programmes that entailed the privatisation of their assets and the liberalisation of their trade and investment regimes. It was from the late 1990s onwards that China, and later India, began emerging as global FDI players.

From the second half of 2000, Asian FDI growth in Africa reached startling growth rates, and spurred significant research interest on the origins and motives of these investments, as well as on the opportunities and challenges for Africa (Alden, Large, and Soares de Oliveira, 2008; Alves and Draper, 2007; Bhattacharya, 2010;

Chunying, 2007; Shelton, 2007). For example, Alden et al. (2008) noted that “Beijing’s engagement appears to be predicated upon a longer-term timeframe and driven by economic diplomacy rather than the ambitious ideology of the past” (p. 6). The rise of China and India in global FDI was indeed exceptional: the average year-on-year growth rate of China outward FDI stock was 24 percent in the 1990-1999 period and 26 percent in 2000-2009 period (UNCTAD Stats). For India it was even higher, at 40 and 52 percent respectively, although from a much lower base. By contrast, developed countries’ FDI stock growth rates were significantly lower: for the US, 14 percent in the 1990s and 7 percent in the 2000s; for the EU, 14 and 15 percent; and for Japan, 5 and 12 percent. Still, China and India accounted for, respectively, only 1.46 and 0.45 percent of world outward FDI stock, compared to 23.73 percent held by the US, 43.77 percent held by the EU and 4.07 held by Japan. At the same time, the growth of the Chinese economy, and its demand for raw materials, drove a commodity price boom. Figure 1 shows that from 2003 onwards, except a short-lived drop from late 2008 to early 2009, all commodity groups’ prices rose substantially. Prices for the metals group did particularly well, before and after the crisis.

Figure 1 Commodity price index, Jan 1980-Jan 2012



Source. IMF Primary Commodity Prices. Note. Indices based on 2005 (average of 2005 = 100). Group indices are weighted averages of individual commodity price indices

In 1999, developing countries overtook developed countries as the major recipients of Chinese investment (Cheung and Qian, 2009). In Africa, China’s role was challenging previous power balances, by increasing aid commitments, largely outside

the institutional framework established by the Western countries, and escalating competition for African natural resources (Gu, Humphrey, and Messner, 2008). The reaction from Western countries was often nervous, as their dominance was challenged in Africa but also in their own markets. Suffice to consider the US reaction in 2005 when blocking Chinese CNOOC's US\$ 1.85 billion bid for a mid-sized oil company, Unocal, and Haier Group's attempt to buy Maytag for US\$ 1.28 billion (He and Lyles, 2008).

Whilst Africa was still a relatively small recipient of China outward FDI, China was becoming an increasingly important source of FDI for many African countries: Niger (27.5 percent of inward FDI stock received from China), Madagascar (10.8 percent), Guinea (8.0 percent), Zambia (7.1 percent), Gabon (6.5 percent), Benin (6.4 percent), and Mauritius (5.7 percent) (2007 data in OECD, 2008). Chinese FDI in Africa spanned from oil in Algeria, Angola, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Kenya, Libya, Namibia, Nigeria and Sudan, to copper in Republic of Congo, Zambia and the DRC, to chrome in South Africa and Zimbabwe, to iron-ore in Gabon (OECD, 2008). China entered multi-billion projects of resource-backed infrastructural projects in Angola and the DRC (Brautigam, 2009).

Economic relationships were entangled with aid and political relationships defined by the 2000, 2003, and, especially, 2006 Forum on China Africa Co-operation (FOCAC) - the platform for cooperation in politics, economy, international affairs and social development (Brautigam, 2009; He, 2008). During the 2006 FOCAC, China announced, amongst other issues, the establishment of three to five economic and trade co-operation zones in Africa, a US\$ 5 billion China Africa Development Fund to support China's OFDI projects in Africa, the further opening of Chinese markets for 440 African exports, a series of public infrastructure projects, and the cancellation of official debts owed by eligible African countries (Brautigam, 2009; He, 2008). Overseas development aid was strongly aligned to the direction of FDI flows (OECD, 2008). The Beijing Action Plan (2007-09) and the 2006 African Policy Paper laid down, respectively, the road map and the principle and priorities of such cooperation (OECD, 2008).

India too engaged in a series of high profile investments in natural resources (Pal, 2008). In 2003, state-owned ONGC Videsh Ltd (OVL) acquired a 25 percent stake in Sudan's Greater Nile Oil Project, minority interests in three other blocks in Sudan and invested in oil in the Ivory Coast. Private Indian companies bought out Shell, BP and Chevron shares from Kenya Petroleum Refineries. In 2005, OVL merged with the world's largest steel maker, Mittal (now Arcelor Mittal), to invest US\$6 billion in an infrastructure-for-oil deal in Nigeria. Other investment projects included Arcelor Mittal's US\$1 billion iron ore mining project in Liberia, and a US\$250 million project by a joint public-private Indian group in Senegal's rock phosphate mines and plants.

Most empirical research on the economic implications of China and India's rise in Africa focused on the macroeconomic dimension. Scholars investigated direct trade impacts, in terms of level and composition of African exports to China and India, and stiffer competition from China and India in Africa's domestic markets and in third markets (Broadman, 2007; Geda and Meskel, 2010; Goldstein, Pinaud, and Reisen, 2008; Jenkins and Edwards, 2006; Jenkins, 2008; Kaplinsky, McCormick and Morris, 2007; Kaplinsky and Morris, 2009; Stevens and Kennan, 2006). Some researchers also considered indirect trade impacts, that is improvement in the terms of trade (Goldstein et al., 2008; Jenkins and Edwards, 2006). Very few studies looked at Chinese and Indian FDI flows to SSA, including possible diversion effects (Broadman, 2007; Jenkins and Edwards, 2006; Kaplinsky, McCormick and Morris, 2007). By contrast, with few exceptions (Kaplinsky, Terheggen, and Tijaja, 2010; Morris, Staritz and Barnes, 2011), there is a research gap on the implications of shifting FDI ownership for local industrialisation processes in Africa. Yet, there are empirical findings pointing out that firm ownership, in terms of home country, matters in more than one way. The home country of the investors shaped their internationalisation strategies (He, 2003; Yip, Johansson, and Roos, 1997; Zhao and Zhu, 2000), the extent of technology transfer to the host country (Ford, Rork, and Elmslie, 2008) and their sourcing strategies (Kotabe and Omura, 1989). Ownership structures determined risk preference and decision-making horizons and, in turn, entry modes and location decisions (Filatotchev et al., 2007).

## 1.4 Research Questions

Linkages development around commodity sectors served as a developmental platform in the past and in the present of some resource-rich countries. In Africa, the commodity price boom offers new opportunities to develop along similar paths, because of the scale of investment in extractive industries and because of the likely duration of the price boom which, at least for metals, has proved particularly resilient even to the global economic crisis. The central hypothesis of this thesis is that the rise of China and India not only as major consumers, but also as major investors in African extractive industries has a distinctive impact on localised industrial and knowledge development trajectories.

Global Value Chain (GVC) research provides a particularly effective theoretical framework to understand linkages development and local upgrading processes. By focusing on how lead firms exert governance, that is select firms participating in the value chain, determine their roles, set key performance parameters, monitor performance and, in case of failure, assist them, GVC research unveils how insertion in global value chains can support or hamper local capabilities development (see Chapter 2 for a comprehensive review). It is therefore within this analytical framework that I formulated the research questions addressed in this study, which are the following:

What are the dynamics of local upstream linkages to copper mining in Zambia?

Does firm ownership, in terms of home country of the investor, determine distinctive value chain governance patterns in the copper mining sector?

How does firm ownership impact on local upstream linkages development?

Zambia offered a suitable case study for at least four reasons. Firstly, it enjoyed a relatively peaceful history after decolonisation in 1964. This implied that a minimum level of social and physical infrastructure was in place and that opportunities for deepening upstream linkages could be seized. Secondly, it had a long history of copper mining, which implied that upstream linkages were somehow developed and it was possible to analyse changes across firms and time. Thirdly, it relied heavily on

copper mining. Investment in copper mining and the price boom had a sizeable, meaningful impact on the economy. In other words, the impact of global commodity markets had a visible effect on local industries and mattered for Zambia's development trajectory. Copper was also an interesting mineral: it showed the lowest price volatility amongst hard commodities, experienced one of the highest price surges and attracted exploration activities on a global scale. Lastly, the ownership structure of Zambia's copper industry was heterogeneous with Chinese, Indian, South African, Canadian, Australian and European investors.

## **1.5 Methodology**

This thesis draws extensively on secondary literature (published and unpublished) and primary data (archive data, interviews).

### **1.5.1 Secondary data**

This thesis makes extensive use of literature review. Chapters one (Introduction), two (Theoretical Framework) and three (Dynamics of Chinese and Indian Outward FDI) are based on empirical and theoretical contributions published in journal articles, conference/discussion/working papers, reports and books. These chapters adopt a multi-disciplinary approach. The discussion on linkages is firstly addressed, in the introductory chapter, by reviewing the work of development economists, resource economists and economic historians. In the following chapter, I review research from GVC and cluster scholars, which also incorporates the contributions of sociologists and business scholars. This provides the theoretical framework for the empirical chapters. Given that many of the major contributions on Asian investment currently originate from the international business literature, these sources form a substantial part of the discussion in chapter three. By exploring different literatures, these chapters provide complementary interdisciplinary perspectives on the dynamics of linkages development, firm ownership and Asian investment. Chapter four is based on contributions published in journal articles and books, and on grey literature consisting of sectoral and industry specific publications. The latter included publications from the United Nations, International Copper Study Group (an inter-

governmental organisation promoting industry specific research and cooperation), and GFMS (a private, UK-based consultancy firm specialised in precious metals, base metals and steel markets).

Quantitative data was sourced from a number of databases. In terms of international databases, I sourced data on merchandise trade flows from the United Nations Comtrade database, which relies on data from national customs authorities and statistical offices. I extracted data on the basis of the Harmonized Commodity Description and Coding System (HCDCS). This enabled me to use the HCDCS-based classifications for copper products provided by ICSG Copper Bulletin (2003), and for capital mining supplies provided by Kaplan (2011). The International Trade Centre (ITC) Trade Map database was consulted with regard to tariff data for copper products. Commodity prices and FDI data were sourced from United Nations Conference on Trade and Development (UNCTAD) Stats and International Monetary Fund (IMF) Primary Commodity Prices Database. Copper prices were based on the London Metal Exchange, while FDI figures were based on balance of payment data provided by national authorities. Given that Chinese FDI data are incomplete, I also referred to Chinese Ministry of Commerce-approved FDI data provided in published journal articles. This data was downward biased as it did not include non-approved investment flows, re-invested earnings and other flows, or round tripping of funds to Hong Kong (cf. sub-section 3.2.2 for more exhaustive explanation). For India, I used mainly Reserve Bank of India, as per UNCTAD Stats, but I am aware that these were also downward biased as they only included approved FDI. Asian FDI data was complemented by merger and acquisition (M&A) data (which covers investment from Chinese and Indian companies irrespective of their locations, rather than capital outflows from their home countries) as included in published journal articles.

Sectoral data were collected from databases by the United States Geological Survey (USGS), GFMS, and ICSG. For the sake of consistency, the discussion on copper markets is largely based on GFMS data. These are reliable data sourced from individual mining companies rather than national authorities. USGS provides reserve data widely quoted in the resource literature.

Finally, data were also sourced from Zambian national institutions. Disaggregated FDI data were sourced from the Bank of Zambia (BOZ), which also provided refined copper exports data. Preference for FDI data from BOZ rather than Zambia Development Agency (ZDA), Zambia's investment promotion agency, was motivated by two factors. BOZ data was based on balance of payment data rather than investment pledges, and it provided a breakdown by home country. The Central Statistical Office (CSO) provided macro-economic data. ZDA provided processed copper export figures. As far as value-added copper products exports were concerned, ZDA exports data were more accurate than CSO data and UN Comtrade data, both based on information provided by the Zambia Revenue Authority, which suffered from problems of incorrect classification. ZDA sourced data directly from exporting companies. Zambia copper industry was also analysed by reviewing key legislation affecting the copper industry and horizontal policies concerning investment, industrial development, technology and skills.

### **1.5.2 Primary data: research design**

Chapter five draws on data collected from the Zambia Consolidated Copper Mines (ZCCM) National Archive in Ndola. The archive hosts a valuable collection of documents concerning the copper sector during the pre-privatisation period. Reports had to be manually searched and selected, given the lack of an electronic catalogue. Material included internal ZCCM reports, external correspondence and project documentation from the World Bank, mostly from the early 1990s. This data was not complete due to several missing or lost documents and poor archiving, which imposed time constraints on the researcher, forcing selectivity.

Empirical chapters five, six and seven are based on primary qualitative data collected during fieldwork in Zambia. In order to address the research questions, I collected qualitative interview data.

Quantitative methods are concerned with numerical data aimed at finding quantifiable, scalable correlation between research variables (Bryman, 2001). They presume that observations are highly comparable because data consist of a precise

point estimate of each observation, based on a single, uniform metric (Gerring and Thomas, 2011). Pre-coded questionnaires and numerical data are privileged data collection instruments.

Conversely, qualitative methods are primarily concerned with experiences of research subjects and how such experiences shape the meaning of data collected (Seale, 1999). This is done by focusing on narratives and processes, or backgrounds in which research subjects are framed and have evolved (Seale, 1999). Observation, content analysis and face-to-face interviews are privileged instruments of data collection. Gerring and Thomas (2011) argued that whilst in theory qualitative data can be transcribed in quantitative form, it is not clear that this is always desirable. If it is true that qualitative data are highly context specific (one time and one place), they also allow one to explore many dimensions of the research objects. According to the authors, the difference between quantitative and qualitative methods lies in the comparability of data, rather than a mere 'numbers versus words' dichotomy (Gerring and Thomas, 2011). Quantitative analysis is inclined towards comparisons that are broad and thin, qualitative research is inclined towards comparisons that are narrow and deep.

I adopted a cross-sectional research design. This approach allowed me to analyse variations, at one point in time, in the two dependent variables - buyers' governance patterns and supply firms' trajectories. My research interests lie on the trajectories of local upstream industries and on unfolding supply chain localisation strategies of mining companies. These companies were pulled in different directions by the economic crisis, government pressures, their corporate structures, financialisation and so forth. It was important to understand how these elements impacted on their strategies and on local trajectories. My research method needed to mirror these research questions. Data had to capture processes rather than outcomes per se. The use of pre-coded questionnaires and numerical data would have not allowed me to uncover such processes. Firstly, pre-coded questionnaires prevent collection of information on the many dimensions of an event (firm success or decline). For example, it would have made it impossible to capture "the mindset" (Yeung, 1995, p.328) of the business executives interviewed. Secondly, pre-coded questionnaires

and numerical data focus on static data concerning industrial structures and firm characteristics, which, when focusing on corporate strategies, are important “as a prelude to further structural analysis” (Yeung, 1995, p. 315). Thirdly, respondents were cautious about sharing quantitative data (e.g. balance sheets, employment structure, wages, purchasing accounts, etc). This would have severely restricted the response rate to questionnaires based on numerical data.

Unlike pre-coded questionnaires and numerical data, qualitative methods work well in capturing the decision-making, implementation, interrelationships and change processes within companies. Processes of change are particularly important because “change is on-going, and every issue in a company is exposed to changes or the threat of change in the near future” (Gummesson, 2000, p. 11). The richness and depth of qualitative data was instrumental in capturing this complex processes, therefore I focused on this type of data.

The research instrument consisted of semi-structured interviews. Interviews were preferred to posting questionnaires with open-ended, more complex questions, because past experience suggests they tend to receive very low response rates and insufficient information (Yeung, 1995). Because qualitative tools are linguistic and words are open to a variety of meanings (Gerring and Thomas, 2011), personal interviews allowed the securing of better quality data. The validity of qualitative data collected through personal interviews can be particularly high because the researcher is able to talk to the right person, and the interview method grants flexibility to probe questions, to ask different questions on the same topic, and explore in depth a particular issue (Yeung, 1995). Moreover, the researcher is able to explain the questions posed to interviewees, which enriches the reliability of data collected (Yeung, 1995).

The interviews were framed to ensure that specific topics were covered, while leaving respondents free to elaborate on other issues. I structured the interviews around questionnaires which included both structured questions and open-ended questions. Structured questions were used to elicit responses according to indicators, which I subsequently used to compare and triangulate data. Open-ended questions were

instrumental in addressing processes of change, and in exploring new issues. The first draft questionnaire was revised following focus group meetings in the context of the Making the Most of Commodities Programme (MMCP), and after a few initial interviews which served as a pilot.<sup>12</sup>

### 1.5.3 Sample selection

The unit of analysis was the firm. The interviews targeted two parallel samples comprising buyers (the mining companies) and suppliers. This was necessary to explore their relationships along the value chain. Moreover, key respondents from public and private sector institutions provided additional qualitative data to shed light on specific value chain dynamics (horizontal cooperation, impact of privatisation) as well as the policy dimension.

#### **Buyers.**

In 2009, there were 8 large mining companies based in the Copperbelt and North Western Provinces. Time and resource constraints limited accessibility. The outside limit was not further than Kansanshi Mine, which is located 6 hours away from Kitwe. Lumwana, given its further distance, was excluded from the sample population.

Table 1 presents the sample population. Kansanshi Mines and Bwana Mkubwa were owned by the same MNE, but run separately, unlike NFCA which ran Chambishi Smelter and Luanshya Mines directly. Therefore, there were six independent buyers, but in terms of firm ownership, the sample population included five distinct mining MNEs: Vedanta (India), China Non-Ferrous Mining Corporation (China), First Quantum Limited (Canada), Glencore/First Quantum Limited (Switzerland and

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<sup>12</sup> The MMCP was a collaborative research and policy programme between Policy Research in International Services and Manufacturing (PRISM), Economics, University of Cape Town, and Development Policy and Practice, Open University. The International Development Research Centre of Canada was the principal funder, with additional funding from the William and Flora Hewlett Foundation, Harry Oppenheimer Institute, and Open University. Further information and other Discussion Papers can be downloaded from: <http://commodities.open.ac.uk/discussionpapers> or [www.cssr.uct.ac.za/prism/projects/mmcp](http://www.cssr.uct.ac.za/prism/projects/mmcp)

Canada), and Metorex (South Africa). The five buyers were approached and four responded. Vedanta-owned KCM was reluctant to grant an interview, probably because it was under intense scrutiny and criticism over its failure to pay suppliers during the economic crisis. When follow-up contacts were attempted through the Kitwe Chamber of Commerce and Industry, an uprising in Chingola over workers' wages made it impossible to further continue discussions.

According to 2008 data, the sample covered 77 percent of refined copper output in the sample population, four out of five mining MNEs, and six out of seven independent buyers. The sample includes sufficient variation in firm ownership, as it includes Chinese, European, North American, and South African ownership. Given the exclusion of Indian ownership from the buyers' sample, the empirical chapters discuss Indian value chain governance with some caution and subject to limitations (cf. section 6.1).

Table 1 Mining companies' sample population

	Mine	Ownership	2008 Refined copper production
Covered by the sample	Kansanshi Copper-Gold Mines Plc	First Quantum Minerals Ltd, Canada (79,4%), ZCCM (20,6%)	215, 300 mt
	Mopani Copper Mines Plc	Glencore International AG, Switzerland (73,1%), First Quantum Minerals Ltd, Canada (16,9%), ZCCM (10%)	113, 400 mt
	Bwana Mkubwa	First Quantum Minerals Ltd, Canada (79,4%), ZCCM (20,6%)	5, 900 mt
	NFC Africa Mining Co	CNMC Corp (90%), ZCCM IH (10%)	30, 700 mt
	Chambishi Smelter	CNMC (85%), ZCCM IH (15%)	21, 100 mt
	Luanshya	CNMC (85%), ZCCM IH (15%)	44, 500 mt
	Chibuluma	Metorex Limited, South Africa (85%), ZCCM IH (15%)	5, 200 mt
	Konkola Copper Mines Plc (KCM)	Vedanta Resources, India (79,4%), ZCCM (20,6%)	131, 700 mt

Most small-scale mining operations were Zambian owned. These operations were highly price-sensitive, and mostly shut down after the 2008 price collapse. Because of this and because of the large number of mining companies operating without licence or mining gemstones rather than copper, it was very difficult to obtain reliable data on the population of small-scale mines. Therefore, I had to adopt a non-random, snowball sampling method. Through conversations with key respondents in the mining sector, I was able to estimate a survey population of around ten small-scale mines located in Central Province: three-four in Mumbwa, two in Chongwe, and five

in Kabwe. Given the lack of data on copper output by the small-scale sector, it is only possible to state that the sample, composed of four companies, represented 40 percent of the survey population in numerical terms.

My objective was to ensure that I conducted interviews with respondents close to the decision-making process with regards to supply chain management, who could provide information about sensitive issues without referring to their supervisors and who had knowledge about overall corporate strategies concerning this topic. Therefore, I ensured that interviews were conducted with respondents at management level. Repeated visits were carried out with three out of four large mining companies. In the small-scale mines sample, I interviewed the owners who were also in charge of supply chain management.

### ***Suppliers.***

On the basis of the directory of the Kitwe & District Chamber of Commerce and Industry and data shared by the mining companies, I estimated the total population of suppliers to lie in a range of 100 to 150 firms. The survey population was defined restrictively. Firstly, because the research also looked at possible agglomeration effects, the geographical location of the firms mattered. The survey population was composed of 95 firms based in the main supplying clusters, Kitwe and Ndola, and in the capital, Lusaka. Out of the 95 firms which received the questionnaire and were contacted for interviews, 52.6 percent responded, which led to a sample size of 50 firms. Secondly, given my research focus on linkages development and upgrading processes, I privileged firms with minimum levels of capabilities, operating with established businesses in the formal economy. Hence I excluded “briefcase businessmen”, a group of largely informal, micro-scale traders, which totalled between 3000 to 5000 units before the price crisis. They operated for limited periods of time, and sometimes simultaneously under different company names. Largely seen as a problem by both suppliers and buyers, they were being progressively excluded from the value chain. I did however interview the briefcase businessmen lobby association. Thirdly, the sample did not include firms that exited the mining value chain. At the time of fieldwork, many suppliers had closed operations. Whilst

valuable information could have been sourced from these suppliers, as well as from briefcase businessmen, time and resource limitations restricted my sample selection.

The suppliers' sample provides enough variation in ownership/sectoral patterns (Table 2). Given the orientation of the supply chain towards services rather than manufacturing sector, service providers seemed under-represented in the sample. In-depth, qualitative interviews with a number of representative bodies provided complementary data.

Table 2 Supply firms' sample characteristics

	Zambian-owned	Foreign-owned	Joint Ventures	Sub-Total
Manufacturers	8	14	1	23
Services	10	11	6	27
Sub-Total	18	25	7	50

I interviewed managers in order to ensure that I interacted with respondents with comparable levels of knowledge. In 43 out of 50 firms, interviews were conducted with general managers (managing directors/CEOs). In the remaining seven cases, I interviewed sectoral managers.

**Key public and private sector institutions.**

Respondents from key private and public sector organisations were identified through snowball sampling. This method was useful in identifying respondents with relevant knowledge. For example, I was able to identify the few officers with an institutional memory of the Mines Procurement Committee which only met in 2006 and 2007. In general, government policy towards upstream linkages development was not felt to be particularly controversial, unlike the mining tax and labour laws. Therefore, respondents were relatively open to discuss the issues with me.

The sample of institutions included, among others, the relevant Ministries, the Chambers of Commerce and Industries, the Chamber of Mines, the Mining Contractors and Suppliers Association, and the IFC Suppliers Development Programme (see Table 3). Moreover, conversations with donors involved in mining issues, and with persons that used to be involved in the supply chain (for example

the ex-manager of BP in the Copperbelt) were also useful in providing background information.

Table 3 Private and public sector institutions' sample

Sector	Institution name/ position of respondent	No. respondents
Government	Ministry of Commerce, Trade and Industry (1 senior official) Ministry of Mines and Mineral Development (1 senior official) National Business Technology Centre (1 specialist)	3
Private sector	Kitwe and District Chamber of Commerce and Industry (Chairman) Ndola Chamber of Commerce and Industry (Chairman) Solwezy Chamber of Commerce and Industry (Chairman) Association of Mining Contractors and Suppliers Association (President) Federation for Small Scale Mining Associations of Zambia (President) Chamber of Mines (General Manger) Zambia Association of Manufacturers (Project Officer)	7
Other Institutions	University of Zambia - Dept. Economics (Professor) Copperbelt University - Business School (Professor) Zambia Institute of Purchase and Supply - Copperbelt branch (Chairman) Association for the Welfare of Former Miners in Zambia (President) IFC Suppliers Development Programme (Programme manager)	5
TOTAL		15

#### 1.5.4 Data collection and analysis

After working for three years in the Ministry of Commerce, Trade and Industry of Zambia as a consultant, I acquired deep knowledge of the general socio-economic context of my research object. Thanks to my position within the Ministry I was able to establish trust and credibility with many key stakeholders which also gave me greater access to respondents from public and private sector organisations. My position within the Foreign Trade Department, which is tasked with trade negotiations, meant that I had no prior contacts with respondents in the supply firms and mining companies, who usually dealt with the Industry Department.

Fieldwork took place between August and December 2009. Identification of respondents, meeting arrangements, and preparatory work were done prior to the fieldwork. The requests for interviews were sent to the survey population under a University of Cape Town letterhead as part of the broader Making the Most of Commodities Project, which introduced the researcher and the research project,

outlined the main issues covered in the interview, and guaranteed confidentiality of the data provided. The Ministry of Commerce, Trade and Industry and the Kitwe Chamber of Commerce and Industry also endorsed the research project, raising its profile.

Data collected was both qualitative (the majority) and quantitative. Questions asked were informed by the theoretical literature on GVCs (Kaplinsky and Morris, 2001), and on clusters (Nadvi, 1999; Schmitz, 1995; Rabellotti, 1995). The suppliers' questionnaire covered seven main areas: company details, supplier relationship with buyers, importance of international standards, firms upgrading efforts, horizontal cooperation, technological efforts, and skills availability. Suppliers were asked to elaborate particularly on their relationship with buyers, on the different requirements, entry barriers, as well as the various forms and intensity of vertical cooperation. Data on supply firm performance was collected for the five years prior to the economic crisis to ensure that it reflected firm competitiveness rather than the general economic downturn. The buyers' questionnaire addressed three main areas: the relationship with suppliers, the importance of international standards, and general issues in the supply cluster. The core of the interview focused on the buyer relationship with suppliers, addressing various issues: the structure of procurement expenditures, the selection of suppliers, supply chain parameters, local suppliers' performance, forms and intensity of vertical cooperation, and opportunities for increasing local content. It was very important for triangulation purposes to collect data on supply chain parameters and supply chain performance using a Likert scale (Kaplinsky and Morris, 2001). Data on forms and intensity of cooperation was also collected using comparable formats.

While most of the questionnaire was informed by GVC and cluster analysis, the issue of firm ownership is under-researched in GVC work. During interviews with the suppliers, therefore, I preferred to discuss this through open-ended questions, which did not constrain the respondents' answers. Indeed, this proved a valuable approach, as supply firms' respondents elaborated at length on the issue. Firstly, this proved that the research question was valid. Secondly, respondents provided a variety of data that could have not been deduced from the theory. Moreover, by asking

respondents to identify causal explanations, this approach allowed me to move beyond observed correlations and find causation between variables (Marsh, 1982, p. 123).

Because the objective of my research was to explain the dynamics of the copper value chain, I was very interested in understanding processes of change, rather than outcomes per se. Therefore, the approach I privileged during the interviews was to ask questions about processes. For example, not only did I ask the supply firm to rate its performance, I also enquired how its competitiveness has changed in the previous years, and what the prospects were in the near future. This enabled me to identify firms that, whilst still operating profitably, were not able to defend their market from more dynamic competitors. Similarly, this approach allowed me to explore issues surrounding the impact of mines' privatisation on local supply firms.

Interviews lasted between 30 minutes and four hours, and were conducted in English. For buyers, data collected from the interviews was complemented with data extracted from company reports and websites. This proved particularly useful in throwing light on issues raised during the interviews. Subject to respondents' agreement, I used a recorder during the interviews. Sometimes, the respondents requested that I pause the recording, and provided sensitive information off the record, for example in relation to corruption in procurement procedures.

Data transcription and coding was completed after fieldwork. Quantitative data analysis was conducted using Microsoft Excel. Data was interpreted with a view to identify first, common themes, and, subsequently, extrapolate patterns or trends. In the second part of chapter five, data from the interviews are complemented with archival data. Operational definitions of key concepts, such as ownership, trajectories, upgrading, and firm performance, are provided in the relevant chapters. In general, operationalising the key concepts was necessarily done before data collection, to ensure that the indicators used were valid, i.e. that they measured the concept they were intended to measure. Nevertheless, by systematically analysing patterns in the data, it was possible to identify and define a new key variable - the supply firm trajectory. This was operationalised at the stage of data analysis, in

chapter seven. In this chapter, I explore idiographic explanations of the supply chain trajectories. Idiographic explanations focus on one case and develop as full an explanation of the case as possible (de Vaus, 2001). For each trajectory, I investigated the role of several variables: the type of supply chain that firms were positioned in, their backward integration in GVCs, and other firm-specific characteristics. I also investigated how other variables not predicted by the theory affected each supply chain trajectory: the relationship to briefcase businessmen, and the “suppliers’ criticality”, for example, were elements contextual to Zambia that emerged during the interviews and played an important explanatory role. By doing so, I unveiled the role of buyers’ ownership in explaining suppliers’ trajectories, whilst being able to “discover” other value chain dynamics.

Data triangulation played a very important role. Firstly, it enabled me to ascertain the validity of my data, for example by triangulating data on vertical cooperation provided by buyers with data by suppliers. Secondly, in GVC research, triangulation is instrumental in highlighting inconsistencies between buyer and suppliers. These inconsistencies are important to understand possible value chain misalignments (Kaplinsky and Morris, 2001; Schmitz and Knorringa, 2000).

To strengthen the internal validity of my research, I focused on consistent themes and patterns, and strived to be precise in the number of respondents supporting a position. I also ensured that interviews were conducted with respondents with relevant knowledge. Moreover, within the data available, I investigated alternative plausible hypothesis: de Vaus (2001) argued that “our mindset needs to anticipate alternative ways of interpreting findings and to regard any interpretation of these findings as provisional” (p. 12). In exploring the suppliers’ trajectories, in chapter seven, I examined alternative explanations. Whilst the issue of external validity of this research is addressed in the conclusions, it should be noted that this study was highly context-specific. Yet, the context was common to many African countries: the impact of privatisation, market and government failures, and increasingly heterogeneity sources of investment in the extractive industry.

It is very important to define the limitations of the methodology adopted. Firstly, it proved very difficult to obtain financial reports or disaggregated procurement figures. The scarcity of firm-level quantitative data is a critical methodological constraint of GVC research (Lee, 2010; Raikes, Friis Jensen, and Ponte, 2000). Hence, GVC studies tend to be qualitative data intensive but quantitative data poor.

Access was problematic. Suppliers responded quite favourably to the request for interviews, but arranging interviews with the buyers was time and resource consuming. Although I took care of specifying that taxation issues were not going to be addressed, mining companies were very anxious about interviews because of conflicts with the government over a new mining tax regime introduced in 2008. Even once they agreed, they were very secretive about quantitative data on procurement. This problem is common in research surrounding the extractive industries (Fraser and Lungu, 2007; Morris et al., 2011b). To this, one should add the constraints of physical accessibility (roads in poor condition) to the North Western Province, and the impact of strikes in Chingola. This limited the opportunity to expand the buyers' sample (KCM, Lumwana) and to conduct repeated visits. Time and resource limitations prevented me from visiting the headquarters of the mining companies in China, India, North America, Europe, and South Africa. Similarly, I could not interview the parent company of subsidiaries and sole distributors.

As mentioned earlier, it was not possible to conduct a random sampling of small-scale mines, which were geographically dispersed and in a fluid situation. Data collected from the sampled mines was complemented with interviews with the President of the Federation for Small Scale Mining Associations of Zambia and with supply firms. However, small-scale mines are discussed separately from the large mines, also because of too little variation in the ownership patterns of this sample (cf. section 6.7).

Respondent bias can occur in fieldwork. Suppliers often tended to place the responsibility for their competitive bottlenecks with external agents (government and buyers) rather than within the firm. I addressed this during the interviews, by asking further questions to assess the underlying motive, and differentiate between

concerns of weak value chain cooperation and industrial policies, and concerns of resource nationalism (“*the mines are ours, and Zambians should get the business*”). A closely associated bias was the tendency of respondents to overstate their own upgrading efforts (investment in their competitiveness). In other words, the account of upgrading efforts did not correspond to the investment undertaken. In their view, this increased the legitimacy of complaints over buyers or government, and met a perceived expectation from the researcher that they had made some investment. I addressed this issue, during the interviews, by enquiring about specific actions, details and examples, and by adopting a sceptical view of generic references to *in-house training* and *constant improvements on quality systems*. At the data analysis stage, I also restricted the definition of process upgrading to ensure I differentiated sufficiently between various depths of process upgrading (cf. sub-section 7.2.1).

In exploring the impact of privatisation on upstream industries, I could not rely on longitudinal data. Therefore, I had to rely on primary data collected from the national archive, and from the interviews, where respondents provided their account of the past. Obviously, these accounts had gaps and were influenced by a comparison with the present situation.

Ethical issues are critical in fieldwork research and in publishing results. Sometimes, during the course of the interviews, I was relayed sensitive information that could undermine the position of the respondents vis-à-vis colleagues or peers in the business community. Therefore, when presenting my research findings, I preferred to err on the side of caution and grant maximum levels of confidentiality. This was done by quoting respondents by a code and a name to identify suppliers, buyers, and government officials. Only with respondents from public and private sector institutions, and with selected respondents from the private sector, such confidentiality was not required.

## CHAPTER 2

### Elements of a Conceptual Framework

From the 1960s onwards, the world economy witnessed a structural shift in the organisation of production processes. From *internationalisation*, when production was still organised within national boundaries and internationalisation took the form of arm's length trade between independent firms, of capital movement and of FDI, the world economy shifted to *globalisation*, a fast-changing process in which geographically dispersed activities were functionally integrated and organised within complex transnational production networks, inclusive of both visible and invisible trade (Dicken, 1998; Gereffi, 1994a, 1994b). This was reflected in the composition of international trade, which moved away from trade in primary commodities and final manufactured products, towards intra-industry and intra-firm trade. Between 1913 and 1990, the ratio of merchandise trade to manufacturing value-added doubled in France, Germany, Italy, and Sweden, and nearly tripled in the US (Feenstra, 1998). Innovations in transport (commercial jets, container transport), communication systems (satellite, fax simile), and microelectronic-based technologies, reduced the cost and time for communication and enabled flexible production systems. In the 1980s, a number of factors led to an acceleration of the globalisation process. The oil shocks caused a shift from import-substitution to export-oriented industrialisation policies in developing countries, while MNEs expanded their outsourcing to global networks of suppliers and sub-contractors (Gereffi, 2005).

The analysis of linkages - their nature, how they were governed, the opportunities they offered for growth and upgrading to firms and countries – was the main objective of the Global Value Chain (GVC) research agenda. This agenda, developed in the 1990s, was widely adopted by scholars to interpret global changes in the organisation of production. A large body of GVC empirical studies, inductively, led to the development of key theoretical concepts, in particular those of governance and upgrading. Closely associated to this, the study of forms of local governance, or industrial clusters, was integrated in the GVC framework.

China, an increasingly important source of foreign direct investment, was becoming a key chain driver of minerals and oil GVCs. The same was true, though at a much lower scale, for India. Nevertheless, the implications of these changes on extractive industries-based GVCs' dynamics, and local industrial upgrading trajectories remained largely unexplored in GVC literature.

This chapter presents the theoretical framework of this thesis. In the first section, I introduce the origins of GVC literature. Section two discusses three key concepts of GVC analysis: governance, upgrading, and local governance. The subsequent section reviews initial research findings on extractive industries-based GVCs. In the fourth section, I review the issue of firm ownership in GVC work: how ownership had been interpreted so far, and some findings. A summary section concludes with the implications of existing literature for this research.

## **2.1 Origins of the Global Value Chain Literature**

The first definition of a commodity chain was found in Hopkins and Wallerstein (1977):

Let us conceive of something we shall call, for want of a better conventional term, "commodity chains". What we mean by such chains is the following: take an ultimate consumable item and trace back the set of inputs that culminated in this item - the prior transformations, the raw materials, the transportation mechanisms, the labor input into each of the material processes, the food inputs into the labor. This linked set of processes we call a commodity chain. (p. 128)<sup>13</sup>

They formulated the commodity chain concept within world-systems theory, which viewed the capitalist world economy as structured hierarchically in core, semi-periphery, and periphery nations (Hopkins and Wallerstein, 1977, 1986, 1994). Countries' insertion in commodity chains reproduced the structural division of labour taking place at the world economy level. Commodity chains, therefore, were intended

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<sup>13</sup> Scholars often referred to a definition the same authors developed almost a decade later: "The concept 'commodity chain' refers to a network of labor and production processes whose end result is a finished commodity" (Hopkins and Wallerstein, 1986, p.159).

as heuristic devices to study, in each stage of the chain, the organisation of production, capital, and labour relations, modes of exchange and geographical and political contexts. Chain dynamics were influenced by two factors: firstly, the level of competition. When market forces eroded their monopoly rents, core nations would pursue innovation or re-organise the commodity chain to restore its high profitability. Secondly, the cyclical expansionary and contractionary shifts of the capitalist economy which determined the core nations' willingness to outsource to semi-peripheral and peripheral nations.

Building on the commodity chain concept, GVC approach emerged in the early 1990s with the aim of investigating the organisational nature of spatially distributed and functionally integrated production processes, governed by transnational industrial and commercial capital, and the implications for developing countries and firms (Gereffi, 1994b, 2005). The concept of commodity chain was used to describe the different value-added links, composed of many activities, required to bring a product from conception and design to its delivery to the final consumer and, finally, to its disposal (Kaplinsky and Morris, 2001).

The GVC approach's commonalities with world-systems theory were three-fold. Firstly, both recognised the hierarchical power structure underpinning global production networks. Secondly, both perspectives transcended the national boundaries of production. The GVC approach, in particular, was network-centred, expanding its unit of analysis to regions and firms (Gereffi, 1994b; Gereffi, Korzeniewicz, and Korzeniewicz, 1994, p. 2). Thirdly, GVC approach was deeply influenced by the chain dynamics identified by world-system theorists, which revolved around rent creation through imperfect competition, innovation, and value chain re-organisation.

Notwithstanding their commonalities, GVC research represented a radical shift from world-system theory. GVC scholars found world-system theory structurally inadequate to explain the recent phenomenon of globalisation of production and its impact on the developmental patterns of developing countries. Indeed, GVC approach originated because of an interest in the actual developmental trajectories of

developing countries. Conversely, world-system theorists, fundamentally embedded in the dependency theory tradition, focused on the historical evolution of capitalism. Hence its analysis was Eurocentric, spanned from the 16<sup>th</sup> century onwards, and had a strong concern for the reproduction of labour forces. To world-system scholars, “there is probably no significant difference in this regard [the organisation of commodity chains] between 1500 and 1975” (Hopkins and Wallerstein, 1977, p.129).

It followed that, for GVC scholars, shifts along the value chain depended on sector-specific characteristics (technology, product cycle) and, critically, the industrial strategies of developing countries (Bair, 2009). They looked at the firm as an agent of change (Bair, 2005, 2009; Gereffi, 1994a), whilst retaining an interest in national institutions (industrial policies, standards, trade regimes) as determinants of value chain governance. Opportunities for developing countries were shaped by their insertion in GVCs. For world-system theorists, developing countries could hardly move away from the periphery, or semi-periphery, where most developing countries were located. Periphery countries could move into new functions, but the overall distribution of surplus-value would remain unequally distributed towards the core. It followed that world system theory dismissed the role of firms and industrial policies in opening up development opportunities for developing countries.

For these reasons, GVC work developed a strong normative agenda. Scholars researched how to enhance the competitiveness of an industry, by addressing systemic, rather than firm-specific, bottlenecks; and how to promote upgrading of firms, regions and countries, into more sustainable, remunerative stages of the global value chain (Kaplinsky and Morris, 2001). This made the GVC approach very popular with developing countries governments, researchers, and international organisations (Bair, 2009; Lee, 2010).

The term *value chain* met the need for a common terminology by scholars who shared similar interests and methodologies, under different research agendas (Bair, 2009). The seminal work in this area by Gereffi, Korzeniewicz, and Korzeniewicz referred to *commodity chains* (1994). Commodity chains were not restricted to primary products, but referred to products characterised by low barriers to entry and

free factor and product markets, in which prices did not exceed the discounted total cost of production (Kaplinsky, 1998). Commodity chains therefore applied to a wide range of products: manufactured goods, agricultural goods, and services.

After a decade of prolific empirical work, a consensus emerged for the term *value chain*, because it overcame ambiguities over sectoral coverage and was inclusive of all chain activities (Gereffi et al., 2001). The term value chain originated in Porter's work (1990). Value chains referred to intra-firm linkages between activities contributing to buyer value. *Value systems* extended the chain beyond the firm, backwards to suppliers, and forward, to distributors. They ultimately determined the firm competitive advantages. The focus on *value creation* and linkages suited the GVC framework. It should be noted that in GVC research (and in this thesis) linkages are defined as inter-firm linkages. Some argued that the shift from Global Commodity Chains to GVCs implied more than pure terminology change. According to Gereffi (2005), GVC approach put more emphasis on value creation and capture across chain activities. Additionally, Bair (2005) argued that GVC approach was more influenced by the business literature, and incorporated sector-specific issues, such as industry structure or production processes.

The study of hierarchical relationships between economic agents and the mapping of commodity chains across spaces belonged also to the Filière approach. The French Filière school was born in the 1960s', with a strong technical content, to study agricultural commodities systems. While it evolved to incorporate additional perspectives, the Filière approach was traditionally restricted to production within local/national contexts, excluding dimensions of international trade, and marketing (Raikes et al., 2000). GVC research expanded the geographical and temporal horizons as well as sectoral coverage of the commodity chain, and created a policy-focused approach, which attempted to theorise change across space, time, and value linkages.

## 2.2 Key Concepts of Global Value Chain Analysis

### 2.2.1 Governance

Gereffi (1994b, 1995) singled out four dimensions of GVCs: a value-added chain of products, services, and resources linked across industries; spatially dispersed production and distribution networks; a governance structure; and an institutional dimension. Of the four, it was around the concept of governance that most research was conducted.

“Governance involves the ability of one firm in the chain to influence or determine the activities of other firms in the chain” (Gereffi et al., 2001, p. 4). Such coordination occurred through non-market relationships (Humphrey and Schmitz, 2002). Gereffi (1994a) identified two types of governance structures: *producer-driven* and *buyer-driven* value chains. In producer-driven value chains, manufacturers controlled the organisation of the value chain, backwards, with large networks of components suppliers, and forward, into distribution and retail. These value chains were found in capital- and technology- intensive industries, such as automobiles and computers. Buyer-driven value chains, typical of labour-intensive, consumer goods industries, were dominated by retailers and trading companies, which coordinated vast, decentralised production and trade networks, largely based in low-cost developing countries. Whilst in producer-driven value chains, profits were generated by economies of scale and R&D, in buyer-driven value chains, these accrued from design and marketing activities that met the demand of fast-changing consumer markets.

If one unpacked the governance concept, a wide range of functions were identified: deciding what was to be produced, selecting participants in the value chain and determining their roles, determining how to handle the flow of products and services along the chain, setting key performance standards, monitoring and, in case of

failure, sanctioning or assisting suppliers.<sup>14</sup> Critically, by controlling the production process, lead firms appropriated and distributed value created along the GVCs. Moreover, their strategies in terms of value chain cooperation determined the opportunities for developing countries to upgrade. Lall (1980) identified this value chain cooperation as “direct relationships established by firms in complementary activities which are external to ‘pure’ market transactions” (p. 204). Relationships consisted of, among others, direct assistance to suppliers to establish their businesses or to locate in close proximity to the buyers, information sharing to facilitate production and investment planning and technical cooperation.<sup>15</sup>

At least three findings of the empirical literature were noteworthy. Firstly, governance power was not correlated with traditional patterns of ownership (Bair, 2005; Gibbon, 2001b; Humphrey and Schmitz, 2002). For example, ownership of the manufacturing facilities did not imply governance power in the value chain. Secondly, governance, that is setting rules that had consequences along the value chain, was distinct from coordination, that is ensuring that rules were enforced in specific value-added links. Indeed, the shift of coordination power down the value chain, through full-package or contractor manufacturing, did not entail a shift in governance power, which remained firmly within the lead firms (Bair, 2009; Morris, 2001). Lastly, value chains were “nodal points of power”, which implied that firms were often part of more than one value chain, and therefore were subject to competing corporate strategic interests and governance types (Morris, 2001, p. 128).

From the 1990s onwards, Gereffi’s dichotomy of buyer vs. producer driven value chains was increasingly ill-suited to explain the widely different governance types found across sectors, regions, and time horizons. In some industries, it was observed that governance power moved downstream. For example, component manufacturing

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<sup>14</sup> According to some authors, the concept of power and its determinants also were under-researched (Henderson et al., 2002; Raikes et al., 2000; Sturgeon, 2009).

<sup>15</sup> In Lall’s analysis (1980), assistance to suppliers was defined as *linkages*. Other linkages included financial assistance, raw material procurement to ensure quality and availability of supplies, managerial training, setting up a negotiation procedure to determine prices, allocating inventory and product development costs, sharing of replacement markets, etc.

became increasingly capital- and technology- intensive, even more than final assembly. Moreover, major MNEs began outsourcing strategic stages of the production process, “extracting a rent from ownership of patented technology rather than profits from using it” (Raikes et al., 2000, p. 8). In the electronics industry, lead firms outsourced the entire manufacturing process to contract manufacturers. This enabled them to cut manufacturing overheads, with the flexibility to adjust production volumes upwards or downwards without consequences for their working and investment capital. Concurrently, suppliers’ capabilities increased massively, with investment in automated manufacturing equipment and upgrading into turn-key supply, which resulted in increased revenue growth, economies of scale, and a global presence (Sturgeon, 2002). A similar pattern was observed in the apparel industry in East Asia, though at an early stage (Appelbaum, 2008). In addition, scholars found different governance types, such as international trader-driven value chains for basic agricultural products and bipolar value chains (Fold, 2002; Gibbon, 2001b; Raikes et al., 2000).

The complexity of the forms of governance encountered in empirical studies stimulated efforts by GVC scholars to develop a theoretical framework to interpret changes across sectors and time. Much of these efforts were significantly influenced by transaction costs theory, in particular Coase (1937, 1960) and Williamson (2002).

Coase (1937), in developing a theory of the firm, argued that the firm decision to vertically integrate was determined by the transaction costs of buying from the market. The firm cost of internalising any activity was determined by decreasing marginal returns and poor economies of scope. The cost of recurring to the markets was determined by the costs of “discovering what the relevant prices are” (p. 390), of uncertainty, of negotiating and concluding a multitude of separate contracts. In subsequent work, he included the costs of enforcing legal contracts (Coase, 1960). He argued that “naturally, a point must be reached where the costs of organising an extra transaction within the firm are equal to the costs involved in carrying out the transaction in the open market, or, to the costs of organising by another entrepreneur” (1937, p. 394). In other words, a firm internalised an activity as long as the costs involved were lower than purchasing from the market.

From organisation theory, Williamson (2002) borrowed two important concepts: bounded rationality and opportunistic behaviour of the economic agents.<sup>16</sup> These two raised the risks for contractual breaches, creating an incentive for firms to control such risks by devising complex forms of governance. Like Coase, Williamson viewed the firm as a governance structure, in which “make or buy” decisions were driven by the need to control transaction costs. Transaction costs were determined by the asset-specificity, frequency and uncertainty of the transactions, and by the costs of vertical integration.<sup>17</sup> Vertical integration implied organising an internal activity under weaker incentives, higher administrative control costs and more difficult contract enforcement mechanisms. Initially, vertical integration was costlier than the markets, but as asset-specificity built up, the cost difference narrowed and eventually hierarchical governance forms were cost-effective. Between hierarchy and markets, Williamson envisaged a “hybrid mode of organisation” (2002, p. 181). This was characterised by different forms of safeguards to preserve the continuity of transactions, such as penalties, information disclosure and dispute resolution clauses.

GVC scholars built on transaction costs theory and, in doing so, unpacked Williamson’s hybrid mode of organisation. In Williamson’s work, uncertainty was mainly due to the opportunistic behaviour of suppliers. However, in GVC work, largely focused on developing countries, uncertainties were defined not only by the willingness of suppliers to abide to a contractual relationship, but also by their capacity to do so.

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<sup>16</sup> The concept of bounded rationality referred to limited cognitive capabilities of individuals, which complicated their ability to engage in contractual relationships without errors (Williamson, 1973). The concept of opportunism referred to an effort to increase individual gains through a lack of transparency, for example by strategic disclosure of asymmetrically distributed information or by abusing ‘first mover advantage’ when executing or renewing a contract.

<sup>17</sup> Asset-specificity was determined by the extent to which investment by one firm was specific to a transaction (Williamson, 2002). If this was the case, the parties became mutually dependent and shared an interest in ensuring continuity of the relationship. Buyers nevertheless faced the risk that suppliers tried to extract improved contractual terms by threatening to suspend supply.

The work by Humphrey and Schmitz (2000, 2001, 2002) represented the first efforts at theory building. According to Humphrey and Schmitz (2002), lead firms moved away from market-based relationships and adopted tighter forms of governance in response to various pressures. Weak suppliers' capabilities in developing countries often required buyers' cooperation. Increased competition in the retail sector emphasised product differentiation and innovation, which in turn, required customized, complex suppliers' relationships. Moreover, buyers had to exercise greater control over labour, safety and environmental processes, while lean production systems intensified coordination requirements with suppliers. These factors, rather than the characteristics of the product per se, shaped governance types:

The key determinant of the governance form is not the intrinsic characteristics of the product, such as its complexity or its closeness to the technological frontier, but rather the risks faced by the buyer. These arise from the level of probability of poor performance and the consequences of that poor performance. (Humphrey and Schmitz, 2000, p. 17)

Tighter governance types included network and quasi-hierarchical relationships. The former was preferred when firms had a high degree of complementary competences and capabilities, the latter when buyers had to exercise stronger control over a weak supply chain (Humphrey and Schmitz, 2000, 2002). In sectors characterised by non-price competition, risks were more accentuated and thus tighter forms of governance had to be expected (Humphrey and Schmitz, 2001). The framework proposed by Humphrey and Schmitz put a strong emphasis on market incentives and penalties, such as the opportunity to sell at a price premium, the risk of being penalised in the market place, and the weakness of supply-side capabilities. Whilst this explained the contextual factors underlying different governance types, this approach tended to ignore potentially critical sectors', industry and product-cycle specificities, and lacked a clear dynamic perspective.

Building on Humphrey and Schmitz, Gereffi, Humphrey, and Sturgeon (2005) proposed a theoretical framework that took into account both product and non-product related parameters. They explained governance types according to three

variables: the complexity of knowledge embedded in a transaction (in terms of product and process specification), the extent to which this knowledge could be codified, and the capabilities of potential suppliers. These variables changed over time and varied at each stage of the value chain. The typologies of governance were specified as follows:

- Market governance. Product specifications were relatively simple and easily codified. Suppliers had high capabilities, were in charge of product development, and were price-setters.
- Modular value chains. Suppliers produced on the basis of the customers' specifications, retaining full responsibility for the entire production process, often under turn-key arrangements. Products were more complex but it was possible to codify component, product and process specifications through technical standards, and tacit information through modules. Transactions replicated some of the benefits of the market - speed, flexibility, low switching costs - but were not limited to price considerations.
- Relational value chains. Exchanges were more complex and asset-specific because more difficult to codify. High suppliers' capabilities made outsourcing viable, but at the cost of higher levels of dependency of the lead firm on the suppliers. These networks were based on reputation, family ties and/or geographical proximity.
- Captive value chains. Transactions were complex and could be codified but suppliers' capabilities were low. Lead firms outsourced and assisted suppliers, but ensured they captured exclusively the benefits of increased suppliers' capabilities. Suppliers became transactionally dependent on large buyers and faced high switching costs.
- Vertical integration. Product complexity was high and difficult to codify, and competent suppliers were scarce. Other considerations, such as protection of intellectual property, mattered as well.

Shifts in governance patterns were explained by changes in one or more of the three parameters, such as new technologies, increased or obsolete standardisation, and/or improved suppliers' capabilities (Gereffi et al., 2005). This governance theory attempted to address two other shortcomings of the previous buyer and producer-

driven dichotomy: its lack of dynamic perspective and its inability to move beyond empirical observations into a theory that could predict change (Sturgeon, 2009).

The main criticism of this theory was that, whilst it explained the dynamics of single value-added links, the characteristic of a single value link could hardly say anything about the governance of other value links or of the value chain in general. By reducing the conceptual scope of value chain governance, it was argued, this theory lost sight of the overall chain coordination (Gibbon, 2008). The relationship between the coordination of single value links and chain governance remained unclear and required further research (Bair, 2009; Lee, 2010).<sup>18</sup> Moreover, the theory ignored that institutional factors and relative power balance were likely to affect how firms adjusted to changes in the three parameters (Sturgeon, 2009).

GVC research has been criticised for paying disproportionately more attention to governance compared to other dimensions. Noticeably, the spatial dimension, and in particular the social and institutional contexts in which specific stages of the chain were embedded had been relatively neglected in most empirical studies (Bair, 2005; Cramer, 1999; Henderson et al., 2002; Lee, 2010; Raikes et al., 2000). This was problematic because path-dependency in value chains and their trajectory could be significantly affected by contextual circumstances: capital markets, trade regimes, local power relations, to name a few. Governance was not determined only by firms' actions, but by institutions and normative systems constraining or facilitating their actions (Gibbon, 2008). For example, advanced National Systems of Innovation and standards and metrology infrastructures reduced the risks and costs of technology- and learning-related transactions, reducing the need for tighter forms of governance (Pietrobelli and Rabellotti, 2009).

The institutional and spatial dimensions of global value chains have been the focus of the Global Production Network (GPN) literature. A GPN is defined as a "globally

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<sup>18</sup> Sturgeon (2009) proposed that the governance of the chain be defined by the coordination link between the lead firm and the largest, first-tier suppliers because this would impact governance further down the chain. This proposal, however, did not distinguish adequately between coordination and governance (Lee, 2010).

organized nexus of interconnected functions and operations by firms and non-firm institutions through which goods and services are produced and distributed” (Coe et al., 2004, p. 471). Unlike GVC research, this literature was explicitly interested in the socio-economic institutions, at national and regional levels, in which firm networks were, to various degrees, embedded.

Value creation, enhancement and capture - what in GVC literature has been conceptualised as upgrading – was, according to GPN scholars, the result of complex dynamics between inter-firms and extra-firms networks: “regional development is conceptualized as *a dynamic outcome of the complex interaction between territorialized relational networks and global production networks within the context of changing regional governance structures*” (Coe et al., 2004, p. 469). In other words, it was the interaction of very localised dynamics and global GVC dynamics that was required to bring about local development and upgrading processes. Localised dynamics were defined in terms of resources and institutions. Resources included technological, organisational and territorial assets which created specific economies of scale and scope. Development occurred when regional assets responded to the strategic needs of global corporations (what GVC research defined “chain drivers”). Institutions, which included government agencies, labour organisations and business associations, played a critical role in building local capabilities and resources, such as R&D capabilities and cooperative labour relations. They were also important in shaping the region’s insertion in GPNs because they had different capabilities to negotiate power and control with chain drivers. Therefore, non-economic actors – nation states, civil society organizations, labour and consumers – played a critical role in shaping value chain dynamics and uneven development (Coe et al., 2010).

Hess and Coe (2006) applied the GPN framework to the telecommunication sector. They explored the role of technology in shaping chain dynamics: wireless communication led to increased complexity of the value chain (or, better, networks), with the entry of a plurality of economic actors, and the development of a bipolar governance mode exercised by mobile companies and contract manufacturers. They also investigated how deregulation and privatisation increased competition, whilst

national authorities still held considerable power via partial ownership and by limiting competition and, especially, setting industry standards. By incorporating institutional factors in their analytical framework, Hess and Coe (2006) identified cultural embeddedness and regulatory frameworks as key explanatory variables of the telecommunication global production network. Firstly, even if geographically dispersed, linkages between mobile companies and the suppliers reflected common nationality patterns. Secondly, regulatory frameworks explained why network companies, unlike mobile companies, and with the only exception of Vodafone, did not become global chain drivers.

According to Coe et al. (2010), not only GVC research marginalised the role of non-economic actors, but also underestimated how important were inter-firm variations within the corporate sector, and the complex and differentiated power relations among actors within the same business groups, and among different corporate groups in the global economy, in understanding power and governance dynamics. The role of non-economic actors, and the differential embeddedness of economic actors in local institutional contexts, explained variations in power balances, governance modes, and network configurations even within similarly defined GVCs (for example in buyer-driven value chains) (Hess and Coe, 2006). This led, for example, to the emergence of labour standards and working conditions as a critical arena of “rule-making” and contestation in GPN research (Nadvi, 2011). By focusing on private governance (company codes of conduct and CSR), public governance (labour laws) and joint initiatives, GPN research unveiled the role of labour shaping chain dynamics (Nadvi, 2011) and ultimately showed that extra-firms networks were equally important in shaping the organisational and geographical distribution of current GVCs (Hess and Coe, 2006).

Whilst GPN research offered an important contribution to the understanding of extra-firm networks in shaping chain dynamics, this thesis focused on the role of firm to firm relations and value chain governance in shaping linkages. Therefore, the GVC approach, on its own, constituted an adequate theoretical framework to guide this research.

## 2.2.2 Upgrading

Upgrading was a key concern of GVC research. Global value chains were characterised by unequally distributed economic rents. Therefore, firms' and countries' insertion into GVCs determined the economic returns to their activities and their development prospects (Gereffi, 1994a; Kaplinsky, 2005). Upgrading allowed them to move into more remunerative, sustainable economic activities.

Similarly to world-systems theory, the GVC approach modelled economic rents within Schumpeterian dynamics: rents accrued through innovation, but were eroded by subsequent competition, which stimulated further innovation. Rents were sourced from, among others, exclusive access to natural resources, to new technologies and to high human capital, to innovative organisational structures, to efficient management systems of downstream and upstream linkages. The firm's success was ultimately defined by its capacity to identify sources of higher rents and to appropriate them (Kaplinsky, 1998).<sup>19</sup>

GVC research enhanced our understanding of the distribution of economic rents. As entry barriers to the manufacturing stages of GVCs fell, many Asian and Latin American producers entered these value chains, under increasing competitive pressure and, sometimes, suffering from the "commoditization" of their production, that is higher economic activity accompanied by decreasing economic returns (Kaplinsky, 2004). Intangible activities, such as design, product R&D, marketing, retailing, and after-sales services, were controlled by firms located in developed countries. These activities were skills-, knowledge-, and technology- intensive, and consequently, attracted high returns (Kaplinsky, 2005). It was in these value-added links that developing countries' upgrading was most desirable, and yet more difficult, because lead firms organised their value chains in order to protect these activities from competition and developing countries' firms had scarce access to markets and resources.

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<sup>19</sup> Other sources of economic rents included: product, marketing (exclusive brands), policy (preferential trade regimes for example), infrastructure and finance (both increasing competitiveness and expanding opportunities) (Kaplinsky, 1998).

In order to move into higher value-added links, firms had to undertake a qualitative shift of their activities and develop dynamic capabilities, “the sub-set of competences/capabilities which allow the firm to create new products and processes, and respond to changing market circumstances” (Teece and Pisano, 1994, p. 541). GVC approach generally adopted a four-fold definition for such capabilities (Humphrey and Schmitz, 2002). Upgrading consisted of improvements in the production process, for example through re-organisation of the production systems or new technologies (process upgrading); moving into higher more sophisticated product lines (product upgrading); moving into higher-skills content functions (functional upgrading), and moving into new production activities (inter-sectoral or chain upgrading).

A critical proposition of the GVC literature was that value chain governance determined the extent of market access for developing countries’ producers, their economic returns, and their opportunity to innovate/upgrade through their relationships with buyers/producers (Humphrey and Schmitz, 2000; Kaplinsky and Morris, 2001). In other words, upgrading was critically determined by the content and quality of buyers-suppliers relationships. Nevertheless, empirical research highlighted a complex relationship between governance and upgrading.

Quasi-hierarchical forms of governance involved knowledge transfer between buyers and suppliers, offering important learning opportunities for suppliers, in terms of process and product upgrading. In captive value chains, knowledge transfer still took place, but was limited to a narrower range of tasks. In both types of value chains, functional upgrading was difficult. Buyers were reluctant, or outright opposed to support functional upgrading which encroached on their core business (Giuliani, Pietrobelli, and Rabellotti, 2005; Humphrey and Schmitz, 2000, 2002; Pietrobelli and Rabellotti, 2009; Staritz and Morris, 2011).

Firms in tightly governed GVCs had two avenues to pursue functional upgrading: moving into new markets, or acquiring functions that the buyers were willing to relinquish. Intra-firm investment and local systems of innovation were critical (Humphrey and Schmitz, 2002). While examples of suppliers moving into functions

relinquished by global buyers abounded, evidence of firms moving into new markets was scarce.<sup>20</sup> For example, component supply subcontracting was instrumental in promoting industrial upgrading in Latin America and East Asia.<sup>21</sup> Yet, these networks were tightly controlled by Original Equipment Manufacturers (OEMs), which were more interested in global flexibility than domestic development. As a result, the strong supply base developed by OEMs found functional upgrading into marketing and retailing very difficult to achieve (Gereffi, 1994a). A similar pattern was found in consumable goods industries. In a Mexican garment cluster, US buyers (marketers and retailers) promoted the upgrading of the cluster into full-package manufacturing, which led to higher profit margins for manufacturers and the localisation of backward linkages. Nevertheless, this upgrading process was limited and selective, as US firms retained control of design, product development, marketing and retail (Bair and Gereffi, 2001). In the Brazilian Sinos Valley shoe cluster, it was suppliers who developed design and marketing capabilities for the domestic market that managed to expand to the Latin American market. Firms inserted into tightly-governed value chains driven by US and European buyers found it more difficult to move away from such relationships into new functions and markets (Schmitz, 1999). In general, shoe producers from Latin America and Asia found that, in order to retain their preferred supplier status with global buyers, they had to put aside plans to directly market their own brands (Schmitz and Knorringer, 2000).

It was in network relationships that there were more opportunities for suppliers' functional upgrading, because of strong learning mechanisms and backward and forward linkages. Nevertheless, these governance types were rare in developing

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<sup>20</sup> Bair (2005) pointed out that functional upgrading could reflect the outsourcing of less profitable activities from the lead firms to the suppliers. If this was the case, functional upgrading did not necessarily lead to increased profitability or security.

<sup>21</sup> Under component supply subcontracting, components manufacturing took place in developing countries, whereas final assembly and marketing occurred in developed countries. Under original equipment manufacturing (OEM), the production of finished consumer goods was done in developing countries, then marketed and distributed by MNEs in developed countries. Under original brandname manufacturing (OBM), developing countries undertook production, under their own brand name, and distribution and marketing of the final goods globally.

countries because they required high local competences (Giuliani et al., 2005; Humphrey and Schmitz, 2000, 2002; Pietrobelli and Rabellotti, 2009).

Significant opportunities for technological intensification also occurred within the same stage of the value chain.<sup>22</sup> Exploring new opportunities “on the side” of the value chain link required substantial levels of skills and technological innovation, enabling firms to move from technology absorption to innovation, and expanding their economic returns (Morrison, Pietrobelli, and Rabellotti, 2008, p. 49). Unpacking the *black box* of process upgrading would be important to understand the extent to which this type of upgrading allowed firms to achieve sustainable, higher rents.

### **2.2.3 Local governance: clusters and upgrading**

Whilst usually involving a large number of geographically-dispersed economic actors, global value chains were also embedded in particular geographical locations where the single value-added link activity was undertaken. In these locations, specific socio-political-economic contexts shaped the dynamics of local value chain governance, and the relationship between local firms and global lead firms. Interest in various forms of local governance was initially spurred from the industrial clusters in Italy and other European countries (Pyke and Sengenberger, 1992). From the end of the 1980s onwards, though, such interest extended to developing countries. This area of studies was increasingly incorporated in the GVC agenda, partly because of the same interest in governance and upgrading, and partly because similar methodological approaches focused on the relational aspects of production networks.

Clusters were usually characterised, to varying degrees, by the following: predominance of small- and medium- sized firms, geographical and sectoral concentration, intense backward and forward linkages, common cultural and social

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<sup>22</sup> It has been pointed out that innovation, when associated with increased value added, could be a better measure of upgrading than increases in the unit value of products (Morrison et al., 2008). The latter, indeed, could be achieved by squeezing wages and by other cost-cutting measures rather than investment to increase productivity.

background, and a network of supportive private and public institutions.<sup>23</sup> Clustering enabled development of a well-developed network of increasingly specialised suppliers, able to exploit economies of scale. Such supply networks, in turn, allowed buyers to cut costs, reduce stocks, shorten delivery times, and increase their flexibility to adjust to new products (Rabellotti, 1995). Moreover, by facilitating specialisation, clustering lowered entry barriers for small firms. Small firms mobilised limited financial and human capital, without the need to invest in all the stages of the production process. Risk-averse entrepreneurs could venture into “small and calculable – rather than wild – risks” (Schmitz, 1997, p. 21). In developing countries, geographical proximity was particularly important because of poor infrastructure and information systems, and the high value of face-to-face interaction (McCormick, 1999).

Clusters were the result, at a specific point in time, of a complex process of evolution (being growth or decline) and, often, of increasing internal differentiation (Cawthorne, 1995; Rabellotti, 1999; Schmitz, 1995). By focusing on the trajectories of clusters, it was possible to incorporate dimensions of time and change, and separate elements crucial to the success of the cluster from elements purely incidental to it (Humphrey, 1995). Empirical findings indicated that access to external markets was important for the success of clusters. External markets posed new imperatives in terms of quality and design. Export agents in Brazil, India, and South Africa (Cawthorne, 1995; McCormick, 1999; Schmitz 1995), foreign buyers in Pakistan (Nadvi, 1999), and wholesalers in Mexico (Rabellotti, 1995) played a key role in upgrading clusters' capabilities in product development, marketing and compliance with international quality and delivery standards. Precisely this relationship between global buyers and local producers was covered by GVC research. The clusters literature focused on the local dynamics of such relationships, and the role of extra-firm institutions.

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<sup>23</sup> Though the distinction between industrial districts and clusters was not clear cut, there was some consensus that clusters mainly consisted of geographical and sectoral agglomeration of small- and medium- sized firms, while industrial districts, usually found in Europe, were a sub-set, characterised by more effective knowledge-disseminating networks, a dense social fabric and supporting public institutions (Altenburg and Meyer-Stamer, 1999, p. 1694; Humphrey and Schmitz, 1996, p. 1863).

Clustering produced localised, Marshallian positive externalities, such as access to a pool of specialised labour, increasing specialisation of suppliers, and ease of knowledge dissemination. Schmitz (1997) argued that these externalities were not sufficient to explain a cluster success. Within his collective efficiency framework, the success of a cluster was determined also by its capacity to undertake *joint actions* (Schmitz, 1997). Joint actions consisted of vertical and/or horizontal cooperation between firms operating in the same value link. Vertical cooperation involved tight supplier-buyer relationships. Horizontal cooperation took the form of informal sharing of information, machineries and labour, or was structured around public or private institutions.

Two sets of empirical studies in 1995 and 1999 tested the collective efficiency framework, analysing selected clusters' responses to exogenous threats: higher product standards imposed by global buyers and increased competition from low-cost producers (Nadvi, 1999; Rabellotti, 1995, 1999; Schmitz, 1995, 1999). Overall, the studies found that clusters increased vertical cooperation: producers strengthened cooperation backwards with suppliers and sub-contractors, and forward with foreign buyers. Cooperation tended to be selective rather than cluster-wide, and vertical cooperation was more common than horizontal one (Humphrey and Schmitz, 2000). The studies found that good export performance was positively correlated with vertical cooperation, both forward and backwards, and with multilateral horizontal cooperation.

The effectiveness of cluster cooperation, nevertheless, had limits. In some cases, firms failed to act beyond issues strictly related to the crisis, and did not tackle other structural problems such as labour training, production organisation, and technical upgrading (Nadvi, 1999). In other cases, cooperation was an ad hoc coping strategy, but then failed to become a permanent feature of the cluster (McCormick, 1999). Also, the intensity of cooperation tended to diminish over time, as higher standards in quality, delivery, and reliability were achieved (Schmitz, 1995, 1999).

Whilst much literature focused on existing clusters and their dynamics, Morris and Barnes (2006, 2007) and Morris, Bessant, and Barnes (2006) investigated whether

clustering could be the result of “purposive action” from key stakeholders. In developing countries’ contexts, often characterised by low trust, weak technological and supply capabilities and significant institutional and market failures, clusters would hardly arise spontaneously, but rather as a result of industrial policy interventions. Also, the traditional fragmentation between parastatal companies, the formal private sector, and the informal sector constrained the development of integrated business systems and the growth of backward linkages between larger-sized firms and smaller local suppliers (Pedersen and McCormick, 1999).<sup>24</sup> Reviewing the experience of automotive, furniture and textile clusters in South Africa, Morris and Barnes (2006, 2007) and Morris et al. (2006) concluded that purposive action could build clusters, fostering horizontal and vertical linkages and learning networks. This was however subject to a number of conditions. External crisis coupled with market opportunities were necessary to trigger firms’ mobilisation. Over time, firms’ relationships had to evolve and become trust-intensive in order to stimulate knowledge transfer. The process had to be driven by internal change agents (within the cluster) and facilitated by external intermediaries (business support sector). Support by the lead firms (buyers, for example assemblers or retailers) was critical in creating both the incentives and the parameters for the cluster upgrading efforts. At the initial stage, the government enabling role was also important.<sup>25</sup>

### **2.3 Global Value Chain Research and Extractive Industries**

The GVC agenda produced a large body of empirical literature on export-driven manufacturing sectors, agricultural commodities, and services. There were indications that sectoral characteristics affected value chain dynamics, for example because of different technological complexity and sources of innovation and

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<sup>24</sup> In SSA, McCormick also identified the following as constraints to clusters development: small market size, large pools of unskilled labour, poor contract enforcement as negative environment (McCormick, 1999).

<sup>25</sup> Government support was important at the early stages to provide legitimacy to the process and to provide financing (therefore sharing risks) within the context of sector-specific or cross-sectoral policies (Morris and Barnes, 2007). However, government support was likely to be hampered by political agendas, obsolete institutional practices, lack of skills and resource-consuming bureaucratic procedures.

upgrading (Giuliani et al., 2005; Raikes et al., 2000). In Africa, GVC researchers focused on agricultural commodities (Fold, 2002; Gibbon 2001a; Ponte 2002). By contrast, extractive industries-based value chains had been under-studied.

Reviewing a large sample of case studies, Giuliani et al. (2005) concluded that, while they did not appear to be organised around one specific governance typology, natural resource-based clusters tended to be characterised by good levels of collective efficiency. The drivers of technological innovation were public research institutes and suppliers, which meant that joint actions between public institutions and firms were critical to foster product and process upgrading. Generalisation of these findings, nevertheless, was constrained by two factors: firstly, the study focussed on Latin America; secondly, only one out of the 11 natural resources-based clusters reviewed concerned minerals.<sup>26</sup>

More recently, Bridge (2008) explored the application of the GVC theoretical approach to an extractive industry, namely the oil sector. He put emphasis on the complexity and sensitivity across time and space of inter-firms and state-firms relationships, a typical GVC perspective. This view challenged the nationally-bound and state-centred perspectives of the resource curse and related literatures, which offered a limited understanding of the dynamics between producers, states, and suppliers.

The extractive industry was distinct from the manufacturing and services sectors in three significant ways (Bridge, 2008). Firstly, besides rents of a technological and relational nature, extractive industries also involved rents from resource extraction. Secondly, ownership and property rights crucially defined the distribution of rents and the forms of competition to capture them. Thirdly, the deep embeddedness of these value chains in proprietorial and institutional structures of the nation-state implied that the latter played an important role in chain configuration and that the balance of

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<sup>26</sup> The copper cluster in the sample presented the lowest level of collective efficiency, and the second shallowest level of upgrading of the entire sample (Giuliani et al., 2005). This may imply that technological entry barriers may be higher than in agricultural-based clusters.

power (inter-firms and between states and firms) warranted more attention in future empirical research.

## **2.4 Global Value Chain Research and Firm Ownership**

This thesis' research questions were defined around the role of firm ownership in shaping value chain governance, a theme which had been under-studied in GVC analysis. As Henderson et al. (2002) noted: "there have been few attempts to understand the significance of firm ownership (domestic or foreign, and in the latter case, by nationality) for economic and social development in particular societies....There is clearly a need to recognize that the 'nationality' of firm ownership may be a key element in economic and social progress" (p. 441).

There was evidence that organisational learning was fostered more by some types of buyers than others. For example, in the apparel value chain in Asia, US branded manufactures entered into production-sharing agreements that required only basic assembly capacity, while US retailers and marketers encouraged upgrading of their suppliers to OEM or full-package production (Gereffi, 1999). Full-package suppliers had to learn how to organise production networks, including logistics, supply chain management, and marketing.

Some studies focused on the impact of end markets on governance. In Mauritius' export clothing sector, suppliers for the European market tended to be nationally-owned, produced higher-value added products, integrated backwards or managed their own suppliers and, to some extent, moved into product design (Gibbon, 2008). US buyers were supplied by Chinese-owned, cut, make and trim (CMT) operations, which sourced from nominated suppliers. Upgrading opportunities for local suppliers, therefore, clearly differed according to the end market. Similarly, in the Asian electronics industry, US firms specialised in intangible activities (design, product specifications), leaving their Asian suppliers to upgrade capabilities in the entire manufacturing process (Borras, 1997). This also led to the deepening and localisation of backward linkages. Japanese firms retained in the home country high-value goods production, and relegated to Asia the low-end of the product range,

thereby curtailing local upgrading opportunities. Examining four markets in the EU, Palpacuer, Gibbon, and Thomsen (2005) found important variations in the sourcing patterns of global buyers, due to different industry structures and the nature of “financialization” of their corporations. In order to maximise share-holder value, UK buyers adopted supply chain rationalization practices which, compared to the value chains driven by continental European buyers, increased entry barriers and constrained upgrading opportunities for developing country suppliers. Kaplinsky et al. (2010) looked at the impact of exporting to Chinese buyers rather than European ones, and found that the depth of local conversion of tropical products by Asian and African producing countries was reduced, with a loss in processing capabilities that were relocated to the Chinese food processing and furniture industries.

Less attention was devoted to the impact of suppliers’ ownership on local upgrading. In Lesotho and Swaziland’s clothing export sector, it was possible to identify two distinct value chain dynamics. Taiwanese ownership of the supply chain was associated with CMT operations, and specialised in long-run, basic products for the US market under AGOA. These were inserted into triangular manufacturing networks, in which sourcing, product development, logistics and marketing activities were located in East Asia, with no local linkages. Conversely, South African firms were interested in re-locating production for the regional market in low-cost locations, and focused on shorter production runs, and more complex products. Their strategy involved the transfer of some backward and forward activities, process upgrading and skills development, therefore opening up local upgrading opportunities, non-existent in the Taiwanese-owned supply chain (Morris, Staritz, and Barnes, 2011; Staritz and Morris, 2011).

In sum, very few studies tackled the role of ownership in global value chains. The ones that did pointed out that firm ownership mattered in at least four respects: the types of value chain governance found, the characteristics of supplier firms in developing countries, the value-addition taking place in developing countries, and their upgrading opportunities.

## 2.5 Conclusion

GVC approach offered a very useful lens to analyse the opportunities and challenges of globalisation for developing countries. The theoretical framework underpinning GVC research was a fundamental break from world-system theory, and dependency theory. GVC researchers were interested in the actual development trajectories of developing countries and, unlike world-system theorists, acknowledged changes in the global distribution of rents derived from the active role played by industrial policies and firms. Sector- and even product-specific characteristics mattered in defining the effectiveness of countries' and firms' decisions. If upgrading by countries in more sustainable, remunerative stages of GVCs was not only desirable, but also possible, it followed that GVC researchers could explore sectoral, inter-firm, and institutional dynamics and draw a relevant normative agenda. As a result, this approach became very popular with policy-makers and development practitioners.

With its network-centred approach, focused on firms as agents of change, the GVC approach was particularly well placed to look at the extent, nature, and depth of inter-firm linkages. The GVC analytical framework was composed of two important concepts: governance and upgrading. These were critical to explain the allocation of value chain functions and economic rents along GVCs, and the opportunities for firms to move into more sustained, profitable stages of the value chain. While these two concepts framed much of the empirical literature produced across a wide range of countries and sectors, theory building efforts on the determinants of governance types were still at their initial stages. Moreover, both empirical work and theory building failed to pay sufficient attention to the role of institutions and social contexts. These, it was argued, were critical in shaping governance and local trajectory opportunities. Moreover, GVC agenda incorporated the perspective offered by the cluster literature on local forms of governance. This literature argued that clustering created positive externalities and offered the opportunity for joint actions to support cluster competitiveness. Whether spontaneously undertaken by the firms or purposively pursued by development-oriented policy-making, these joint actions offered the opportunity to overcome competitiveness bottlenecks within the firm and within the value chain.

This thesis focused on two themes that were still under-researched in GVC literature: extractive industries and firm ownership. Initial GVC studies on extractive industries highlighted that this sector had specific characteristics that were bound to influence how value chains were governed. Extractive industries had distinctive sources of rents (resource rents), mechanisms to appropriate them (proprietary arrangements), and relationships with the state. Moreover, intensive intra-cluster cooperation involving firms and public sector was critical for local upgrading.

The few studies that looked at ownership did so in terms of type of firms (manufacturers vs. retailers and marketers) and in terms of nationality of the end buyers (US, Europe, Japan) or the supply firm (Taiwan CMT operations vs. South African firms). They pointed out that firm ownership impacted on governance and the depth and trajectory of local linkages. Nevertheless, there was a paucity of empirical work on the role of Asian, and in particular, Chinese ownership, especially with regard to producer-driven value chains. As natural-resource seeking investment from Asia into Africa increased, this question assumed growing importance. We now turn to a body of literature, on international business, which theorised and tested the distinctiveness of Chinese and Indian investment compared to traditional investors from industrialised countries. Whilst this literature used a different approach and methodology from GVC, and unlike GVC was not interested in localised upgrading opportunities, its findings increased our understanding of Chinese and Indian lead firms' governance patterns.

## CHAPTER 3

# The Business Dynamics of China's and India's Outward Foreign Direct Investment

GVC analysis, in stressing the drivers of value chains, focused on the lead firm characteristics and sector-specific issues. The national ownership of the lead firm and its role in determining differential dynamics of value chains tended to be ignored. Conversely, the international business literature has produced an important body of work, both theoretical and empirical, on the role of ownership. Firm ownership, in this literature, contributed to determine the motives, level, and form of foreign direct investment. For this particular reason, international business researchers were well placed to look at Chinese and Indian FDI activities, and to address the critical question of whether these were distinctive from traditional sources of investment. The findings have implications for our understanding of Chinese and Indian value chain governance. As might be expected, China attracted comparatively more attention than India. This is reflected in the review presented in this chapter, mostly focused on China.

In this chapter, I present the findings of international business scholars on Chinese and Indian outward investment activities. The first section briefly presents the basic framework of the internationalisation theory, in particular with respect to ownership. Empirical research on Asian FDI has been mainly undertaken within this theoretical framework.

Section two focuses on the dynamics of China's outward foreign direct investment (henceforth, OFDI or FDI). Firstly, I describe key reforms of China OFDI policy and regulatory framework. Then I describe the patterns of Chinese OFDI flows and stocks. In the following sub-section, I turn to the critical issue of whether Chinese OFDI is distinctive. I address this issue by reviewing recent empirical findings on the characteristics of China OFDI. To understand the distinctiveness of China investment, the subsequent sub-sections unpack the domestic processes underpinning it. I discuss, in order, the reform process of the state-owned enterprises

(SOEs), the role of the private sector, and capital market imperfections characterising Chinese FDI activities.

Section three is dedicated to the dynamics of India's outward FDI. I review key policy and regulatory aspects of its OFDI regime in sub-section one. Then, in the subsequent subsection, I present the patterns of OFDI flows and stocks. Lastly, I discuss the role of the private sector in driving India OFDI. Section four includes few comparative remarks and is followed by a conclusion of the chapter.

### **3.1 The OLI framework**

The key concepts of the internationalisation theory were laid out by Buckley and Casson (1976). They understood firm internationalisation as a process of internalisation of intermediate product markets, be these inputs, knowledge, or expertise, across borders. When these markets were imperfect, the firm had an incentive to bring them under its ownership and control. In other words, the "make or buy" decision was extended to overseas countries.

Vertical integration in these imperfect markets granted benefits in terms of certainty, strategic pricing, adequate incentives, and cost saving. Integration took place until the marginal costs and benefits of internalisation were equalised. Costs of internalisation included the costs of coordinating different internal markets and the cost of "foreignness", that is of dealing with foreign governments.

Buckley and Casson (1976) argued that, while pre-WWII MNEs aimed at internalising markets for raw materials, from the 1950s onwards, they internalised knowledge markets in developed countries with high skills levels and R&D capabilities. Industry factors played a predominant role in explaining patterns of FDI between developed economies. Firm ownership influenced the efficiency of the internalisation process, in the form of "the ability of the management to organise an internal market" (p. 43). In general, ownership, at firm- or country- level, mattered at the margin, but was not seen as shaping FDI flows.

Building on Buckley and Casson, Dunning's eclectic paradigm rested on three explanatory variables, OLI: ownership advantages of enterprises (O), a concept borrowed from direct investment scholars; location endowments of countries (L), a concept found in international trade theory; and internalisation (I), a concept which owed much to transaction costs theory (Dunning, 1977, 1981).

A country's location endowments included Ricardian-type assets and intangible assets not available to, or not used by, domestic countries' enterprises. Ownership advantages were internal to the firm and affected its competitiveness over host countries' firms. Put differently, ownership advantages explained why foreign firms fared better than domestic ones in harnessing location endowments. Ownership advantages derived, among others, from exclusive possession of intangible assets, such as intellectual property rights, technological, managerial, and organisational capabilities.

In perfect markets, firms exploited differential location endowments through international trade, and exploited their ownership advantages through arm's length transactions with independent firms in the host countries, such as licence or lease agreements. Firms pursued internalisation as a strategy to respond to market imperfections (such as uncompetitive markets, high transaction costs, information asymmetry, difficulty in capturing economies of interdependent activities) or government interventions (affecting taxation or the possibility to appropriate rents of technological innovation for example).<sup>27</sup> Natural resource-, market-, efficiency- or strategic asset-seeking FDI were driven by different OLI configurations (Dunning, 1977, 1980, 2001). Moreover, the configuration of OLI advantages changed as countries developed (Dunning, 2001).

The OLI paradigm differed from the GVC approach. The latter posited vertical integration as one of the possible outcomes of value chain governance. The international business literature, on the other hand, was concerned with one specific governance type, that is vertical integration, and only across borders. The

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<sup>27</sup> Jenkins (1987) pointed out that a crucial assumption of this theory is that the MNEs responded to, but did not generate market imperfections.

implications were two-fold: firstly, international business scholars did not take into account non-equity forms of partnership; secondly, the impact for host countries' local linkages development and upgrading were rarely discussed.

Turning to the conceptualisation of ownership in Dunning's eclectic paradigm, this concept was firmly defined at the firm-level, rather than national one. The paradigm, nevertheless, accommodated country-specific variables in two ways. As discussed above, a host country's location endowments increased incentives for inward FDI. Most importantly for this research, Dunning argued that home country location endowments contributed to shape firm-level ownership advantages: "the ability of enterprises to acquire 'ownership' endowments is clearly not unrelated to the endowments specific to the countries in which they operate – and particularly their country of origin" (1980, p. 10). There were three ways in which home countries influenced firm-level ownership advantages (Dunning, 1981, p. 86-98). Firstly, the structure and size of the home markets promoted economies of scale which were critical in particular industries. Secondly, resource endowments in the home country encouraged the development of skills, expertise and technologies to access and use such resources, which in time could become internationally competitive. Thirdly, government intervention advantaged firms through, among others, state ownership, investment to develop factor markets, or knowledge stocks.

Internalisation augmented firm-level ownership advantages, but the firm, in Dunning's view, had to hold ownership advantages prior to engage in FDI. Only in this way could the firm internalise markets successfully and compete with host country firms (2001, p. 175). Admittedly, this proposition was difficult to test because "today's ownership advantages of enterprises may be the inheritance of yesterday's country-specific endowments" (Dunning, 1981, p. 91). In his classical formulation, therefore, country-specific factors shaped firm-level ownership advantages, but the latter had to be completely established for firms to invest overseas. This theory worked well for industrialised countries and for Newly Industrialised Economies. On the latter, Dunning, van Hoesel, and Narula explained how "such outward FDI activity has been a result of government-assisted upgrading of location-specific advantages of the

home country, which in turn has helped upgrade the competitive advantage of their firms” (1998, p. 256).

Whilst Dunning’s theory made room for home country factors to affect the competitive advantage of a firm, for example through skills or technology policies, the possibility that home countries were the direct source of specific types of ownership advantages and drove the firms’ internalisation decision directly was not contemplated. China OFDI challenged the OLI paradigm exactly in these respects, by posing the question of state-driven ownership advantages and internalisation decisions. In subsequent work, the OLI paradigm was extended to incorporate Northian institutions (Dunning and Lundan, 2008a). Formal and informal rules (norms of behaviour, codes of conduct, belief systems) and their enforcement mechanisms resulted in different corporate cultures and externally-generated incentives, which affected firm-level management. Partly, this contributed to fill a gap in our understanding of how home country factors shape OFDI at the margin, the *how* of markets’ internalisation. Nonetheless, a conceptual gap remained with regard to the role of home country factors in determining whether investment happened in the first place, and in directly shaping the competitive advantage of firms.

## **3.2 The Dynamics of China’s Outward Foreign Direct Investment**

### **3.2.1 China’s outward foreign direct investment policy regime**

China, like other emerging economies, had to find a way to balance macroeconomic balance of payments considerations (need for inward FDI) with microeconomic considerations (internationalisation as an avenue to enhance firms’ competitiveness) (Sauvant, 2004). The encouragement of FDI kicked off with the *open door* policy proclaimed by Deng Xiaoping in 1979. From the mid-1980s, the regulatory framework for outward FDI was progressively liberalised and decentralised. In 1985, the then Ministry of Foreign Economic Relations and Trade laid down the basic requirements for project approval, basically opening up the opportunities for overseas operations by any eligible enterprise. This was subject to exchange rate monitoring and deposit requirements by the State Administration of Foreign Exchange (SAFE). The

opportunity was quickly seized by local and provincial governments which prompted their firms to go overseas (Hong and Sun, 2006). Beijing also supported export-oriented FDI, undertaken by large state-owned trading houses (Buckley et al., 2008; Hong and Sun, 2006) (see Appendix A for policy reforms).

In the 1990s, China developed regulations on the approval mechanisms and relaxed some foreign exchange regulations. OFDI liberalisation progressed cautiously because of a series of project losses in the early 1990s, due to lack of investment know-how and experience in overseas countries, and in the late-1990s due to the Asian financial crisis (Brautigam, 2009; Cheung and Qian, 2009; Hurst, 2011).

Finally, China supported decisively outward FDI with the *going global policy*, launched in 1999 and formally adopted in 2001 through the 10<sup>th</sup> National Development Plan. Accession to the World Trade Organisation in 2001 added further momentum to this process. From 2002 onwards, exchange rate regulations were relaxed, thresholds for investment requiring approval were raised, and approval mechanisms were simplified and decentralised.

Moreover, China designed a support system for strategic investment, targeting “inward-oriented outward investment” that is investment geared towards domestic development goals (Zhan, 1995). These included: securing scarce natural resources, acquiring R&D, technological capabilities, and global competences; creating goods and services export opportunities; and strengthening economic ties with partner countries (UNCTAD and UNDP, 2007; Zhan, 1995). State support took the form of subsidies, tax incentives, and market intelligence both at home and through investment promotion centres abroad. Fiscal incentives privileged investment projects that were linked to the export of Chinese machinery, plants, and equipment (Sauvant, 2004). Concessional loans, export credits and international guarantees as well as direct capital contribution and subsidies associated with official aid programmes were channelled mainly, but not exclusively, through the policy banks. In 1995, in a major reform of its Africa aid programme, China set up a concessional loan fund through China Export-Import Bank (Exim Bank) (Brautigam, 2009). By doing so, China encouraged joint venture investment in manufacturing and

agriculture, the establishment of assembly factories, and exploration and investment in forestry and mineral resources. These were, from China's point of view, win-win projects: Africa received much needed investment capital; Chinese firms were assisted in entering new markets, creating demand for Chinese equipment and machinery, and speeding up the relocation of sunset industries outside China. Under FOCAC 2006, China committed US\$ 5 million in preferential credit and export credit through China Exim Bank (Moss and Rose, 2006; OECD, 2008; Wang, 2007).<sup>28</sup> The China Development Bank allocated US\$ 5 billion for a development fund to support Chinese FDI in Africa.

As shown in the next sub-section, the effect of the going global policy on China OFDI was considerable. Following an acceleration of the pace of economic reforms in the 1990s, commercial interests and, since 2003, the private sector became more prominent in China OFDI (Alden et al., 2008; Hong and Sun, 2006). Indeed, the Chinese presence abroad became more heterogeneous, in size, motivations, behaviour (Gill and Reilly, 2007; Li, 2010). Nevertheless, China outward investment remained dominated and driven by SOEs, a critical factor in explaining its FDI patterns (Buckley et al., 2008; Cheung and Qian, 2009; Morck, Yeung, and Zhao, 2008). According to Cheng and Ma (2010), between 2003 and 2006, 73.5 percent, 82.3 percent, 83.2 percent, and 86.4 percent, respectively, of OFDI flows was concentrated in few Central Government SOEs. In 2004, their shares of FDI stocks amounted to 85.5 percent, decreasing only slightly in 2005 (83.5 percent) and 2006 (82.1 percent). The remaining shares of FDI flows and stocks were owned by provincial SOEs (Beijing, Shanghai, and Guangdong) and by collectively- and privately- owned non-SOEs. Private firms represented a miniscule share, accounting for 1 percent of total FDI stock in 2006. In the natural resource sector the dominance of SOEs was particularly significant (Gelb, 2010; OECD, 2008). Whilst involved in

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<sup>28</sup> The government also established special funds to provide direct subsidies and discounted loans to Chinese OFDI enterprises establishing plants and/or R&D centres abroad or conducted various forms of economic and technical co-operation in agriculture (OECD, 2008). Moreover, SINOSURE, established in 2001 to provide investment insurance, was increasingly targeting FDI in Africa, which in 2006 absorbed 30 percent of its medium to long term insurance value (Wang, 2007).

outward FDI, almost all SOEs enjoyed an officially-sanctioned monopoly in major industries at home. In 2005, the top 10 SOEs (8 of which were major OFDI firms) accounted for over 75 percent of the total income of China's 169 national SOEs, and 32 percent of the income of the total industrial sector (Morck et al., 2008).

The implications of state-ownership were summarised by Buckley et al. (2007):

MNEs remain in state hands, even though corporatized in order to focus on commercial objectives. State direction means that these firms still align their operations, whether at home or abroad, with the five-year plans and national imperatives. This is a model that is not replicated, in any general way, in any of the other leading emerging economies. (p. 514)

### **3.2.2 Patterns of China's outward foreign direct investment**

An analysis of Chinese FDI requires some preliminary remarks about data quality. This section is based on both balance of payment-based data collected by UNCTAD and secondary data from studies utilising the Chinese Ministry of Commerce statistical bulletin.

The Chinese Ministry of Commerce started collecting data according to OECD standards only from 2003 (Buckley et al., 2008; Cheng and Ma, 2008; OECD, 2008). Before this date, FDI data did not include subsequent investment on the same project. Data collected according to new guidelines were more accurate but still downward-biased because limited to approved projects. They did not include FDI which by-passed official approval, re-invested earnings, intra-company loans, transfers and investment capital raised abroad, or State Council SOEs "show case" projects.<sup>29</sup> Moreover, both approved data and balance of payment data did not cater for "round tripping", that is capital invested abroad and re-invested back in order to benefit from tax exemptions. Around one third of China's inward FDI was estimated to originate from round tripping. Round tripping capital was mostly directed to Hong Kong, which hosted around half of China's FDI stock. Hong Kong also enabled firms

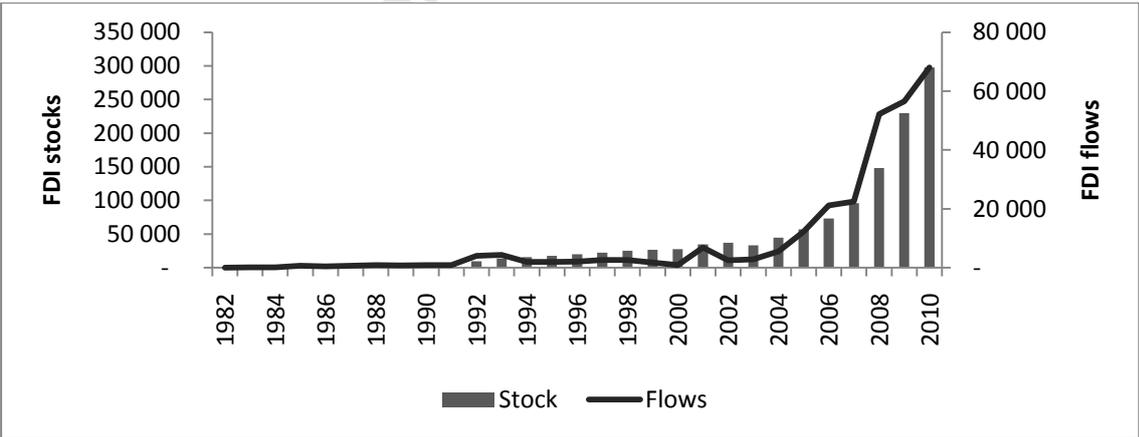
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<sup>29</sup> These projects aimed at improving political relationships with states, and included, for example, construction of stadiums, parliament houses, and presidential palaces (Alden et al., 2008).

to access additional financing opportunities. Two other important destinations were tax havens, the Cayman and the British Virgin Islands, where capital was invested in financial assets or re-directed to third countries.

Figure 2 presents China’s historical OFDI activity. In broad terms, Chinese outward investment, in particular to developing countries, started from a very low level, but has been fast-growing (Broadman, 2007; Wang, 2007). Average annual FDI flows amounted to US\$ 453 million in the 1980s, increased to US\$ 2.3 billion in the 1990s, and reached US\$ 18.3 billion in the 2000s. In 2010, China FDI flows amounted to US\$ 68 billion. According to Ministry of Commerce statistics, non-financial investment targeted 3,125 foreign enterprises in 129 countries and regions.<sup>30</sup> In terms of FDI stocks, investment was almost non-existent in 1980, and by 1990 amounted to a meagre US\$ 4.4 billion. A decade later, FDI stocks had increased to US\$ 27.8 billion, and in 2010 to almost US\$ 300 billion. Clearly, FDI activity accelerated dramatically from 2000 onwards. Between 2000 and 2010, the average annual FDI flows growth rate equalled 91.7 percent, compared to 30.7 percent in the period 1990-1999. FDI stocks increased on average by 23.6 percent per year in the 1990s, and by 26 percent the following decade.

Figure 2 China’s FDI flows and stocks (1982-2010, US\$ millions)



Source. UNCTADstats database accessed January 2012. Note. US\$ at current prices and current exchange rates

<sup>30</sup> Chinese Ministry of Commerce. (2011). Statistics of China's Non-financial Foreign Direct Investment in 2010. Retrieved from

<http://english.mofcom.gov.cn/aarticle/statistic/foreigninvestment/201101/20110107386833.html>

In global terms, China outward investment activity remained small. In 2010, China was the source of only 5.14 percent of world outward FDI flows and 1.46 percent of world stocks. China inward FDI stocks were almost twice as large as its outward stocks.

Using approved data for 1990-2004, Buckley et al. (2008) disaggregated China OFDI by destination market (Table 4). Early in 1990s, more than two thirds of Chinese FDI stocks were concentrated in developed countries (Australia, US, Canada). Developing countries, though, hosted 63.3 percent of the total number of projects, reflecting a large number of small-scale investments in culturally-close countries. A decade later, developing countries had overtaken developed countries, receiving 78 percent of FDI stock and 74.6 percent of total projects. Hong Kong became a major destination of Chinese investment, its share of total Chinese FDI increased from 8.9 percent in 1999-2001 to 38.2 percent ten years later, skewing the relative weight of developing countries. Other major recipient countries were found in the South, East and Southeast Asian region (notably Cambodia and Indonesia), Africa (notably Zambia, South Africa, Mali, and Tanzania) and Latin America (especially Peru, Mexico, and Brazil), and two tax havens (the Cayman and the British Virgin Islands).

Table 4 China's FDI stock by host region (1990-2004, percentage, number of projects)

	1990-1992	1993-1995	1996-1998	1999-2001	2002-2004
Developed countries	69.44 (384)	64.12 (574)	49.95 (652)	36.11 (759)	21.97 (1920)
Developing countries	30.56 (673)	35.88 (1191)	50.05 (1521)	63.89 (2096)	78.03 (5652)
<i>Of which:</i>					
Asia	16.61 (358)	18.71 (606)	22.22 (790)	27.87 (1090)	55.81 (3823)
Africa	4.03 (111)	5.18 (173)	11.02 (259)	16.07 (401)	8.64 (642)
Latin America	4.87 (72)	4.96 (121)	10.04 (147)	13.83 (207)	8.08 (402)

*Source.* Adapted from Buckley et al. (2008). *Note.* Based on approved investment projects. Three-year average cumulative FDI stocks

In general, Chinese investment was market- and natural resource- seeking, but in developed countries it was driven by the strategic search for more advanced production technologies, brands, R&D capabilities, and distribution and marketing

networks. In the next sub-section, I discuss further what drives Chinese investors, unpacking the determinants of China FDI by region.

Taking a closer look at Africa, we observed a remarkable growth in Chinese engagement in the continent. In absolute terms, Chinese FDI flows to Africa increased from US\$ 74.7 million in 2003 to US\$ 5.49 billion in 2008, a 73-fold increase, compared to a 34-fold increase to non-OECD countries and 8-fold to OECD (Hurst, 2011, using approved data).

Removing FDI to Hong Kong, the Cayman and the British Virgin Islands,<sup>31</sup> and with more up-to-date data, Gelb (2010) calculated that whilst Africa hosted 11 percent of China OFDI flows and stocks in 2003, by 2008, this share increased to 40 percent of FDI flows and 21 percent of FDI stock. In 2008, Africa was the top destination of China's FDI flows and the second largest destination of FDI stock after Asia. The leading recipients were South Africa (39 percent of China FDI stock in Africa), Nigeria (10.2 percent), Zambia (8.3), Sudan (6.8), and Algeria (6.5). Nonetheless, China, in global terms, was still a small partner for Africa, accounting in 2006 for only 1 percent of Africa inward FDI stock (OECD, 2008).

Chinese firms in Africa, estimated at around 800 in 2005, of which 100 SOEs, invested in a wide array of sectors (Alden et al., 2008; Wang, 2007). For the period leading up to 2005, manufacturing absorbed almost one third of Chinese FDI stock, while resource extraction received 27.5 percent, followed by services and agriculture (Table 5). Such sectoral distribution, nevertheless, did not reflect major investment in the banking and extractive industries after 2005.<sup>32</sup> For example, in 2006, 53.8 percent of China's FDI flows went into the services industries, 40.4 percent into mining and petroleum and 4.3 percent into manufacturing. As a result, by the end of

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<sup>31</sup> The three destinations accounted for around 80 percent of total China OFDI in the 2003-2008 period. The final destination of these investment was difficult to ascertain (Cheng and Ma, 2010; Gelb, 2010).

<sup>32</sup> In 2007, the Industrial and Commercial Bank of China acquired a 20 percent stake in South Africa Standard Bank for US\$ 5.4 billion, and China Development Bank partnered with Nigeria's United Bank of Africa (Alden et al., 2008).

2006 business services accounted for the largest share of China's outward FDI stock (21.5 percent), followed by mining and petroleum (19.8 percent), finance (17.2 percent), wholesale and retail (14.3 percent), transportation and storage (8.4 percent), and manufacturing (8.3 percent) (Cheng and Ma, 2010).<sup>33</sup> In sum, services and extractive industries became the top sectors for China investment activities in Africa.

Table 5 Sectoral distribution of China's FDI stock in Africa (1979-2005)

Sector/industry	Number of projects	Investment value (million, US\$)
Agriculture	22	48
Resource extraction	44	188
Manufacturing	230	316
<i>Machinery</i>	20	16
<i>Home appliance</i>	36	25
<i>Light industry</i>	82	87
<i>Textile</i>	58	102
<i>Other manufacturing</i>	34	86
Services	200	125
Others	3	6
Total	499	683

Source. Adapted from UNCTAD, 2007. Note. Based on approved investment projects

### 3.2.3 Is China's outward foreign direct investment distinctive?

In recent years, international business scholars have become increasingly interested in the determinants of Chinese FDI. Table 6 presents key findings of selected studies which tested the OLI paradigm on Chinese FDI flows. In general, the studies found Chinese FDI to be predominantly market- and natural resource- seeking. Cheung and Qian (2009) and Hurst (2011) disaggregated FDI by destination countries, and found that market-seeking FDI mainly targeted developed countries, in particular the low end of their consumer market. Chinese firms searched new markets as part of a long-term business development strategy.

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<sup>33</sup> Many studies, including OECD (2008) and Cheng and Ma (2010), used the Ministry of Commerce disaggregated data for 2003-2006. FDI in financial service was included for the first time in 2006, thereby reducing the relative weight of other sectors between 2005 and 2006 (Cheng and Ma, 2010).

Table 6 Selected empirical findings on the determinants of China's FDI

Authors	Data	Key findings
Buckley et al. (2007)	SAFE-approved foreign exchange outflows for the duration of the investment project* 1984-2001	Pre-1992: market-seeking FDI, including for promotion of Chinese exports. Cultural (Chinese presence in the host country) and regional proximity increased FDI After 1992: natural resource-seeking FDI, increased flows to OECD countries, cultural proximity remained important FDI positively correlated to political risks
Cheng and Ma (2010)	Ministry of Commerce – approved FDI (Almanac of China's Foreign Economic Relations and Trade)* 1980-2005 (controlling for tax havens)	Market-seeking FDI Proximity increased FDI (geographic distance, sharing a common border, same language) FDI positively correlated to the need to externalise reserves
Cheung and Qian (2009)	Ministry of Commerce – approved FDI (Almanac of China's Foreign Economic Relations and Trade)* 1991-2005 (controlling for tax havens)	Developed countries: market-seeking (low end of the consumer market), natural-resource seeking, efficiency seeking (skills, technologies) Developing countries: resource-seeking (low labour costs, natural resources). Positive, not significant correlation to political and institutional risks. Positively correlated to Chinese exports (FDI facilitated exports) Africa not a recipient of disproportionate levels of natural resource-seeking FDI Going global policy increased FDI, across sectors and regions FDI positively correlated to the need to externalise reserves
Hurst (2011)	Ministry of Commerce Statistical bulletin of China's outward foreign direct investment 2003-2008 (controlling for tax havens)	OECD: market-seeking FDI, looking for less competitive markets, less restrictive property rights regimes and closer cultural proximity Non-OECD: natural resource-seeking FDI, trade-facilitating FDI (positively correlated to Chinese exports)

Source. Author's compilation from various sources

Investment pursued by SOEs as a diversification strategy was generally not included by the surveyed studies. As their monopolistic profit margins at home shrank, SOEs with a long experience as international trading houses used state support to move into a diversified portfolio of OFDI activities (Hong and Sun, 2006; OECD, 2008; Sauvart, 2004). These were the circumstances underlying China National Chemicals Import & Export Corporation (Sinochem) expansion into agriculture, energy, chemicals, finance and real estate.

In addition, Chinese FDI targeted developed countries for efficiency-seeking motives, to access superior production, managerial and technological capabilities, and strategic assets-seeking motives, to acquire proprietary technology, globally-

recognised brand names, and/or established customer networks and sales channels, through the acquisition of sometimes loss-making firms (Buckley et al., 2008; Hong and Sun, 2006).<sup>34</sup> These types of investment were pursued through M&A rather than greenfield investment (OECD, 2008). Indeed, from the mid-1990s, Chinese FDI privileged wholly-owned entry. The move to whole-ownership reflected increasing confidence by the government on its firms' international competitiveness, its readiness to bear risks and costs associated to whole ownership, and its desire to control strategic assets (Buckley et al., 2008).

Market-seeking FDI to developing countries aimed at quota-hopping, at establishing distribution centres to promote Chinese exports, and gaining a foothold in emerging regional integration blocks (Buckley et al., 2008; OECD, 2008). Brautigam (2009) argued that China was also explicitly relocating sunset industries in Africa as a strategy to restructure its domestic manufacturing sector towards higher technology product. In fact, China removed domestic incentives for high-emission industries (chemical, smelting) and labour-intensive (plastics, textile), while incentivising upgrading and technological innovation.

In the early stages, natural resource-seeking FDI was mainly concentrated in the developed countries, but from the 1990s onwards, it broadened to the developing regions (Hong and Sun, 2006). Cheung and Qian (2009) found no support for the idea that Africa was a recipient of a disproportionate large share of this type of investment, consistent with findings from other authors (Gelb, 2010 for South Africa; OECD, 2008 for Africa). This finding contrasted with Hurst (2011). Using a different indicator for natural resources (production figures rather than primary export

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<sup>34</sup> Examples of strategic asset-seeking investments in the US included Fuyao Glass Industry, China's largest automotive glass suppliers, investment in a US\$ 8 million plant in 1994, Haier Group (home appliances) in a US\$ 40 million plant in 2000, Lenovo acquisition of IBM's PC division for US\$ 1.75 billion in 2005 (He and Lyles, 2008). In Europe, Nanjing Automotive's acquisition of UK's MG Rover Group in 2005 and TCL's acquisition of France's Thomson Electronics in 2004 (Cheng and Ma, 2010). China invested in R&D centres in India, Sweden, Singapore, in particular Huawei Technologies invested in Dallas, Silicon Valley and Bangalore (Sauvant, 2004).

concentration), he found that FDI in developing countries were markedly more resource-seeking.

Most interestingly, and contrary to received FDI theory, Buckley et al. (2007) found that Chinese FDI was positively correlated to political risks and higher market returns in the host countries.<sup>35</sup> Capital market imperfections granted Chinese investors soft budget constraints, limiting their aversion to risks and investment project failure. The authors put forward a set of additional explanations: a different perception of risks by Chinese investors, less experience in risk assessment, or influence by foreign policy considerations which superseded profit-maximisation.

Similarly, China's policy regime had a positive effect on FDI. The going global policy at the turn of the century was determinant: between 2000 and 2006, China's FDI experienced a 19-fold increase (OECD, 2008). Moreover, the studies found that the rapid accumulation of international reserves pushed China to increase its outward investment activities, a finding consistent with other authors' studies (Davies, 2009; Yao, Sutherland, and Chen, 2010). It was foreseen that this factor would become more relevant in future, with the recently approved China's Qualified Domestic Institutional Investor programme (Cheng and Ma, 2010; Cheung and Qian, 2009). The programme allowed Chinese citizens to invest in foreign equity markets and Chinese corporations to retain earnings abroad. It also set up China Investment Corporation, a sovereign wealth fund to manage part of its reserves, with initial capital of US\$ 200 billion.

Some scholars pointed out cultural factors contributing to the Chinese distinctiveness. State ideology and national pride eased the enforcement of formal policies and processes, and worked as guiding principles for ambitious top executives interested in advancing their individual careers (Morck et al., 2008; Ren, Liang, and Zheng, 2010). For Hofstede, "management is not a phenomenon that can be isolated from other processes taking place in a society" (1993, p. 89). China

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<sup>35</sup> Cheung and Qian (2009) found the political risks' variable positive in developing countries, but not significant. In general, the studies surveyed found that cultural proximity supported FDI, mainly by reducing risks through a Chinese network familiar with local business environments.

differed from Western countries in terms of less power distance in corporation hierarchy, low levels of individualism and strong weight on kinship and mutual support and a general long-term perspective (which translated into high savings propensity and persistence). Naughton (1994) argued that collective institutions, rather than private property drove China's industrialisation (p. 486). The importance of relationships, or *guanxi*, for business, and the political and ideological distance from Western economies, created a significant liability of foreignness for Chinese investors (He and Lyles, 2008).

In sum, Chinese FDI appeared to be distinctive in at least three respects: an unusual level of highly strategic investment, for a developing country; a lack of aversion to political risks; and the strong influence of policy and, some scholars argued, cultural factors. The source of such distinctiveness was highly context-specific, and concerned China's economic reform process, the subject of the following subsections.

These observations called for a redefinition or expansion of traditional investment and comparative advantage theories. Institutional factors, namely the role of the State, shaped the comparative advantage of firms (Aggarwal and Agmon, 1990; Buckley et al., 2007; Cheung and Qian, 2009; Yao et al., 2010; Ren et al., 2010). In short, in the Chinese case "some of the competitive advantages of firms follow rather than lead their internationalisation" (Dunning, 2006, p. 140).

### **3.2.4 The reform process of state-owned enterprises**

China economic reform process, informed by gradualism and sequencing, started cautiously in 1978, within the framework of central planning and state ownership, two tenets of China's communist economic structure. From the 1990s, the reform process accelerated towards a market-based economy but this transition was far from complete. We turn to three aspects of the reform process: the reform of SOEs, imperfect capital markets, and the role of the private sector.

Since nationalisation in 1949, SOEs and collectively-owned town and village enterprises (TVEs) constituted the pillar of China industrialisation effort.<sup>36</sup> SOEs were under the control of the central government, and subject to its planning targets, but also subject to the administration of a multitude of sub-national entities (from provinces to municipalities) (Sharma, 2009). Their importance was two-fold: firstly, they provided income and social benefits to over 100 million people (the so-called *iron rice bowl*). Secondly, they held monopolistic positions in critical sectors of the economy. This explained why their reform proved to be a long, cautious and imperfect process.

Until the late 1970s, the government influence over enterprises was exerted through ownership and direct control. The State not only decided on quotas, prices, raw materials, and labour allocated to the enterprises, but also appointed top management staff, including party members responsible for ideological matters and invested with the highest authority. Chen and Li argued that “the factory director would be in charge of production matters that were of secondary importance” (2007, p. 246). The incentive system for SOEs was flawed in two respects: managers future promotions were not based on their ability to maximise profits but rather on their ability to meet government-set targets, and soft budget constraints led to imprudent investments (Kuo, 2007, p. 258). In order to increase the profitability of SOEs, the reform process addressed both the incentive system and the capital market imperfections.

Between 1978 and the late 1980s, China undertook the first phase of the SOEs reform process. Reforms aimed at increasing the role of market mechanisms in allocating resources. Firm managers were given more decision-making power, at the expense of party cadres and were allowed to retain a larger share of their profits, in order to encourage management and workers to increase productivity (Li and

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<sup>36</sup> Collectively-owned TVEs were run at local level and were relatively free from government intervention (Sharma, 2009). They were profit-oriented, operated within hard budget constraints, and were an important source of revenue for provincial governments. Soon they became the engine behind China industrial growth, totalling 23 million firms in 1996 and accounting for 31 percent of GDP in 1996.

Putterman, 2008; Sharma, 2009). In the mid-1980s, market prices were allowed to operate for above plan quota production, thereby increasing profit incentives at the margin. A process of consolidation reduced the number of ailing firms. Concurrently, financing through direct government grants was replaced by interest-bearing loans from the banking sector: in 1978, SOEs obtained 78 percent of their capital investment from government; in 1997, it was less than 3 percent. Finally, fiscal decentralisation in the 1980s meant that, as they could retain a larger share of the taxes, local governments pushed for higher financial responsibility for their firms. Government monitoring of SOEs continued, but was increasingly focused on profitability rather than plan fulfilment (Naughton, 1994).

Mismanagement of SOEs and TVEs, manipulation of government directives by local governments to protect their industries, and incomplete reforms in other sectors of the economy continued hampering the growth of SOEs (Sharma, 2009). In the mid-1990s, an emboldened political leadership, eager to tackle more strongly the decreasing profitability of SOEs and the piling up of non-performing loans, embarked on a new phase of SOEs reform. The *zhuada fangxiao* strategy (“grasping the big and letting go of the small”) meant that China retained ownership of the largest SOEs, while “letting go” of small and medium sized SOEs. As small firms were mostly sold to employees and privates or let go bankrupt, large SOEs were restructured by diversifying the ownership structure. More than 20,000 companies were turned into joint stock companies, their shares sold to employees or, for around 1,400 firms, allowed to float on the stock exchange (Li and Putterman, 2008). To supervise and improve the governance of almost 200 SOEs, in 2003, the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) was established (Sharma, 2009). SASAC put in place measures to ensure that non-performing SOEs would exit the market, whilst the others, the *dragon heads* (or “national champions”), reached international competitiveness (Brautigam, 2009). As of mid-2007, SASAC controlled 155 Chinese SOEs with combined assets of more than US\$ 1.5 trillion and decided on major issues including human resources, budgets, and investment strategies (OECD, 2008).

Whilst ambitious, the reform process did not fundamentally alter the role played by the State. State-ownership ensured that the state had controlling voting power in SOEs, and appointed corporate managers (Morck et al., 2008; Sharma, 2009). The company Party Committee yielded substantial decision-making power, either directly by chairing the board, or indirectly through the influence of the Central Party. In the largest SOEs, the Party Committee appointed top executives by orders of the Communist Party's Organisational Department, monitored their performance and determined their prospects for career advancement. Top executives were often promoted in the Party and State bureaucracy, and vice versa. Chinese SOEs had to fulfil broader political objectives and therefore were not driven exclusively by profit-maximisation (Cheung and Qian, 2009; Gill and Reilly, 2007; Hurst, 2011; Ren et al., 2010).

SOEs public listing aimed at increasing participation by private sector and improving corporate governance, with positive effects on SOEs performance. This process, nevertheless, masked a complex reality. Around two thirds of the shares were not tradable, and were state-owned (directly and indirectly, through legal persons). Moreover, state investment funds held also tradable shares, and cross-shareholding by SOEs was common (Morck et al., 2008). According to calculations by Liu and Sun (2003), in 2001, the state was a dominant share-holder in 84 percent of listed companies. Chen and Li (2007) argued that the Shanghai and Shenzhen stock markets played a limited role in affecting the SOEs corporate governance. In fact, most large SOEs were not listed, two thirds of the shares of the listed SOEs were not tradable, and the state remained the majority shareholders of most listed firms. Stock markets signalled limited information to investors due non standards accounting practices and limited transparency. Government and securities regulatory authorities enjoyed substantial decision-making power, more than listed company boards.

Whilst an assessment of the reform is beyond the scope of this chapter, few issues are briefly presented. Firstly, the commonly-held view of SOEs as *dinosaurs* holding back the Chinese industrial sector appeared misguided. Industrial SOEs profits decreased from 15 percent of GDP in 1978 to below 2 percent in 1997, and the profit and tax share of industrial value-added declined from 22 percent of GNP in 1978 to 8

percent in 1990 (Li and Putterman, 2008; Naughton, 1994). However, this was largely accounted for by the entry of new firms contesting previously monopolistic markets, rather than declining SOEs performance. Indeed, between 1978 and 1991, SOE output grew by 7.7 percent annually, and productivity increased as well (Naughton, 1994).

Notwithstanding this, SOEs, by international standards, still operated at low levels of efficiency and productivity (Naughton, 1994; Zhang, Zhang, and Zao, 2001). Li and Putterman (2008) surveyed a large number of empirical studies on the impact of the reforms on SOEs performance. SOEs productivity in the 1980s, following the first reform period, was certainly higher than in the previous decades, but lower than TVEs. As far as the second reform phase was concerned, the 22 studies surveyed confirmed increases in productivity, profitability or both, in restructured SOEs. There was evidence, nonetheless, that some level of direct or indirect state ownership contributed positively to SOEs' performance, suggesting that state and Party connections were still an asset.

Inter-industry differences mattered. The problem of low efficiency was acute in heavy industries, characterised by strong state ownership and low domestic competition due to high economies of scale and technological entry barriers. Kuo (2007) compared SOEs productivity performance in 37 industry groups, between 1994 and 2000, on the basis of China Statistical Yearbook data. On average, the efficiency of the heavy industry group equalled 0.38 before 1997, and 0.40 afterwards. The overall average for all 37 industry groups pre- and post-1997 was 0.75 and 0.77, respectively. Taking a closer look at the mining and smelting industries in Table 7, it emerged that the ferrous metal mining and coal mining industries were the worst performers, while non-ferrous metals mining, oil, and natural gas fared better. Higher value-added industries were more efficient than extractive ones, though the latter registered higher efficiency improvement.<sup>37</sup>

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<sup>37</sup> Pre-1997 average production efficiency for oil processing and metals smelting stood at 0.74 compared to 0.40 for extractive industries

Table 7 Production efficiency estimates by industry (1994-2000)

	1994	1995	1996	1997	1998	1999	2000	Pre-1997 average	Post-1997 average
Coal Mining & Dressing	0.33	0.34	0.38	0.31	0.32	0.31	0.32	0.34	0.32
Petroleum and Natural Gas Extraction	0.44	0.48	0.51	0.48	0.42	0.59	0.58	0.48	0.53
Ferrous Metals Mining & Dressing	0.20	0.24	0.20	0.22	0.33	0.23	0.23	0.22	0.27
Nonferrous Metals Mining & Dressing	0.55	0.58	0.56	0.58	0.68	0.61	0.61	0.57	0.63
Nonmetal minerals Mining & Dressing	0.39	0.38	0.36	0.40	0.59	0.61	0.30	0.38	0.50
Petroleum Processing & Coking	0.88	0.90	0.87	0.93	0.74	0.85	0.93	0.90	0.84
Smelting and Pressing of Ferrous Metals	0.72	0.54	0.54	0.52	0.54	0.57	0.56	0.58	0.56
Smelting and Pressing of Nonferrous Metals	0.77	0.78	0.71	0.67	0.70	0.72	0.69	0.73	0.71

Source. Adapted from Appendix 1 and 2 in Kuo, 2007

Therefore, whilst SOEs' productivity registered improvements, their performance was still low by international standards, in particular in the extractive industries. This implied that, in the international arena, their ownership advantages were not of a traditional kind. Indeed, their international competitiveness in terms of world class management, technology, know-how, and knowledge of foreign markets was still low (Soares de Oliveira, 2008; He and Lyles, 2008). It was hypothesized that Chinese accrued some ownership advantages from familiarity with large markets and with opaque bureaucratic and political systems (Buckely et al., 2007; Morck et al., 2008). Much of the literature, nonetheless, pointed at capital market imperfection as the main source of ownership advantages.

### 3.2.5 China's capital market imperfection

With one of the highest investment to GDP ratio in the world (Dollar and Wei, 2007), China's capital markets were instrumental in supporting SOEs and the national industrialisation efforts. In the past, banks provided SOEs with working capital and book-keeping services, while capital investment was sourced directly from government budgets. Banks reported directly to the State Council, and were ultimately responsible for implementing the centrally-mandated credit plan (Sharma,

2009). Provincial and local branches held considerable discretionary power in loans monitoring, which meant they were heavily influenced by provincial and local governments with an interest in securing credit flows to ailing SOEs.

Since the mid-1980s, China reformed its banking system with the objective of enhancing the regulatory function of the People's Bank of China and to ensure that the four state-owned banks were run on a commercial basis (Sharma, 2009). In 1994, regulations were put in place to make provincial and local bank branches independent from local authorities and to establish three policy banks to take over policy lending. These banks, the China Development Bank, Export-Import Bank of China and China Agricultural Development Bank operated on the basis of political criteria, often with little regard to creditworthiness and repayment ability, and had soft budget constraints (Sharma, 2009). After a major bail out at the end of the 1990s, in which State banks were re-capitalised and their bad SOEs loans transferred to state assets management companies, reforms intensified in 2003-2004. Regulatory functions were transferred to the China Banking Regulatory Commission and state-owned banks were made increasingly responsible for their performance and independent from the central credit plan (Sharma, 2009; Shirai, 2002).

Overall, the Chinese banking system became more efficient in fulfilling its role of financial intermediation, and the non-performing loans ratio of the four state-owned banks decreased from 40 percent in 1998 to 25 percent in 2005 (Sharma, 2009, p. 120). However, the commercialisation of the banking system was far from complete. Even after the major 1994 reforms, state banks' lending was biased in favour of SOEs with a high risk profile. Yet, in 2005, SOEs' marginal returns to capital were a quarter to half lower than private or foreign firms. The banks moral-hazard behaviour was induced by the expectation that government implicitly guaranteed these loans (Dollar and Wei, 2007; Lu, Thangavelu, and Hu, 2007; Shirai, 2002). Compared to private firms, SOEs and TVEs showed a much higher reliance on bank loans and state budgetary appropriation and lower reliance on self-raised funds, which consisted mostly of retained funds rather than bonds and shares (Chen and Li, 2007, p. 241-242).

As banks were not allowed to invest directly in enterprises, they supervised the firms' performance through their role as creditors. When a firm risked bankruptcy, it resorted to lobbying local governments or securing additional loans from banks. Banks, burdened by non-performing loans, avoided their own bankruptcy by re-scheduling repayments and releasing new loans. In other words, loan-making decisions was loan-performance independent (Chen and Li, 2007, p. 241).

Moreover, loans to domestic SOEs were subject to approval by a local state planning commission. Only for out-of-quota production, could banks engage in commercial negotiations with the borrower. Loans continued to be made on the basis of administrative instructions (Chen and Li, 2007; Ren et al., 2010; Sharma, 2009). Senior bank management was filled by party and government officials with allegiances to central authorities. Indeed, "even after years of restructuring, they [the banks] still operate like government units" (Sharma, 2009, p. 117).

As mentioned earlier, listed SOEs were not fully subject to the rules of the market. Being directly or indirectly owned and controlled by the State and Party bureaucracy, in spite of high profits, large SOEs retained their corporate earnings, rather than paying dividends to their shareholders (Morck et al., 2008). China National Petroleum Corporation in 2005 paid only 1 percent of net profits exceeding 130 billion yuan. Being able to save more earnings than traditional MNEs meant Chinese SOEs could seize investment opportunities quickly, without recurring to external financing. Often such opportunities were unprofitable but strategically important to advance the political career of their managers. In some cases, the largest conglomerates operated internal capital markets, by acquiring or establishing their own financial intermediary, which further increased their access to resources (Buckley et al., 2007).

### **3.2.6 Emergence of the Chinese private sector**

Officially, seven types of ownership existed in China: individual ownership, private ownership, foreign ownership, joint ownership, shareholdings corporations, collective ownership, and state ownership (Lin and Song, 2007). From the 1980s onwards, privately-owned firms became increasingly involved in China's economic landscape.

Initially, China encouraged only individual firms (less than eight employees), but as private firms grew in terms of capital and employment, and proved their competitiveness, in 1987, the Communist Party explicitly decided to encourage both individual and private firms. In 1988, the private sector was allowed under the Constitution. Whilst suffering a setback in the aftermath of Tiananmen Square, in 1992 the reformist process accelerated with Deng Xiaoping tour to southern China and the decision of the Fourteen Part Congress on the establishment of a socialist market system (Tian, 2007).

Before the 1980s, SOEs and TVEs firms accounted for more than 90 percent of gross industrial output (Lin and Song, 2007, p. 1-2). By 2000, SOEs accounted for only 47 percent of total manufacturing value-added. Four years later, this share declined to 35 percent, while the private sector produced 65 percent. Also in terms of job creation, the importance of SOEs declined: they employed 70 percent of the labour force in 1990, 35 percent in 2000, and 25 percent in 2004. Private firms in 2004 accounted for 72 percent of total employment, a significant change from a mere 4.6 percent in 1990.

Yet, the private sector did not receive the same level of support as SOEs. The public sector had a privileged status in China under the constitution, as well enjoyed favourable treatment in terms of subsidies and taxes, exclusive market access to a wide range of sectors, and preferential access to soft and hard infrastructure as well as bank lending (Sharma, 2009; Tian, 2007). By 2006, restrictions on private firms' outward investment were largely gone, but these did not receive active government support (Cheng and Ma, 2010). They had limited access to capital, as they could hardly access policy banks lending and were prohibited from obtaining finance overseas with domestic collateral. SOEs, on the other hand, received in the 1990s around 70 percent of total banking loans, at lower than market interest rates, sometimes even at negative rates (Lin, 2007).

SOEs, accounting in 2009 for a quarter of total industrial output, were still much larger than private firms. In 2006, the top ten SOEs were eight times bigger than the top ten private firms (Sharma, 2009, p. 115). By contrast, 2.2 out of 3 million private

enterprises had less than 15 employees (2002 data, Chen and Li, 2007, p. 253). Though the private sector was emerging, and becoming increasingly involved in OFDI, the size of private firms and the size of their investment was still marginal compared to SOEs.

Whilst China's reform process tackled important areas of the economy, in particular SOEs and capital markets, the process was far from complete and the tasks of implementing the next set of reforms was much harder as it related to building the institutions of a market economy (Hou, 2007; Sharma, 2009; Tian, 2007).

### **3.3 Dynamics of India's Outward Foreign Direct Investment**

#### **3.3.1 India's outward foreign direct investment policy regime**

Whilst outward FDI from China and the NIEs grew in the 1980s and 1990s, a large group of developing countries, including India, lagged significantly behind. Underlying these differences was the role of government in supporting OFDI (Dunning, van Hoesel, and Narula, 1998). Before 1992, India support to OFDI was timid. OFDI were seen as an instrument for South-South cooperation and for export promotion of machineries and intermediate goods, within the constraints of a difficult balance of payment situation and scarce foreign exchange reserves (Nayyar, 2008; Pradhan, 2007). Participation in OFDI projects was restricted to minority JVs, with equity contribution being provided in non-cash modes (exports of equipment, know-how). 50 percent of dividends had to be repatriated to India. Moreover, approval procedures were cumbersome, as they had to be vetted by Ministries against political, technical, and financial viability criteria and had to meet policy guidelines concerning preferred industries and destination countries

Until the 1980s, between two thirds and the totality of OFDI flows targeted developing countries (Pradhan, 2007). For three decades, Indian outward FDI were largely regional in scope and market-seeking (Dunning, 2008; Kumar, 2007; Pradhan, 2007). Import-substitution policies in developing host countries created markets for Indian firms, which had experience in protected domestic markets with similar factor and

market conditions to the host countries. They operated small-scale firms, with adapted technologies, at the end of the product cycle. With liberalisation taking place across the developing world, nevertheless, these investments were no longer profitable, as Indian firms had to compete globally, rather than domestically or regionally.

In the 1990s, outward FDI regulations and policy were drastically liberalised (Hattari and Rajan, 2010; Pradhan, 2007; Sauvant, 2004) (see Appendix B for key policy reforms). In 1992, India established an automatic approval route for OFDI below a US\$ 2 million ceiling. The ceiling was progressively raised and eventually removed, together with minority-ownership restrictions. JV and wholly-owned subsidiaries were allowed to invest abroad up to 100 percent of their net worth on an automatic basis, a ceiling progressively raised to 400 percent. In 2003, firms were allowed to invest in sectors outside their core business, including natural resources, in excess of this limit. Reforms also reduced red tape, relaxed exchange rate controls, and removed constraints on Indian entities abroad, allowing them to purchase assets, open bank accounts, and receive additional funding from the parent company. In addition, listed Indian companies were permitted to undertake portfolio investment abroad of up to 50 percent of the net worth. In 2009, Indian majority-owned and controlled firms were allowed to invest in a downstream subsidiary without the foreign share (of 49 percent or less) counting against the new company's FDI limit (Hattari and Rajan, 2010).

This policy resulted in drastic changes in the destination and drivers of Indian FDI. From 2000 onwards, developed countries absorbed most Indian OFDI activity. Much of these FDI were strategic asset- and efficiency- seeking, aimed at acquiring technological and R&D capabilities (energy, telecom), control of marketing and distribution networks (automotive, information technology), and brands (consumer goods, pharmaceuticals).<sup>38</sup> To this end, Indian MNEs moved into full or majority ownership, privileged M&A to greenfield investment, and broadened the sectoral

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<sup>38</sup> Recent Indian FDI activities included Tata acquisition of Jaguar and Ford, Tata Tea acquisition of Tetley, Asian Paints acquisition of Berger International, and software companies' investing in the US in order to acquire the domain knowledge of clients and new business opportunities.

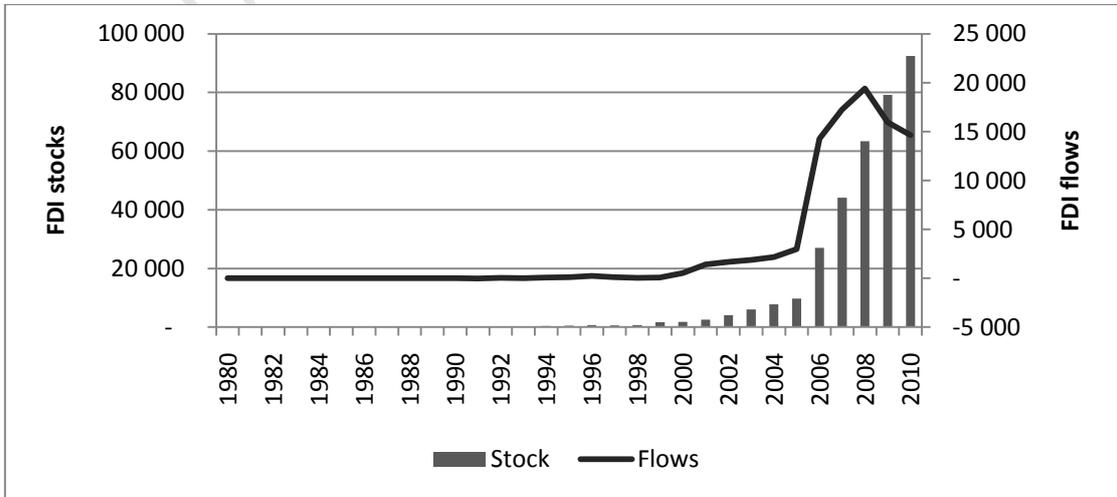
distribution of their FDI (Hattari and Rajan, 2010; Kumar, 2007; Nayyar, 2008; Tolentino, 2008).

Whilst liberalisation was significant, India did not establish the extensive and articulated support system provided by China to its SOEs. Compared to the top-down internationalization strategy adopted by China, India’s approach was decentralized and calibrated (Hattari and Rajan, 2010).

**3.3.2 Patterns of India’s outward foreign direct investment**

In value terms, India’s outward FDI became significant only by the turn of the century (Figure 3). FDI flows, which stood at a meagre annual average of US\$ 4 million in the 1980s and US\$ 70 million in the 1990s, jumped to annual averages of US\$ 8.4 billion between 2000 and 2010. FDI stocks increased from US\$ 78 million in 1980, to US\$ 124 million in 1990, to US\$ 1.7 billion in 2000 and reached US\$ 92 billion in 2010. Similarly, the number of parent companies increased from 187 in the early 1990s to 1700 in the early 2000s (Nayyar, 2008). FDI flows grew on average by 26.6 percent per year from 2000 to 2010, less than a third of China. Notwithstanding the fast growth rates, in 2010, India outward FDI stocks represented less than half a percentage point of world FDI stocks and were less than half the value of inward FDI stocks.

Figure 3 India’s FDI flows and stocks (1980-2010, US\$ millions)



Source. UNCTADstats database accessed January 2012. Note. US\$ at current prices and current exchange rates

Contrary to China, developed countries overtook developing countries as recipients of Indian FDI: by mid-2000s they accounted for 70-80 percent of total FDI flows (Kumar, 2007; Nayyar, 2008; Pradhan, 2008).<sup>39</sup> In 2007, around two thirds of Indian FDI flows targeted the manufacturing sector (pharmaceutical, automotive, consumer goods, chemicals), whilst services sectors absorbed the remaining third of total FDI (information technology, software, business process outsourcing).

In 2000-2007, developing countries still attracted one third of India FDI flows (Table 8). In absolute terms, FDI flows to developing countries expanded significantly: in the 1960-1989 period, 164 firms invested in 50 developing countries. By 2000-2007, there were 1012 firms involved in 78 developing countries. Traditionally, FDI flows in developing countries were concentrated in manufacturing, but from the 1990s, they shifted to the primary and tertiary sectors (Pradhan, 2008).

Table 8 Destination and composition of India's FDI (1961-2007)

	1961-69	1970-79	1980-89	1990-99	2000-07
OFDI into Developing Countries US\$ million (share of total OFDI)	22 (68.69)	84 (96.2)	116 (76.3)	1890 (56.4)	8788 (36)
OFDI into Africa US\$ million (share of OFDI into Developing Countries)	13 (60)	35 (42)	25 (21.9)	317 (16.8)	2968 (33.8)
Sectoral composition of OFDI into Africa US\$ million					
<i>Primary sector</i>				23	594
<i>Manufacturing</i>	13	27	21	259	1556
<i>Services</i>		8	3	32	817

Source. Adapted from Pradhan, 2008

Indian investors had a long-standing presence in Africa, due to historical business links and a large population of Indian origin in the continent (Pal, 2008). In absolute terms, Indian investment into Africa grew substantially, from US\$ 25 million in the

<sup>39</sup> It should be noted that also Reserve Bank of India FDI data suffered from some limitations: it did not include investment financed through international financial markets and only included approved investment projects, and referred only to initial remittance proposed or made by each Indian company (Nayyar, 2008; Pradhan, 2008).

1980s to almost US\$ 3 billion in cumulative FDI flows for the period 2000-2007 (Table 8). This amounted to one third of India OFDI flows to developing countries, and 12 percent of OFDI flows to the world. More than 70 percent of Indian FDI flows in 2000-2007 went to Mauritius, an offshore financial centre used for investment in third countries and for round tripping.

In 2000-2007, 52.4 percent of Indian FDI flows to Africa targeted manufacturing, mainly chemicals (31.3 percent), rubber and plastic products (8.9), transport equipment (4). Services received 27.5 percent of OFDI, mainly software development (10.9 percent), financial and insurance (7.7), and transportation services (5.5). Natural resources attracted one fifth of Indian FDI flows, mainly constituted of three deals in the oil and gas sector in Sudan and Libya, led by state-owned ONGC Videsh Ltd (Pal, 2008; Pradhan, 2008). It would be a mistake, nevertheless, to assume that resource-seeking investment privileged Africa: India's oil investments were more significant in Russia (Sakhalin oilfields) and most of its mining investment was concentrated in Australia (Nayyar, 2008).

### **3.3.3 India's private sector as a driver of foreign direct investment**

Unlike China, India's economic reforms were hastily introduced as a response to the balance of payment crisis in 1991. Sharma (2009) provided an accurate overview of the reform process. The 1991 New Economic Policy (NEP) consisted of wide-ranging trade and investment liberalisation measures and sectoral and macro-economic reforms that turned the page on a long history of strong government intervention. As far as the industrial sector was concerned, the NEP removed burdensome licensing requirements for establishing or expanding industrial units. Market entry restrictions under the Monopolies and Restrictive Trade Practices Act (1970) were also eased. In the past, under the Act, larger private enterprises were allowed only in selected sectors, whilst heavy industries, mining, telecommunications, and other sectors were reserved for the State outright. According to Pradhan (2008), it was these sectoral and firm size restrictions that spurred the pre-1990 wave of OFDI by few private companies. Birla, Tata, Thapar and the like, constrained in their domestic market, pursued their strategy of scale and sectoral expansion overseas. With time, these

private investors developed significant experience and knowledge on managing cross-border alliances, more so than their Chinese counterparts (Hattari and Rajan, 2010).

This was not to say that the reform process initiated by the NEP was completed. Indian manufacturing sector was dominated by small firms, including SOEs, protected by restrictions to entry. This situation prevented efficiency gains accruing from technological innovation and economies of scale. Indian firms were also less integrated than their Chinese counterparts in global value chains (Sharma, 2009; Sun et al., 2012).

In the capital market, under the NEP, prudential and supervisory regulations were strengthened and implemented in conformance with international standards, interest rates were deregulated and credit controls eliminated. The largest state banks were restructured and given more independence, for example by stipulating that boards, rather than government, nominate management. This resulted in a reduction of non-performing loans, which did not exceed 4 percent (Sharma, 2009). Although privatisation of state-owned banks lagged behind, and although the Reserve Bank of India had a preferential credit line for agriculture and small businesses, and for rural areas, the Indian banking sector worked relatively well in financial intermediation and allocating credit to the private sector. This was reflected in India outward investment activities: international M&A by Indian enterprises were undertaken by privately-owned firms with relatively easy access to the stock market (Gupta, 2005; Kumar, 2008; Nayyar, 2008; Pal, 2008; Sauvart, 2004). Overall, Indian MNEs were experienced with corporate governance standards required from the stock exchange, had healthy balance sheets, and enjoyed robust credit ratings

Whist ridden with inefficiencies and incomplete reforms at home, Indian enterprises were profit-driven and operated in a context of market-based institutions. These, ultimately, were the drivers of India OFDI. Estimating the determinants of bilateral FDI flows from and to 57 countries, between 2000 and 2005, Hattari and Rajan (2010) found that “drivers of outward investments from Indian corporations are not that different from their counterparts elsewhere” (p. 510). The only exceptions were a

higher correlation of Indian investment to cultural and geographic proximity (language, colonial relationship, physical distance) and to market- and resource-seeking motives.

This implied that Indian OFDI firms relied on existing ownership advantages, accruing from technological and managerial competence, financial strength, and overseas expertise, which lay behind the global competitiveness of large, but also small and medium-sized Indian investors (Pradhan, 2004; Sauvart, 2004). Pradhan (2004) found that firm experience, managerial skills and technological capabilities were the key determinants of Indian OFDI. Analysing a sample of 4270 manufacturers in the 1990s, Kumar (2007) found that experience and cost-effectiveness were critical ownership advantages for low-medium technology industries (textiles, cement, plastics, rubber), while internal technological efforts, measured as R&D expenditures, were critical for medium-high technology industries (chemical, machinery, pharmaceuticals). In general, previous export experience was positively correlated with the probability of investment.

From the late 1950s to the 1980s, protected markets, investment in higher education, and an ambitious industrial policy laid the basis of current managerial and technological capabilities. These were put to a test during the 1990s, when liberalisation led to a consolidation of the industrial and services sectors, with surviving Indian firms emerging “leaner and meaner” (Nayyar, 2008, p. 126). Rather than being assisted by the government, Indian firms had to find the resources to overcome the weakness of the government. On the one hand, this process was highly selective, on the other hand, few MNEs, in particular in the steel and software industries, grew to operate at the technological frontier and developed internationally competitive marketing and brands. Moreover, a lower cost, younger labour force allowed India to be more competitive than China in a number of labour intensive industries, such as mining (Sun et al., 2012). As Sharma aptly put it: “India’s post-liberalisation economic growth is as much about entrepreneurial freedom as it is about reducing the role of the intrusive state in the economy” (2009, p. 163).

The 1990s reforms allowed firms to pursue their growth and internationalisation strategies, but did not drive this process. In other words, it “enabled Indian firms to move across borders; but it did not drive Indian firms to move across borders” (Nayyar, 2008, p. 126). Critically for our discussion on outward FDI, the interaction of state ownership and capital market imperfections found in China, was not relevant in India and did not affect the level, nature and direction of outward FDI investment. With the exception of some state oil companies, Indian FDI was largely driven by private enterprises, with little coordination with the government. Indeed, before 1991, when governments aimed at promoting South-South trade, India OFDI were more policy-driven than they would ever be after this date (Hattari and Rajan, 2010; Pradhan, 2008).

### **3.4 Comparing Asian Giants**

Recent surveys of foreign investors in Africa highlighted important investors’ differences (Broadman, 2007; Henley et al., 2008). Chinese investment was younger, privileged greenfield investment in labour-intensive, fast-growing, export-oriented industries, and targeted integration up and down the value chain. They sourced more from their parent companies and were affiliated with state entities. Indian investment was largely composed of owner-managed firms, involved in traditional import-substituting sectors and more integrated into domestic markets, often through informal networks.

A comparative study conducted by Boston Consulting Group of the 100 top companies from emerging economies highlighted key differences between Indian and Chinese MNEs (2008). Indian companies were much smaller, but with a higher proportion of international sales and a greater proportion of acquisitions in developed countries. All the 20 Indian companies listed were private firms. On the contrary 29 out of 41 Chinese MNEs were SOEs. This reflected the fact that China OFDI was driven by large and relatively inefficient SOEs, while more efficient private firms remained largely domestic (Morck et al., 2008).

Tolentino (2008) compared the macroeconomic determinants of FDI for China (1982-2006) and India (1980-2006). Chinese FDI was found to be largely independent from home country macroeconomic variables such as openness, interest rates, human capital, technological capabilities, and exchange rates. In India, whilst most of these variables were largely insignificant, national technological capabilities augmented the ownership specific advantages of Indian firms—a finding consistent with Pradhan (2004) and Kumar (2007).

Table 9 Comparative sectoral distribution of Chinese and Indian M&A (2000-2008, US\$ million).

Chinese MNEs			Indian MNEs		
Target industry	No. deals	Deal Value	Target industry	No. deals	Deal Value
Energy minerals mining	86 (12%)	20,402.7 (21.2%)	High-tech services	98 (9.3%)	2,318.3 (3.6%)
Non-financial institution investment	56 (7.8)	1,083.9 (1.1%)	Computer software services	91 (8.6%)	816 (1.3%)
Oil and gas exploration	49 (6.9%)	24,259.3 (25.2%)	Medical products and services	89 (8.4%)	2,509 (3.9%)
Auto parts	39 (5.5%)	1,133.9 (1.2%)	Commercial services	62 (5.9%)	1,142.5 (1.8%)
Computer software service	30 (4.2%)	246.9 (0.3%)	Energy minerals mining	58 (5.5%)	22,066.8 (34.6%)
Real estate	29 (4.1%)	3,468.9 (3.6%)	Auto parts	53 (5.0%)	3,254.3 (5.1%)
Manufacturing	24 (3.4%)	1,623 (1.7%)	Chemical products	53 (5.0%)	1,971.4 (3.1%)
Telecom equipment	21 (2.9%)	200.9 (0.2%)	Food and beverages	38 (3.6%)	2,697.8 (4.2%)
Chemical products	20 (2.8%)	56.6 (0.1%)	Manufacturing	32 (3.0%)	2,014 (3.2%)
Food and beverages	20 (2.8%)	910.8 (0.9%)	Oil and gas exploration	29 (2.7%)	7,226.9 (11.3%)

Source. Sun et al., 2012. Note. Top 10 M&A, based on deal value

Sun et al. (2012) compared 1,526 M&A transactions by Chinese and Indian MNEs in the 2000-2008 period. Chinese and Indian firms completed M&A for a total value of US\$ 130 and 60.5 billion respectively. The top ten cross-border overseas participants, in value terms, were mostly SOEs for China, and all privately-owned for India. Indian firms were more successful than the Chinese counterparts in closing M&A transactions. Indian investment was smaller-sized and targeted forward integration to tap into the European (58.4 percent of M&A value) and US markets (22.9 percent). China M&A activities had a significant regional reach, with Hong Kong

capturing 40.5 percent of total M&A value.<sup>40</sup> Table 9 shows the sectoral allocation of M&A activities. Whilst natural resources accounted for the bulk of total M&A value in both China and India, in terms of number of deals, Indian M&A were significant also in knowledge-intensive and manufacturing sectors (26.3 and 16.6 percent of total deals, respectively). Resource extraction accounted for only 8.2 percent of the total number of deals in India, but for almost 20 percent in China.

### **3.5 Conclusion**

This chapter reviewed key theoretical and empirical research surrounding Chinese and Indian outward FDI. While international business scholars were preoccupied with adjusting traditional investment theories to take account of the role of state in driving national comparative advantages, an emerging body of empirical research increased our understanding of the dynamics of China and India outward investment.

Chinese OFDI stocks in 2010 reached almost US\$ 300 billion, after a decade in which FDI flows grew on average by 91.7 percent per annum. In India, OFDI stocks stood at US\$ 92 billion in 2010, as FDI flows grew on average by 26.6 percent per annum from 2000 to 2010: less than a third of China's, but nevertheless strikingly high.

China's fast-growing OFDI targeted a variety of sectors and countries, pursuing highly strategic objectives set by Beijing and aimed at securing scarce natural resources, acquiring R&D, technological capabilities, and global competences, creating goods and services export opportunities, and strengthening economic ties with partner countries (UNCTAD and UNDP, 2007; Zhan, 1995). The distinctiveness of China investment was not limited to this. Chinese investors were neutral to political risks and were influenced by the State, and according to some by cultural factors, in ways not found in any other industrialised or emerging economy. The reason for this distinctiveness was the dominance of SOEs in Chinese OFDI

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<sup>40</sup> This should be interpreted with caution in view of the previous discussion on data reliability. Other important deals were closed in the UK (16.4 percent, 12 deals) and the US (8.6 percent, 77 deals). Canada, South Africa, Australia and Singapore were also important destinations.

activities. SOEs enjoyed domestic monopolies at home, soft budget constraints, and were risk-takers because their operations were not threatened by bankruptcy and takeover. State-owned, policy banks ensured that SOEs strategic investment efforts were supported by access to funds, at preferential rates and subject to weak monitoring mechanisms. Even after three decades of reform, state control on SOEs was tight, exerted through voting powers, appointment of management and heavy influence of Party cadres to ensure that investment decisions were aligned to Beijing policies. Chinese firms overseas relied on state support also at the political level: for example, in 2008, Africa had 28 Bilateral Investment Treaties with China, compared to only 5 with India (Pal, 2008).

Two caveats had to be considered. Firstly, there was some level of discrepancy between policies set in Beijing and the practice of Chinese corporations on the ground (Gill and Reilly, 2007; Li, 2010). Secondly, the private sector was increasingly involved in outward investment, a fact that, in future, had the potential to create a convergence with FDI from industrialised countries. Listed, privately-owned Chinese companies might differ a little from their American counterparts.

Indian outward FDI had more in common with other emerging or industrialised countries than with China. Its private sector built ownership advantages over decades of protectionism and investment in skills and technologies. With liberalisation in the 1990s, selected enterprises survived competition and grew, overcoming their government failure rather than benefitting from its support. At the same time, reforms of the capital market enabled a functional system of financial intermediation. Moreover, some firms had a presence in foreign markets which dated back decades, granting them superior expertise in dealing with cross border alliances and foreign markets. As a result, Indian investment was driven by competitive private firms, which relied on expertise in foreign investment environments, access to a functioning capital market, and existing ownership advantages.

The difference between China and India were largely attributable to their differing political systems and development strategies (Hattari and Rajan, 2010). This had several implications for their investment patterns. Indian investors were on average

smaller, more experienced and possessed higher managerial and technological capabilities than their Chinese counterparts. While both China and India pursued market-, efficiency- and strategic asset- seeking in developed countries, for India these were the bulk of its OFDI. Conversely, most Chinese investment targeted market- and natural resource- seeking investment in developing countries. Again, within natural resource-seeking investment, Chinese and India strategies differed. In the steel industry, for example, Indian MNEs held strong ownership and locational advantages, and investment was aimed at internationalising operations, acquiring advanced processing technology and accessing markets (Kumar and Chadha, 2009). Chinese FDI pursued backward integration of raw materials extraction and trading.

Differential access to capital markets underlined China and India response to the global economic crisis. In 2008, total FDI flows declined by 16 percent. In 2009, FDI outflows declined by a further 43 percent. China's outward FDI into the non-financial sector (mainly extractive industries) grew unabatedly (Davies, 2009; UNCTAD, 2010; Yao et al., 2010). On the contrary, being governed by market parameters and affected by the credit crunch and declining sales and profits growth, Indian OFDI declined drastically, especially in the manufacturing sector (Pradhan, 2009). Comparing the first half of 2009 with the same period in 2008, Indian overseas acquisition fell by 64.7 percent in value (from US\$ 8 billion to US\$ 2.8 billion) and 80 percent in number of deals (from 140 to 28). In the primary sector, only the oil and gas sector was not affected due to a large-scale acquisition by state-owned OVL in Siberia, but in the mineral sector, investment slowed down. Major energy MNEs disinvested in some countries.

Lastly, China and India differed in terms of sourcing strategies. Unlike India, China outward investment was explicitly geared towards the promotion of Chinese exports, as envisaged by the going global policy and Exim Bank guidelines. Broadman (2007) found this sourcing pattern in its survey of Chinese investors in Africa, similarly to Suliman and Badawi in Sudan (2010). Overall, though, comprehensive work on Chinese investors sourcing patterns was scarce. As one recalls, there was evidence that Chinese corporations followed practices which differed from Beijing guidelines. This was more likely if they invested retained earnings rather than Exim Bank funds.

Whether Chinese investors on the ground were more influenced in their sourcing decision by Beijing-defined export promotion objectives or by profit-maximisation was a critical determining factor for domestic upstream industries in the host countries. These research questions, nevertheless, were largely ignored in the international business literature. The impact of China and India outward FDI on local industrialisation patterns in the host countries fell largely outside the research agenda of international business scholars.

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## CHAPTER 4

### Copper Value Chain: Global and Zambian Perspectives

This chapter examines the copper value chain in its global dimension and within the Zambian context. By doing so, I situate the study and provide an overview of the institutional and historical context in which the GVC dynamics investigated in the following chapters take place.

The dynamics of the copper GVC were shaped by industry-specific characteristics, with regard, for example, to technological innovation, economies of scale and sources of rent, and by global shifts affecting world prices, sources of world copper demand and the organisation of production. In Zambia, the copper value chain and its upstream industries were influenced not only by global dynamics, but also by the specific political, economic and social circumstances in which it was embedded. In addition to these circumstances, the changing ownership structure of the copper sector emerged as another important factor. I will examine this in greater detail in this chapter.

The chapter is structured into two sections. In the first section, I introduce the copper GVC. I look, in turn, at the dynamics of world copper prices, supply and demand. Subsequently, I map the copper GVC, elaborating in particular on the role of the lead producers and proceeding to a first identification of key supply industries. These sub-sections explore how production is organised and what are the sources of economic rents in the copper GVC. Moreover, this analysis proposes an additional perspective on China's comparative advantages in the extractive industries. In the last sub-section, I discuss the impact of the trade regime on the copper value chain.

The second section contextualises the copper GVC in Zambia. It briefly introduces the history of the copper sector. Thereafter, I present the role of the sector in the economy and its export profile in recent times. The subsequent sub-section describes the ownership structure of the copper industry after privatisation. This discussion places Zambia in the context of the overall phenomena of emerging Chinese and Indian outward FDI.

## 4.1 The World Copper Market

### 4.1.1 The copper price boom

Figure 4 shows monthly copper prices from January 1960 to November 2011.<sup>41</sup> After WWII, economic expansion in Europe, the US and Japan resulted generally in growing demand for copper. Indeed, until 1972, annual prices grew on average by 2 percent per year. In 1973, copper prices jumped by 40 percent compared to the previous year, in the context of a general commodity price boom spurred by continued demand, supply side constraints, apprehension over supply disruption, and increased demand for commodity contracts by investors (Farooki, 2009). Between January 1973 and the peak, in the first quarter of 1974, average monthly prices equalled 2,524.2 US\$/t. This amount was more than 3 and a half times the average price in the first quarter of 1960. The price boom was nevertheless short-lived and from the early 1974 copper prices began a long-term decline due to a combination of two global recessions, reduced intensity of metal use and excess supply. Albeit higher than their 1960s levels, copper prices declined by 3 percent per year from 1974 to 1980. During the 1980s, prices grew on average by 2 percent per year, with a mean price of 1,835.54 US\$/t (1980-89). Improvements were registered in the 1990s, with average price equalling 2,223.1 US\$/t (1990-99),

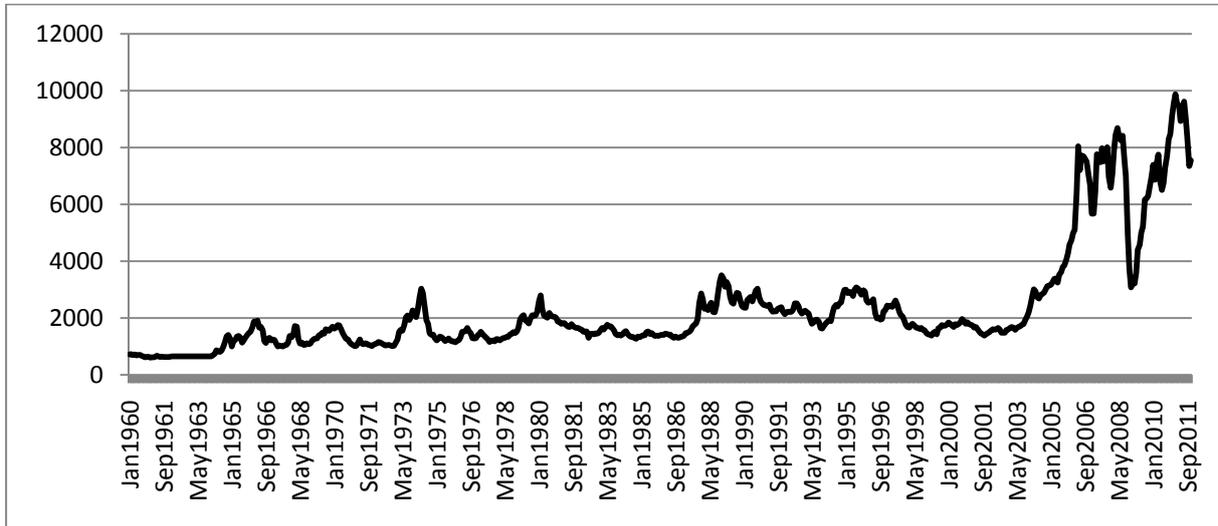
2003 marked the beginning of an upsurge in world copper prices, with a three-fold price increase between 2003 and 2007, peaking to 8,441.8 US\$/t in the second trimester of 2008. From the last quarter of 2008, prices declined following the global economic crisis, with rock bottom levels of 3,105 US\$/t in December 2008. By the second half of 2009, nevertheless, prices recovered to an average of 6,253 US\$/t in the second semester. At this stage, the recovery was driven by continuing demand from investors eschewing other portfolio investment rather than improved market fundamentals (GFMS, 2011). In 2010, demand from the advanced economies and from China picked up again, causing prices to overtake the pre-crisis level, with an

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<sup>41</sup> Whenever possible, data in this chapter was updated to the latest available year (often the case with FDI or trade databases). In some cases, however, I had to use data collected at the time of fieldwork, for example with Bank of Zambia internal data. The year is nevertheless always specified.

average of 7,535 US\$/t for 2010. In December 2010, prices overtook the 9,000 US\$/t ceiling, and did so for seven out of eleven months in the January-November 2011 period.

Figure 4 Refined copper prices (January 1960- November 2011, US\$/t)



Source. UNCTADstats database accessed January 2012. Note. Copper grade A, electrolytic wire bars/cathodes

#### 4.1.2 Production patterns

In 2010, global copper ore production totalled 15.9 million tonnes. Latin America was the largest producing region, Chile alone accounted for over one-third of global output (5.4 million tonnes), followed by Peru (1.2 million tonnes). China, at 1.16 million tonnes, overtook the US (1.13 million tonnes) and became the third largest world producer. Over the years, ore production grew very slowly: between 2007 and 2010, annual output growth rates ranged between 0 and 3 percent, mainly driven by increased supply from China and Zambia.

Refined production registered higher growth rates than copper ore output due to high recycling of scrap metals, which in recent years provided up to one third of refined copper (ICSG, 2010). Refining operations were located both in ore producing countries and in copper concentrates importing countries. Producing countries tended to vertically integrate smelting and refining, because proximity conferred a competitive advantage for such operations. Importing countries had a large industrial

base, and their refining capacity was developed in the second half of the 20<sup>th</sup> century on the back of falling transportation costs (UNCTAD, 1996). They relied entirely (Japan) or partially (US) on imports of unprocessed metal.

In 2010, world refined output totalled 19 million tonnes, up from 18.4 million tonnes the previous year (Table 10). Asia was the leading and fastest-growing region in copper processing: 52 percent of global smelted production (24 percent in China alone) and 44 percent of refined production (22 percent in China alone) (ICSG, 2010 using 2009 data). Five of the 20 top smelters and six of the top 20 refining plants, measured by capacity, were located in China and India (ICSG, 2010).

Table 10 Global production of refined copper by region (2006-2010, '000 tonnes)

	2006	2007	2008	2009	2010
Total	17,290	17,956	18,205	18,402	19,096
Asia	7,099	7,738	7,793	8072	8572
<i>China</i>	3003	3497	3779	4110	4573
<i>Japan</i>	1532	1557	1520	1440	1549
Europe	3525	3460	3517	3452	3607
Latin America	3934	3952	4064	4195	4171
<i>Chile</i>	2811	2936	3058	3272	3240
North America	1751	1764	1723	1499	1407
Africa	553	600	606	738	928

Source. GFMS (2011)

Because mining involved long gestation periods, which reduced price elasticity, there was a significant lag between supply and demand. Moreover, in recent years, a number of factors constrained supply: falling ore grades in developed areas (US, Chile), high cost of capital, exchange rate risks, political instability and labour disputes in producing countries, and increasing costs of exploring and mining new areas (ICSG, 2010; UNCTAD, 2007).<sup>42</sup> Production costs, in particular, had risen following the higher cost of consumables, raw materials and fuel, which alone accounted for around 10 percent of mining costs, depending on mining method

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<sup>42</sup> Future production from large greenfield investment in Latin America and Asia was expected to relax supply constraints (GFMS, 2011).

(GFMS, 2011). These were only partially offset by higher revenues from by-products such as gold.

#### **4.1.3 China as a leading demand driver**

By the early 1990s, demand for copper and other non-ferrous metals was on the rise: growing demand from Asia, and, for a period, the US more than offset the collapse of the ex-Soviet Union (Crowson, 2001). From the early 2000s, nevertheless, one country alone was responsible for the price boom: China.

Whilst industrialised nations underwent a process of dematerialisation, whereby the resource intensity of their economic activities decreased (Radetzki, 2008), copper demand from China, India and other emerging economies increased substantially, as they embarked on a resource-intensive stage of economic development. Given its level of development, China's consumption pattern was not exceptional, but its economic size was (Farooki and Kaplinsky, 2011). In 2005, China accounted for two thirds of the growth in copper demand (UNCTAD, 2007).<sup>43</sup> Between 1990 and 2010, China's copper consumption grew on average by 14.2 percent per year, compared to -1.3 percent in North America and -0.1 in the EU (GFMS, 2011). Only India showed a similarly aggressively high rate, with an average of 8 percent per year. Nevertheless, Indian copper consumption, mainly absorbed by goods manufacturing for domestic and export markets, was, in value terms, more than 10 times smaller than China's (GFMS, 2011).

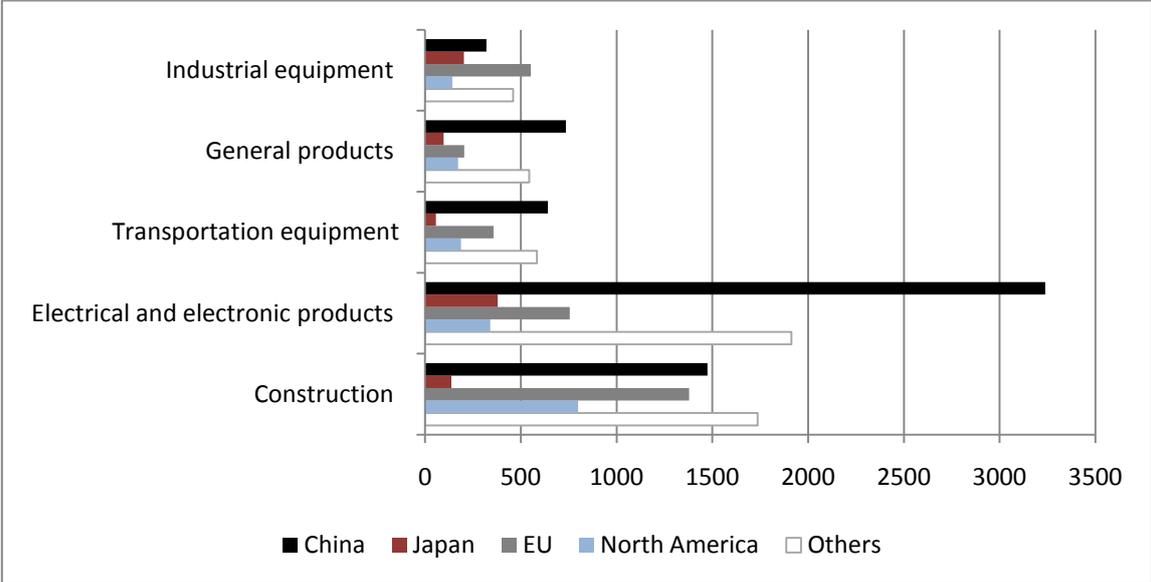
Asian demand for refined copper expanded more than five-fold in less than 30 years (ICSG, 2009, 2010). China was the largest copper user, with a demand that equalled about one third of world production. By 2009, North America and Western Europe absorbed, respectively, only 11 percent and 14 percent of global production. Their usage levels did not change much from the 1980s, but were dwarfed in relative terms by the spectacular growth of Asian demand (ICSG, 2009, 2010). The economic downturn in 2008 widened this diverging pattern.

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<sup>43</sup> A recent report estimated that in 2000-2007 China alone accounted for copper demand growth (Macquarie Commodities Research, 2008 in Farooki, 2009).

Figure 5 shows the sectoral consumption of copper by major consuming countries and regions in 2009. China accounted for 27 percent of global copper usage in construction, 49 percent in electrical and electronic equipment, 35 percent in transportation, 42 percent in consumer and general products and 19 percent in industrial machineries. With the exception of industrial machinery, in which Europe maintained its global competitiveness, China dwarfed the other countries and regions in every sector.

Figure 5 Major consuming countries of refined copper by sector (2009, '000 tonnes)



Source. GFMS (2011)

China’s copper demand was driven mainly by domestic factors: infrastructure and housing development and the consumer goods market, both of which received a boost with the stimulus package that government implemented after the global economic crisis (Farooki, 2009; GFMS, 2011). High urbanisation rates meant that China, unlike the US or the EU, had to invest largely in new construction projects (44 percent of total urban infrastructural investment in 2007) rather than expansion or maintenance (Farooki, 2009). Public infrastructure and housing was the fastest-growing copper end user in China, with demand growing by 88 percent between 2006 and 2010 (GFMS, 2011). At the same time, investment in the national power grid drove China’s demand for electric and electronic equipment. In value terms,

construction and electric equipment represented the bulk of global copper demand, accounting for 70 percent.

Whilst accounting for only one tenth of world copper consumption, consumer goods were the second-fastest growing end user in global terms in the 2006-2010 period, after electrical and electronic equipment. In China, rising domestic income levels led to a seven fold increase in demand for manufactured goods in the first half of 2000s (Farooki, 2009). In particular, between 2000 and 2006, automobile ownership increased more than seven times, whilst microwaves and air conditioners ownership almost tripled.

In order to meet its booming demand, China increased ore production and scrap collection. As highlighted earlier, China was the third largest ore producer and, together with Zambia, the main source of output growth in the past years. Despite this, consumption had quickly outpaced domestic output growth in the past decades (Farooki and Kaplinsky, 2011). The gap between ore production and consumption increased from 3 percent in 1990 to 40 percent in 2009, with a smaller gap for refined copper: 9.2 percent (Table 11). Consequently, China increased its reliance on imports, mainly from developing countries. Out of US\$ 211.1 billion of world copper exports in 2009, China imported US\$ 99.1 billion, or 47 percent. The same share of world exports was registered in 2010, but imports value rose to US\$ 155.6 billion.<sup>44</sup> As discussed in section 3.2, China's demand for natural resources reflected not only on trade, but also on investment patterns. These investments were highly strategic and tightly linked to the state: four fifths of China's FDI was pursued by Central Government SOEs, under the direction and with the support envisaged by the 2001 go global policy, especially in the natural resource sector. This allowed China to introduce a model that bundled aid, infrastructure development, and natural resource extraction together. Such model, implemented first in Angola, was rolled out in the DRC and was replicated by India in Nigeria (Pal, 2008; Wang, 2007).

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<sup>44</sup> Trade figures were extracted by UN Comtrade. It should be noted that the relative value of China's imports was overestimated because import figures included CIF costs, exports figures did not. If one uses world copper import figures, China import share decreases to 42 percent in both years.

Table 11 China's share of global copper production and consumption

		Share of global production	Share of global consumption	Production minus consumption
Ore	1990	3	6	- 3
	2000	4	18	-14
	2009	6	46	-40
Refined	1990	5	5.4	-0.4
	2000	9	13.6	-4.6
	2009	21	30.2	-9.2

Source. Adapted from Farooki and Kaplinsky, 2011

## 4.2 The Copper Global Value Chain

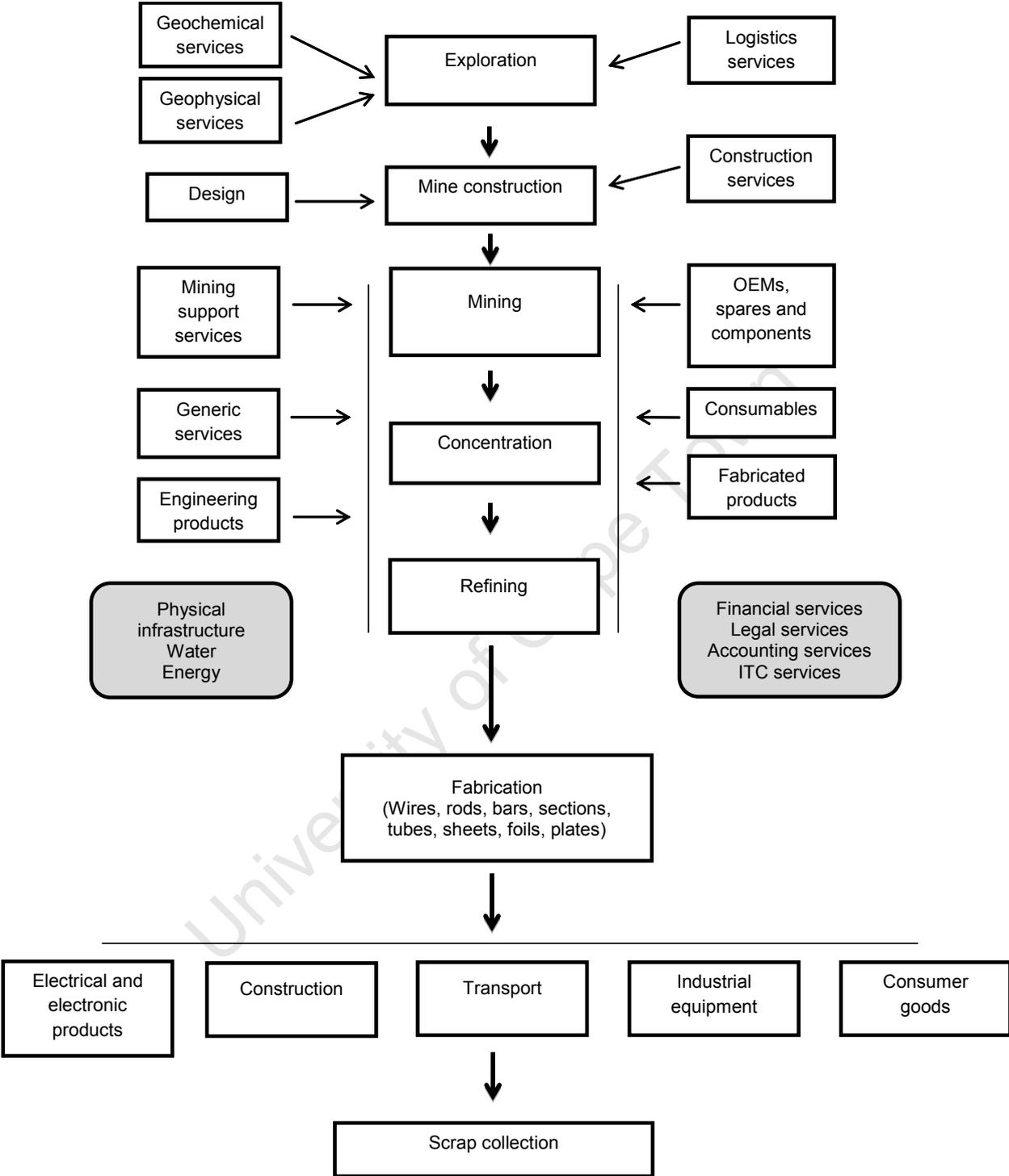
### 4.2.1 Mapping the copper global value chain

The copper GVC, graphically presented in Figure 6, is a producer-driven value chain - high capital and technological intensity, strong internal governance by the producers. This sub-section focuses on the following production stages: exploration, mines construction, mining, ore processing, and fabrication. It then briefly examines the geographic distribution of these stages. Given the focus of this thesis on upstream linkages to copper mining, the subsequent analysis centers on the economic agents populating this stage of the GVC: lead commodity firm and their supply firms.

#### **Exploration.**

Exploration activities were undertaken by small- and medium- sized companies that usually did not have the capacity to undertake mining operations but rather sold their rights to large MNEs (UNCTAD, 2007). They operated knowledge- and skill-intensive activities and relied on specialised suppliers of geo-chemical and geo-physical services to identify target areas, extract samples, and analyse them. The supply chain included companies to manage the logistics of working in some of the remotest areas in the world. Exploration involved considerable risks: after evaluating the economic feasibility of hundreds of target areas, only few areas were identified as

Figure 6 Copper mining global value chain



Source. Author's compilation from various sources

having the potential for drilling (Poliquin, 2004). For every 500 to 1,000 target areas drilled, on average only one economically-feasible mineral deposit was discovered.

While endowment of copper deposits was undeniably critical for a country’s production capacity, historically, it was investment in exploration activities, together with mining education and technological progress that determined the geographical distribution of copper production (cf. sub-section 1.3.3 for an exhaustive discussion). This implied that the geographical distribution of global copper production was determined by the concentration of exploration and mining activities, rather than solely on the basis of endowment. Increased exploration and mining investment enabled China to become the third largest copper ore producer despite being a latecomer and having lower reserves than Peru and Australia (Table 12).

The copper price boom prompted a resurgence of world-wide exploration activities. In the late 1990s, this was driven by the common association of copper to gold in many deposits, but from 2003 onwards, copper became a primary mineral target in its own right (Wilburn, 2005). Copper became the second most explored mineral target after gold. Exploration activities targeted places as unlikely as Wales, where mining was considered a thing of the past (*The Economist*, 17.12.2011).

Table 12 Copper production and reserves for selected countries (2011, ‘000 tonnes)

	Mine production	Reserves
Australia	900	80,000
Chile	5,520	150,000
China	1,150	35,000
Peru	1,285	90,000
US	1,120	35,000
Zambia	770	20,000

Source. USGS database accessed January 2012. Retrieved from <http://minerals.usgs.gov/minerals/pubs/commodity/copper/mcs-2011-coppe.pdf>

**Mine construction.**

Following a MNE’s decision to invest, the first stage of mining involved mine design and construction. These processes were usually sub-contracted to specialised project design consultancy firms and large mine construction contractors from a restricted number of countries: North America, Australia, and South Africa (Hanlin, 2011). Construction contractors usually operated under lump sum turn-key (LSTK) or

engineering, procurement, construction and management (EPCM) arrangements, which implied they were in charge of the procurement of equipment, materials, and services, , among other functions (Ahmad and Walker, 2005). They usually brought with them their supplier networks from previous projects, in order to minimise risks, reduce lead times and overcome the transaction costs of developing a local supply base in often remote locations (Hanlin, 2011).

Procurement decisions at this stage often affected the dynamics of supply links in subsequent stages of mining because constructors would set product standards, purchase equipment that required future spares and maintenance from specific OEMs, and develop relationships with specific suppliers that were retained by the MNEs when the mine was completed (Hanlin, 2011).

### ***Mining and concentrating.***

Copper has a high value per unit weight, which allows its tradability on the global market. With 77 percent of the value-added accruing at mining stage (UNCTAD, 2007), mining is a highly profitable business. Nevertheless, mining was characterised by long project gestation periods, with lags of several years between the decision by MNEs to invest in a mining operation and the beginning of ore extraction. Moreover, copper mining involved large economies of scale. This implied that mining was relatively price inelastic, because the production scale could not easily be adjusted. It also meant that price increases would take a long time in stimulating supply because MNEs were wary of undertaking multi-billion capital investment with significant sunk costs, often in politically unstable countries (Crowson, 2001).

The operational phase of a mining project consisted of ore extraction, crushing, concentration, smelting and refining. After being drilled and blasted, rocks were hauled to the crusher (GFMS, 2011). Extraction involved reducing the size of ore by crushing the ore and grinding it in a rotating mill. The resulting slurry underwent a process of concentration, in which finely ground ore was mixed with reagents and processed into concentrates, containing around 30 percent copper. The remainder of the slurry was then sent to a dam for storage and future treatment. Copper

production was mainly located in developing countries in Latin America, Asia and, to a less extent, Africa (cf. sub-section 4.1.2).

### ***Smelting and refining.***

Mining companies adopted two different technologies to refine copper: one consisted of smelting copper into blister copper (around 99 percent purity) and then electrolytically refining it into copper cathodes (99.99 percent purity). The other technology involved treating the ores with leaching and electrowinning (SX-EW) processes. Smelting was costlier than the SX-EW process, but was the predominant method worldwide, including in Zambia (Ahmad and Walker, 2005). This was because SX-EW refining could only be applied to particular ore deposits.

Copper production and processing tended to be vertically integrated operations. By integrating processing, MNEs reduced exposure to the market fundamentals for concentrates and internalised the costs of processing, which otherwise would be subject to treatment and refining charges by smelters. Additionally, the weight of copper concentrates fell by two thirds in the refining stages, enabling MNEs to cut shipping costs (Radetzki, 2008).

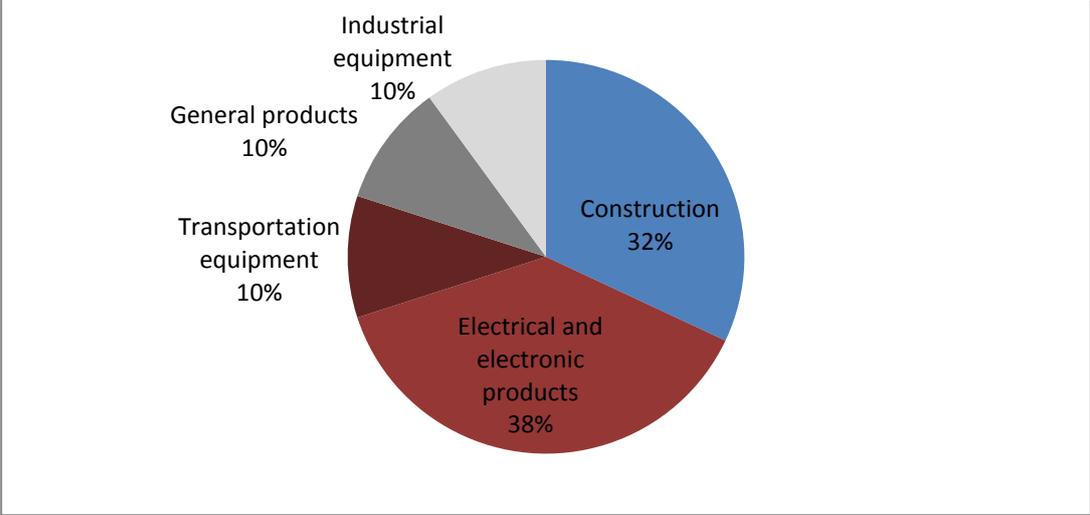
### ***Fabrication.***

Semifabricators were the first users of refined copper. Competitiveness in manufacturing of wire, rods, plates, strips and so forth was not typically determined by proximity to the mines, but by labour cost and access to infrastructure. Unsurprisingly, therefore, in 2009 China was the world largest producer of semifabricates, having produced more than 12 million tonnes, three times the production levels in the US, the second largest producer, followed by Germany and Japan (ICSG, 2010).

In term of final usage, ICSG estimated that in 2009 equipment manufacturing absorbed the largest share of copper output (52 percent, or 11.6 million tonnes), followed by building construction (7.3 million tonnes) and infrastructure (3.2 million tonnes) (ICSG, 2009, 2010). According to GFMS estimates, shown in Figure 7, the same year, equipment manufacturing absorbed 58 percent of copper output,

disaggregated in electrical and electronic equipment (38 percent), transportation and industrial machinery (10 percent each) (GFMS, 2011). Building construction accounted for a higher share than the estimates by ICSG, 32 percent, while consumer and general products accounted for 10 percent. These shares remained unvaried in 2010.

Figure 7 Copper consumption by end user sector (2009, percentage)



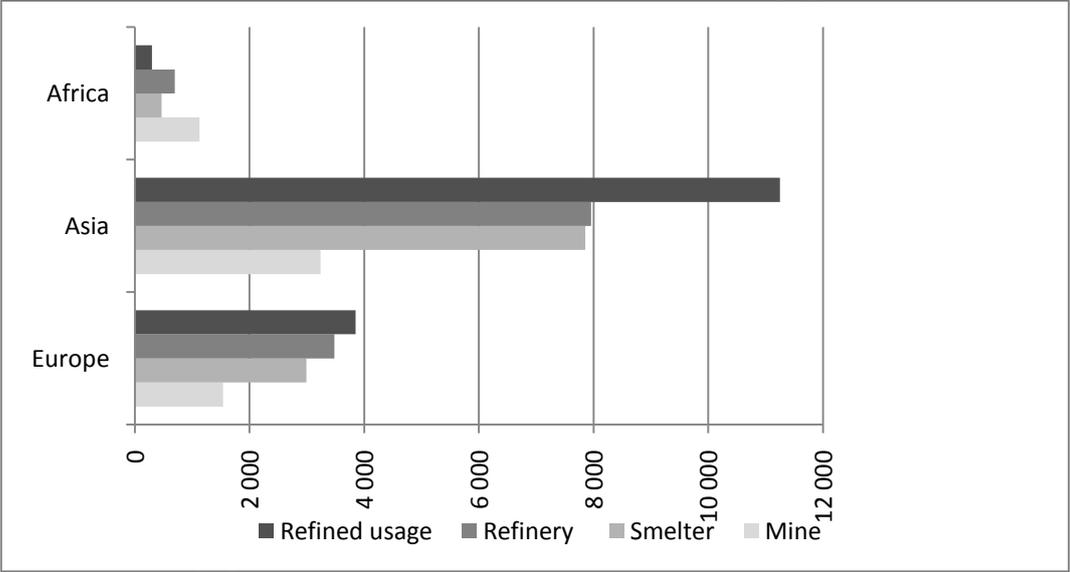
Source. GFMS, 2011

#### 4.2.2 Geographical dispersion of the copper global value chain

Broadly speaking, there were three typologies of insertion in the copper GVC. Firstly, net exporting countries, like Chile, Peru and Zambia, exported almost all their production. They were expanding their position in this stage of the GVC, by augmenting production and refining capacity. This group also included countries with more significant domestic copper usage, like Australia, Canada and Indonesia, though these were also expanding their positions downstream. Secondly, there were producing countries whose output was destined for internal consumption, supplemented by imports, such as China, the US, and Russia. These countries had a strong presence both at the mining stage of the GVC and downstream. Lastly, there were countries with a presence only downstream: they had no domestic ore production, but a large import-dependent industrial base (Japan, Germany).

Given the focus of this thesis on Africa, Figure 8 provides a graphical comparison of the absolute positions of Africa, Asia and Europe in various stages of the copper GVC. The first striking result was that refined copper usage in Africa accounted for only 26 percent of total production, concentrated in South Africa. In Europe and Asia, refined copper usage represented 249 percent and 156 percent of ore production, respectively. Secondly, Africa was a marginal player in copper ore production, with only one significant producer, Zambia. Exploration and mining investment privileged Asia and Latin America. Africa was not only at the bottom of the copper value chain, with some refinery and insignificant industrial capabilities (except South Africa), but was also marginal in its mining exploration and development activities.

Figure 8 Copper production and usage for selected regions (2009, '000 mt)



Source. ICSG database accessed June 2011

**4.2.3 Value chain drivers: lead commodity firms in a changing environment**

The ownership pattern of copper production changed significantly in the past 60 years, with respect to nature of ownership, country of origin and market structure. Until the late 1950s, mineral production in developing countries was dominated by privately-owned MNEs from industrialised countries (Radetzki, 2008). These lead commodity firms aimed at securing raw materials supply for high value added activities located in the home countries. Two strategies were adopted to control supply: direct ownership of mining operations (the Anglo-Saxon model) and long-

term contracts with independent producers. Under the latter arrangement, known as the German model, MNEs offered technical and financial support, without direct control.

The 1960s and 1970s saw the partial or complete nationalisation of oil and mineral production in developing countries. In the early 1980s, 41 percent of world copper ore capacity was under state ownership, with a high degree of intra-firm vertical integration (Brown and McKern, 1987). The goal of nationalisation was to increase revenues and linkages from the mineral sectors to the rest of the economy, but the experience of subsequent decades was largely disappointing (Crowson, 2001; Radetzki, 2008). From the late 1970s to the early 1990s, many highly-indebted mining companies struggled under the burden of low metal prices and high interest rates. Moreover, state interference often forced mining companies to take operating and investment decisions which had little to do with profitability and impacted negatively on productivity. At the same time, companies had to operate at near full capacity in order to maintain cash costs under control (Crowson, 2001; Farooki and Kaplinsky, 2011). Until the 1990s, private investment in exploration and mining stagnated. Only SOEs undertook some investment, which was largely politically motivated.

The 1990s witnessed three global shifts: firstly, in the relationship between public and private, secondly between corporations and societies, and thirdly between traditional and emerging investors.

With the exception of the oil sector, from the early 1990s onwards the relationship between private and public sectors in the extractive industries changed completely (Humphreys, 2009; World Bank and IFC, 2003; Radetzki, 2008). Taking stock of the negative experience of nationalisation, developing countries opened up the mineral sector to private investors and divested state interests. Foreign MNEs returned to being dominant players in mineral production, whilst mining-related public institutions moved away from owning/operating the mines and functioned more as lesser and regulator. In this sense, Radetzki referred to a “government abdication from involvement in primary commodity markets” (2008, p. 19). Nevertheless, the role of

governments remained important for some mineral commodities. Given that the most profitable stage in the copper GVC was mining, firm-state relationships became critical to access the economic rents of mining through licensing (Bridge, 2008).

Global shifts also affected the operating environment of MNEs from industrialised countries. They were subject to pressures to meet environmental and social sustainability standards from civil society groups, which scrutinised the actions of mining corporations through global networks of civil society (World Bank and IFC, 2003). Standards became more binding through adoption by the international capital market (Haglund, 2010). The mining sector response was multi-faceted and is still evolving. The Extractive Industry Transparency Initiative aimed at increasing financial transparency from corporate and host countries. The International Council on Mining and Metals was an industry initiative to address human rights and environmental concerns. Down the value chain, the Electronic Industry Code of Conduct was a set of voluntary standards adopted by electronic products companies concerning human rights, labour and environmental standards of their supply chains, which civil society groups wanted enforced on minerals supply as well (Nordbrand and Bolme, 2007).

At the same time, an increasing share of mineral production, including copper, was owned and controlled by MNEs from developing countries. By 2009, half of the top 30 mining companies originated from emerging economies (Humphreys, 2009).<sup>45</sup> Eight of these fifteen companies produced copper.

Since the mid-1990s, the copper industry witnessed a process of market consolidation (Cuddington and Jerrett, 2008; ICSG, 2009; UNCTAD, 2007). In the 1990s, market consolidation was caused by a large number of mine closures due to ore depletion, declining ore grades, natural disasters, or low profitability (Crowson, 2003). Production capacity was reduced in Africa and closures took place in the US and Europe. At the same time, mining projects in Latin America, Asia and Australia were extended through expansion or new mining operations.

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<sup>45</sup> This list included SOEs and companies listed in London which maintained management in the countries of establishment. Emergent economies include Brazil, Russia, Chile, Mexico, South Africa, Poland, India, Indonesia, and Kazakhstan.

From the 2000s onwards, further market concentration was fuelled by frenzy M&A activities. The profitability of mining increased dramatically with the price boom. Between 2002 and 2008, the operating costs of the largest forty mining companies rose by 277 percent, but revenues increased by 367 percent. As the share of costs in total revenue fell (from 79 percent in 2002 to 57 percent in 2008), their annual gross profits rose sharply, from US\$ 4 billion to US\$ 57 billion (Farooki and Kaplinsky, 2011). One consequence of the copper price boom was to improve access of MNEs to international capital markets, mostly in the form of bank borrowing and bond issues, but also through tapping equity markets (Humphreys, 2009). Two copper producers, Vedanta Resources and Kazakhmys, raised more than US\$ 1 billion at the LSE in 2003 and 2005, respectively.

To increase copper production and maximise shareholder-value, MNEs acquired smaller mining companies, a faster avenue to expand capacity than greenfield investment with high risks and long gestation periods (Farooki and Kaplinsky, 2011). The value of M&A activities in metal and oil sectors reached peak levels in 2008, at US\$ 87 billion (UNCTAD, 2010). This further increased market concentration: in 2005, 149 firms controlled 60 percent of the global metal mining output; the 10 largest firms controlled 30 percent (UNCTAD, 2007). In the copper market, the 10 largest firms accounted for 58 percent of global output. These were mostly MNEs with a high degree of internationalisation, and to a less extent SOEs (Chile, China).

It followed that the capacity to conclude high value M&A and start new mining projects defined the competitive advantage of mining companies. Technological innovation was not the key source of economic rents. In the copper mining industry, the past 100 years have witnessed two major technological breakthroughs: new concentrating techniques based on flotation rather than gravity, and the introduction of the electrowinning process (Bartos, 2007). At an early stage, by enabling higher recovery rates, they expanded the resource base of the US, allowing it to overtake Chile at the turn of the 20th century, and to meet the booming demand from the electric and automotive industries (David and Wright, 1997; Girvan and Girvan, 1970; Wright and Czelusta, 2004). Nevertheless, as technology becomes diffused, firm ownership advantages generally diminish or change (Dunning, 1981, p.91). This was

the case with copper concentrating and refining technologies, which became readily available (Crowson, 2001). This was also an industry in which skilled technical personnel was geographically mobile. It was exactly this technological feature of the sector that enabled developing countries to nationalise the mining industry in the 1960s and 1970s (Mikesell, 1971a). Moreover, many of the technologies for smelting and refining had a long lifecycle because of the high direct and opportunity costs of upgrading technologies in the mines (Bartos, 2007). This implied that producers did not invest in continuous upgrading of smelting and refining processes. Also, the uniform nature of mineral commodities, by definition, made product differentiation irrelevant.

In other words, expansion of production was the critical objective pursued by mining companies. Whilst expenditures in R&D were small compared to other sectors, these were directed at exploration rather than research on new extraction or processing techniques or new equipment (Bartos, 2007). This differentiated the mining industry from other sectors, in which the main sources of economic rents and competitiveness derived from R&D and protection of intellectual property rights (such as high-tech services and pharmaceutical products) and from marketing and branding (such as the clothing sector).

Two other areas became critical for firm success: access to capital to undertake high value M&A and greenfield investment, and organisational capabilities. Over the past decades, mining companies borrowed managerial practices and techniques usually associated with other industries (such as automobile and electronics industries) and adapted them to the mining sector (Culverwell, 2000). Just-in-time, total quality management and total cost management quickly became some of the cost-saving managerial practices used in purchasing and supply chain management. In periods of depressed prices, supply chain strategies defined the profitability of mining operations. In more recent times, they had to coordinate larger projects across the globe. Between 1976 and 2000, the copper mines' mean size grew by 182 percent and their median size by 252 percent (Crowson, 2003). Moreover, companies were under increasing pressure to manage the safety and environmental aspects of their operations. Developing organisational capabilities to manage complex financial and

production networks became even more important in light of increased internationalisation of companies.

Whilst they could be disadvantaged in terms of world class management and knowledge of foreign markets (He and Lyles, 2008), Chinese companies had a strong competitive advantage in terms of access to capital. Given the high risks, long gestation periods and capital required by mining investment, Chinese resource companies were best placed to drive investment in new mining projects. This was facilitated by state-owned banks, direct state funding, and access to high levels of retained earnings not disbursed to share-holders (Moss and Rose, 2006; Morck et al., 2008; OECD, 2008; Wang, 2007).<sup>46</sup>

#### **4.2.4 A broad definition of upstream linkages**

As shown in Table 13, the supply chain for copper mining was highly heterogeneous in terms of degrees of value-added, technological sophistication and competition. For example, cleaning, catering, security services and general transport were generally low value-added services, which previous research found to be largely localised (Bloch and Owusu, 2011; Mbayi, 2011; Teka; 2011).

Mining equipment manufacturing, on the other hand, was highly capital- and skills-intensive. The manufacturing, installation and servicing of large equipment like smelters and shafts was controlled by a handful of specialised OEMs in Australia and North America. Smaller capital equipment included drilling and haulage equipment, excavators, handling equipment such as conveyors, locomotives and scrapers, crushing and grinding equipment and so forth. Their value chains were controlled by a small number of OEMs, usually based in North America and Europe.

Between low and high value-added supply links, there was an intermediate category of supplies that involved some level of skills, knowledge and technological sophistication: electrical and mechanical engineering services, process control, civil engineering services, fabrication products, construction material, rubber products,

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<sup>46</sup> For comprehensive discussion see Section 3.2.5.

transport, laboratory testing services, and pneumatic and hydraulic equipment and services. It was in this last category that African experiences with localisation varied significantly. Nigeria, and Ghana, for example, have been more successful than Tanzania in localising such medium value-added supply links (Morris et al., 2011b).

Table 13 Types of supplies to various stages of the copper GVC

Stage of the GVC	Type of suppliers
Open-pit mining	Explosives, detonators, drilling equipment and parts, conveyors, haulage and excavators and their parts, tyres, consumables (fuel and lubricants), services
Underground mining	Explosives, detonators, drilling equipment and services, bulk materials handling (conveyors, locomotives, scrapers, etc), pumps and valves, vehicles, head gear (motors, chains, cables), ventilation equipment, services
Minerals processing	Crushing and grinding equipment, storage tanks, chemicals and reagents, liquid-solid separation equipment, materials handling (conveyors, pumps)
Smelting	Furnaces, dryers, refractories, tapping equipment
SX-EW	Reagents, chemicals, lime, handling equipment, vessels
General supplies and services	Personal protective equipment (PPE), health services, electrical equipments, electrical and mechanical engineering services, security services, catering, cleaning, administration, process control, civil engineering services, fabrication products, construction material, rubber products, transport, power, laboratory testing services, pneumatic and hydraulic equipment and services

Source. Adapted from Ahmad and Walker, 2005

During the 1980s and 1990s, capital equipment manufacturers under-invested in plant capacity and R&D (Farooki, 2009). This caused a slow supply response to soaring demand for capital equipment after the copper price boom. Lead times for capital equipment increased significantly, impacting negatively on the production capacity of the mines. In 2007, lead times for grinding mills, draglines and locomotives doubled compared to the pre-boom period, whilst the increase in lead times for large trucks and tyres was four-fold. The recent entry of Chinese OEMs into the market (Buyer 10, 12.2009; Haglund, 2010) has the potential to relax supply-side constraints in the future.

Whilst mining companies focussed on their core competence, equipment manufacturers became the key source of innovation in the industry, mainly in the form of incremental product innovation (Bartos, 2007). Investment in R&D shifted to

the mining supply chain and to public institutions and various private-public partnerships (Walker and Minnitt, 2006). From the 1980s onwards, mining companies increased economies of scale and cut costs. This was possible because of innovation pursued by equipment manufacturers, which developed, for example, larger haul trucks and excavators (Bartos, 2007). Product development was often done in cooperation with lead producers. Examples included BHP Billiton's global alliance with Caterpillar, Rio Tinto's alliance with Komatsu and Codelco's alliance with Deutsche Bergbau Technik.

#### **4.2.5 Impact of the trade regime on value chain dynamics**

Historically, commodities have attracted significant trade restriction measures through quantitative export restrictions and international cartels aimed at controlling domestic or international prices, increasing revenues, and ensuring supply for domestic markets (Radetzki, 2008). Greater restrictions were implemented during the commodity price crisis in the 1930s, after WWII, and during the 1970s. Nevertheless, the restrictions applied mainly to agricultural commodities and oil, rather than metals.

Export taxes were common for all natural resources, and in 2010 around 5 percent of world trade in mining products was covered by export taxes. In the case of copper, almost all traded copper was covered by export taxes. Export tariffs had a rent-shifting effect in favour of the exporting country (WTO, 2010). Export taxes were also used, with mixed results (Piermartini, 2004), to pursue other goals. These included promoting domestic value-added industries, improving a country terms-of-trade position (only for large countries), smoothing out the volatility of export earnings, promoting export diversification, and responding to tariff escalation (WTO, 2010). Compared to other natural resource sectors, mining products attracted a relatively high number of restrictions in terms of non-automatic export licensing, quota restrictions, and prohibition.

In terms of import taxes, these were generally low for minerals. The average MFN rate stood at 0.8 percent for developed countries and 6 percent for developing

countries. In comparison, merchandise products were subject, on average, to a 10.3 percent MFN rate.

Table 14 shows the import regime of key copper importers using the ITC database for 2010. In general, MFN rates for unrefined copper were zero or very low for most countries, with the exceptions of India and the Russian Federation, where a 5 percent tariff rate applied to unwrought copper. Japan partially or entirely exempted developing countries from import tariffs that would otherwise range between 0 and 3 percent.

Similarly to other mineral products, tariff escalation was minimal, if it existed at all. China applied some level of tariff escalation whereby zero rates for unwrought copper rose to 3-4 percent for bars, plates, sheets, tubes and so forth, and to 6-8 percent in the case of copper alloys semis. At the 2006 FOCAC, China announced that 440 tariff lines would be zero-rated for African Least Developed Countries. As shown in Table 15, these exemptions largely excluded copper semis in tariff headings HS 7406 to 7411. In the EU market, the difference between MFN rates on unprocessed copper and semis was 4.8 percent, but it did not apply to most of SSA. The latter had historically benefitted from preferential treatment under a series of unilateral agreements: Yaoundé Convention (1964-1975), Lomé Convention (1975-2000), and Cotonou Agreement (2000-2007 as far as the trade provisions were concerned). The bilateral Economic Partnership Agreement negotiated by African regional economic groups and the EU did not change the trade regime for copper products. India and the Russian Federation applied a flat rate across copper products, whilst Japan and the US applied zero rates on copper semis imports from developing countries under their Generalised Scheme of Preference.

In sum, the trade regime did not play a key role in determining the geographical distribution of activities along the copper GVC. Notwithstanding the wide range of objectives pursued by export taxes, these were most likely to impact on revenue generation rather than domestic processing. Import regimes were largely liberalised, with minimal levels of tariff escalation that largely did not apply to developing countries. It was domestic policies that played a larger role in determining the

Table 14 Trade regime for copper products in key destination markets (2010)

		China	EU 27	India	Japan	Russian Federation	US
<b>Unwrought copper</b>							
Unrefined copper	HS 7402	0%	0%	5%	0-3% MFN 0% GSP	5%	1% MFN 0% GSP
Cathodes	HS 740311	0%	0%	5%	0-3% MFN 1.8% GSP 0% LDC	5%	1% MFN 0% GSP
Wire-bars	HS 740312	2%	0%	5%	0-3% MFN 0% LDC	5%	1% MFN 0% GSP
Billets	HS 740313	2%	0%	5%	0-3% MFN 1.8% GSP 0% LDC	5%	1% MFN 0% GSP
Others	HS 740319	2%	0%	5%	0-3% MFN 1.8% GSP 0% LDC	5%	1% MFN 0% GSP
Alloys	HS 7403 2	1%	0%	5%	0-3% MFN 0% GSP	5%	1% MFN 0% GSP
<b>Semifabricates</b>							
Powders, flakes	HS 7406	3% ref. copper 6% alloys	0%	5%	3% MFN 0% GSP	5%	0%
Bars, profiles	HS 7407	4% ref. copper 7% alloys	4.8% MFN 0% LDC, ACP	5%	3% MFN 0% GSP	5%	1-3% MFN 0% GSP
Plates, sheets, strips	HS 7409	4% ref. copper 7-8% alloys	4.8% MFN 0% LDC, ACP	5%	3% MFN 0% GSP	5%	1-3% MFN 0% GSP
Foils	HS 7401 10	4% ref. copper 7% alloys	5.2% MFN 0% LDC, ACP	5%	3% MFN 0% GSP	5%	1-3% MFN 0% GSP
Tubes	HS 7411	4% ref. copper 7% alloys	4.8% MFN 0% LDC, ACP	7.5%	3% MFN 0% GSP	5%	1.4-3% MFN 0% GSP

Source. ITC database accessed January 2012. Notes. Ad valorem equivalent tariff. Copper classification by the ICSG Copper Bulletin, 2003. Retrieved from <http://www.icsg.org>. MFN refers to Most Favoured Nation treatment; GSP to preferences granted under the Generalised System of Preference, LDC to preferences granted to Least Developed Countries.

location of beneficiation processes. One example was differential investment environments, which led First Quantum Minerals Ltd to invest in processing facilities for DRC copper on the Zambian side of the border. Another example was China’s use of domestic VAT taxation to promote smelting capacity for domestic and export markets (Radetzky, 2008). Refined copper imports, but not concentrates, were subject to a 17 percent VAT. Because of this, smelters offered very low processing charges compared to foreign smelters.

Table 15 List of zero-rated products under China’s preferential scheme for African LDCs

List number	HS Code	Description
344	74010000	Matte, Deposited Copper(Cement Copper)
345	74020000	Non-Refined Copper, Copper Anode for Electro refining
346	74031100	Refined Cathode Copper and Refined Copper Sections of Cathodes
347	74032900	Other Copper Alloy, Not Forged
348	74040000	Copper Waste and Scrap
349	74091900	Other Refined Copper Board, Sheet and Belt
350	74152100	Copper Gasket (Including Spring Washer)
351	74199110	Other Casted, Molded and Stamped Copper Products for Industrial Use
352	74199999	Other Copper Products for Non-Industrial Use

Source. Extracted from Freemantle and Stevens, 2010

### 4.3 Zambia’s Copper Industry

#### 4.3.1 Historical background

In the early stage of Zambia’s commercial copper mining, at the beginning of the 20<sup>th</sup> century, production was controlled by two mining companies, Rhodesia Selection Trust and Anglo-American Corporation (AAC). These were nationalised in 1969, as the post-colonial era wave of nationalisation swept across Africa and Zambia. With copper prices on the rise, Zambia’s political leadership was optimistic that the mining sector could anchor wider social and economic development. For subsequent decades, mining revenues, which accounted for up to three quarters of total revenues, were spent on social sectors and subsidies to production and consumption (Lungu, 2008). In 1979, Zambia was the world largest producer of refined copper,

745,000 tonnes (8.3 percent of global refined output) (Brown and McKern, 1987). It was followed by US Asarco, Chilean Coldelco, Zaire's Gècamine, and US Kennecott and Phelps Dodge. Copper mining also had extensive linkages to the rest of the economy, upstream to local manufacturers, and downstream to a cable and wire semifabricator, ZAMEFA, a joint venture between the Zambian government and Phelps Dodge Ltd. (US). In 1982, in order to rationalise operations and utilise scarce technical skills more efficiently, the mines were consolidated into the Zambia Consolidated Copper Mines Ltd. (ZCCM), majority-owned by the Zambian government (60.3 percent), with a minority share owned by AAC (27.3 percent) (ZCCM, 1-3 June 1994).

From the mid-1970s, Zambia's copper mining sector came under mounting pressures: on the one hand from plummeting world prices, and on the other from scarce re-investment from the government on exploration, mines development, and crucially, mines re-capitalisation (ICSG, 2007). This was coupled with increasing transportation costs due to disruption of the main transport routes through Zimbabwe and South Africa (UNDP, 2007). The failure of the government to reform the status quo, Shafer (1990) argued, was due to Zambia's political context. While powerful state mining companies ensured that resources were not diverted into other productive sectors, well-organised trade unions held government captive with regard to any reform which entailed job cuts. No other strong business groups existed at the time to lobby government for reforms. As a result, the operations of the mines were severely penalised. Ore reserve development was neglected and, rather than developing new underground mines, ZCCM depended largely on inefficient open pit mine operations (World Bank, 1992). As ZCCM mined deeper and less accessible deposits, ore grades declined. At the same time, loss-making units were kept in operation to preserve jobs. Foreign exchange scarcity stretched the supply of parts, equipment replacement and consumables. Skills scarcity and gaps at technical and managerial level made any attempts at reform difficult to implement.

By the end of the 1970s, ZCCM became one of the world's highest-cost producers and was heavily vulnerable to downward price fluctuations (ZCCM, 1-3.06.1994; ZCCM, 1992; World Bank, 1992). Production costs rose by 100 percent in only 8

years, between 1969 and 1977 (Libby and Woakes, 1980). The following decade, production costs rose further, from US\$ 48.30 c/lb in 1984/85 to US\$ 116.32 c/lb in 1993/94, which meant total production costs were around 15 percent above world prices (World Bank, 1992). Annual output fell from 750,000 tonnes in 1973 to 257,000 tonnes in 2000 (Chamber of Mines, 2005). The fall in revenues was more dramatic than the price drop. While pre-nationalisation prices stood at US\$ 1.92/lb in 1965-70, but decreased to US\$ 1.49/lb in 1971-1974 and further to US\$ 0.90/lb in 1975-80, annual average government revenues in the same periods fell from US\$ 758 million, to US\$ 438 million and, finally, to US\$ 30 million (Radetzky, 2008). A 53 percent price reduction between 1965 and 1980 translated, in Zambia, into a 96 percent drop in revenues. Because copper mining generated between half and three quarters of government revenues in the period under analysis (Lungu, 2008; Shafer, 1990), Zambia had to resort to foreign debt to finance its budget. Between 1975 and 2004 (HIPC completion point was achieved in 2005), debt service averaged 9 percent of GDP (UNDP, 2007).

In 1983, Zambia commenced the first phase of a SAP, which was implemented consistently only from 1991, with the newly elected Chiluba government. The core agenda of the SAP became the privatisation of the mines. Between 1992 and 1997, ZCCM was dismantled and the first mine sold to foreign investors. The process was fraught with complications arising from the strategic importance of the mines, their dire financial situation at the time, pressures from donor agencies to complete the process and inconsistent positions from the main decision-makers (Craig, 2001; Kaunda, 2002). By 2001, all the mines with the exception of Konkola Copper Mines (KCM) had been privatised. After agreeing to acquire KCM by the government in 2000, AAC pulled out in 2002, leaving Zambia desperate to sell its largest mining asset at the time. Transactions over the latter were concluded with an Indian investor in 2004. Phase II of the privatisation process, the offer of minority shares held by Government-owned ZCCM Investment Holdings to the Zambian public, have yet to be concluded.

The legal framework for the privatisation process was set by the 1995 Mines and Minerals Act (GRZ, 1995). The Act liberalised the investment regime and provided for

fiscal incentives to be negotiated with each mining company and enshrined in Development Agreements (DAs). The DAs provided very favourable financial terms for the mining companies, because they were negotiated at a time of low prices and the mines required significant re-capitalisation (Fraser and Lungu, 2007). The DAs also included provisions for the development of local businesses. Following the copper price boom, profits for the mining companies soared, but revenues for the Zambian government were largely unaffected (Bova, 2009). The mining tax regime enshrined in the DAs rapidly became an issue of major contention in national political debates (Fraser and Lungu, 2007). Like other mineral- and oil- producing developing countries after the commodity price boom, Zambia revised its mining sector fiscal regime (UNCTAD, 2007). In 2008, the Zambian government repealed the 1995 Act and replaced it with a new Act: the DAs were unilaterally suspended, and Zambia increased corporate tax and mineral royalties, and introduced a windfall tax and a variable profit tax (GRZ, 2008a, 2008d). Due to the copper price fall in 2008, the 2009 National Budget scrapped the windfall tax and increased the capital allowance to 100 percent (GRZ, 2009a). The elimination of the windfall tax was reconfirmed in the 2010 National Budget (GRZ, 2010).

#### **4.3.2 Profile of the Zambian copper sector**

In 2010, Zambia was the largest copper producer in Africa and the seventh largest in the world (up from eight position in 2009). Reserves of 19 million mt and a reserve base of 35 million mt of copper content ensured that, even without new discoveries, copper mining could continue at current rates for 60 years (ICSG, 2007, based on USGS 2006 data). Table 16 shows the performance of the copper sector in Zambia's economy. The value of copper exports grew dramatically in the past decade. In 2000, Zambia was exporting US\$ 474 million worth of copper. By 2008, exports peaked at almost US\$ 4 billion then fell to US\$ 3.17 billion in 2009 due to the copper price crisis, only partially offset by increased production volumes. By 2010, copper exports reached a new high, US\$ 5.65 billion, thanks to a combination of price recovery and new production from the Lumwana Mines, which brought total volumes to over 600,000 tonnes. In 2000-2005, copper exports contributed to around half of total foreign exchange earnings, but from 2007 to 2010, this share was in the range of

73.7 - 80.5 percent. Whilst in absolute terms, non-traditional exports rose (sugar, floriculture, horticulture, and gemstones), their share in total exports was dwarfed by a more than proportional growth of copper exports. Copper also provided 10 percent of formal employment, and its contribution to GDP in the last decade increased from 6.2 percent in 2000 to 9.9 percent in 2010.

Zambia exported copper mostly in refined form (cathodes). Because of the time lag between expansion of refining capacity and ore production, between 2005 and 2008 the share of unrefined copper exports over total exports was higher than in previous years, ranging between 16 and 18 percent. During these years, however, substantial investment took place to expand refining capacity beyond the three existing smelters. New investment consisted of a Chinese-funded US\$ 310 million-worth smelter, which increased domestic refining capacity by 150,000 t/year; Indian investment in the Nchanga smelter; and a Swiss-Canadian US\$190-million investment to expand the capacity of an existing smelter to 850 000 t/y (the largest copper smelter in Africa and the fifth-largest in the world) (CNMC, 2010a; ICSG, 2007; *Mining Weekly*, 6.10.2006). By 2010, the share of unrefined copper had fallen to 4 percent of total copper exports.

Except for Vedanta, which sold directly to end-consumers, Zambian copper was mostly marketed at mine-gate to traders, largely based in Switzerland (Haglund, 2010). The Chinese mining company operated along similar lines, exporting its output to South Africa through off-take agreements, although more recently more production was exported directly to China. Indeed, China imported US\$ 1.2 billion-worth of copper from Zambia in 2009, and US\$ 2.5 billion in 2010. This was 38 percent and 43 percent of Zambia's total copper exports in these respective years.<sup>47</sup>

Zambia also produced copper semi-fabricates. Data on the extent of semis production, though, is inconsistent. According to UN Comtrade data, exports of plates, sheets and wire increased from US\$ 16.7 million in 2000 (4 percent of total

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<sup>47</sup> Zambia's CSO did not report export by final destination. Due to the Swiss ownership of many traders, Switzerland is regarded as a main importer of Zambia's copper. UN Comtrade data was considered more reliable (ICSG, 2007).

Table 16 copper exports, 2000-2010 (US\$, '000 and percentages)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Unrefined	1 765	1 067	2 637	11 136	25 875	86 824	472 378	407 657	697 514	287 987	238 960
Refined	455 370	487 887	471 026	394 241	497 777	633 284	1 485 602	2 104 680	2 113 744	2 249 855	4 575 356
Semis	16 680	15 695	19 276	91 964	182 279	361 419	1 075 505	1 023 244	1 148 244	638 595	833 873
Total	473 817	504 652	492 940	497 344	705 934	1 081 529	3 033 487	3 535 583	3 959 503	3 176 439	5 648 190
% Refined over total copper	99.63%	99.79%	99.47%	97.76%	96.33%	91.97%	84.43%	88.47%	82.38%	90.93%	95.77%
% Total exports	53.1%	51.1%	51.5%	50.7%	44.8%	59.8%	80.5%	76.6%	77.7%	73.7%	78.4%
% GDP <sup>a</sup>	6.2	6.8	7.7	7.6	8.2	8.3	8.5	8.4	8.1	9.1	9.9

Source. Export figures based on UN Comtrade database accessed January 2012. GDP figures based on Zambia Central Statistical Office data. Notes. <sup>a</sup> Constant 1994 GDP prices. Unrefined copper includes concentrates, cement copper, blister and anodes.

Table 17 Zambia's engineering copper exports, 2000-2010 (US\$, million)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	20.6	21.3	22.2	29.1	64.7	96.4	288.6	210.5	225.7	154.9	190.6

Source. Zambia Development Agency data

copper exports) to US\$ 100 million in 2003 (18 percent), to over US\$ 1 billion in 2006 (35 percent). After the price crisis, exports declined to US\$ 649 million in 2009 (20 percent) and US\$ 834 million in 2010 (15 percent). Data from the Zambia Development Agency (ZDA), which relied on corporate data, reported significantly lower levels of semis exports (Table 17). These data were consistent with Bank of Zambia data and painted a more realistic picture. Until 2003, semis exports were lower than US\$ 30 million, but from 2004 increased substantially to a peak of US\$ 288.6 million in 2006. From 2007, exports declined and dropped to US\$ 154.9 million in 2009, though partially recovering in 2010.<sup>48</sup> Production was largely accounted for by one firm, ZAMEFA, producing copper wire, copper rods and power cables for the local market (mining sector, utilities) and for export to South Africa and other regional markets (ZDA, 2011).

#### **4.3.3 The new kids on the block: Asian investment in the Copperbelt**

The positive performance of the copper sector in Zambia was the result of exceptionally favourable world copper prices, as discussed in sub-section 4.1.1, as well as the injection of new investment capital after privatisation. Figure 9 shows Zambia's inward FDI stocks in the past three decades. Three phases can be identified: the 1980s, a period of relative stagnation; the 1990s, when investment increased by an annual average of 4 percent (1991-2001) due to privatisation of non-mining assets; and the period from 2001 onwards. In this last stage, the privatisation of mining assets was completed and FDI stocks increased by an average of 11 percent per year (2002- 2009), totalling US\$ 8.5 billion in 2010, largely in the mining sector. Investment by the new owners of the mines went into plant rehabilitation, expansions and new projects (Chamber of Mines, 2005).

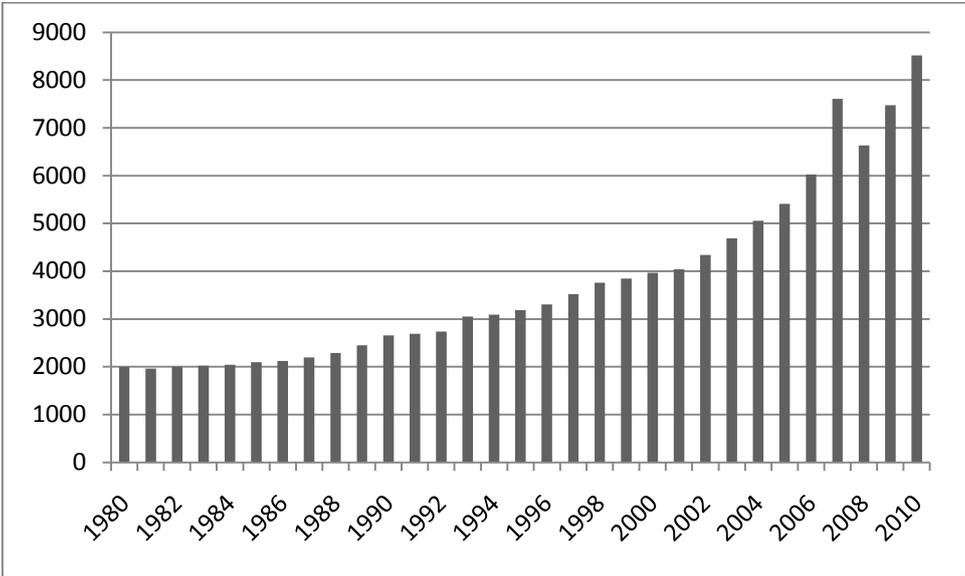
Until 2008, the copper mining sector attracted unrecorded but growing levels of domestic investment in small-scale mining. Whilst low in absolute and relative terms, these investments involved hundreds of mining operations. They were highly price

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<sup>48</sup> For 2006, for example, ZDA data pointed at US\$ 200 million, one fifth of the UN Comtrade figure for that year. BOZ estimated that copper exports amounted to US\$ 3.4 billion. The BOZ and ZDA estimates would total US\$ 3.6 billion, consistent with UN Comtrade total exports for that year.

sensitive and used unsophisticated mining techniques, although a few invested in mechanised methods to extract the ore. Most small-scale mines were unlicensed, operating in artisanal mines and old waste dumps (Haglund, 2010). Their ore was sold directly or through traders and consolidators, often Chinese, to refineries of the large-scale mining companies. During the price boom, the sale of stolen ore from unlicensed miners became a significant problem for the largest mines, and caused major losses of revenue to the government. The majority of these small-scale mines, both licensed and unlicensed, went out of business after the 2008 price crisis.

Figure 9 Zambia’s inward FDI stock (1980-2010, US\$ millions)



Source. UNCTAD Stats database accessed February 2011. Note. US\$ at current prices and current exchange rates

Table 18 disaggregates Zambia 2009 inward FDI stock, by home country. The largest sources of FDI in Zambia were Canada and India, which held 19.17 percent and 17.10 percent respectively, of total inward FDI stock.<sup>49</sup> Australia and Switzerland ranked third and fourth, holding around 11 percent each of total FDI. China was the fifth largest investor, with a similar pattern to other SSA countries: small FDI levels,

<sup>49</sup> A Canadian-Australian company undertook the Lumwana mining project, the largest greenfield investment, located in a new mining area, the North-Western Province. It started production ten years after acquisition, in 2008.

relative to developed countries, but fast-growing (UNCTAD, 2008, 2010).<sup>50</sup> South Africa invested slightly more than US\$ 0.5 billion, not only into mining, but also into agriculture and services. Investment from the European Union was fragmented across 12 countries and across different non-mining sectors. FDI from Netherlands and the UK accounted for the lion's share, standing at US\$ 524 million and US\$ 464 million, respectively.<sup>51</sup>

Table 18 Source countries of Zambia's inward FDI stock (2009, US\$ million and percentage)

	US\$ million	%	By component		
			Equity	Reinvested Earnings	Other capital
			US\$ million	US\$ million	US\$ million
Canada	1,433.00	19.17	98	1,335.00	0
India	1,277.90	17.10	564	172.2	541.7
Australia	810.4	10.84	751	58.1	1.3
Switzerland	805.4	10.78	37.9	46	721.5
China (incl. HK)	597.4	7.99	196.1	72.7	328.6
Netherlands	524.2	7.01	234.1	67.4	222.8
South Africa	510	6.82	61.1	137.3	311.6
UK	465.7	6.23	114.6	106.2	244.9
Africa (excl. ZA)	270.6	3.62	146.9	21.7	101.8
ROW	778.7	3.89	96.5	74.8	119.4
Total world	7,473.50	100.00	2,316.70	2,271.30	2,885.60

Source. Bank of Zambia, 2009

MNEs from developed countries have dominated metal mining in Africa since colonial times and well into the 1960s (UNCTAD, 2007). When African countries undertook SAPs in the late 1980s and 1990s, the bulk of investment, though decreasing, was still sourced from the North. By the turn of the century, as discussed in sub-section 1.3.4, Asian investors emerged as key extractive industry players. China's outward FDI flows grew by an annual average of 30.7 percent in 1990-1997, and by 91.7

<sup>50</sup> On the basis of pledged data provided by ZDA, Kragelund (2009) argued that, by 2007, China was the third largest investor in terms of FDI stock, and the largest in terms of FDI flows. He also estimated that around 175 Chinese firms were operating in Zambia in 2006. I used BOZ actual investment figures.

<sup>51</sup> In 2009, the top sources of FDI flows, according to BOZ data, were: India (43%), Canada (29%), Ireland (26%), Netherlands (11%), China (11%), and South Africa (11%).

percent in 2000-2010. As far as Africa was concerned, China's FDI was sizeable and fast-growing: excluding Hong Kong and tax havens, in 2008, Africa was the top destination of China's FDI flows and the second largest of FDI stock (Gelb, 2010). Natural resources attracted a large part of this FDI. An estimated one third of Chinese FDI stock in Africa in the mid-2000s was in the extractive industries (UNCTAD, 2007).<sup>52</sup> Indian investment took off later than China's, and whilst definitely less spectacular in absolute and growth terms, in the period 2000-2010, India outward FDI flows grew on average by 26.6 percent per year. These flows targeted manufacturing and services industries in industrialised countries, and extractive and services industries in developing countries (see Chapter three for a comprehensive discussion).

Zambia's inward investment pattern reflected these changes. In 2000, MNEs from developed countries held 78 percent of Zambia's total inward FDI stock, while India and China together accounted for only 4.6 percent (UNCTAD, 2008). By 2009, India and China aggregated share rose to 25 percent (Table 18). The ownership structure of the mining sector, presented in Table 19, changed radically.

Zambia's relationship with China dates back to the 1970s, at first pursuing purely geo-political goals, and later also Chinese economic interests (Taylor, 1998). In the past decade, Chinese SOEs and private sector firms took advantage of Zambia's favourable investment regime and invested in a wide range of sectors, from manufacturing to agriculture (Carmody and Hampwaye, 2010). China's entry into Zambia's mining sector was gradual, with acquisition in 1998 of a relatively small mining operation, closed at the time, by NFC Africa Mining Co (NFCA). Unlike in recent years, during the 1990s China privileged a cautious approach, based on minority acquisitions and acquisitions of early stages development projects (Humphreys, 2009). In 2006, China invested in a US\$ 310 million smelter. Luanshya, a mine with significant potential for expanded production, was acquired in 2009 after an Indian investor (1997-2000) sent it into receivership and a Swiss investor (2003-2009) pulled out due to the economic crisis. US\$ 400 million has been committed to

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<sup>52</sup> Scholars nevertheless disagreed on the extent to which China's FDI engagement in Africa was disproportionately natural resource-seeking (cf. sub-section 3.2.3).

Table 19 Ownership structure of Zambia's copper sector

Mines	Investor	Year of acquisition	Corporate structure <sup>a</sup>	Mining assets	2008 Refined copper output
Kansanshi Copper-Gold Mines Plc	First Quantum Minerals Ltd, Canada (79,4%), ZCCM (20,6%)	2001	Listed on LSE, TSX	Kansanshi	215, 300 mt
Konkola Copper Mines Plc (KCM)	Vedanta Resources, India (79,4%), ZCCM (20,6%)	2004	Listed on LSE	Nchanga, Konkola, Chingola, Nampundwe, Chililabombwe	131, 700 mt
Mopani Copper Mines Plc	Glencore International AG, Switzerland (73,1%), First Quantum Minerals Ltd, Canada (16,9%), ZCCM (10%)	2000	Private equity	Nkana, Mufulira	113, 400 mt
Luanshya Mines	CNMC (85%), ZCCM IH (15%)	2009	SOE	Luanshya, Mulyashi	44, 500 mt
Chambishi Mines NFC Africa Mining Co	CNMC Corp (90%), ZCCM IH (10%)	1998	SOE	Chambishi	30, 700 mt
Chambishi Metals	CNMC (85%), ZCCM IH (15%)	2009	SOE	Chambishi smelter, slag dumps	21, 100 mt
Lumwana Copper Project	Equinox Minerals Ltd, Canada/Australia (95,6%), ZCCM HI (4.4%)	1999	Listed on ASX, TSX	Lumwana	7, 200 mt (just started operations)
Bwana Mkubwa	First Quantum Minerals Ltd, Canada (79,4%), ZCCM (20,6%)	1997	Listed on LSE, TSX	SX-EW plants	5, 900 mt (but capacity of plus 30.000 mt)
Chibuluma	Metorex Limited, South Africa (85%), ZCCM IH (15%)	1997	Listed on the JSE	Kalulushi	5, 200 mt (Usually production averages 15, 000 mt)

Source. Author's compilation from various sources. Refined copper data based on Bank of Zambia, 2012. Note. <sup>a</sup> Australian Securities Exchange (ASX), London Stock Exchange (LSE), Toronto Stock Exchange (TSX), Johannesburg Stock Exchange (JSE).

re-capitalise the mine, in addition to a further investment of US\$ 300 million for the construction of an acid plant (ZDA, 2010a). At the same time, it invested to develop West Chambishi and made other commitments to develop South East Chambishi. After FOCAC 2006, Synohidro Corporation of China signed an agreement with the national electricity company to a US\$ 243 million contract to extend North Kariba Bank power station (Ndulo, 2008).

Zambia was selected with other six countries as part of a Chinese experiment with large, integrated trade and economic zones (Brautigam, 2009; CNMC, 2011a). NFCA would construct and operate the Chambishi Zambia-China Economic and Trade Cooperation Zone (ZCCZ), a US\$ 800 million-worth investment, inclusive of the Chambishi Copper Smelter, acid plants, as well as a copper semi-fabricates manufacturing plant<sup>53</sup>. The interesting feature of China's expansion into various mining operations has been the network structure of its operations, formally independent, but functionally and organisationally integrated under NFCA leadership (Haglund, 2010). As the Vice Deputy Manager of ZCCZ put it "China is investing in three industries linked to copper and cobalt: exploration, extraction and manufacturing" (Z. Baosen, 20.11.2009)<sup>54</sup>.

Little empirical data exists on the relationship between Chinese mining companies and local suppliers. Recent research indicated that the Chinese mines outsourced from the home country, undercutting opportunities for local suppliers (Haglund, 2008, 2010). On the other hand, the discrepancy between policies set in Beijing and the practice of Chinese corporations on the ground, as highlighted by Gill and Reilly (2007), was noted in Zambia (Haglund, 2010; Li, 2010). Haglund (2010) in particular found that, following the copper price boom, NFCA relied on its own earnings rather

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<sup>53</sup> China was also investing in a US\$ 500 million ZCCZ sub-zone in Lusaka for light manufacturing and services (Kragelund, 2010). Luwmana Copper Mines agreed with government on the establishment of a MFEZ through issuance of a Statutory Instrument. It was not known, nevertheless, if Equinox Minerals Ltd. had taken responsibility for the required infrastructural investment.

<sup>54</sup> Manufacturing involved long timeframes because, Baosen argued, whilst technology could be imported from China in relatively short times, skills transfer to the local workforce was a time-consuming process (Z. Baosen, 20.11.2009).

than Beijing's, and became increasingly autonomous in taking business decisions (p.108).

India was the last country to enter Zambia's mining sector. In 2004, London-based Vedanta Resources acquired KCM assets, with a commitment to develop Konkola Deep Mining Project. This project was of key strategic importance for the country's future in the industry, with the potential for a three-fold increase in Konkola mines' output (USGS, 2007). As shown in Table 19, by 2009, Indian investors controlled around one quarter of Zambian copper production, with significant implications in terms of foreign exchange earnings and employment. This gave Vedanta considerable leverage on the government and other Zambian stakeholders (cf. sub-section 7.3.5).

The other large mining companies in the Copperbelt were owned by Australian, European, North American, and South African interests. These were Canadian-owned First Quantum Minerals, which controlled Kanshanshi Mines, the largest mining capacity in the country, and Bwana Mkumbwa, which processed copper extracted at Lonshi, DRC.<sup>55</sup> First Quantum Limited was also partial owner of Mopani Copper Mines, majority-owned by Swiss Glencore, a global hard and soft commodities' producer and trader. Lumwana Copper Mines, the last to come on-stream, was the result of a greenfield investment by a consortium of Canadian and Australian investors. Chibuluma was a relatively small-scale, efficient mining operation owned by South African Metorex.

Mining investors differed not only by country of origin, but also by corporate structure (Table 4). All but one of the firms from developed countries were listed on the major stock exchanges, and two out of three were operating as JVs.<sup>56</sup> The South African and Indian firms were listed publicly as well. Vedanta was listed at the London Stock

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<sup>55</sup> In 2008, the DRC imposed an export ban on copper oxide ores in order to promote domestic processing. At the time of the interview the ban had been lifted. The ban highlighted the potential conflict between neighbouring countries, with interests in promoting their respective domestic downward and upward linkages, rather than coordinating the same to create economies of scale and scope at regional levels.

<sup>56</sup> One company was privately-owned, but minority-owned by one of the listed companies.

Exchange, but its Indian-based management justified its classification as an Indian company (Humphreys, 2009). Unlike the others, the Chinese mining company was funded by China Exim Bank and owned by China Non-Ferrous Metals Corporation (CNMC), one of China's largest SOEs, under direct supervision of SASAC. CNMC was one of the national champions selected by the Chinese government for special support at domestic and international levels. CNMC corporate objectives were formally in line with central five year plans, SASAC guidelines and with national policies to promote Chinese investment along the entire mining value chain (CNMC, 2010b).

By the end of the first decade of the 2000s, the ownership structure of Zambia's copper mining sector was highly heterogeneous, with the extensive presence of regional, Western, and Asian players. Indian investors controlled the second largest mining operation, but the Chinese state-owned mining company was the fastest growing investor, in terms of mining capacity as well as in activities upstream and downstream the copper value chain.

## **CHAPTER 5**

# **Breadth and Depth of Zambia's Upstream Linkages to Copper Mining**

This chapter reviews the impact of privatisation on the development and upgrading of upstream linkages to copper mining. Clusters are generally characterised by high degrees of heterogeneity because they are the result, at a specific point in time, of a complex process of evolution (growth or decline) and of increasing internal differentiation (Schmitz, 1995; Nadvi, 1999; Cawthorne, 1995). Zambia's supply cluster to the copper mines has undergone processes of momentous change in the last half century.<sup>57</sup> Broadly speaking, it was possible to identify two phases: the period of nationalisation, from 1969 to the end of the 1990s; and the post-privatisation period, from the end of the 1990s to the late 2000s.

The first section of this chapter discusses the evolution of upstream linkages to the copper mines in Zambia. In this discussion I elucidate how these were shaped by the organisation and intra-firm dynamics of copper producers as well as the policy framework. I identify and discuss separately the pre- and post- privatisation periods. In the second section, I map Zambia's copper value chain with respect to upstream linkages, discussing the problems of measuring local procurement and presenting each category of supply industries. I then turn to the impact of the 2008/2009 price crisis on linkages. The final sections analyse the extent and patterns of externalisation of these linkages, and examine the policy framework affecting the localisation of linkages. The last section summarises and draws the conclusion for this chapter and chapter four.

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<sup>57</sup> I refer to the Copperbelt cluster as a geographical agglomeration of suppliers and buyers. I do not use the definition of cluster as resulting from joint actions (Schmitz, 1997) or purposive action (Morris and Barnes, 2006).

## 5.1 Mines' Nationalisation and Industrialisation Efforts

One of the objectives of the nationalisation of mining and oil companies in the 1960s and 1970s was the promotion of economic diversification (Radetzky, 2008). Clearly, upstream linkages development was seen as a relatively straightforward mechanism to encourage the growth of domestic industries. In Zambia, this policy objective was pursued through a range of different strategies.

As a general procurement policy, the state-owned mining company, ZCCM, was directed to maximise the extent of sourcing from local suppliers. For the most part, the local supply industry was controlled by the state, under the Industrial Development Corporation (INDECO) (F. Bantubonse, 13.11.09). INDECO and the mining sector were tightly linked: at the policy level they were regulated by the same ministry (Sardanis, 2003). At the corporate level they were two divisions of the Zambia Industrial and Mining Corporation (ZIMCO). INDECO owned and managed large-scale manufacturing firms, from steel fabrication to gas production, which were meant to provide the bulk of ZCCM supplies.

In addition, ZCCM had direct ownership of supply firms. Upon its formation, ZCCM launched the Export Rehabilitation and Diversification Project (ZCCM, 1-3.06.1994). One of the strategies adopted was for ZCCM to own and control, through wholly-owned subsidiaries, a number of non-mining related activities. Local commercial and industrial subsidiaries were grouped under the holding company Mulungushi Investments Ltd. These companies included supply firms but also tourism and agriculture businesses (World Bank, 1992). ZCCM also pursued forward integration with the acquisition of overseas companies, in particular a UK-based commodity trading company.

SOEs were by no means the only beneficiary of ZCCM preferential sourcing policy. It was in fact during this period, that many family-run businesses established by European and Indian migrants flourished. Their competitiveness was based on the technical expertise of the owners, who managed every aspect of the business and transferred knowledge and management within their family networks. They employed

and trained a Zambian workforce that was largely qualified thanks to the extensive technical and vocational education system and to programmes sponsored by the mining sector. Zambian-owned services and manufacturing firms were also involved in a variety of activities: metal fabrication, mechanical repair, and materials manufacturing. Local businesses were supported by the import substitution industrialisation policy and by preferential policies in terms of licensing, financing and so forth.

Zambia import substitution industrialisation policy affected the internationalisation strategy of OEMs. Most FDI in this period was organised with a “polycentric approach” (Kotabe and Omura, 1989, p.113). Local branches were a *de novo* firm: a new plant, which replicated almost all the activities of the parent firm. FDI activities were market-seeking, driven by the need to avoid trade barriers as well as the scarcity of US dollars: by producing locally, MNEs could defend their markets (Dunning and Lundan, 2008b). This implied that parent firms were heavily involved in technology and skills transfer, with significant impacts on local learning processes. In Zambia, whilst some OEMs continued operating through agents, others invested in local subsidiaries, transferring manufacturing stages of their value chains. These included Chloride (batteries), Dunlop (tyres) and Boart Longyear (drilling equipment) (F. Bantubonse, 13.11.09). ZCCM and the OEMs would source simple spares and components from local manufacturers rather than importing these. This was done to save foreign exchange but also to meet Zambia’s policy goals.

Few MNEs developed direct relationship with ZCCM, by offering financing facilities and expanding the range of products to non-OEM products (ZCCM, 15.02.1997). Among these, the Tata Group provided import and financing services since the 1980s, and two Japanese groups, Mitsubishi and Mitsui, had financing agreements with ZCCM which enabled purchases of equipment, materials and spares with deferred payments. ZCCM resorted to these arrangements when lacking liquidity, but these were cost-inefficient due to high mark ups and high interest rates (ZCCM, 15.02. 1997; ZCCM, 28.04. 1994).

Government and ZCCM were actively involved in building local industrial capabilities. ZCCM cooperated intensively with local supply firms, for example on information sharing. One respondent explained that “ZCCM was much more open [on information exchange], maybe because they relied a lot more on our [suppliers] expertise....With ZCCM, we used to get involved in projects, we used to talk about it” (Supplier 11, 12.2009). Information sharing helped suppliers to prepare sound business plans. One contractor recalled:

ZCCM would prepare a budget for capital investment and routine maintenance work....As a supplier, you had access to that information, you would be able to prepare and plan which projects to target....Now the mines still have budget, but they can decide to adjust it during the year, they can stop projects...and can choose between more suppliers. It's more difficult to plan for a supplier. (Supplier 38, 11.2009)

ZCCM was also proactive in searching for local suppliers: “at the beginning of the year, ZCCM would send the buying departments to check available suppliers” (Supplier 7, 11.2009). Cooperation also extended to the technical areas. Joint product development projects between industry, mines and public institutes were common (J. Lungu, 12.11.2009). Technology transfer and reverse engineering were encouraged (Letter from Techpro Procurement, 28.04.1994). A manufacturer confirmed that “there was a deliberate policy...they [ZCCM] stressed local content, the local contractors used to import technologies, and then local contractors had access to them, and could do business” (Supplier 30, 11.2009). Yet the problems remained substantial, as noted by the manager of an engineering services firm:

During the ZCCM era, local manufacturing was important...there was a lot of reverse engineering for spares manufacturing. But there was poor quality control...the mines operated in desperate conditions, with no foreign exchange to import. Engineering firms were thriving on repairs, because the mines could not import new equipment. (Supplier 47, 11.2009)

ZCCM also cooperated with technical institutes. The trainees worked for 6 months in the mines during their technical studies. This ensured that very practical skills were imparted. Notwithstanding this intense level of value chain cooperation, a

combination of factors prevailed to constrain the overall competitiveness of the supply chain.

To some extent, the inefficiency of the supply chain discussed in the next paragraphs was due to the organisation of procurement within ZCCM. One of the reasons for the consolidation of the mines under ZCCM in 1982 was the need to cut costs by rationalising purchasing functions and improving the utilisation of stores and equipment (ZCCM, 1-3.06.1994). Nevertheless, two problems hampered the rationalisation of procurement. Firstly, large capital investment projects and supply management strategies were decided by headquarters (ZCCM, 1992, 15.02.1997; World Bank, 1992). Decision-making at headquarters rested largely on non-technical, but politically influential personnel (World Bank, 1992). This meant that supply chain strategies were often defined on political, rather than efficiency grounds. Secondly, apart from large capital investment, the purchasing system was de-centralised, with each mine division responsible for supply purchases with little input from the centre (ZCCM, 1992, 15.02.1997).<sup>58</sup> Apart from the lack of coordination between headquarters and the mine division (World Bank, 1992), this system also gave local procurement staff with considerable discretion over their preferred suppliers (ZCCM, 15.02.1997; Govt Official 1, 2009). By early 1980s, it became obvious that the supply chain to ZCCM was highly inefficient.

Firstly, ZCCM suffered from liquidity problems. This implied that it had to cut down costs. ZCCM reduced outsourced costs by undertaking as much services as possible in-house (ZCCM, 1992). Secondly, because of low copper prices, high inputs prices and declining production volumes, there was a generalised shortage of foreign exchange, which restricted both ZCCM and the supply industry's capacity to import. ZCCM cut down on purchases of spares and capital equipment. By the end of the

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<sup>58</sup> Overseas purchasing was usually done through agents. In general, the bulk of overseas purchasing consisted of capital equipment, chemicals, reagents, refractories, and tyres. The largest agent was the Techpro International Group, based in the UK and South Africa, which in 1995 accounted for 84.2 percent of total overseas purchases (ZCCM, 15 February 1997). The company was a ZCCM subsidiary and its management had worked in the ZCCM procurement department for many years.

1980s, inadequate supply of spares was identified, together with a lack of skills availability, as the key constraints to improve ZCCM operational efficiency (World Bank, 1992). A lack of capital investment also meant that ZCCM continued operating old equipment and used outdated production technologies (ZCCM, 1-3.06.1994). For example, the technologies to extract and process the copper ore were obsolete (World Bank, 1992). In the past, rudimentary open-stopping techniques and unskilled labour were sufficient to mine high grade ores, but by the 1980s these proved inadequate for ZCCM, resulting in deeper and thinner bodies of decreasing ore grade quality. These required capital- and skills- intensive techniques that ZCCM could not afford, such as backfilling (a mechanised, continuous method based on skilled operators and efficient supply of spares).

While reducing spares and capital expenditures, ZCCM allowed a fast-track procurement procedure for urgent items. This, coupled with the large discretionary power of individual mine divisions' procurement offices, left the system open to mismanagement (ZCCM, 15.02.1997). By manipulating urgent orders and specifications, procurement and user department officers ensured that orders were placed with particular suppliers. Building networks within the mines became a critical asset for local suppliers. As a respondent explained:

Suppliers were producing goods of inferior quality, but managed to continue to supply the mines because they had close relationship with the supply managers, sometimes even kinship....They [supply managers] sometimes would get kickbacks....The system was corrupted...ZCCM was losing out. (Govt Official 1, 2009)

One manager of a supply firm in operation at the time argued that "suppliers made a fortune by colluding with supply managers" (Supplier 26, 11.2009).

Another problem was poor standardisation (ZCCM, 1-3.06.1994; ZCCM, 1992). Because of its reliance on international financing, ZCCM had to comply with different procurement procedures which favoured the cheapest supplier, with little discretion for preferred suppliers. As a result, ZCCM purchased a wide range of product models and brands. This created several problems, including increasing the cost of

maintaining stores inventories and training internal mechanics and operators, spreading limited funds across a wide range of spares and inadequate service and spares back-up from local agents. Additionally, poor inventory management created significant wastage and losses (ZCCM, 1-3.06.1994; World Bank, 1992).

In an efficient supply chain, buyers need to ensure that the goods and services supplied meet technical specifications and quality expectations. Yet, an internal ZCCM report highlighted that ZCCM was doing a poor job in ensuring that supplies met the technical specifications required by the mines (ZCCM, 15.02.1997). Respondents from companies in operation at the time confirmed that suppliers were rarely sanctioned if they failed to meet agreed specifications, quality or lead time. In one respondent words, “ZCCM was an easy buyer, an easy customer” (Supplier 1, 11.2009). Similarly, the manager of a manufacturing company established in the 1960s recalled that “under ZCCM there was no technical check, if one items fails, you just supply it again!” (Supplier 36, 11.2009). The manager of a services firm explained “before privatisation, you could literally, as a supplier, pay your way out of a poor quality job, people just used to pay them [the procurement staff]” (Supplier 6, 11.2009).

Partly, poor enforcement of supply chain requirements was due to ZCCM being expected to privilege local suppliers irrespective of their performance, in order to meet public policy goals and to reduce foreign exchange expenditures.<sup>59</sup> One supplier explained:

With private mines, the procurement is well defined and it’s an open system. It’s profit-oriented, there is no consideration for parastatal....Under ZCCM, there was less competition and there was a relaxed approach, ZCCM would take care of the few suppliers and give a share of the business to everyone. (Supplier 38, 11.2009)

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<sup>59</sup> To the problems highlighted above, one should add that ZCCM scarce foreign exchange, investment capital, skills and management time was diverted to non-core businesses (supply firms, tourism, agriculture) with negative effects on both mining operations and non-mining activities (World Bank, 1992).

One respondent from a company nationalised in the 1970s and privatised in the 1990s confirmed that “we used to supply most of their [the mines] requirements... there was very good relationship....Then they were all government-owned, so the expectations was that they would supply from us, there was no competition” (Supplier 4, 11.2009).

According to many respondents, over three decades, poor enforcement of supply chain parameters shaped a business culture in the Copperbelt that was defined as “paternalistic” or “of entitlement” (Buyer 1, 11.2009; Buyer 6, 11.2009). As discussed in this and the next chapters, this had implications for the response of part of the private sector to new mining investment after privatisation. A large number of local businessmen perceived having to compete with new suppliers as unfair. Rather than investing in technical expertise, they developed personal networks to gain access, even if for the short-term, to the mining supply chain.

The nature of challenges for Zambia’s supply firms in the ZCCM period was two-fold. On one hand, there were problems exogenous to the firms, on the other hand intra-firm dynamic capabilities were weak. Exogenous problems mostly concerned ZCCM poor payment records and the scarcity of foreign exchange, which curtailed the suppliers’ capacity to import inputs (National Economic Advisory Council, 2007). From 1980s, ZCCM poor payment records affected all suppliers. The President of the Association for Mining Suppliers and Contractors of Zambia recalled that ZCCM delays reached up to 6 months, “suppliers queued all day outside ZCCM office to meet the supply department....It became unmanageable” (F. T. Banda, 10.11.2009). Precedence on payments was given by ZCCM and Techpro International Group, the lead agent for overseas purchases, to foreign suppliers with the power to threaten to stop supplies or to start legal action (ZCCM, 15.02.1997). This left local suppliers significantly disadvantaged. Suppliers responded by focusing on short-term profit maximisation, for example one respondent explained that “we [suppliers] played the game...in ZCCM the foreign exchange was difficult to come by, so if you had foreign exchange, basically it was your price. Also because in instances it would take ZCCM 18 months to pay, so you would have to cover yourself” (Supplier 11, 12.2009). For state-owned supply firms, there was an additional constraint due to price controls

aimed at providing ZCCM inputs at below market prices. These hampered the profitability of the SOEs. Box 1 presents the illustrative example of SCAW, the largest foundry in Zambia.

Box 1 The crisis of a state-owned steel foundry under ZCCM

SCAW Ltd, the largest foundry in Zambia, provided an illustrative example of the problems discussed. SCAW, owned by ZCCM holding company, supplied mill balls and castings to the mines. The profitability of the company and the quality of its products had been a frequent concern for ZCCM (ZCCM, Internal memo, 17.12.1996). The key problems faced by SCAW were identified in several documents (SCAW Ltd., 13.12.1996; ZCCM, 7.10.1996; ZCCM, Internal memo, 17.12.1996):

- Delayed payments from ZCCM caused scarce liquidity. This, together with foreign exchange shortages, prevented replacement of casting machines, furnaces, heat treatment equipment and so forth;
- Operational and engineering problems: skills gaps, skills shortages, low efficiency in the utilisation of capital equipment and poor maintenance;
- An oversized labour force which was not possible to downsize;
- In a sector in which economies of scale were important, SCAW could not operate the plant at full capacity. Notwithstanding high demand from the mines, SCAW failed to supply the required volumes of mill balls and castings

Prices were set by ZCCM, which kept them at below market rates in order to reduce operating costs. Low profitability and mounting debt burdens mean that, by the early 1990s, the company was bankrupt. In response, in 1995, ZCCM planned to invest in a foundry to meet its demand for complex castings (ZCCM, 02.1995). Consistent with its past approach, this facility was supposed to “complement rather than compete” with SCAW (p. 1).

At the intra-firm level, there were severe competitiveness bottlenecks. Selected illustrative examples were extracted from internal supply chain evaluation reports (ZCCM, Letter from Techpro Procurement, 28.04.1994; ZCCM, 15.02.1997). Explosives, critical for extraction operations, used to be sourced from a local producer. As the global explosive industry moved away from nitro-glycerine into water and gel emulsion-based products, widely used by the mining industry, the local firm failed to adopt the technology to produce the new generation of explosives. Local steel fabricators failed to meet the volume required for as simple products as

nuts, bolts, bearing, belts and brakes, as well as components of old equipment which OEMs were no longer producing. Operational problems at ZCCM processing plants and at Maamba Collieries Ltd, a state-owned mine, caused an under-supply of sulphuric acid and coal, respectively. Finally, poor value chain coordination between Zambia National Oil Company, marketing companies and third-tier suppliers disrupted supply of heavy fuel oil. These bottlenecks further aggravated ZCCM cash constraints, forcing it to resort to import from overseas suppliers which by then required upfront payment (ZCCM, 15.02.1997).

By the end of the 1980s, ZCCM embarked on a reform programme to arrest its decline (ZCCM, 1-3.06.1994; World Bank, 1992). As far the supply chain was concerned, reforms aimed at improving quality control and inventory management. Moreover, ZCCM was to rationalise and restructure its subsidiaries, moving away from non-core business activities. Eventually the reform programme failed to turn around ZCCM profitability. The underlying reason was government priority on maximisation of foreign exchange earnings, revenues and employment rather than operational efficiency, financial sustainability and long-term planning (World Bank, 1992). In the early 1990s, ZCCM's dire financial situation led to reductions in capital expenditures by more than 50 percent, from US\$ 750 million in 1993/1994 to US\$ 326 million in 1995/96 (ZCCM, 1992). ZCCM continued reducing foreign exchange allocations for capital and spares supply, which not only further deteriorated plants and equipment, but harmed supplier creditworthiness and delivery capabilities.

## **5.2 The Impact of Privatisation on Local Upstream Industries**

Privatisation changed the face of Zambia's supply cluster in many, sometimes contradicting respects. Respondents pointed out a complex reality of deepening specialisation in Zambia's local supply chain, accompanied by the emergence of an overwhelming number of non-specialised traders.

Under ZCCM, the supply chain was relatively diversified. Firstly, ZCCM operated a number of non-core activities to the benefits of employees and communities, such as housing, municipal facilities, and sports facilities. Secondly, as discussed earlier,

through its holding companies, it owned a range of non-mining businesses, such as supply firms, tourism and agricultural businesses. The manager of a paint manufacturing firm explained that under ZCCM, the volumes supplied were larger because ZCCM owned and managed housing for all the employees (Supplier 37, 11.2009). Similarly, the manager of a transport company explained that ZCCM offered more diversified opportunities because of transport services required by ZCCM agricultural businesses (Supplier 26, 11.2009). By focusing on their core business, the new mining companies restricted the nature of the supply chain. The net effect was, nevertheless, was an expansion of the supply chain, because they injected new capital into every stage of the mining value chain, from exploration to processing. Not every supplier however benefitted from the investment boom.

To explain the dynamics of the local supply chain, the changes in the performance requirements imposed by the new mining houses needs to be considered. At the sectoral level, the mines benefitted from tax exemption on capital equipment imports, while at the macro-level, investment and trade liberalisation opened the door to the establishment of foreign-owned supply firms and to the import of goods and services. The mining companies were no longer subject to restrictions with regard to their sourcing strategies. On the contrary, these MNEs had tight relationships with suppliers they worked with in other mining projects, often from the same home countries. In their global operations, these companies adopted world class management and required their supply chain to comply with some international standards. As summarised by one manager of a supply firm, “the private mines can now buy from anywhere in the world” (Supplier 31, 11.2009). The manager of an engineering company agreed: “The private mines require higher quality, have wider choice and suppliers need to perform” (Supplier 17, 11.2009). Comparing his operations under ZCCM, a service firm manager noted “if you don’t produce what they want, they are not going to get it” (Supplier 6, 11.2009). Whilst local suppliers agreed that the new mines operated better and had better payment records, they faced much stiffer competition.

Competitive pressures also existed on large OEMs. Their volumes increased due to the mines recapitalisation, which ensured that even if global competition lowered unit price, their overall profits grew. One manager explained:

Consumption has definitely grown in size, there is much stronger emphasis on price reduction, because now we have global buyers who are saying “Well I am not going to pay this here because in Australia or South Africa I can pay that much”. So we have been under immense pressure to reduce our prices and come up with more competitive marketing terms like maybe giving extended credit and things like that.

Plus obviously there has a lot of emphasis on quality accreditation, this is why this one is an ISO 9001 accredited company, and we also have occupational health and environmental accreditation...We did it with privatisation because new players started demanding things like that. With ZCCM things were relatively easier. (Supplier 40, 11.2009)

Conversely, a manufacturing firm that lost business complained that “the profit margins dropped because the mines demand huge discounts and they buy from their countries, from South Africa, from India” (Supplier 30, 11.2009). He explained that his firm required larger economies of scale in order to be competitive but could not expand due to lack of access to capital. This issue affected most local suppliers: poor access to capital and, in general, lack of supporting policies or infrastructure from the government. The lack of government initiatives made it more difficult for Zambia’s supply industry to win competition from imports and from Zambian-based foreign suppliers, whilst adjusting quickly to new, international standards required by the mining companies.

Local suppliers underwent an intense learning process from their buyers on the requirements of a highly modernised mining supply chain. One respondent noted that “[the] supply chain improved, suppliers are more exposed to global competition, more aware of global customers” (Supplier 40, 11.2009). In the view of another respondent, “Zambia has been exposed to foreign consultancy and investors which introduced higher quality requirements and know-how...this has allowed local suppliers to understand the new requirements in terms of quality” (Supplier 13,

11.2009). Moreover, the new mining companies required higher quality goods which encouraged innovation: the manager of a manufacturing company argued that “volumes have come down, but in terms of focus on products, the mines are gradually starting to move into high-tech products...they are becoming more knowledgeable” (Supplier 37, 11.2009). The process, nevertheless, was highly selective, and many firms exited the value chain.<sup>60</sup>

Two issues were noteworthy about the entry of new firms in the supply chain. Firstly, significant spillover took place between the mining sector and the supply chain. The President of the Association for the Welfare of Former Miners in Zambia estimated that between 1992 and 2000 46,000 workers were retrenched (L.P. Kanyanta, 12.11.2009). Many ex-employees from the mines’ operations and procurement departments moved to establish their own supply businesses.<sup>61</sup> Knowledge of internal procurement procedures, “soft skills”, was particularly important for suppliers. For one respondent from a mining company this was problematic: “after privatisation, lots of people were laid off, mostly at old age. They entered the supply chain with the idea that the mines owed them some business....Only in the past 10 years, things have improved a bit” (Buyer 1, 11.2009).

Secondly, newer firms entered the supply chain on the basis of objective criteria. Having supplied ZCCM for a long time was no longer sufficient to win new orders. In my research, this pattern emerged clearly with the 50 supply firms sampled. Table 20 shows that for firms established before 1990, entry into the supply chain happened through working together for a long time (88 percent) and reputation (65 percent). In the words of the manager of a long-term supply firm: “we have always been with the mines. My association with the mines goes back to 1967. I have a long relationship with the mines” (Supplier 11, 12.2009). Working together was less important for

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<sup>60</sup> Similar dynamics occurred when domestic firms were exposed to external markets, which imposed stringent imperatives in terms of quality and design (Cawthorne, 1995; McCormick, 1999; Nadvi, 1999; Schmitz, 1995; Rabellotti, 1995).

<sup>61</sup> Other sources of employment for former miners were the agricultural sector (the largest source), often involved farming without land titles, and to a less extent small-scale mining, mostly gemstones and copper dump sites (L.P. Kanyanta, 12.11.2009).

firms established after 1990, while auditing and third party certification became entry channels for 42 and 35 percent of supply firms, respectively. As expected, reputation remained important also for newer firms, firstly because a good name with one mining company helped with doing business with the others, and secondly because global brands created such reputation effects.

Table 20 Entry channels to the copper GVC and establishment year by supplier firms (percentage)

	Audit	Reputation	Work together	Certifications	Recommended	Oth.
Firms established before 1990	24%	65%	88%	12%	18%	0%
Firms established after 1990	42%	70%	64%	36%	18%	21%

Source. Author’s fieldwork data. Note. n=50. Multiple answers allowed.

In general, the suppliers that succeeded in expanding their business volumes after privatisation responded to the new challenges with a combination of two or more of the following strategies: moving into higher quality products, increasing post-sale services, expanding size to meet increased demand, and increasing the range of specialised products offered. One hydraulics equipment supplier elaborated on their response: “we benefitted a lot from the new investment in the mining sector, we adjusted by expanding the workshop, we built our own and we then bought the property...We also established braches in Solwezy, one inside the mines and one outside... [and in] Ndola, Lumwana, here inside the mines servicing the mines and large suppliers, and in Mukushi in a farm block. The Copperbelt is the fastest growing branch in our group [which is based in South Africa]” (Supplier 35, 11.2009).

The realignment of the mining companies to their core business forced increased specialisation. This was best illustrated by the examples of a transport company moving away from tipped work to focus on copper dry bulk transport; another transport company that used to operate as a general transporter but specialised in sulphuric acid transport; and an OEM that sold its agricultural equipment division to focus on mining equipment (Supplier 12, 11.2009; Supplier 24, 11.2009; Supplier 26, 11.2009). The manager of an engineering supply firm explained: “there has been a tremendous market specialisation, also because the internet has allowed access to a

large number of suppliers. The company had to specialise in fewer product lines, and sourcing has changed to bring down the costs” (Supplier 23, 11.2009).

In some circumstances, product specialisation was forced by the decline of other market segments. One personal protective equipment (PPE) manufacturer explained that out of the 250 textile companies employing over 20,000 workers in the 1980s, only five survived at the time of the interview, with around 1,000 workers. The decline of the textile industry led his firm to move away from uniforms and trousers and specialise on PPE for the mines (Supplier 46, 11.2009). In practice, competition from imports in the consumer market, privatisation of major sectors of the economy and the decline of inputs demand from the manufacturing sector meant that many firms and their second-tier suppliers searched for markets in the mining sector. A supplier of mechanical products explained that “at the beginning we were supplying quarries, sugar estates, breweries and cement factories, but with privatisation the new owners preferred to deal with their own suppliers. We found it very difficult to go back in their supply chain” (Supplier 11, 12.2009).

The process of specialisation and product and process upgrading involved both existing and newly-established suppliers. As mentioned earlier, this process was nevertheless highly selective. A large group of suppliers struggled or exited the mining value chain altogether. These were mainly manufacturing firms that could not compete with imported goods. The loss of manufacturing capacity in the Copperbelt was reported by almost every respondent as the most noticeable effect of the policies implemented in the 1990s. In their place, a fast-growing number of importers emerged. Some of them were specialised and provided various levels of value added services, others were one-time importers, known as “briefcase businessmen”. The following section draws a profile of each supplier’s category and their trajectory.

## 5.3 Mapping Zambia's Upstream Linkages

### 5.3.1 Extent of local linkages

Data on the extent of local sourcing was scarce. The level and composition of outsourced costs varies with the size of the mine, the type of operations (underground/open cast,<sup>62</sup> refining) and the quality of the copper deposit, among others. In general, ore extraction accounted for the bulk of production costs, around 60-70 percent,<sup>63</sup> the remaining accounted for by concentration and refining operations (Ahmad and Walker, 2005). Around three quarters of operating costs consisted of fixed operating costs, while procurable spend accounted for the remaining quarter.

Haglund (2010) estimated that the value of local procurement for all the mines amounted to \$US 1.5-2 billion in 2006. In this research, data provided by the mining companies was partial and incomplete. One mining company reported local expenditures totalling US\$ 86 million in 2007, which included fuel, electricity and contractors. In numerical terms, the mine estimated it had around 150 overseas suppliers and 500 local suppliers, 80 percent of which were briefcase businessmen. The Chinese buyer reported sourcing US\$30 million worth of consumables, equipment and spare parts from local suppliers in 2008. This excluded services, fuel and electricity. Whilst this data did not make it possible to estimate total local procurement of goods and services, a number of considerations were in order. Firstly, local procurement was likely to be significantly lower than Haglund's estimate. Indeed, Ahmad and Walker (2005) estimated that, depending on the precise degree of outsourcing, total procurement (local and imported) of goods and services for the five largest mines ranged between US\$140 and 180 million per annum. Whilst this figure only included five mines, it was far below Haglund's estimate. Secondly, local sourcing referred to Zambian-registered companies under the Patent and Companies Registration Act. This criterion did not distinguish between Zambian, foreign or joint

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<sup>62</sup> Compared to open cast, underground mining was more capital intensive, required a broader range of supplies and more complex organisational arrangements.

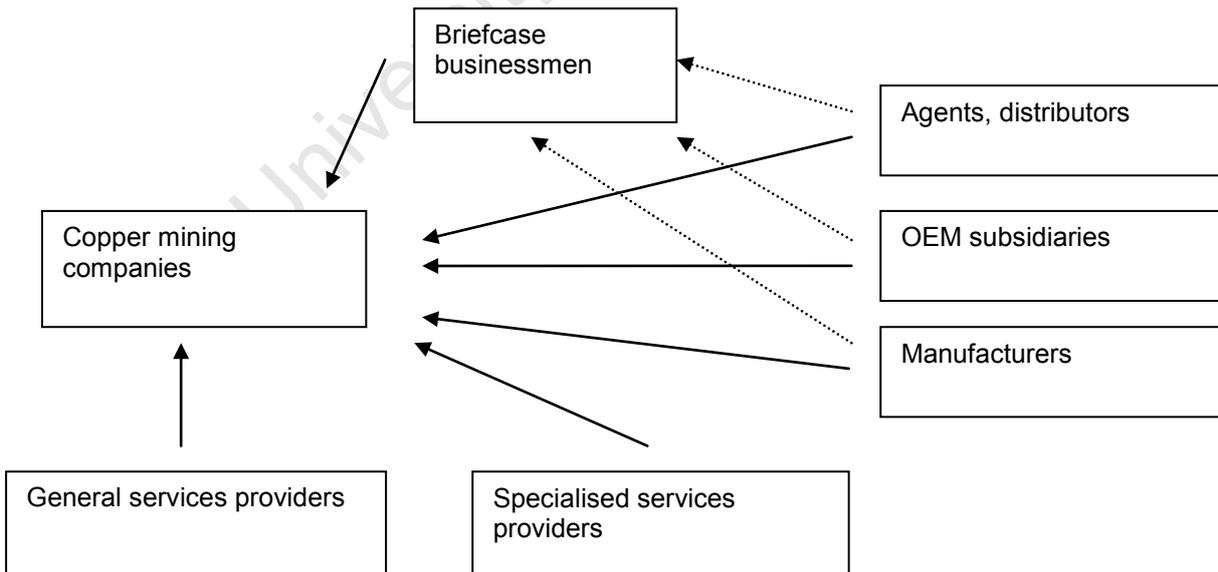
<sup>63</sup> 50 percent of ore production costs consisted of labour and electricity (Ahmad and Walker, 2005).

ownership, nor did it take into consideration the value addition of the suppliers. Indeed, given the high share of briefcase businessmen, it emerged that most of procured goods were just imported. Thirdly, the implications of data scarcity were important from a policy perspective because it makes it difficult to assess opportunities and monitor local supply chain development over time.

**5.3.2 Profile of the firms populating local upstream linkages**

Figure 10 displays Zambia copper value chain, with respect to upstream linkages. Zambia’s local supply chain was populated by a heterogeneous group of firms. In general, privatisation saw the demise of manufacturing activities and the emergence of a vast array of service providers. Excluding few capable suppliers, the level of value addition taking place in Zambia upstream industries was very low. A brief description of the categories of first-tier suppliers, mostly based in the Copperbelt, is presented.

Figure 10 Firms populating local upstream linkages to Zambia’s copper mining sector



Source. Author’s fieldwork data

### ***Agents and distributors.***

Agents and distributors supplied a wide range of products: engineering products, electrical equipment, reagents, consumables, and small and large capital equipment. Because they were not always reliable, due to liquidity constraints, spares for crushers, liners and conveyor belts, which were critical for extraction and concentration operations, were usually directly imported and stocked by the mining companies.

Agents and distributors had various depths of relationship to the OEMs and different levels of capabilities. Some distributors, able to meet the requirements of the OEMs, moved into after-sale services and held large stocks.

### ***Briefcase businessmen.***

A large group of importers was positioned in low-value added links, characterised by low barriers to entry and exit, high-profits and low-risk. They became known as briefcase businessmen because they operated “out of a briefcase”. In order to be successful, these businesses invested in networking to secure ad hoc orders. Other capabilities were not critical to succeed, and indeed only few upgraded into established businesses. The reliance on social networks to access procurement dated back to decades of similar practices under ZCCM. They were not specialised, on the contrary they offered any product put on tender. In the view of one manager of a supply firm, “[these] small, non specialised suppliers are driven by the uncertainty of the income gap, and try to supply as many products as possible....In the past, they would refer to the banks, by using overdrafts until they would get into trouble” (Supplier 2, 11.2009). Another respondent added: “firms don’t want to specialise, because once they are connected they can get all sorts of orders” (Supplier 27, 11.2009).

With no overheads and largely outside of the tax regime, briefcase businessmen could be price-competitive, pushing more established suppliers out of the value chain. Often, though, lower operating costs were not passed onto the buyers in the form of price reductions, as they would collude with mine personnel to maintain high profits. This was done through cooperative bidding or corruption. As noted by a

manager of a supply firm “they [briefcase businessmen] have unethical business practices but they have nothing to lose in terms of reputation. If they are caught, they change name and move on. Other companies cannot afford this” (Supplier 23, 11.2009). Moreover, the lack of technical expertise, facilities or capital often translated into failure to meet delivery times, and in poor or no advisory and after-sale services. Poor record keeping by these firms increased monitoring costs for the procurement departments. With time, buyers saw them as increasingly inefficient economic actors in the supply chain.

Briefcase businessmen would either import from South Africa or supply from first-tier suppliers in Zambia. Most first-tier suppliers accepted to supply briefcase businessmen because these had better access to the supply chain. Power relations between briefcase businessmen and first-tier suppliers varied and were important to determine rent allocation. When briefcase businessmen had to source from OEMs, power relations were skewed in favour of the OEMs: “briefcase businessmen are not a problem: if they come to buy from [us] because they have an order... [we] would add a 10-30% margin, so that would make our business and the mines would eventually prefer to go to the OEM” (Supplier 48, 11.2009). In specific cases, briefcase businessmen would just backstop further OEM supply: “the mines have a trade-off. If the OEM takes too long to deliver spares, the mine looks for a quick-fix, of low quality, low-cost supplies to ensure operations continue. Briefcases businessmen provide lower quality items, but fill for the OEM delays. The mines would then wait to receive the OEM spares” (Supplier 48, 11.2009). On the contrary, briefcase businessmen held considerable power versus local manufacturers, because the latter were not protected by brands and competition from local firms and imports was stiff. In this case, briefcase businessmen could appropriate the largest share of manufacturers’ profit margins.

The Association for Mining Suppliers and Contractors of Zambia, which has primarily represented the interests of briefcases businessmen, had around 400 to 500 members (F. T. Banda, 10.11.2009). Respondents however estimated the total number varied between few hundreds to and 5000 individuals. In the past the Association was particularly effective in lobbying government to gain market access

to the supply chain. Public discourse was strongly focused on resource nationalism, with the press, NGOs and the opposition party arguing that Zambians did not benefit from the privatisation of the mines (Haglund, 2010). In the 2000s, buyers were under pressure from government, because of the Das, and because of successful lobbying, to grant some level of market access to local businesses. Whilst the efficiency problems caused by briefcase businessmen were obvious, high profit margins during the copper price boom made it possible to tolerate their presence. Respondents from two mining companies estimated that up to 80 percent of registered local suppliers were briefcase businessmen before the crisis (Buyer 1, 11.2009; Buyer 8, 11.2009).

### ***OEM subsidiaries.***

Equipment was generally purchased through local OEM subsidiaries or imported directly when local subsidiaries or agents were not available, or when the OEMs parent company granted higher discounts. After-sale services however were mostly sourced from the OEM subsidiaries.

With privatisation, many OEMs established a direct presence in the Copperbelt, eliminating sole distributorship and agency agreements with local firms. The objective of investing directly in a subsidiary was two-fold: first, to tighten control over the quality of the goods and services provided to the mines, and second, to increase revenues streams from highly profitable after-sale services. OEMs enforced stringent warranty systems, which tied the buyers to such after-sale services (spares, maintenance and repair). Manufacturing, on the contrary, was largely re-located to more competitive industrial countries.

The activities of the OEM subsidiaries in Zambia were to be understood within the context of the re-organisation of the OEMs GVCs. Since the early 1990s, the competitive advantages of the OEMs moved away from manufacturing activities, into technology- and knowledge- intensive activities. OEMs had to coordinate complex inter-related activities, both vertical with suppliers and customers, but increasingly also horizontal, pursuing alliances to acquire new technologies or new markets. This required a re-organisation of their GVCs, with less autonomy for the subsidiaries and their integration on a global basis (Dunning and Lundan, 2008b). OEM subsidiaries

now focused on investment in streamlined distribution and servicing centres, highly integrated into the OEMs global network.

### ***Specialised firms.***

The local supply chain included a relatively small number of capital-intensive, specialised firms, such as drilling companies and specialised transport. Because access to capital was costly in Zambia, only few local businesses could enter these supply links.

There was a relatively higher number of skills intensive services providers, mostly, electrical and mechanical engineering services. More specialised firms were scarcer (pneumatic and hydraulic equipment and services). Because for most of these activities entry barriers were skills-related rather than capital-related, it was possible for a large number of Zambians with technical expertise to establish small businesses.

### ***Manufacturers.***

These firms produced a wide range of inputs, such as metallurgical, plastic and rubber products, engineering products, paints, and foundries. With the exception of one large steel foundry, they were relatively small-sized. This group included manufacturing companies established after privatisation, mainly by South African and Asian investors, as well as firms established before the 1990s. These were once state-owned firms now privatised and family-run businesses owned by European and Indian migrants and by Zambians, although many closed down by the late 1990s. Local manufacturers found it difficult to compete with imports from South Africa and Asia. In the view of a manager of a manufacturing firm, “investors were scared to invest in manufacturing because there was no guarantee of volumes of business. It’s smarter to import the goods and add a mark-up” (Supplier 30, 11.2009).

### ***General services suppliers.***

This category included basic services such as cleaning, building maintenance, security and so forth.

### 5.3.3 A useful categorisation of suppliers

Lead producers categorised supply links according to the concept of “critical supply”, as shown in Table 21. In the value chain literature, the concept usually indicates value links vertically integrated by the producer. In this context, nevertheless, it is defined as “supplies which, if not available, could cause production to stop”. The financial implications of a failure in a supply link, therefore, defined how critical it was. Some of the respondents also defined as critical supplies necessary to meet government regulations: “critical would be anything that can stop the plant, and forces you to stop production, or impacts environmental or safety issues” (Buyer 2, 11.2009)

Criticality was affected by scarcity, which in turn was determined by the degree of competition in a specific supply link and by the level of competences of local suppliers. The concept of critical supply was key in explaining value chain governance: in order to control critical supplies, buyers adopted a number of strategies, ranging from vertical integration to developing tight relationships.

This finding confirmed Humphrey and Schmitz’s argument that value chain governance was defined by the risks faced by buyers (2000, 2001, see sub-section 2.2.1 for comprehensive discussion). They argued that these risks, and their related penalties, rather than the complexity of transactions per se, determined how lead firms set product and process specifications, and in which form of governance they engaged. In our case study, this can best be illustrated by two examples extracted from the interviews. The quality of mill balls was important because, although they were relatively cheap and low-tech, they affected the functioning of crushers. In the buyers’ view, given the low quality of local production, these were critical items. With one exception, general transport was not considered critical. For a mine located in a remote area, with few local suppliers, though, general transport became critical supply and required tight cooperation in the form of long-term contractual relationships with the supplier.

Table 21 Categories of supply links to Zambia’s lead commodity firms

Critical	Equipment Valves, pumps, hydraulics Crusher spares, mill liners spares, conveyor belts, mill balls Spare parts for smelters and concentrators Consumables: explosives, lime, cement, fuel, reagents, etc. Maintenance services for equipment Specialised transport (copper concentrates, acids) Accommodation, health care Insurance
Non-critical	Civil engineering Office consumables (stationery) Welding, laboratory consumables PPE Fasteners General transport Cleaning, gardening

Source. Author’s fieldwork data

### 5.4 The Impact of the Global Economic Downturn on Upstream Linkages

Whilst the copper price crisis was relatively short-lived, its impact on Zambia’s supply industry was significant. With the economic crisis, the mining houses had to face a price squeeze that called for the re-organisation of their supply chains. They had to cut costs and look for value added services. The strategies adopted in order to achieve these objectives differed between mines, as described in sub-section 6.4.4. There was however a general response adopted by all buyers, which consisted in promoting the exit of briefcases businessmen from the value chain. The president of the Association for Mining Suppliers and Contractors of Zambia explained that “the crisis has resulted in a selection of suppliers, lots of small-scale suppliers went down as they could not afford not to be paid while still having to pay for their fixed expenses. The problem with this is that the small-scale sector is not growing” (F. T. Banda, 10.11.2009). Indeed, after the crisis, a large number of briefcase businessmen left the supply chain and moved into non-mining sectors.

On the supply side, many firms adopted a strategy of market diversification. This aimed at reducing the risks of exclusive reliance on the mining buyers. The manager of an OEM explained that “the experience with the recent crisis has shown us that putting your eggs in one basket is dangerous. So we are trying to bring up new

products, such as clear water pumps for water utilities” (Supplier 48, 11.2009. Market diversification was pursued by a large number of firms, irrespective of their performance. Rather than investing in new products or new processes, these firms looked for new non-mining customers as a response to the economic crisis. Table 22 shows reported market diversification efforts extracted from the interviews. 15 firms out of 50 were explicitly targeting customers outside the mining value chain. These included OEMs moving into construction, forestry and utilities sectors. Other suppliers targeted Lafarge (cement) and Zambia Sugar, two of the largest non-mining corporations in Zambia, as well as oil marketing companies, breweries and other activities. It was noteworthy that government procurement was indicated by many respondents as providing a low-risk diversification strategy.

Table 22 Market diversification strategies for selected suppliers

Sector	New target markets
Compressors and other capital equipment distribution	Oil marketing companies, industrial sectors
Electric products	Transport, government procurement, corporate and exports
Electric products	Breweries, oil marketing companies
Engineering products	Corporate, farming
Electrical engineering	Corporate
Equipment supplier	Corporate
Fabrication	Agriculture, transport
Gas products	Corporate, households
Hydraulic equipment	Transport, industrial hydraulics, farming
Limestone and hydrated lime	Sugar refinery, households
OEM equipment	Construction, forestry
OEM pumps	Water utilities
Steel fabrication	Utilities, oil marketing companies, government procurement
Steel fabrication	Construction
Wire manufacturing	Corporate

Source. Author’s fieldwork data

### 5.5 Externalisation of Linkages

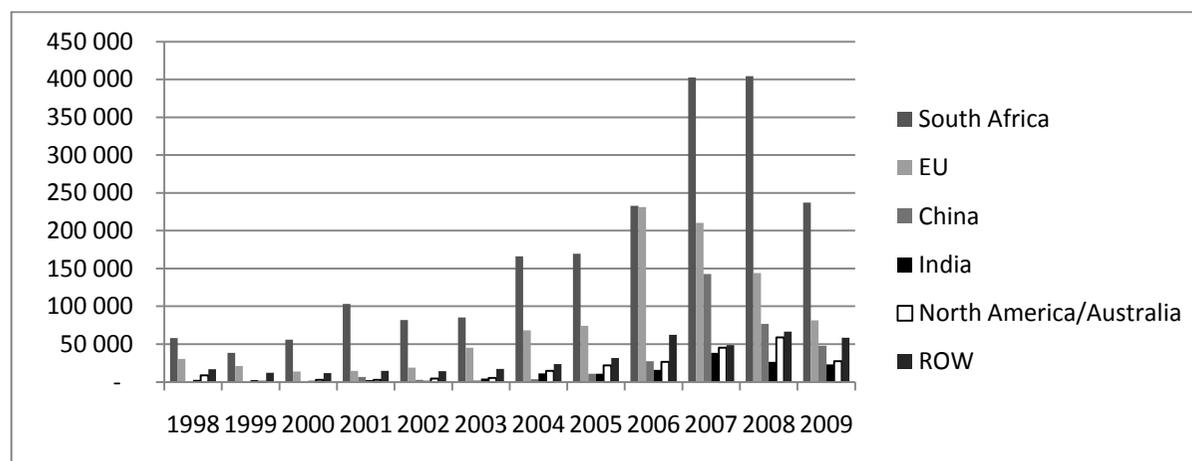
Most upstream linkages arising from the construction, recapitalisation and operation of the copper mines were externalised, that is, goods and services were imported. I undertook an analysis of import flows of mining capital goods, from 1998, the year in which recapitalisation commenced, until 2009. Whist this analysis was limited to

trade in goods, Zambia's copper sector imported a wide range of specialised services, especially, related to maintenance and repair services.

In this 12-year period, over US\$ 4 billion worth of mining capital supplies was imported (Table 23). Imports increased drastically from 2004 onwards, peaking to US\$ 890 million in 2007 and US\$ 779 million in 2008. South Africa remained the core source of supply (Figure 11). In 1998-2009, over US\$ 2 billion of mining-related equipment was sourced from South Africa. In relative terms, this accounted for 54 percent on average of total imports, although this share declined over the years. Europe was the second most important source of imports (22 percent of total imports), in particular the UK, Finland, Sweden and Germany. China was almost insignificant until 2005, but caught up with imports totalling US\$ 306 million, or 9 percent of total imports, in the 2005-2009 period. This amount was larger than imports from Australia and North America over the same period (US\$ 180 million, 6 percent of total imports). India remained a relatively less important supply source, on average 3 percent of total imports were sourced from India over the 12-years period under analysis. Japan and Switzerland were other important sources.

South Africa was a key regional hub for Zambia's supply chain. Often, these flows were part of an integrated value chain, where goods, as well as expertise and training, were sourced from South Africa and complemented the activities undertaken by subsidiaries, agents and distributors based in Zambia. South Africa, being so close geographically and culturally, increased the local suppliers' competitive advantage.

Figure 11 Imports of mining-related capital equipment, 1998-2009 (US\$, '000)



Note: HS codes for mining-related equipment sourced from Kaplan (2011). Source: UN Comtrade database accessed January 2011

Table 23 Imports of mining-related capital equipment, 1998-2009 (US\$, '000)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
South Africa	58,147	38,536	56,044	103,033	81,910	85,322	165,906	169,578	232,809	402,531	404,279	237,071
EU	30,521	21,037	13,678	14,636	19,089	45,238	68,389	74,193	230,989	210,348	144,184	81,617
China	212	287	785	6,798	2,867	2,152	3,794	10,745	27,668	142,552	76,758	47,942
India	2,653	2,545	1,556	2,352	1,699	4,347	11,442	10,815	16,005	38,686	26,664	23,111
North America/Australia	8,712	399	2,781	2,974	4,339	5,519	14,593	21,857	26,509	45,539	58,981	27,474
ROW	16,741	12,304	11,548	14,640	14,087	17,091	23,815	31,684	62,368	48,629	66,449	58,542

Note: HS codes for mining-related equipment sourced from Kaplan (2011). Source: UN Comtrade database accessed January 2011

## 5.6 Zambia's Policy Framework on Linkages Development

### 5.6.1 The Development Agreements and local procurement

Historically, policy in Zambia played a key role in determining the extent and nature of local linkages. After privatisation of the mines, the policy framework for upstream linkages to the mining sector was determined by the DAs between the government and the mining companies. All the DAs included provisions on local procurement.<sup>64</sup> The mining companies were to grant local firms an adequate opportunity to bid for tenders and to ensure no unfair discrimination. They also had to submit a local business development programme. This was to be monitored by a cabinet-appointed, inter-ministerial committee comprising the Ministry of Mines and Mineral Development and the Ministry of Commerce, Trade and Industry.

The provisions of the DAs on local suppliers were formulated in a policy environment that was, at least in theory, favourable to the development of local enterprises. The economic policy of the years following privatisation was geared towards private sector development. The 2006 Fifth National Development Plan (FNDP), which guided the policies of the Government in the period under analysis, acknowledged that the economic growth spurred by the mining and construction sectors had failed to reduce poverty. More particularly, limited integration of the copper sector into the rest of the economy made Zambia doubtful of its broader developmental potential. The underlying response of the FNDP was the promotion of export-oriented, private sector growth (GRZ, 2006). Since 2005, government also designed horizontal policies aimed at cutting the cost of doing business, through the Private Sector Development Reform Programme. In 2006, the Zambia Development Agency Act set a framework to promote investment, through a range of regulatory simplifications and fiscal incentives. Multi-Facilities Economic Zones were to be established, with infrastructural and fiscal benefits to large-scale investors in selected priority sectors. In 2009, Government decided on a sectoral approach to industrial policy, through the

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<sup>64</sup> Development Agreements between Government of the Republic of Zambia and NFC Africa (1998), Chibuluma Mines Plc (1997), Konkola Copper Mines Plc. (2004), Mopani Copper Mines Plc. (2000), Cyprus Amax Kansanshi Plc (1997).

establishment of cabinet committees. Priority sectors were identified under the 2008 Commercial, Trade and Industrial Policy (GRZ, 2008b).<sup>65</sup>

The provisions of the DAs on local suppliers were largely disregarded by both the mines and Government, with the exception of the International Finance Corporation (IFC) Suppliers' Development Programme (SDP).<sup>66</sup> The explanation was three-fold.

Firstly, the years after privatisation were focused on recapitalising the mines. Later, policy makers and the public at large focused on revenue and miners' wages issues (Mutesa, 2010). It should also be considered that until 2007, the content of the DAs was largely unknown to the public, which limited the capacity of civil society to lobby for their enforcement (Haglund, 2010). Local suppliers caught the attention of the public mainly in two circumstances: when one large mine tried to change its procurement system, and briefcase businessmen managed to successfully elicit intervention from Government at the highest political level; and when Vedanta-owned KCM suspended payment to its suppliers following the 2008/2009 price crisis (cf. sub-section 7.3.5). Overall, however, local supply chain issues remained marginal to the national debate on the copper mining sector.

Secondly, policy-makers failed to see the potential for private sector development in the localisation of upstream linkages. These were not included in the Commercial, Trade and Industrial Policy nor in any private sector development policy or programme. However in 2007, the World Bank, through the IFC, undertook a suppliers' development programme in the Copperbelt Province. This was and remains a donor and private sector-funded programme, with little ownership from government. Staff from the relevant ministries attended only a few initial meetings.

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<sup>65</sup> The 2006 Citizens Economic Empowerment Act provided for measures to support Zambian-owned, "indigenous" enterprises. One of the most significant measures was preferential government procurement policies.

<sup>66</sup> The IFC SDP ran from 2007 to 2009, with funding from the mining companies, the IFC and Japanese International Cooperation Agency. The mining companies were Mopani Copper Mines, First Quantum Minerals Ltd, Chambishi Mining and Luanshya Copper Mines (both before being acquired by Chinese NFCA). Two mining companies agreed to continue financing the activities at the end of the programme.

The project was implemented solely by the mines' supply managers, with guidance from the CEOs, and the IFC staff.

Thirdly, the lack of implementation of the DAs reflected poor institutional capacity of the Ministries involved. No comprehensive assessment of the supply chain was conducted, nor were monitoring mechanisms established or support programmes designed. This was due to, among other reasons, high staff turnover in the Ministries, lack of clear implementation and monitoring mechanisms and a highly personalised style of management, which built on individual rather than institutional capabilities. Also, neither strong political guidance nor resources were invested in this area.

Policy, therefore, failed to play a role in encouraging mining companies to increase local content and in upgrading local supplier capabilities. The unilateral cancellation of the DAs under the 2008 Mines and Minerals Development Act removed the only legal obligation of the mines to develop local supply chains. At a horizontal level, the implementation of private sector development programmes was slow. Also, government did not address two key challenges for suppliers. In the interviews, most respondents highlighted scarce access to working or investment capital and fluctuating exchange rates as key constraints to production and expansion. Poor public policy-driven governance made internal value chain dynamics the key driver for the localisation of linkages.

### **5.6.2 The tax regime and local procurement**

Policy also affected the supply chain through the tax regime on imported goods. The 1995 Mines and Minerals Development Act, and later the 2008 Act, granted the mines VAT exemption and elimination of custom and excise duties on all machinery and equipment. According to Zambia's tariff book, MFN duties generally amounted to 0-5 percent for capital goods and 15 percent for spare parts. In 2009, one third of mining-related goods entered at 0 and 5 percent; slightly less than two thirds at 15 percent and a small number of lines were set at 25 percent, mostly to protect domestic producers of protective clothes, plastic and wooden goods (Table 24).

The tax regime only applied to the firms holding mining rights, which included mostly the mines but not their suppliers. Suppliers of capital goods, therefore, paid a customs duty ranging from 15 to 25 percent for some goods - unless these goods qualified for SADC FTA treatment and were imported from South Africa - plus VAT on all imports. This measure conferred a cost penalty on local suppliers.

Table 24 Zambia's import tariff regime for mining-related goods

MFN duty	0%	5%	15%	25%	Tot
No. tariff lines	42	25	129	7	203

Source. 2009 Zambia Revenue Authority Tariff Book

## 5.7 Conclusion

Chapters four and five examined the dynamics of the copper value chain at the global level and in the Zambian context. At the global level, the copper price boom that started in 2003 marked the end of 30 years of decline for the copper industry. The copper price boom was driven by the dramatic growth in China demand for infrastructure development and demand for consumer goods. India, though from much lower levels, was also showing increasingly aggressive rates of consumption growth. The implications for the copper GVC were manifold. Firstly, global refining and processing activities shifted to China, which developed the fastest-growing smelting, refining and semis manufacturing capacity. The effects of skyrocketing prices on copper production instead were delayed. Mining involved long project gestation periods which implied that the supply response was slow and prices were likely to remain high in the medium-term. This increased dramatically the profitability of copper mining, where two thirds of value added happened at the mining stage. After two decades of stagnation, producers invested in frenzy M&A activities, with increasing market consolidation, and the emergence of high-level, high-growth investment from China and, to a less extent, India in the extractive industries. Greenfield investment targeted developing countries: Latin America, Asia and, in Africa, Zambia.

In this context, China privileged access to capital and state support became a determinant source of competitive advantage. In the copper GVC, management of complex financial and production networks and access to capital, not technology, were the key sources of economic rents. In other sectors, such as high-tech sectors or design and marketing-intensive sectors, China was disadvantaged by relatively low skills endowment and R&D capabilities. In the extractive industry, soft-budget constraints granted by loans from state-owned banks, direct state funding and access to high levels of retained earnings provided Chinese mining companies with an advantage over competitors in all the stages of the GVC: exploration, extraction and processing.

Three major processes were highlighted in the discussion of the copper GVC. Firstly, a major shift with regard to the role of the state. After the conclusion of the nationalisation experience in large part of the developing world, states retreated from ownership and management and ceased to be the main driver of value chain dynamics. Secondly, whilst technology was not the critical source of competitiveness for mining producers, it was for the OEMs. Since the 1980s, these became the source of technological innovation in the GVC. Thirdly, by and large, Africa was relegated to the role of refined copper production, but its production volumes remained marginal and its presence in downstream stages of the value chain insignificant.

Zambia was an important global copper producer, ranked seventh in 2010. Historically, copper mining played a major role in the economic fortunes and misfortunes of the nation. After the high expectations for copper mining contribution to broader social and economic development at the time of nationalisation, Zambia faced more than two decades of depressed copper prices and mismanagement of the copper mines, ZCCM. After privatisation of the mines in the late 1990s, new mining corporations injected the capital required to re-invigorate the sector. From 2000, production volumes increased dramatically, and copper returned to represent the major source of foreign exchange earnings. The novelty of the post-privatisation ownership structure of the mining sector was the significant and growing importance

of Asian investors. In 2009, an Indian company controlled one quarter Zambia's copper production, and whilst the Chinese current production capacity remains small, it is in the process of completing massive investment to expand mining, processing and beneficiation capacity. India and China together held one quarter of Zambia inward FDI stock.

Zambia's supply industry to the copper sector underwent momentous processes of change that largely reflected the history of the mining sector. During the ZCCM era, from 1969 to the late 1990s, upstream linkages development was seen as a key policy instrument to promote local industrialisation. This objective was pursued through a combination of direct state ownership of part of the supply industry, preferential sourcing, import substitution industrialisation and intense value chain cooperation between ZCCM, its suppliers and public research and training institutions. By the early 1980s, it became obvious that this project failed to produce a viable local upstream industry. The reasons underlying this were numerous. ZCCM suffered a liquidity and foreign exchange crisis. This led to cuts to the supply chain, which aggravated the deterioration of its operations and caused long delays to payment to the suppliers. Moreover, ZCCM supply chain management was inefficient, with mine divisions left with large discretionary power and using these to manipulate urgency procedures and technical specification to favour particular suppliers. Capacity to sanction non-performing suppliers was weak, both because of corruption and because of policy direction to support local suppliers. Suppliers in turn invested in personal relationship in order to access and remain in the supply chain, with long lasting consequences for the local business culture. Their competitiveness was often weak in terms of technological innovation, costs and lead time, contributing to soaring production costs for ZCCM.

The mines privatisation imposed higher performance requirements on Zambia's supply industry and the new mining, trade and investment regime created stiff competition. The supply industry underwent an important process of specialisation and learning from the new buyers. OEMs re-organised their GVCs, increasing their direct presence in the Copperbelt, moving away from manufacturing and focusing on after-sale services. The past two decades were also witness to the loss of

manufacturing capabilities, and a local supply chain increasingly dominated by a variety of services providers. Only some of the latter provided high value services, while most, known as briefcase businessmen, were involved in low value-added activities, with no upgrading opportunities. Only with the 2008/2009 price crisis, the mining companies re-organised their supply chain to exclude hundreds of briefcase businessmen. Nevertheless, the depth of the local supply chain remained low and upstream linkages were mostly externalised, especially to South Africa. The low depth of local linkages was consistently highlighted by all buyers as the key challenge for the development of a viable local supply chain and was likely to be further aggravated by the fact that many specialised suppliers either did not survive the procurement cuts or responded to the crisis by pursuing market diversification strategies.

The role of the government in the post-privatisation dynamics of Zambia's copper value chain has been remarkably weak, an issue further explored in the discussion of the supply cluster in Chapter seven. The provisions of the Development Agreements on local supply chain development were disregarded and government failed to see the potential for industrialisation and knowledge intensification in upstream linkages to copper mining. Without the support of government resources and policies, Zambia's supply industry depended largely on the dynamics of the mining value chain for growth and upgrading opportunities. Because of this, and in light of the discussion on the distinctiveness of Chinese investment and the large role played by Indian investment, this thesis investigates how ownership of the mining companies impacted on the trajectory of the local supply chain. This analysis is at the core of the next two chapters.

## CHAPTER 6

### Firm Ownership and Value Chain Governance

In chapter four, I discussed the evolution of the ownership profile of Zambia's mining sector from independence onwards. After privatisation, the ownership structure of the mining sector became highly heterogeneous. Chinese and Indian MNEs have emerged as new, important players alongside MNEs from Australia, Europe, North America and South Africa. Moreover, the copper price boom attracted a significant number of predominantly Zambian, small-scale mining investments. As a result, when looking at the dynamics of copper mining in Zambia, I argue that not one, but many value chains co-existed within the same sector. Building on this, I analyse how firm ownership of the commodity lead firms affects governance, in terms of outsourcing strategies, selection of participant firms, value chain parameters, their enforcement, and buyer-supplier relationships.

Although the main focus of this chapter is on Chinese and Indian ownership in a comparative perspective with North American, European, and South African mining companies, I also discuss the dynamics of the copper value chain driven by small-scale mines. The reasons for their inclusion were two-fold: firstly, they were and are likely to again become numerically important. Several supply firms highlighted that, before 2008, orders from these buyers were multiplying and becoming valuable. Although many small-scale miners exited the copper value chain after the 2008 price crisis, it is reasonable to assume that this is a temporary phenomenon given the recovery in copper prices. Secondly, they presented distinctive dynamics in terms of supplier-buyer power balance which deviated from the GVC's definition of a producer-driven value chain.

The first section includes preliminary remarks on how the concept of ownership was operationalised and on the limitations of my analysis. The second section discusses the relationship between firm ownership and lead commodity firm outsourcing strategies. The third section outlines the selection of suppliers by different lead commodity firms. In the fourth section, I analyse how ownership affects supply chain parameters in the following order: product quality, trust and reliable delivery, lead

times, product price, capacity to produce volumes requested, learning and innovation capabilities, suppliers' flexibility and international standards. The fifth section focuses on the relationship with suppliers. In particular, I discuss buyer monitoring processes and the extent and content of cooperation with suppliers. The characteristics of the Indian value chain, and its evolution from South African ownership, are discussed separately in section six. In section seven, I turn to a discussion of small-scale mining and its supply chain. Lastly, the form and content of horizontal cooperation between buyers is reviewed. This is followed by chapter conclusions.

## **6.1 Operationalising the Concept of Ownership**

In order to operationalise the concept of ownership, four categories of lead commodity firms were identified (Table 25). North American, European, and South African lead commodity firms were categorised as *Traditional buyers* or *Traditional lead commodity firms*. These Traditional lead commodity firms were characterised by Western corporate structures and incentive systems. They also had significant experience in the extractive sector. In the colonial era and the time period before the nationalisation of mining assets in developing countries in the 1960s and 1970s, South African, North American, and European corporations dominated the production and marketing of copper (Mikesell, 1971a). South African FDI closely matched FDI from the Western countries, in terms of size, sectors, and preference for formal governance structures (Henley et al., 2008). In fact, the corporate behaviour of South African and Western lead commodity firms in Zambia were found to be largely similar. The few divergences between South African and Western corporate behaviour are explicitly addressed in this chapter.

Chinese and Indian lead commodity firms (also referred as buyers) are also included in the analysis. As discussed in sub-section 4.3.2, the Indian lead commodity firm entered Zambia's copper value chain through a large-scale brownfield investment, acquiring large copper mining assets as well as downstream processing units. It inherited old equipment and plants, which required significant re-capitalisation as well as investment to develop deep-mining projects. By contrast, the Chinese lead commodity firm entered with a relatively small brownfield investment in copper

production, and progressively expanded capacity in mining output and downstream processing.

Table 25 Buyers' sample characteristics

Category	Case-studies	Key features
Traditional buyers	Kansanshi Mines Bwana Mkubwa Mopani Copper Mines Chibuluma	Home countries: Canada, Switzerland, South Africa; all but one were listed companies
Chinese buyers	NFCA just acquired Luanshya Copper Mines and Chambishi Smelter	Chinese ownership SOE Not listed
Indian buyers	KCM	Indian ownership Privately owned Listed
Small-scale mines	Chilibwe Mining Copperhead Oriental Quarries Sokotela mines	All but one, Zambian Privately owned Not listed

Source. Author's compilation from various sources

The analysis of the Indian value chain was subject to a major limitation. As I explained in the Introduction (cf. sub-section 1.5.3), the buyers' sample did not include the Indian lead commodity firm, which meant I had to rely on data sourced from the suppliers' sample and from the sample of key institutions.<sup>67</sup> This data limitation prevented a direct comparison between the Indian buyer and other buyers, or a triangulation with suppliers. However, given the importance of the Indian lead commodity firm in Zambia's copper value chain and the willingness of respondents to provide a considerable amount of data, the Indian value chain has been included in the analysis subject to this important caveat.

It is important to highlight that the variations in governance patterns observed in this chapter could be imputed to two alternative variables: establishment year and type of investment. Firstly, in relatively younger operations, a time lag may occur before buyers become familiar with the local supply cluster and develop supply

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<sup>67</sup> KCM was reluctant to grant an interview, probably because it was under intense scrutiny and criticism over its failure to pay suppliers during the economic crisis. Moreover, an uprising in Chingola over workers wages made it not possible to attempt further contacts.

relationships. However, the Chinese and Indian lead commodity firms were not younger investors than the Traditional investors. The Chinese lead commodity firm established its presence before two of the three Traditional lead commodity firms. The Indian lead commodity firm was established only 3 years after the youngest Traditional buyer, taking over long-established procurement procedures from the previous owner. Secondly, it could be argued that greenfield investors must invest more in the development of their supply chains than brownfield investors. However, in this respect, the Chinese lead commodity firm, which acquired closed mining assets, was in a similar situation to two Traditional lead commodity firms, which had to set up new procurement procedures either because they acquired closed assets or were greenfield investors. The Indian buyer, which acquired pre-existing operations, was in a similar situation to the other lead commodity firms. In sum, the sample characteristics of these buyers allowed us to ensure that none of them were unique in terms of establishment year or investment type. The only exception was the SOE nature of the Chinese buyer, an issue addressed extensively in the next concluding chapter.

Small-scale mines were mostly owned by Zambian investors. Ideally, the governance of the small- and large-scale mining value chains would be compared directly. However, all but one of the small-scale firms in the sample were Zambian, while all the lead commodity firms were foreign. This made it difficult to extrapolate the extent to which country of origin rather than size accounted for variations in governance. Therefore, the analysis of the small-scale mining value chain was conducted separately.

In terms of the organisation of this chapter, when the discussion makes a generic reference to *buyers*, these are Traditional and Chinese buyers only. Small-scale mines and the Indian lead commodity firm are analysed in specific sections.

The overwhelming majority of supply firms agreed that ownership mattered in shaping their relationships with buyers. As one firm explained, “business culture is different for most of the mines...it strongly depends on the culture of the owners, Indian, Chinese, Caucasian” (Supplier 38, 11.2009). In general, the categorisation

proposed in this chapter is consistent with the views of the respondents. They referred to “Indians” and “Chinese” as two very distinct types of buyers, and treated Traditional buyers as a homogenous group, while highlighting their experience with particular buyers when necessary. The consistency between the respondents’ categorisation and mine eased the interpretation of the data and triangulation between buyers and suppliers.

## 6.2 Outsourcing Strategies

Local management had the power to make procurement decisions for all but one buyer, which shared capital goods procurement decisions with their headquarters abroad. Additionally, one buyer reported that, due to the economic crisis, purchasing functions for all African operations were being centralised to increase the group’s leverage in negotiations with suppliers.<sup>68</sup>

Two elements of the buyer outsourcing strategies affected local upstream linkages: the extent to which activities were outsourced, in other words the “make or buy” decision, and the extent to which outsourced activities were supplied from local rather than overseas firms.

Traditional buyers tended to outsource activities outside their core business (Chamber of Commerce, 2005). Buyer outsourcing strategies were adapted to local supplier capabilities. For example, a Traditional buyer had once outsourced the maintenance and operation of loaders to local firms, a critical operation for ore extraction. After local firms proved unreliable, the buyer vertically re-integrated this activity (Buyer 8, 11.2009). It should be noted that some Traditional buyers outsourced labour to Zambian and foreign contractors. The latter partly controlled the procurement of consumables and capital equipment.

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<sup>68</sup> The impact of the centralisation of procurement on local suppliers was difficult to predict. The mine was likely increased its bargaining power with the OEMs headquarters, but local OEM subsidiaries would supply after-sale service and spares. For suppliers for which physical proximity was a key competitive advantage, the impact was likely to be minimal. Suppliers most likely to be affected were distributors and manufacturers.

Traditional buyers, whenever possible, preferred a localised supply chain. Dealing with foreign suppliers increased transaction costs; as one buyer explained, “we can negotiate directly, but it’s a nuisance because we have to set up relationships with overseas...and the perception of Africa is that it is a risky destination - Americans are not keen, they all want upfront payment because of the economy” (Buyer 6, 11.2009). It was very difficult to assess the value of local procurement. One Traditional buyer outsourced around 60 percent of its procured goods and services to local suppliers. Another buyer estimated that the total number of active suppliers was more than 600, of which around 500 were local firms. Of these, 80 percent were briefcase businessmen. This nevertheless was not informative in terms of value of procurement.

The Chinese lead commodity firm was more vertically integrated than Traditional lead commodity firms. When it acquired Chambishi mine, the buyer had considerable room for manoeuvre to set up its organisation, as it did not inherit supply contracts or capital equipment. To minimise the risk of relying on local suppliers that did not meet their expectations in terms of volume and price, the Chinese lead commodity firm invested from the early stages in in-house engineering services (electrical, mechanical) and a foundry. Exploration and drilling services were also vertically integrated. In these sub-sectors, the Chinese buyer’s strategy curtailed opportunities for local suppliers. For example, the manager of a local electrical engineering company complained that “the company has not benefitted from the investment boom, the Chinese brought their own staff” (Supplier 14, 11.2009). Nevertheless, other services and goods were outsourced, and the Chinese buyer reported spending US\$30 million on capital goods procured from local suppliers. These goods included capital equipment and spares, explosives, steel plates, oil, rubber products, cement, lubricants, tyres, components, and PPE.

This high level of local procurement suggested a misalignment between the Chinese lead commodity firm's outsourcing strategy and the formal corporate objectives of the parent company, which targeted expansion both upstream and downstream in the metal mining value chain (CNMC, 2010b). The analysis of import flows of mining

supplies presented in section 5.5 further corroborates this. South Africa was the key supply hub for the Zambian mining sector, accounting for more than half of total imports in the 1998-2009 period. China became a significant supplier only from 2005 onwards, supplying 9 percent of total imports between 2005 and 2009. Interviews with key respondents from the Chinese lead commodity firm confirmed that the supply chain was efficiency and price-driven. The Vice General Manager for NFCA estimated that in 2008 only US\$ 2 million worth of supplies were imported from China (largely specialised supplies such as spares for the concentrators) against US\$ 35 million from local and regional suppliers. The Vice Deputy Manager of ZCCZ explained that the company operated on the basis of market rules: “business is business, we don’t buy from Chinese companies” (Z. Baosen, 20.11.2009). He explained that ZCCZ approached partnerships with Zambian companies in the same way. Whilst partnerships are encouraged by political leaders, they had to take place on the basis of “mutual advantages” (Ibid.) - Zambian businesses had to offer advantages in terms of quality and price.

### **6.3 Buyer Selection of Suppliers**

Whilst reputation and past working relationships were important to enter and remain in the supply chain, in section 5.2, I showed how firms established after 1990 increasingly relied on auditing and third party certification. These, however, were considerations at the aggregate level. This section unpacks the issue of supplier selection and how it differs on the basis of lead commodity firm ownership.

Table 26 summarises the key differences in the selection criteria of different buyers. Traditional buyers operated well-established procurement procedures based on selective tenders. This system had the advantage of restricting entry to preferred suppliers whilst preserving some level of competition in the bidding process. It also aimed at increasing transparency: for all but one, corruption was not a significant problem. In registering preferred suppliers, Traditional buyers relied heavily on past relationships as a selection criterion. The supply manager of one firm explained, “we would normally go for suppliers we worked for, considering the experience the end user department got...If you have to renew a contract, you would rather stay with

them [the suppliers on contracts already], you have a customer relationship...with new suppliers you have new problems to sort out again” (Buyer 2, 11.2009). The effectiveness of this selection criterion was reinforced by the tendency of Traditional buyers to employ their procurement staff from a small pool of labour, often expatriates. These employees had over time worked in many Traditional lead commodity firm procurement departments and developed trusting relationships with preferred suppliers, which they carried with them when they moved between lead commodity firms. The trust content of these relationships was high, due to their embeddedness in the small local business community, where “everything is based on a word of mouth” (Buyer 6, 11.2009).

Table 26 Buyers’ selection of suppliers

Supply chain	Main selection criteria	Secondary selection criteria	Entry barriers for suppliers
Traditional buyers	Historical relationships	Increasing reliance on selective auditing Role for the Chamber of Commerce and Industry	High entry barriers for new entrants
Chinese buyers	Extensive auditing	Trust built with considerable effort	Low entry barriers for new entrants
Indian buyers	Ensure a large suppliers’ base	Increase competition between new and regular suppliers	Low entry barriers for new entrants

Source. Author’s fieldwork data.

Many suppliers argued that entering the Traditional lead commodity firm supply chains was extremely difficult.<sup>69</sup> Selection based on past relationships ensured that suppliers were reliable and knew the operating requirements of the mines, but it excluded new, potentially competitive entrants. Indeed, two buyers reported that one of the most significant and unexpected benefits of the IFC SDP was that they “discovered” a number of capable suppliers (Buyer 6, 11.2009; Buyer 8, 11.2009). Traditional buyers also had a high level of brand loyalty for critical supply links, such as capital equipment and components. This made it easy for OEM subsidiaries and distributors of established brands from Europe, Australia, North America and South

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<sup>69</sup> One buyer adopted an electronic procurement system. Suppliers argued that this gave them an opportunity to compete with historical suppliers. By replacing the “word of mouth” with objectively verifiable criteria, the system levelled the playing field for all suppliers.

Africa to maintain their market positions. By contrast, distributors of new brands were at a disadvantage.

Despite reliance on historical relationships, Traditional buyers granted some market access to briefcase businessmen for non-critical supply links before 2008 because of pressure to increase opportunities for Zambian-owned suppliers. This was particularly the case for Mopani Copper Mines. As prices collapsed in 2008, Traditional buyers re-organised their supply chains. They tightened the screening process, first by increasing collaboration with the local Chamber of Commerce and Industry. Registration with the Chamber became a requisite for registration in the mines vendor list. By doing so, part of the screening cost was shifted to the Chamber. Because the Chamber was dominated by established suppliers suffering from competition with briefcases businessmen, it had an interest in ensuring effective screening. Secondly, the buyers conducted direct auditing of the premises of all registered and potential suppliers.<sup>70</sup> Because resources allocated to the buyer procurement departments were not sufficient, the auditing process became selective and entry barriers remained high for many potential suppliers.<sup>71</sup> Agglomeration effects also played a role as buyers concentrated their efforts on suppliers based in their proximity, at the expenses of suppliers based outside their towns or the Copperbelt.

Unlike Traditional buyers, entry barriers to the Chinese supply chain were low. Chinese buyers were more open than Traditional buyers to try new products and new suppliers. Their selection relied heavily on extensive auditing to assess potential suppliers with respect to capabilities, product quality, reputation and general experience with the mining sector. Strict auditing processes were less a result of the crisis and more of negative experiences in the past with local suppliers. When Chinese investors acquired Chambishi mines, poor knowledge of the local business environment and cultural and language barriers opened the supply chain to a large number of briefcase businessmen. To this, one should add that unlike other

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<sup>70</sup> One buyer was planning extending auditing to suppliers based in South Africa and other countries.

<sup>71</sup> One buyer found that only 4 out of 34 audited firms met the basic requirements (Buyer 5, 11.2009). Therefore, auditing was restricted to firms with workshop facilities or in JV with a foreign entity.

companies, the Chinese buyer acquired a closed mine, inheriting only 112 employees who had been retained for care and maintenance. This curtailed the buyer's opportunity to absorb pre-existing organisational practices, and meant it had to set up new systems (Chunying, 2007; Haglund, 2010; Mutesa, 2010). Moreover, Chinese expatriate staff were relatively segregated from local communities, living and socialising in different physical spaces. This slowed the development of local knowledge.

Over time, the Chinese buyer re-organised the supply chain and began exercising stronger governance over the selection of participants. This was done by allocating resources and staff to conduct effective auditing. Many suppliers reported being visited by the Chinese buyer immediately after bidding for a tender, whilst having to wait a long time before Traditional buyers would agree to visit their premises. One supplier explained "[Traditional buyers] like to deal with their own suppliers and it takes time to get to know them, to gain their trust....The Chinese would approach the supplier themselves, explore possibilities" (Supplier 10, 10.2009). Trust remained very important, but was built after suppliers entered the supply chain.

#### **6.4 Critical Success Factors**

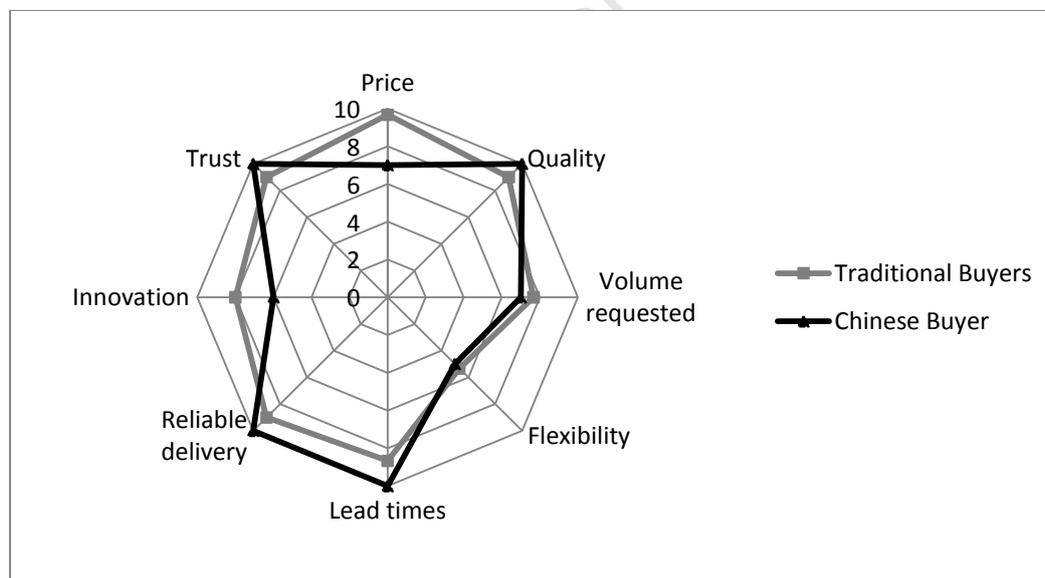
Market requirements changed significantly during the 1990s. As explained in the previous chapter, the privatised mines operated at the global technological frontier, with supply networks dispersed across continents and high performance requirements for local suppliers.

Market requirements are referred to in GVC analysis as critical success factors (CSFs). Hill's categorisation of order-qualifying and order-winning criteria has been usefully adopted with respect to CSFs (Kaplinsky and Morris, 2001). According to Hill, "qualifiers are those criteria that a company must meet for a customer to even consider it as a possible supplier" (Hill, 2000, p. 36). Order-winner criteria make it possible for suppliers to succeed by out-performing the competition in order to

maintain market share and grow. Both sets of criteria are market and time specific (Kaplinsky and Morris, 2001).<sup>72</sup>

In order to disaggregate CSFs by ownership, different groups of buyers were asked to rate the weight attached to selected CSFs on a 1 to 10 Likert scale (1 being *unimportant*, 10 *very important*). The CSFs were the following: price competitiveness (*price*), product quality (*quality*), capacity to produce volumes requested (*volumes requested*), capacity to supply small batches or adopt quick changes in production lines (*flexibility*), lead times, trust, reliable delivery, and capacity to learn and keep up with innovation (*innovation*). The results are displayed in Figure 12. A consideration is in order before turning to the individual CSFs. There was a remarkable level of consistency between Traditional buyers in their ratings of CSFs, with the exception of suppliers' flexibility. The South African buyer rated this requirement higher than other buyers in the group. This could be explained by the smaller size of their operations, which increased their reliance on JIT production.

Figure 12 Rating of CSFs, by Traditional and Chinese buyers



Source. Author's fieldwork data. Note. n=4

<sup>72</sup> It was not always possible to operationalise these criteria because in some cases such distinction did not hold (Schmitz and Knorringa, 2000).

#### **6.4.1 Product quality**

Quality has many dimensions, including performance, reliability, durability, conformity to agreed specifications. It was an order-qualifying CSF for both Traditional and Chinese buyers, being rated 9 and 10, respectively, on the ten-point Likert scale. Mining is a long-term investment, in which buyers tend to focus on total cost of supply, which take into account the cost of spares and components, maintenance requirements and product performance during its entire life-span. Supply of high quality products was cost-effective in the long period. Moreover, there were critical supplies for which high quality reduced the risk of a breakdown with potentially negative consequences for operations. For example, poor quality pumping systems increased the risk of flooding and the consequent suspension of ore extraction activities.

In the Chinese value chain, quality-based parameters were the result of a learning process. In the early phases, the Chinese organisational practice privileged short-term cost cutting strategies. Supplies from briefcase businessmen were offered at discounted prices, but often resulted in long lead times and defective products. The Chinese buyer explained that “they were unreliable...they would promise one or two months, after six months they still have not delivered....This could affect production, safety” (Buyer 9, 11.2009). With time, total costs of supply increased, as sub-standard products broke down and required replacement or repairs. Buyers began to attach more importance to product quality. The manager from a firm that supplied the Chinese buyer for years stated that “[the Chinese buyer] used to be less demanding, but now they are waking up” (Supplier 24, 11.2009). Another manager confirmed “they are very concerned with quality and go to [our firm] because they know the equipment is internationally certified and the spares are genuine” (Supplier 10, 10.2009).

#### **6.4.2 Trust and reliable delivery**

Trust was as important as quality in determining supplier participation in the mining value chain, rated 9 on the ten-point Likert scale by Traditional buyers, and 10 by the

Chinese buyer. As both Traditional and Chinese buyers re-organised their supply chains, trust, which used to be an order-winning CSF, became an order-qualifying CSF. Firstly, buyers had to trust the firm's competence to provide products and services at high professional standards. This implied that buyers could rely on supplier advice in solving problems and on the quality of their services and products. Trust was also important in terms of contractual trust. Buyers expected to operate with the confidence that suppliers would fulfil their contractual obligations with regard to, among others, metrics, quantity and delivery times. This aspect was also captured by the delivery reliability CSF. Delivery reliability, or on-time delivery, implies that products are supplied at the agreed delivery time. This was rated very important by both Chinese and Traditional buyers - 10 and 9 on the Likert scale, respectively.

Whereas contractual trust was important for all types of supply links, competence trust was comparatively more important for critical supply links, essential for the smooth running of mining operations. Indeed, the case of one supplier of critical services is illustrative of the benefits of trust-based transactions. Over time, the supplier developed a high trust-content relationship with buyers, so that he would provide its services upon a buyer's demand, often on an emergency basis, without waiting for the formal order and deposit. Buyers trusted him to provide high quality services and meet their expectations in terms of price and lead times (Supplier 6, 11.2009).

Two processes were identified by respondents as being important to build trust. One way to build a trust relationship was through reiterated, successful transactions. Such patterns explained the relationship between historical suppliers and Traditional buyers. In this relationship, characterised by high social embeddedness, low cultural and language barriers and therefore high information flows, reputation was an effective asset to convey information about a supplier's capability. Conversely, in the Chinese supply chain, trust-building was more time and resource intensive because of diffidence and language and cultural barriers. Suppliers took the initiative to build a relationship with the buyer, and had to invest resources to earn trust. From the interviews, it emerged that low levels of trust caused inefficient outcomes, as the

Chinese buyer failed to seek and use advice from specialised suppliers and jointly devise solutions to technical and operational problems. Often, by sharing the costs of failed transactions, suppliers invested in their reputational asset and were able to enter the Chinese supply chain for the long-term. Trust was built around technical and financial capabilities (Box 2).

The second way to enhance trust relied on global brands or third party certification. These were less effective mechanisms for building trust. Distributors of branded, ISO-certified equipment or components, for example, were reliable as far as competence trust was concerned, in terms of their products and technical services. This however did not mean that buyers could trust them as far as lead times were concerned, as the latter were determined by the parent company's supply capacity, the supplier's access to capital, and barriers at the border.

Box 2 Building trust-based relationships with the Chinese buyer

Two critical, high-performing suppliers explained the long process required to build relationships in the Chinese supply chain. One supplier was promptly audited by the Chinese buyer, but its small physical premises did not convince the buyer of the firm's capabilities (Supplier 47, 11.2009). The firm was given the opportunity to enter the Chinese buyer's supply chain only after more than one year. When the buyer requested assistance with a technical problem with the pumping equipment, the firm conducted underground work several times without compensation. The firm invested in the relationship by working closely with Chinese operations personnel, providing advice, solving technical problems and explaining the characteristics of their products. Low trust levels and language barriers proved to be the main challenges. The firm eventually gained the trust of the buyer's procurement, engineering and production departments. Building trust enabled the firm to establish a solid business relationship with the buyer. The manager reported that "it's difficult to get them to trust you, but once they do, the business relationship is good".

Another large, well-known supplier incurred significant sunk costs to enter the Chinese supply chain (Supplier 24, 11.2009). The Chinese buyer provided the wrong specifications for a large construction project, ignoring the supplier's advice, and the project failed. The supplier was paid, but decided to re-do the project at its own expenses. The manager explained, "we wanted to prove the Chinese that you can work with us, we are not just there to make money...I want to build a relationship for the long-term and I want to preserve my reputation". He continued, "we'll provide good technical advice and

would rather extend the payment terms in order to do a proper job rather than take shortcuts and get paid immediately". The Chinese buyer then re-contracted the supplier for a long-term project. The Chinese ZCCZ Vice Deputy Manager confirmed that this was an example of a good partnership (Z. Baosen, 11.2009). Due to trust, the supplier was able to expand its capacity and diversify into new products in order to meet the demand of ZCCZ.

### **6.4.3 Lead times**

Lead times were an important order-winning CSF in the supply chains of all buyers, especially the Chinese one. Once quality and trustworthiness were ascertained, lead times were one of the most important performance requirements. Lead times scored the maximum rating, 10, on the Chinese supply chain, while Traditional buyers rated it somehow less important, at 8.7 on the ten-point Likert scale. Most suppliers highlighted that that the Chinese buyer expected the goods to be delivered "on-the-spot" and preferred multiple, ad hoc purchases rather than large batches that required maintaining large stocks.

The importance of lead times in theory conferred an advantage on suppliers located near the mining companies. Nevertheless, poor access to capital constrained investment in the stock-holding which was critical to reducing lead times. The Vice Deputy Manager of ZCCZ explained that "ZCCZ would prefer to use local suppliers because of lead times, Zambians would get the first preference" (Z. Baosen, 11.2009). In general, short lead times enabled buyers to outsource stock-holding of spares, materials and components. Buyers were incentivised to outsource stock-holding only if they could rely on fast supplier lead times. Moreover, short lead times defined the competitiveness of maintenance and repair services providers, especially of an emergency nature, because damages to equipment could cause production to stop, or risks to worker health and the environment.

### **6.4.4 Price competitiveness**

Price is particularly important in mature phases of the product life cycle. For some products, buyers would ensure that the price falls within an acceptable range, in

which case price is an order-qualifier. When buyers select on the basis of the lowest-priced goods or services, price is an order-winning CSF (Hill, 2000, p. 53).

Price was one of the two CSFs in which Traditional and Chinese buyers differed substantially. Traditional buyers rated price 9.7 on the ten-point Likert scale - more important than quality (9), lead times (8.7), trust (9) and reliability (9). Within the context of quality and trust, price became an order winning CSF.

By contrast, price was rated 7 by the Chinese buyer, significantly lower than quality, lead times, trust and reliability (each received a 10). This reflected a shift for the Chinese buyer from a predominantly price-driven supply chain to a quality-driven one. The Chinese buyer nevertheless further qualified this requirement. For non-critical supply links, the supply chain was markedly more price-driven and the buyer was willing to compromise on quality. Indeed, non-critical suppliers indicated that price was more important than quality and that their prices were compared to those of Chinese competitors: “the Chinese asked us to lower price to the levels of imported Chinese boots” (Supplier 49, 12.2009); “they look for the cheapest sources, and don’t listen to [our] advice on the specifications” (Supplier 8, 11.2009). By contrast, for critical supplies, price was not an order-winning CSF. The manager of an OEM subsidiary noted, “once you have built the trust relationship, then price does not become a critical issue....The Chinese managers still have to show their superiors that they got a discount, but they become reasonable when you explain why prices can’t be lowered” (Supplier 12, 11.2009).

The variance in the rating of price as a CSF can be attributed to underlying differences in corporate response to the 2008 price crisis. All but one of the Traditional lead commodity firms were listed on the Australian Securities Exchange, London Stock Exchange, Toronto Stock Exchange and/or Johannesburg Stock Exchange, and thus faced with shareholder value responsibilities and transparency requirements. Facing falling copper prices and a credit crunch, the mining industry generally resorted to production cuts, cost cutting measures and halting new investment projects (ICSG, 2008). Table 27, drawn from company reports for 2009, illustrates responses by non-Chinese mining companies in Zambia. Due to the price

crisis, higher wages (16 percent increase) and higher fuel and steel prices, 2009 was a difficult year and these costs were only partially offset by the depreciation of the Zambian kwacha. Apart from Lumwana, which started production in 2009, all of the mines focused on cutting production costs, in one case by a sharp 52 percent. Moreover, some mines were put on care and maintenance (ICSG, 2009). As a result, the supply chains of the Traditional buyers became increasingly price driven: “we are cutting costs everywhere we can, especially from the last quarter of 2008...we are more focussed on price than usual. For critical items, there are still quality and cost benefits considerations....We asked for discounts even from the OEMs” (Buyer 6, 11.2009).

Table 27 Anti-crisis corporate strategies by selected mining companies (2009)

Company	Response to the crisis	Production costs
Chibuluma	Cash flow improvement Increased production volumes Lower capital expenditures (largest capital investment were undertaken in previous years)	Cash costs increased from US\$ 2663/t in 2008 to US\$ 2793/t in 2009
Kansanshi, Bwana Mkubwa	Cost saving programme, lower input costs Increased production volumes	Production costs in 2009 at US\$ 0.99/pound, 15% lower than in 2008
Konkola Copper Mines Plc (KCM)	Cost curtailment; Renegotiate all contracts for supplies, commodities and logistics Increase recoveries Shut down of high-cost Nkana smelter Reduced manpower by 2000 workers Continuation of construction of new smelter and Konkola Deep Mining Project	Production costs decreased from 292.8 cent/lb in 2008 to 140 cents/lb in March 2009
Lumwana Copper Project	Improving suppliers' after-sale services for capital equipment	US\$ 1.49/pound (1st year of production)

Source. Metorex (2010a, 2010b); KCM (2010a); First Quantum Minerals Ltd (2010a); Equinox (2010a)

By contrast, the Chinese mine had a counter-cyclical expansion, with the acquisition and re-capitalisation of a new mine and continued investment in the ZCCZ. The Chinese mine did not cut production or development projects, and neither it nor the South African buyer retrenched workers (Haglund, 2009b; Li, 2010; Lungu and Kapena, 2010)<sup>73</sup>. Instead, they focussed on improving the efficiency, quality and

<sup>73</sup> The South African lead commodity firm made significant investment in the past to align its operational management to principles of operational leanness and rigid cost control. These enabled it to withstand the price crisis without having to downsize employment levels.

reliability of their suppliers. For this reason, price was weighted much less in their rating of CSFs.

#### **6.4.5 Capacity to produce requested volumes**

Chinese and Traditional buyers rated supplier capacity to produce the volume requested as moderately important: 7.7 by the Chinese buyer, and 7.7 by the Traditional buyers. Supplier ability to produce the requested volume benefited buyers in two ways: it reduced lead times, and avoided breaking down one large order in multiple smaller orders, thus reducing transaction costs (paperwork, monitoring).

For specific supply links, however, other considerations superseded the firm's capacity to supply large volumes. One such case concerned OEMs. As orders piled up, the parent companies were not able to supply their Zambian subsidiaries and distributors within short lead times. When the cost of switching to other brands was too high, buyers had to accommodate such supply-side constraints and this CSF became less relevant. In 2010, Kansanshi output declined by 32 percent compared to the previous year due to a lack of equipment availability (GFMS, 2011). Another example was mechanic engineering services. Supply capacity in terms of volume was low, but services could not easily be imported.

#### **6.4.6 Learning and innovation capabilities**

Innovation is a key source of competitiveness for mining capital equipment suppliers. OEMs operated at the technological frontier and invested in incremental innovation through substantial R&D activities and cooperation with mining companies across the globe (cf. sub-sections 4.2.3 and 4.2.4). In specific supply links, smelting equipment or shafts for underground mining for example, equipment was imported and installed by the OEMs. At later stages, these OEMs would export spares and maintenance and repair services, without localising any activity. For other capital equipment, such as drilling equipment and underground locomotives, OEMs relied on subsidiaries and distributors in Zambia. Whilst the most knowledge intensive stages of the production process were located overseas, local supply firms had to

develop technological absorption capacity. Technical know-how was required for assembly, marketing and servicing activities. All buyers expected OEM subsidiaries to possess such capabilities.

There were other supply links in which firms did not operate at the technological frontier. Examples include routine services such as ventilation system maintenance, or technologically mature and standardised products such as nuts and bolts and some PPE. For these supply links there were still opportunities to improve firm competitiveness via marginal improvements in the production process, for example by adopting computerised systems, acquiring technical expertise to advise customers on the most suitable solution for their mining operations, or organisational innovation that assisted customers with after-sale services or by reducing transaction costs. An illustrative example was provided by a firm supplying reagents (Buyer 6, 11.2009). The firm re-organised the supply chain for the products, sourced technical experts to provide evaluation and advisory services, acquired a stockholding facility in Namibia and took over the buyers' contractual obligations with the Chinese manufacturers. This cut transportation and transaction costs and reduced lead times for the buyers.

For Traditional buyers, learning and innovation capabilities were important. Their rating of dynamic capabilities equalled 8 on the ten-point Likert scale. Irrespective of the technological intensity of the supply links, this was an order-winning CSF. A buyer complained that "local suppliers can't provide technical advice, recommending new products which are better suited for [the mine] operations" (Buyer 2, 11.2009). By placing emphasis on innovation, Traditional buyers created incentives for suppliers to innovate and upgrade, as these efforts would be rewarded in the market place.

Compared to Traditional buyers, the Chinese buyer attached less weight to learning and innovation capabilities. These were rated 6 on the Likert scale, the second lowest rating for the Chinese buyer. The implications were two-fold. Firstly, the Chinese buyer failed to recognise the benefits accruing from these capabilities. Indeed, for the Chinese lead commodity firm, seeking advice from suppliers and

engaging in joint problem solving were the exception rather than the rule (see Box 2) Secondly, this reduced incentives for suppliers to upgrade and innovate. They focussed instead on quality, price and lead times.

#### **6.4.7 Supplier flexibility**

Flexibility has been defined as the capacity of suppliers to supply small batches or quickly adapt to changes in production lines. Supplier flexibility was a comparatively less important CSF in both Traditional and Chinese supply chains. It was rated 5 and 5.3 by Chinese and Traditional buyers, respectively. This can be explained by the fact that these mining companies operated on the basis of large volumes and economies of scale. This translated into large, standardised orders that required minimal production flexibility by manufacturers and by local distributors. There were only a few cases where buyers required smaller, combined batches of non-critical products such as pharmaceutical products or stationary. These products were typically supplied by small importing firms that were able to cater to small orders or a wide range of products.

#### **6.4.8 International standards**

International standards, both mandatory and voluntary, have been found to be important in other GVCs in determining entry barriers for local producers and their competitiveness in global markets.

In terms of product-related standards, in critical supply links such as mining capital equipment and reagents, ISO certification was required. This was an order-qualifying CSF for all the groups of buyers. Buyers imported ISO-certified products or sourced only from OEM subsidiaries, distributors, and agents capable of supplying ISO-certified products. Because the manufacturing stages of these GVCs were located outside Zambia, the effort to meet certification requirements was made at the manufacturing facilities abroad. This implied that product certification per se did not result in the upgrading of local suppliers. What did contribute to upgrading processes was the relationship between parent companies and their distributors, discussed in

sub-section 7.2.2, and the process-related standards that local companies were required to put in place.

Traditional buyers were the only group that required their supply chain to comply with process-related standards. Suppliers were expected to maintain minimum levels of quality, environmental and, occupational health and safety management systems. This was monitored through supplier auditing, which, as explained in the next chapter, was becoming more common. Nevertheless, apart from a few exceptions, standards did not have to be international and suppliers did not have to acquire third party certification.<sup>74</sup> In other words, certified compliance with international standards did not seem to provide firms with a significant competitive advantage over firms with good management practices, audited by the buyers.

The exceptions concerned OEM subsidiaries, especially if also involved in contractor work, which instead were required to meet international standards. The relevant international standards were ISO 9001.2008, concerning quality management standards; ISO 14001.2004, concerning environmental management; OHSAS 18001 concerning occupational health and safety management. In these cases, certification was obtained from the South African Bureau of Standards or other recognised bodies.

Social standards, for example on child labour, were included in the Traditional buyers' CSR policies and passed down to the supply chain through contracts. However they were not enforced.

Table 28 below summarises the nature and enforcement of supply chain parameters in Zambia's mining value chain. Firm ownership explains the variance in the content of internal value chain parameters (CSFs) and variance in the application of process-related standards and social standards.

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<sup>74</sup> One buyer explained that the mining company ISO certification required it to audit both first- and second- tiers suppliers, and that was the direction for the future (Buyer 8, 11.2009).

Table 28 Nature and enforcement of supply chain parameters in Zambia's mining value chain

	CSFs	Product standards	Process standards	Social standards
Source of parameters	Internal to the chain	ISO	Informal good practices  ISO 9001.2008, ISO 14001.2004, OHSAS 18001	Child labour
Who applies the parameters	Variance between Chinese and Traditional buyers	All buyers	Traditional buyers only	Traditional buyers only
To whom the parameters apply	All suppliers, with some differentiation between critical and non-critical supply links	Only for mining equipment, spares and reagents	All suppliers  OEMs subsidiary	All suppliers
Audit compliance	Internal to the chain	Third party certification bodies	Internal to the chain  Third party certification	Not enforced

Source. Author's fieldwork data.

## 6.5 Relationship with Suppliers

There are two dimensions of the buyer-supplier relationship that matter for local upgrading trajectories. The first one relates to how buyers monitor supply firm compliance with the parameters set in the value chain. The second one concerns how lead firms assist suppliers, directly or indirectly, in meeting the value chain requirements (Kaplinsky and Morris, 2001, 29-32). Assistance provided to suppliers can take many forms (Dunning and Lundan, 2008b, p. 574-575). Information exchanges on market conditions and future investment intentions build suppliers' knowledge of the market. Pricing assistance takes place when, in the course of negotiations, suppliers are helped with product costing. Technical assistance can target R&D, production facilities, tooling, quality control, labour training, inventory management, inspection and testing procedures, and so on. Buyers can provide financial assistance through loans, pre-financing, special price agreements or assistance in accessing capital markets. Procurement assistance helps suppliers to source capital equipment and inputs at competitive prices. Managerial and organisational assistance aims to enhance supplier financial, accounting and

management control procedures and adapt their organisational structures and processes to global standards.<sup>75</sup>

In Zambia's copper value chain, the nature of relationships between buyers and suppliers varied considerably depending on lead commodity firm ownership along ownership patterns (Table 29). Traditional buyers, on average, had longer-term relationships with their suppliers.<sup>76</sup> As a response to the economic crisis, Traditional buyers re-organised their supply chains to meet two objectives: to increase and improve outsourcing, and to exclude briefcase businessmen. Stock-holding increased inventory and warehousing costs, tied up working capital, and was not part of the buyer's core business. In order to outsource this function, buyers focused on developing long-term relationships with a selective number of suppliers. As one buyer explained, "we are trying to reduce the supply base so that we can develop quality suppliers" (Buyer 8, 11.2009). After the price crisis, the buyer's strategy changed: "we want to support genuine businesses, not briefcase businesses...that we want them there tomorrow... those which are adding value" (Ibid.). The key implication of a more selective and supportive approach to supply chain management was that value-addition had to increase in the local supply chain. As elaborated by another buyer: "There must be some value addition going on in the supply chain....A supplier cannot win on prices, because [the mining company] has the clout to negotiate good prices with any supplier around the word. We don't have to go through middlemen" (Buyer 6, 11.2009). The buyer wanted to move away from sourcing from general dealers and work with specialised firms that were able to hold stocks and acquire technical expertise. Traditional lead commodity firms were aligning their supply practices to global practices (Gibbon, 2008; Palpacuer *et al.*, 2005) that were becoming predominant also in the global mining sector (Walker and

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<sup>75</sup> Dunning and Lundan (2008b) also included institutional assistance, which takes place when "the investing company helps to provide and/or upgrade the incentives structures and enforcement mechanisms, which in turns affects how well the local partner is able to benefit from and efficiently utilise the other forms of assistance on offer" (p. 575).

<sup>76</sup> One buyer further elaborated on its strategy. In supply links with limited suppliers' competition, he would prefer long-term relationships to ensure suppliers tied their resources to the supply chain. In supply links with more contestants, the buyer would switch suppliers often, with the objective of diversifying risks and preserve high levels of competition.

Minnitt, 2006). These required buyers to focus on core competence, reduce the size of supply networks to fewer, bigger suppliers, set highly detailed and demanding standards for core suppliers, and intensively monitor supplier performance.

Table 29 Nature of buyers-suppliers relationships

Long-term relationship	Arm's length relationship
<p>Traditional buyers Formalised, selective Direct and indirect cooperation for supply chain upgrading</p> <p>Chinese buyers For critical supply links: trust-based, informal agreements For non-critical supply links: arm's length relationships No cooperation</p>	<p>Indian buyers Arms' length relationships No cooperation Late payments, low trust</p> <p>Small buyers Personalised, but arm's length relationships Some cooperation with local manufacturers, but no resources for upgrading</p>

Source. Author's fieldwork data

As discussed in section 5.3, briefcase businessmen were excluded from the supply chains. Traditional buyers concluded forward purchasing agreements (FPAs) with selected suppliers. Such agreements tied buyers to purchase an agreed amount of goods or services from the supplier, for a relatively long-term period. It was a high trust-content relationship, as one buyer put it: "the expectations are short lead times on the supplier side and a commitment on constant quantity usage on the buyer side" (Buyer 2, 11.2009). The contract had to be complied with and at the end of the year the buyer would purchase all the agreed quantity "to ensure that you don't kill your suppliers" (Ibid.). Whist this process was highly selective (Box 3), it was also more conducive to foster upgrading processes as suppliers could plan investment in stock levels, improve inventory management processes on the basis of agreed prices and volumes, and had the collateral to access working capital from the bank. This was critical for most suppliers because access to working capital is a key entry barrier for local firms wishing to move into inventory management (Gibbon, 2008). With the exception of sole distributors and OEM subsidiaries, local suppliers could not access credit facilities from the parent companies. FPAs coupled with good payment records from Traditional buyers relaxed these capital constraints.

Box 3 Forward Purchasing Agreements: exclusion and upgrading

Long-term contracts helped suppliers plan in advance and invest for upgrading. Building selective, long-term relationships, nevertheless, implied that other suppliers exited from that particular supply link. This finding was consistent with Gibbon's argument (2008) that global procurement practices create additional entry barriers and lead to differentiation and exclusion processes.

A Traditional buyer re-organised its supply chain for PPE in 2001-02 by outsourcing procurement functions for all equipment to an intermediary firm. The intermediary firm purchased from local manufacturers and from overseas. One of the suppliers interviewed was sub-contracted by this intermediary firm. The supplier was able to increase its profit margins by charging the standard price with no discounts, and was able to plan production and investment in advance.

In 2004 another company was contracted by the mining company to coordinate PPE supplies. This new company shifted to another local manufacturer, also included in our sample. The latter was able to expand its market and undertake process and product upgrading. The first supplier, on the other hand, found it very difficult to re-enter the supply link. In sum, there was a trade-off between the number of participants in the supply chain and the opportunity to upgrade.

Traditional buyers monitored supplier compliance with supply chain parameters directly. The exception to this was the use of contractors for ore extraction activities, which meant that these coordinated procurement of some equipment and consumables. Also, some Traditional buyers outsourced the coordination of transport services and in one case, PPE, to third parties. These foreign, specialised companies sourced from both local and overseas suppliers.

If suppliers failed to meet supply chain parameters, Traditional buyers tended to engage suppliers to find solutions and, depending on the circumstances, resorted to contractual financial penalties. Respondents also mentioned a "three strikes system", whereby suppliers were given another two opportunities before exclusion from the supply chain. Only for serious breaches such as fraud or lack of compliance with safety regulations would exclusion would take place immediately.

Traditional buyers cooperated with their suppliers directly and indirectly. Two out of three buyers did both. The type and frequency of direct cooperation are shown in

Table 30. Buyers engaged consistently in intense information exchange flows and negotiations. They also provided advance payment to improve delivery reliability, and assisted suppliers with transport to reduce lead times. By transporting products domestically and from South Africa, buyers reduced lead times and transport costs because they consolidated different batches of supplies and dealt with freight, customs etc. Less frequently, they would assist suppliers with product quality improvement, jointly running quality tests and providing quality feedbacks. As discussed previously, there was a preference for longer-term contractual relationships.

Buyers rarely engaged in deeper forms of cooperation, such as joint product development, staff training, technical upgrading and development of quality assurance systems. There was one exception, however. One of the three buyers assisted suppliers to develop internal quality assurance systems by sending qualified personnel to audit supplier structures and processes and provide technical recommendations.

Table 30 Type and intensity of Traditional buyers' cooperation with their suppliers (frequency)

	Not at all	Sometimes	Consistently
Information exchange		1	2
Negotiation of payment and delivery conditions		2	1
Joint product development	2	1	
Cooperation for product quality improvement		3	
Actions to improve delivery time		1	2
Actions to improve delivery reliability	1		2
Actions for adapting production to smaller / larger batches	2	1	
Change suppliers less than before		2	1
Cooperation in technical upgrading	2	1	
Cooperation in staff training	3		
Cooperation in developing quality assurance system	2	1	

Source. Author's fieldwork data. Note. n=3

Traditional buyers also cooperated with suppliers indirectly, through the IFC SDP (IFC, 2005, 2007). Buyers co-funded the programme, which pursued two main activities: information sharing with suppliers on mining company procurement procedures and CSFs, and the provisions of assistance to a selected group of

manufacturers. These manufacturers received an initial one year supply contract that could be extended based on good performance. They also were assisted with product development, the formulation of a business plan and the development of quality assurance systems.<sup>77</sup>

The Chinese buyer was consistently reported by suppliers to be a “very good customer” and “results-oriented”. The buyer engaged in tough price negotiations, but paid on time and reduced bureaucracy to a minimum. In critical supply links over time, price negotiations ceased to be the only determinant of the relationship, with tacit agreements that good performance be rewarded with more orders. Nonetheless, for non-critical supply-links, arm’s length relationships prevailed. The Chinese buyer monitored the supply chain directly, with no third party involved, including contractors. Suppliers failing to meet parameters were excluded with no other opportunity.

It is worth noting that the Chinese buyer did not provide any direct or indirect assistance to suppliers. Indeed, the buyer engaged consistently only in negotiations regarding payment and delivery times, and did not engage in any other forms of cooperation indicated in the questionnaire. This was corroborated by two examples extracted from the interviews with suppliers. In identifying its competitive strength, the manager of one of the most successful firms in the Chinese supply chain highlighted “the capacity we have, we move in and we move out, we’ll not ask for advance payment” (Supplier 24, 11.2009). The respondent explained that it was important not to request any form of assistance from the Chinese buyer. The manager of another firm inserted in both the Chinese and Traditional supply chains explained that he had good relationships with all buyers. With the Chinese buyer, the firm worked on small orders and was required to offer very short lead times. With the Traditional buyer, the firm had one year contract and benefitted from the IFC SDP (Supplier 19, 11.2009).

Underlying the variance in governance types between Traditional and Chinese buyers was a different level of internalisation of supply chain development. The

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<sup>77</sup> The South African lead producer was the only firm in the sample not to participate to this programme.

Chinese mines relied heavily on government-to-government intermediation (Buckley et al., 2008; Haglund, 2009a; Kragelund, 2009). Zambia and China concluded five cooperation agreements spanning the multi-facility economic zones, cooperation in the mining sector, infrastructural projects, and cultural exchanges (ZDA, 2010b). The Chinese buyer did not see local supply development as part of its corporate strategy and did not invest in embedding itself into the local cluster. It was not registered in the Chamber of Mines or active in the Kitwe Chamber of Commerce and Industry, and did not participate in the IFC SDP. Localisation of upstream linkages, in its view, was the responsibility of the Zambian government and was to be catalysed by investment in the ZCCZ.

Conversely, lead commodity firms from developed countries and from South Africa foresaw local supply chain development as part of their Corporate Social Responsibility (CSR) Policy, including the need for their suppliers to meet health, safety and environmental standards (Company Reports for 2009). Indeed, two out of three Traditional buyers indicated that, whilst the supply chain was driven by efficiency and profit-maximisation, there was an element of CSR behind the decision to favour local suppliers in some non-critical areas, such as civil construction of local schools. No such policy was mentioned by the Chinese buyer.

## **6.6 The Evolution of a Value Chain: From Traditional to Indian ownership**

Similarly to the Chinese buyer, the Indian lead commodity firm was more vertically integrated than Traditional buyers. When one of the largest OEM subsidiaries downsized its workforce due to the economic crisis, the mine recruited the skilled workers to build an in-house maintenance unit (Supplier 9, 11.2009). The Indian buyer did not appear to pursue backward integration with home country suppliers. From the acquisition of KCM in 2004 until 2009, imports of mining capital supplies from India ranged between 3 and 5 percent.

Entry barriers to the Indian supply chain were low, particularly for non-critical supply links. The Indian supply chain was increasingly price-driven and, in 2008/2009, the

mining company experienced liquidity problems that delayed payments to local suppliers by several months. In order to avoid disruptions in the supply of goods and services, the Indian buyer switched to new suppliers during this period. This was relatively easy to do for non-critical supply links, which were characterised by low quality and reliability entry requirements and intense competition between local firms, including briefcase businessmen. By maintaining low entry barriers, Indian buyers were also able to negotiate lower prices with new suppliers who were eager to enter the market, and with regular suppliers who were willing to make sacrifices to remain in the supply chain.

Whilst the rating of CSFs by the Indian buyer was not available, supplier respondents elaborated at length on the parameters of the Indian supply chain. There was a remarkable level of consistency in the data extracted from the interviews. According to 40 out of 50 suppliers,<sup>78</sup> the Indian supply chain was exclusively price-driven. The suppliers largely agreed that quality, trust and learning and innovation capabilities were not important.

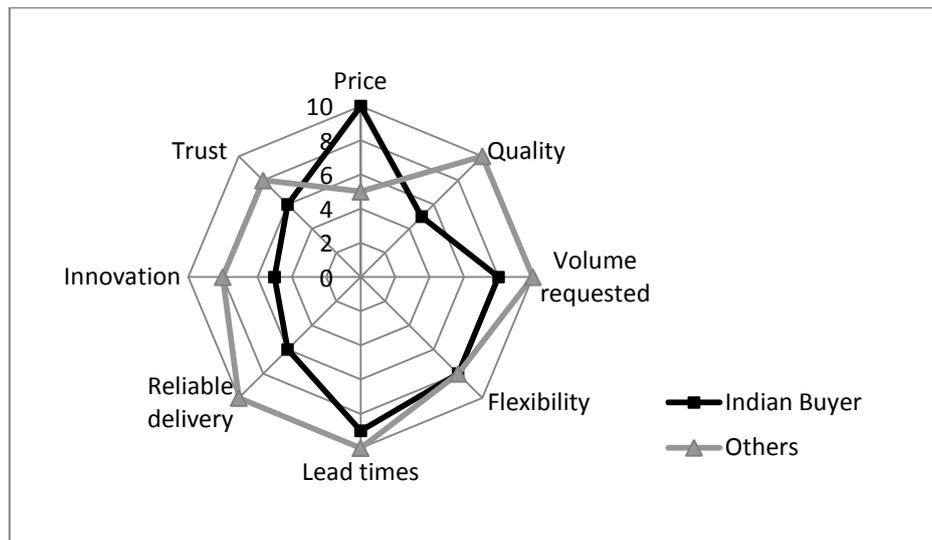
Respondents from a manufacturing firm and a service provider argued that the CSFs applied by Indian buyers were very different from the other buyers and formulated a comparative rating of the Indian and non-Indian supply chains.<sup>79</sup> In Figure 13, the manager of the manufacturing firm argued that on the Indian value chain price (rated 10 on the ten-point Likert scale) and lead times (9) were the order-qualifying CSFs. Quality, learning and innovation capabilities and trust received very low ratings.

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<sup>78</sup> The remaining 10 firms either did not respond (3) or did not make business with KCM or did not have a negative opinion (7).

<sup>79</sup> Respondents argued that there were differences between Chinese and Traditional buyers, but wanted to explain what set apart the Indian buyer.

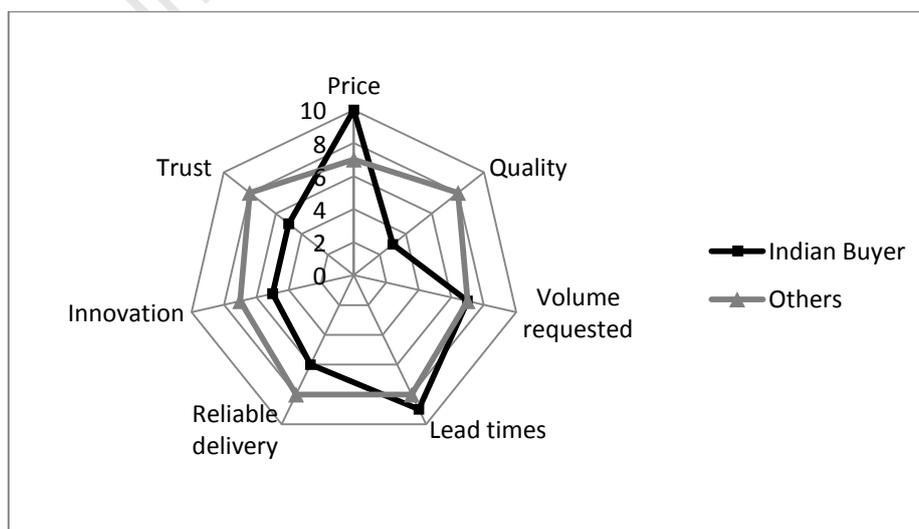
Figure 13 Comparative rating of CSFs for the Indian and non-Indian supply chains, by a manufacturing firm



Source. Author's fieldwork data. Note. n=1

In Figure 14, the manager of the service supplier rated price and lead times identically to the manufacturer. Again, trust, and learning and innovation capabilities were marginal, but in his judgement, quality was even less important (rated 3 on the Likert scale). The contrast with the requirements of non-Indian buyers was stark, in particular with reference to quality, reliability, trust, and learning and innovation capabilities.

Figure 14 Comparative rating of CSFs for the Indian and non-Indian supply chains, by a service provider



Source. Author's fieldwork data. Note. n=1

Competing exclusively on price was difficult for Zambian suppliers operating in a high cost environment. There was also no incentive to invest in dynamic capabilities because the Indian buyer was not interested in value-added products. The Indian buyer relied on arm's length market transactions: low trust, no brand or supplier loyalty, high propensity to switch suppliers and no cooperation.<sup>80</sup> This emphasis on price-only competitiveness meant that Indian buyer was also unwilling to enter into after-sale agreements, which were critical to support the upgrading of service providers into stock-holding functions, and maintenance and repair functions. A respondent explained: "KCM buys with on the spot transactions, it's [been] 4 years they have not been keen on entering into contracts – it is a problem for [the firm], we cannot negotiate every time for a small order. KCM does not look into after-sale, they just look at prices" (Supplier 4, 11.2009). Reciprocal trust was low due to poor information flows and widespread corruption. Suppliers identified price negotiations as the main content of their relationship. In fact, the Indian buyer engaged in multiple price negotiations for the same transaction. These negotiations were unbalanced given the suppliers' high transactional dependency on KCM. The manager of an engineering firm explained that "we have less than one percent of returns per year, which should convince KCM to trust us, but they spend hours negotiating" (Supplier 14, 11.2009). Nevertheless, he continued, "we cannot afford to lose KCM, while KCM can afford to lose us" (Ibid.). In another respondent's view, "at every stage of the game, they want to gain something, even after you agreed on an initial contract" (Supplier 38, 11.2009). Nevertheless, he had to accept because "you, as a supplier or contractors, are desperate for money, you have borrowed from the banks, from individuals, and they want their money back" (Ibid.). Suppliers reported that the Indian buyer was also abusing contractual financial penalties in order to reduce prices and did not provide suppliers with an opportunity to discuss problems, but rather rescinded contractual relationships immediately. The underlying reason, according to few suppliers, was that the Indian buyer lacked the solid technical experience of other mining houses. They pursued a short-term, profit-maximising perspective which left no room for investment in an efficiency- and quality- driven

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<sup>80</sup> Only one firm inserted in the Indian value chain reported cooperating with the buyer in sourcing raw materials.

supply chain. A respondent explained “Vedanta management has a trader mentality, it’s all about negotiations and discounts” (Supplier 8, 11.2009).

The cost-cutting measures undertaken following the 2008 economic crisis squeezed suppliers even further. Payments were delayed by as much as six months. Only critical suppliers (OEMs, fuel companies) managed to be paid, by coordinating efforts and threatening to suspend supplies. Low profit margins meant that many suppliers “work for survival not for expansion” (Supplier 30, 11.2009). Responses from other respondents corroborated this view: “we were like beggars” (Supplier 47, 11.2009); “[the Indian buyer] has really spoilt the Copperbelt” (Supplier 37, 11.2009).

A recurrent theme emerging from the interviews was the contrast with supply chain management by the previous owner, AAC, which ran KCM from 2000 to 2002. AAC developed trust-based relationships with the suppliers, including practices such as cooperation on quality management, open books accounting, open door policy, joint product development and promotion of linkages between South African manufacturers and local firms. A manufacturer recalled: “we discussed the cost formulas, cost control, all those things because their [AAC] focus was that you need to add value, you need to expand, because you are in business. You should not supply at a loss” (Supplier 30, 11.2009). The emphasis on price was different, he continued: “they [AAC] would tell you with this price you quoted, you cannot do the job, it’s low...your price is below our estimates, if we give you the job, something is going to suffer, quality” (Ibid.). The manager of a service provider agreed: “there is a big difference with Anglo-American. Anglo-American was experienced in terms of negotiations and running the mines....The Indians have no background on mining...Pro-active maintenance requires planning and resources, which [the Indian buyer] does not do” (Supplier 47, 11.2009). AAC also set up the first supplier development programme in the Copperbelt. The Indian lead commodity firm inherited it and completed it, but this was not followed up by orders to the suppliers as envisaged by the programme. Neither was supply chain development included in its CSR Policy. Similarly to the Chinese lead firm, the buyer failed to internalise supply chain development in its own long-term strategy. The Indian buyer did not

provide direct or indirect assistance, and its supply chain management negatively impacted supplier incentives and resources to upgrade.

## 6.7 Does Size Matter?

Small-scale mines locally sourced between 35 and 80 percent of their procured costs.<sup>81</sup> In absolute terms, the value of purchases by small-scale mines was low because they did not require high-level capital investment such as hydraulic equipment, pumps and valves used in underground mining, and because they had limited access to capital. Nevertheless, in relative terms, they relied heavily on the local supply chain. This was partly explained by the fact that, rather than importing equipment and spares, small-scale mines hired equipment from local firms. Equipment hire, rather than purchase, became more prominent following the global economic crisis.<sup>82</sup>

Small-scale mines, both foreign and Zambian-owned, had no formal procurement system and the buying functions were held by the owner/manager. Entry barriers to their supply chains were low, as buyers pro-actively searched for suppliers, “shopping around” for the best quality/price in Zambia and South Africa. They selected suppliers through a process of trial and error: one buyer reported testing products from up to ten suppliers before selecting one (Buyer 11, 12.2009). Entry for new entrants and new products was eased also by low levels of brand loyalty. During the 2008/2009 economic downturn, one buyer was approached by a Chinese mining OEM. This OEM found it difficult to access the supply chain to Traditional buyers. Given its offer of a lease agreement with discounted interest rates and longer repayment periods, the small-scale buyer switched away from its US OEM to this new supplier.

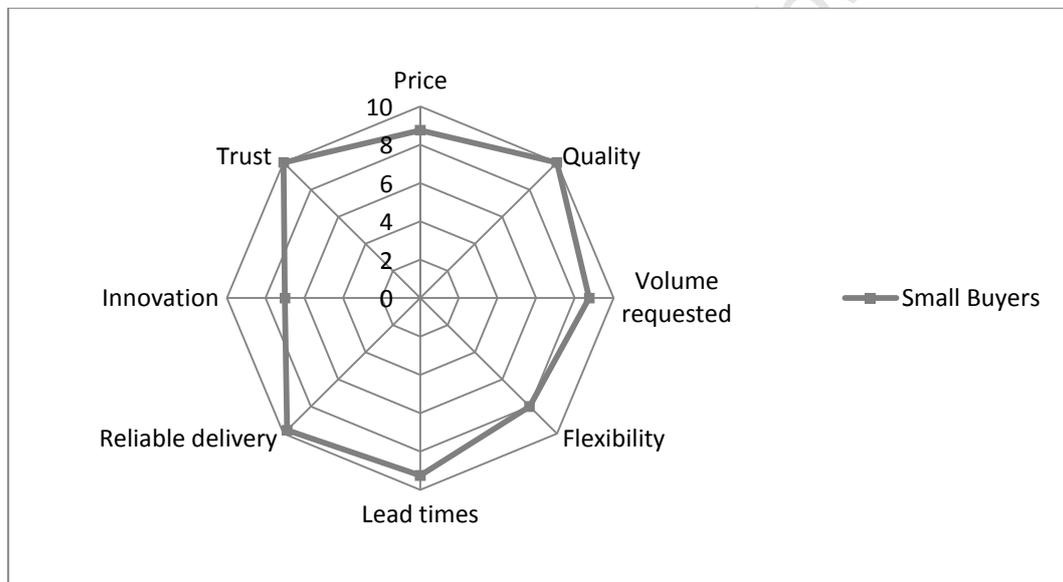
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<sup>81</sup> Four small-scale mines surveyed responded. Data refer to the share of local content in their annual expenditures, both capital and operational, with limited disaggregation by type of expenditure.

<sup>82</sup> The crisis forced three out of four buyers to re-organise their supply chain with regard to OEMs, by relying on new Asian suppliers or by leasing rather than purchasing equipment.

Small-scale mining was highly price sensitive (cf. sub-section 4.3.3). Their rating of CSFs on the Likert scale highlights that they were demanding customers (see Figure 15). Except for learning and innovation capabilities, ratings ranged between 8 and 9 points. They also attached significant weight to supplier capacity to supply small batches or adapt quickly to changes in production lines, rated 8 on the ten-point Likert scale. This was explained by the size of their operations and their limited liquidity, which caused them to rely on continuous, small-sized orders from their suppliers. They also had higher levels of engagement with local manufacturers. Manufacturers indicated that small buyers were very demanding and required them to fulfil small orders, within short lead times, at high quality standards.

Figure 15 Rating of CSFs by small-scale buyers



Source. Author's fieldwork data. Note. n=4

Small buyer relationships with suppliers were largely based on arm's length, on-the-spot transactions. Buyers could purchase low-value consumables in bulk, but not high-value items such as capital equipment. As might be expected, value chain governance power switched in favour of large suppliers. OEM subsidiaries, engineering firms and specialised distributors required advance payment because of the high risks involved in small-scale mining. Nevertheless, as investment in small-scale mining increased and competition from Asian OEMs emerged, local suppliers, including OEMs, had to engage in more negotiations and improve customer care. A

respondent from an OEM subsidiary explained that “initially [the OEM] lost a lot of business because they didn’t realise how price sensitive the small mines were” (Supplier 12, 11.2009). When an Asian OEM offered 20 percent price reductions to enter the small-scale mining sector, the OEM subsidiary had a “wake-up call” (Ibid.).

Small buyers engaged in joint product development with local manufacturers. The manager of a PPE manufacturing firm explained “the small mines keep us on our toes; we have to innovate and provide good quality, because small mines pay attention to what they buy. Large mines do not consider us as critical suppliers, would not pay so much attention” (Supplier 46, 11.2009). However, small mines did not have the resources for supply chain upgrading cooperation. Moreover, the President of the Federation for Small Scale Mining Associations of Zambia explained that even though access to supplies was a key constraint for small-scale mines, there had been no effort to undertake joint purchases (P. Mundia, 10.2009).

## **6.8 Ownership and Horizontal Cooperation**

Horizontal cooperation between buyers was weak, informal, and differed by lead commodity firm ownership. In general, cooperation between buyers was a fairly recent phenomenon. The Chamber of Mines, their main representative body, was re-established only in 2001. Whilst its profile was growing in terms of participation in the policy formulation process and member contributions, it was rarely involved in supply chain issues.<sup>83</sup>

As far as upstream linkages were concerned, buyers only cooperated to increase the effectiveness of the enforcement process and sanctions. From 2008, buyers shared a black list of suppliers that contravened safety regulations and engaged in fraudulent practices. Only three Traditional lead commodity firms participated in these efforts, while the South African lead commodity firm did so informally, through contacts between supply chain managers. The information sharing system was not

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<sup>83</sup> The exception was submission of a proposal to lower corporate taxes for local manufacturing in an effort to promote value-added activities in the cluster (F. Bantubonse, 13.11.09).

very effective given that small businesses easily changed company name and subsequent verification from buyers was weak. However, one large buyer explained that they were in the process of improving the quality of cooperation. The buyer support for the newly-established Zambia Institute of Purchasing and Supply was a step in this direction. The aim was to improve not only black listing of supply firms, but also transparency and professionalism in the supply chain.<sup>84</sup>

## 6.9 Conclusion

In this chapter, I analysed how ownership shapes value chain governance. The key finding is that firm ownership influences how buyers organise their supply chains. The first issue I discussed was outsourcing. The outsourcing strategies of Traditional buyers were informed by world class management, as they maximised outsourcing within the constraints of local supplier capability. By contrast, the Chinese lead commodity firm was more vertically integrated. Whilst this curtailed opportunities for some local supply-links, the Chinese lead commodity firm also outsourced a significant amount of services and goods to regional and local suppliers. This dispelled the long-held view that Chinese mines did not outsource locally and relied on home country suppliers. The Indian lead commodity firm pursued some level of vertical integration but also relied largely on the regional supply hub, South Africa.

In terms of supplier selection, Traditional buyers relied heavily on historical suppliers and on brand loyalty. Developing selective, high trust relationships enabled them to minimise transactions costs in the supply chain, a process facilitated by their embeddedness in the local business community. Notwithstanding this, their supply chain was also populated by many briefcase businessmen, due to political pressures to accommodate market access for local SMEs. The 2008 price crisis brought this to an end, and Traditional buyers re-organised their supply chains to increase

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<sup>84</sup> This was a statutory body established by the Zambia Institute of Purchasing and Supply Act (no.15 of Ch. IV, Section 7(1) and (2), 2003). According to the Chairman of the Copperbelt office, all procurement officials would be required, within a 5 years grace period, to register as professionals with ZIPS (D. Kabamba, 11.11.2009). ZIPS was also coordinating training for supply firms and mining companies staff and aimed to establish a Supply Chain Management Research Centre.

efficiency. The Chinese buyer relied on extensive auditing, overcoming low embeddedness in the local community through an objective selection process based on quality, reliability and so forth. The implication was that entry barriers for new entrants in the Chinese supply chain were much lower than in Traditional lead commodity firms' value chains. Entry barriers were low also for the Indian supply chain, but this, together with low performance requirements, was used strategically by the lead commodity firm to stiffen competition and squeeze the profit margins of suppliers. During the liquidity crisis in 2008/2009, this was also used to allow for the continued flow of supplies.

This chapter analysed how supply chain parameters varied according to firm ownership. I found that quality and trust were order-qualifying CSFs for Traditional and Chinese buyers. In the Chinese supply chain, nevertheless, the trust-building process was more resource-intensive because of lower social embeddedness, language and cultural barriers. In other words, while the Chinese buyer valued trust, it was more difficult for a supplier to develop a trusting relationship with the Chinese buyer than Traditional buyers. Because of this, most supplier relationships with the Chinese buyer were market-based. Lead times were an order-winning CSF for all buyers, but especially so for the Chinese buyer. The latter preferred smaller-value orders rather than maintaining a large in-house stock. The emphasis on lead times, in theory, granted a competitive advantage to firms located near the mining company. These however often lacked the capital to invest in the stock-holding required to reduce lead times.

The most significant variance between buyers existed with regard to price and learning and innovation capabilities. Following the 2008 price crisis and the credit crunch, Traditional lead commodity firms had to halt new projects, reduce production and undertake drastic cost-cutting strategies. As a result, their supply chains became increasingly price-driven. By contrast, the Chinese lead commodity firm engaged in a counter-cyclical expansion, acquiring new mining capacity, investing in the ZCCZ and improving the efficiency of its supply chain. The effort to improve its supply chain resulted in a shift from what used to be a price-driven to a quality-driven supply chain. The learning process of the Chinese buyer underlined some convergence

between the organisational practices of the Chinese and Traditional lead commodity firms.

Buyers also rated the importance of dynamic capabilities within the supply chain differently. For Traditional buyers, these were an order-winner CSF because they recognised the benefits of value-added services. Dynamic suppliers were able to provide technical advice, engage in joint problem solving efforts, and devise innovation to reduce buyer transaction and production costs. The Chinese buyer failed to see these benefits and considered these capabilities of marginal relevance for its operations. The implications for local upgrading trajectories were very important: the incentive for local supply firms to innovate and upgrade existed only in the Traditional lead commodity firm value chains.

An analysis of buyer relationships with suppliers highlighted further differences based on ownership patterns. As a response to the crisis, Traditional buyers reduced their supply networks and focused on selected suppliers which were expected to provide value added services and comply with more stringent requirements. While briefcase businessmen were excluded from the supply chain, the buyers increased cooperation with suppliers. For example, buyers directly assisted suppliers through intense information sharing, advanced payments and transport arrangements. However, this direct cooperation did not tackle other areas such as joint product development or technical upgrading. In part this was due to the fact that the mining companies did not allocate sufficient resources to their procurement departments to enable them to take on board local supply chain development issues. Most Traditional buyers also assisted suppliers indirectly through the IFC SDS, which provided technical assistance to manufacturing firms. To some extent, and unlike their Chinese counterpart, supply chain development was internalised as part of their corporate social responsibility. Traditional buyers were also the only group of buyers to engage in forms of horizontal cooperation. While the content and effectiveness of such cooperation were weak, buyers were supporting a more institutionalised and ambitious channel to cooperate - the Zambia Institute of Purchasing and Supply.

The Chinese buyer was generally considered to be a good customer. It reduced bureaucracy and promptly paid its suppliers, particularly important in an environment in which working capital was scarce. If suppliers had the capability to supply the Chinese buyer, they had opportunities to expand their businesses as good performance was rewarded with repeat orders. However, the Chinese supply chain offered no support to upgrade suppliers' capabilities. The Chinese lead commodity firm did not directly or indirectly integrate supply chain upgrading into its procurement strategy. In fact, the buyer seemed to rely more on state-to-state interaction and ZCCZ than its own corporate governance to catalyse upstream linkage development. The Chinese buyer's sanctioning of suppliers also indicates that the Chinese relationship with suppliers was market-based. Whilst Traditional buyers provided additional opportunities to a supplier that failed to meet the requirements, the Chinese buyer tended to exclude the firm and search for new suppliers.

Whilst it was not possible to collect data directly from the Indian lead commodity firm, it was possible to extract a large amount of qualitative data from the interviews with supply firms. Respondents provided largely consistent data, which pointed to a price-driven Indian supply chain, characterised by low trust and no brand or supplier loyalty. The Indian buyer operated through arm's length market transactions, similar to the Chinese buyer. However, there were also large differences between the Indian and Chinese buyers. Firstly, the Indian buyer placed little weight on quality, trust and reliability, which were important for the Chinese buyer. Secondly, whilst the Chinese buyer did not cooperate with suppliers, it had an interest in dealing with capable ones, and continuing to procure goods and services from them. Although difficult to build, the Chinese buyer aimed at trust-based relationships. The Indian buyer lacked this long-term perspective and was interested in squeezing supplier profit margins and pursuing cost-reduction at any cost. Thirdly, when the 2008 crisis hit the industry, the Indian lead commodity firm suspended payments to the supply chain, the Chinese buyer expanded investment, creating demand for local goods and services. Largely this could be accounted for by the SOE nature of the Chinese lead commodity firm compared to the Indian lead commodity firm's obligation to maximise shareholder value. However, the different behaviour of the Indian buyer compared to Traditional buyers, which were equally under pressure from capital markets to cut costs, points to a weak corporate governance in the Indian firm, both in terms of

CSR and local economic development issues, as well as internal corporate transparency (suppliers argued that this buyer had the most corrupt procurement officers).

This chapter reviewed how small-scale mines governed their supply chains. As expected, the power balance with large suppliers was reversed, as these largely dictated the terms of the transactions. Whilst the copper mining GVC was generally understood to be a producer-driven value chain, I underlined that in this specific context, the power relationship between firms may make this definition of the copper value chain less convincing. However, in relative terms, the small-scale mines value chain was too small to challenge the governance patterns established by the large mining companies. The relevance of this discussion was two-fold. Firstly, small buyers had higher degrees of local sourcing and cooperated with local manufacturers on product development and other areas. Given the price recovery from the last part of 2009, we can expect that small-scale copper mining will attract again a large number of investors. These buyers largely sourced locally and could offer an alternative market segment to local suppliers. Secondly, given their low entry barriers, these buyers could help new suppliers enter the mining supply chain. It emerged that this was already happening with Asian mining OEMs.

## CHAPTER 7

### Dynamics of the Local Supply Chain

This chapter focuses on the trajectory of local upstream linkages to copper mining in Zambia. In chapter five, I discussed the institutional framework and socio-economic context that framed the development of linkages since the 1970s. I highlighted the changes that followed the privatisation of the mining companies, and the impact, in general, that this had on the local supply chain. This included the entry of foreign firms, the demise of the manufacturing sector and the proliferation of briefcase businessmen. I also discussed the evolution of the business culture and how decades of doing business with ZCCM shaped practices and expectations that are now challenged by new lead commodity firms.

In chapter six, I moved away from the historical perspective and generalised picture, and looked at the impact of firm ownership on value chain governance in Zambia's copper sector today. By disaggregating data by firm ownership, I interpreted the dynamics of four value chains driven by Traditional, Chinese, Indian, and predominantly Zambian, small-scale buyers. In this chapter, I turn to the trajectory of local supply firms. To do so, I explore how value chain governance by the buyers impacted on local performance and upgrading processes.

I also explore dynamics of the supply firms in terms of suppliers' horizontal cooperation. This analysis unveils the institutional context of the mining value chain: the quality of social capital, the role of the state and the response of the cluster to a crisis. It is within this milieu that the Chinese, Traditional and Indian lead commodity firms' differential impact on local supply firms has to be understood.

In the first section, I look at the extent and nature of value chain misalignments between buyers and suppliers. Two dimensions are discussed: misalignment on what the supply chain critical parameters are, and misalignments on how the local supply chain performed with respect to these parameters. The second section analyses the performance and upgrading trajectory of the local supply chain on the basis of firm-level data. I discuss how the concepts of firm performance and

upgrading have been operationalised in the study. Then I turn to the four trajectories of local supply firms - growing, static, exiting and struggling - and I analyse the underlying determinants of each trajectory. Section three focuses on other cluster dynamics in terms of direct and indirect horizontal cooperation between supply firms, the role of the state, and the experience of the cluster in responding to a crisis. Lastly, section four briefly looks at four major external constraints to upstream linkages development in Zambia: skills, technology, capital markets and infrastructure. The last section summarises and concludes.

## **7.1 Value Chain Misalignment**

### **7.1.2 Value chain misalignment on supply chain parameters**

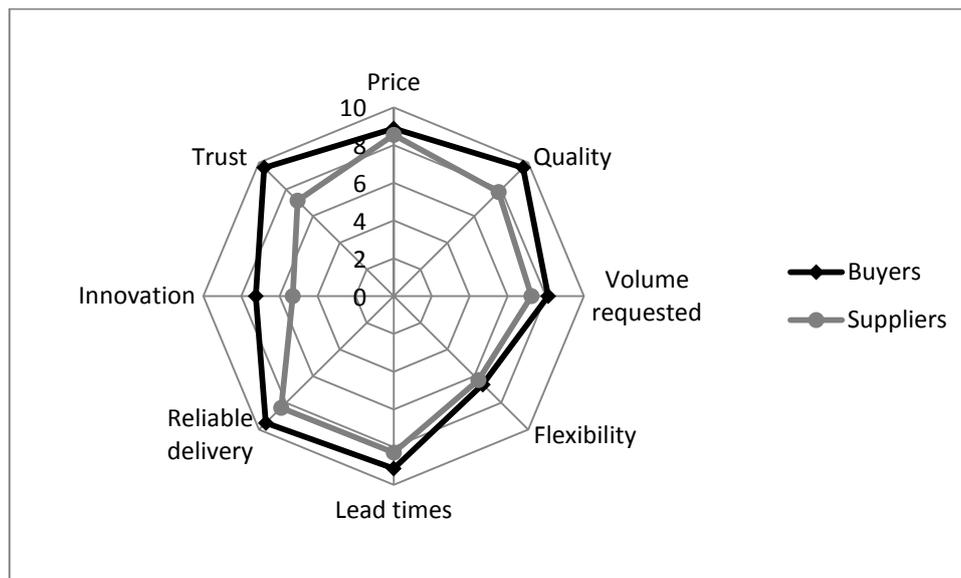
A crucial indicator of value chain efficiency is given by the degree of alignment between buyers' and suppliers' understanding of the CSFs and the performance of the supply chain in this respect. To start with, I consider the buyers' and suppliers' understanding of value chain parameters. In order to assess this, I triangulate their ratings of CSFs (Figure 16). The findings pointed to significant value chain misalignment, which reflected scarce capacity on the suppliers' side to "hear" the parameters set by buyers, and on the buyers' side to communicate their needs to suppliers.

Suppliers argued that the mining supply chain was mainly price-driven. Because this view did not differentiate between buyers, it was likely to be heavily influenced by the Indian supply chain which was disproportionately price-driven. Indeed, suppliers identified Traditional buyers as the less price-driven and Indian buyers as the most price-driven. Suppliers underestimated the weight attached by buyers to two order-qualifying CSFs (trust, product quality) and to one order-winning CSF (firms' learning and innovation capabilities), rating them, on average, between 1.8 and 2.5 points less than buyers on the ten-point Likert scale.<sup>85</sup>

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<sup>85</sup> Triangulating small-scale buyers and suppliers views did not yield different results, except for one parameter. On flexibility, suppliers underestimated by 1.7 points on the Likert scale the weight

Figure 16 Comparative rating of CSFs, by all groups of buyers and by suppliers



Source. Author's fieldwork data. Note. n=54

Taking a closer look at the different groups of buyers reveals variations in value chain misalignment (Figure 17).<sup>86</sup> Suppliers underestimated the weight attached by Traditional buyers on learning and innovation capabilities which, on average, were rated by suppliers almost 3 points less on the Likert scale than by Traditional buyers. Data from the interviews confirmed that suppliers largely failed to understand that Traditional lead commodity firms required price competitiveness and innovation capabilities. In the suppliers' view, Traditional buyers demanded high quality for which they were willing to pay higher prices. Quality was considered an order-winning CSF. Instead, Traditional buyers were re-organising their supply chains in order to procure from fewer, selected firms, capable of providing value-added services and keeping up with innovation. But they were willing to pay only marginally higher prices, very far from the very high mark-ups expected by local suppliers. For example, it was no longer sufficient for a local agent to distribute ISO-certified products. In order to win orders, the firm had to offer stockholding or after-sale

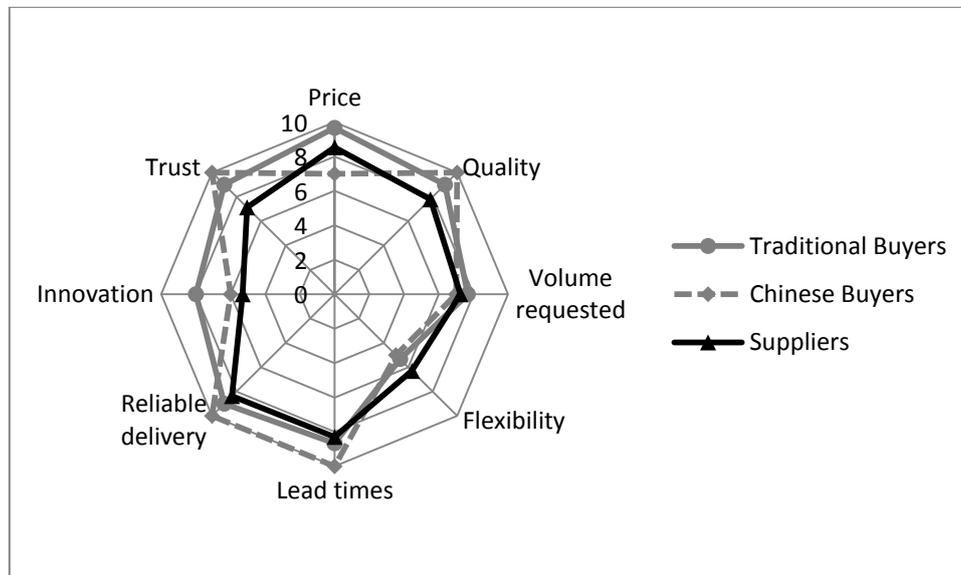
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attached by small-scale buyers. As discussed in section 6.7, this parameter was relatively more important for small-scale buyers.

<sup>86</sup> Triangulation with Indian buyer data was not possible because the Indian lead commodity firm was not included in the sample.

services, be able to provide technical advice, and still operate within an acceptable price range.

Figure 17 Comparative rating of CSFs, by Traditional and Chinese buyers and by suppliers



Source. Author's fieldwork data. Note. n=54

A different value chain misalignment emerged in the Chinese value chain (Figure 17). Suppliers overestimated the weight of price as an order-winning CSF, whilst underestimating the importance of quality and trust which they rated, respectively, 2.2 and 2.9 less points on the Likert scale than the Chinese buyer. Only a few suppliers understood that quality was increasingly important for critical supply links. One of them was a respondent that argued “[one of the Traditional buyers] used to be quality-driven but now is more price-driven, while the Chinese are learning to appreciate quality” (Supplier 46, 11.2009). By contrast, in non-critical supply links price remained the key criteria, as echoed by the manager of a firm supplying non-critical goods: “they [the Chinese buyer] have a different approach to business, they want to take the cheapest they can get, it’s unprofessional” (Supplier 19, 11.2009).

It is noteworthy that suppliers’ and buyers’ views on lead times were aligned. In fact, suppliers consistently pointed out that the Chinese buyer’s requirement in this area was exceptionally high. The manager of a successful supply firm explained that “the Chinese like things to move, and, as a supplier, you don’t do delays, and you don’t

argue over changes they require. You do as they wish, and then maybe fix the problems later” (Supplier 24, 11.2009). Similarly, another manager reported that sometimes it was difficult to manage delivery because “they [the Chinese] want things delivered even before they have placed an official order” (Supplier 13, 11.2009).

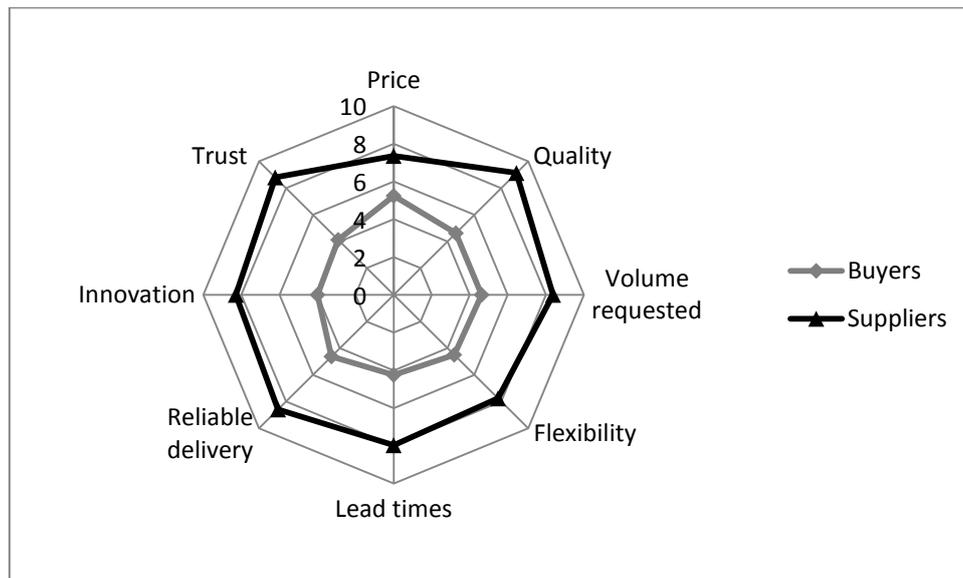
### **7.1.2 Value chain misalignment on supply chain capabilities**

An important value chain misalignment also emerged from triangulating the buyers’ and suppliers’ view on the performance of the local supply chain. This data was critical to convey information about the strengths and weaknesses of local suppliers (Schmitz and Knorrington, 2000) and to assess the suppliers’ understanding of their competitiveness bottlenecks. Suppliers needed to understand where they did not meet customers’ expectations in order to be able to target investment effectively and improve competitiveness. Most suppliers in Zambia did not have marketing departments which implied that interaction with buyers was the key source of information in this regard.

Figure 18 highlights two stark results. Firstly, buyers were very dissatisfied with the performance of the local supply chain. Though they all pointed to the existence of a small number of capable suppliers (mostly OEM subsidiaries and some engineering firms), the average rating for all parameters equalled 4.5 on the ten-point Likert scale, and the rating was not higher than 5.3 for any parameter. The worst performance of the local supply chain concerned learning and innovation capabilities, rated 4 points on the Likert scale.

On price, buyers complained that suppliers negotiated very high mark-ups ranging from 40 to 60 percent (Buyer 2, 11.2009; Buyer 6, 11.2009). Transport costs and taxes were also identified as cost-raising factors (Buyer 6, 11.2009; Z. Baosen, 20.11.2009). In the buyers’ view, suppliers were driven by short-term profit maximisation rather than an interest in developing long-term relationships based on trust and reasonable profit margins.

Figure 18 Comparative rating of supplier capabilities by all groups of buyers and by suppliers



Source. Author's fieldwork data. Note. n=54

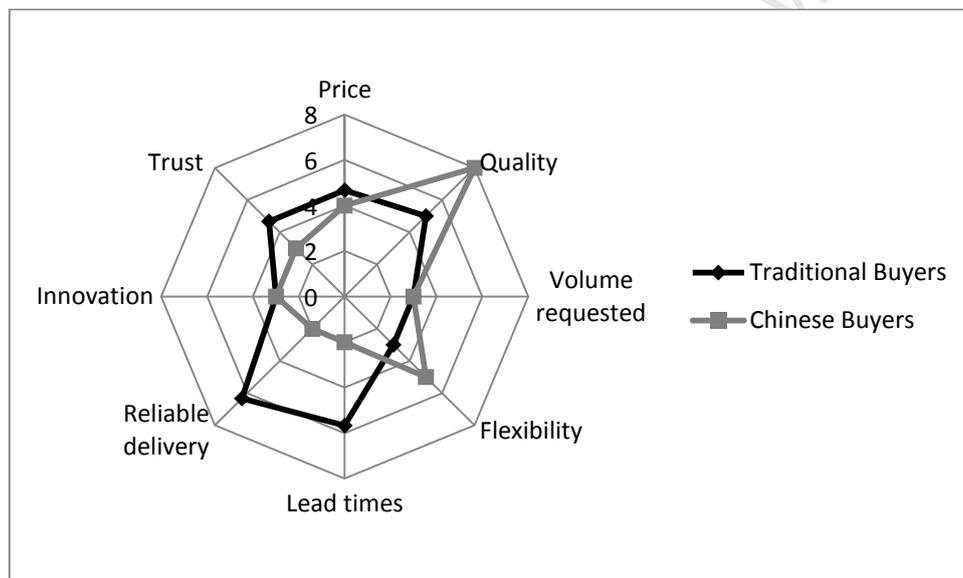
Indeed, trust was rated very low. Buyers reported that suppliers were often not transparent in disclosing information, which raised risks in the buyers' decision-making process. For example, three out of four buyers reported that local suppliers often provided quotes ex-stock, offering short lead times and sometimes lower prices than competitors (Buyer 2, 11.2009; Buyer 6, 11.2009; Buyer 9, 11.2009). Buyers were generally willing to pay higher prices for short lead times but found that, after winning the order and signing the contract, suppliers requested changes to the contractual terms such as longer delivery periods and sometimes upward price adjustments. For the buyers, this resulted in long lead times, additional monitoring costs, and often higher total costs.

In Figure 19, the buyers' ratings are disaggregated by ownership. The Chinese buyer was comparatively more dissatisfied with the local supply chain performance on delivery reliability and lead times. In fact, the Chinese buyer rated suppliers' performance on these CSFs, respectively, 3.7 and 4.3 less points on the Likert scale than Traditional buyers.<sup>87</sup> The Chinese buyer also gave the lowest rating to trust-

<sup>87</sup> The Chinese buyer was reasonably satisfied with product quality. The buyer explained that goods were manufactured in South Africa and Europe therefore tended to be of high quality. As discussed in

worthiness of local suppliers – this was also echoed as a significant problem during the interview with the Vice General Manager of ZCCZ (Z. Baosen, 20.11.2009). Traditional buyers were particularly dissatisfied with the quality of products supplied locally, which they rated 3 points less on the Likert scale than the Chinese buyer. It is noteworthy that Traditional buyers rated lead times and delivery reliability relatively higher. This could be an indication that their FPAs were effective in increasing suppliers' reliability and lead times. Both Traditional and Chinese buyers rated the local suppliers' innovation capabilities low, but this mainly constituted a problem for Traditional buyers who attached greater weight on this CSF.

Figure 19 Comparative rating of supplier capabilities by Traditional and Chinese buyers



Source. Author's fieldwork data. Note. n=54

The second stark result is that suppliers by and large failed to understand their weaknesses, rating their performance in all CSFs almost twice the rating given by buyers (Figure 18). This was especially true as far as trust and learning and innovative capabilities were concerned. The suppliers' rating was relatively less inflated only on price, as they were aware of operating in a high-cost economic environment.

section 6.2, the Chinese lead commodity firm vertically integrated engineering services, which meant it was not exposed to the quality of services by local suppliers.

## **7.2 Supply Firms' Performance and Upgrading**

### **7.2.1 Operationalising the concepts of growth and upgrading**

In order to assess firm-level performance, two criteria were selected: sales growth to the mining sector and upgrading efforts. Given my focus on expansion and deepening of local linkages to the mining sector, profitability was not an accurate indicator of a firm performance because a number of firms were diversifying away from the mining sector. When they did that successfully, their profit margins were unchanged or growing. But this was not a reflection of their success in supplying the mines. Because profit growth was not always correlated to sales growth and upgrading in the mining value chain, sales growth was preferred as a performance criterion. Respondents were asked to indicate their performance in this respect for the five years before the crisis, namely 2003-2008, which coincided with the investment boom. In this period, a firm performing well is expected to have increased, or at least defended, its market position in the mining supply chain. I discuss firm profitability in the context of each category of suppliers.

GVC literature found that an expansion in output is not necessarily followed by higher economic returns. In order to position themselves in higher value-added stages of the GVC or simply maintain profitability in their current stages, firms have to develop dynamic capabilities and upgrade. Therefore, in order to grasp a broader understanding of the supply firm trajectory, upgrading efforts were assessed together with sales growth. Following Humphrey and Schmitz (2002), four types of firm-level upgrading efforts were assessed: process, product, functional, and chain upgrading (cf. sub-section 2.2.2). Overall, firms undertook no upgrading, process upgrading, or a combination of different categories of upgrading, though chain upgrading was very rare.

Morrison et al. (2008) suggested the importance of unpacking the “black box” of process upgrading. I did so, by disaggregating it into two components: improvement in the quality of existing products and improvement in the production process. The latter was further broken down into different actions: investment in new machineries,

workers' upskilling, actions to reduce lead times, introduction and improvement of total quality management systems, and introduction of new organisational or management techniques. The advantages of unpacking process upgrading were two-fold. Firstly, I was able to identify the most common actions whilst investigating what constrained firms from undertaking the others. Secondly, it was possible to differentiate and compare the depth of process upgrading undertaken by each firm. Suppliers had to undertake three or more actions to qualify for process upgrading.

This issue deserves more attention. It was obvious during the interviews that an interview bias was occurring whereby a number of firms answered positively to questions on upgrading to meet a perceived expectation by the interviewer, whilst not being able to provide any substantial evidence of process upgrading (cf. subsection 1.5.4). In particular, interviewees responded positively to legitimise their subsequent complaints on some disadvantageous value chains dynamics (lack of cooperation, excessive emphasis on price). In order to deal with this, I required more than one order of process upgrading. This accorded with observations that firms that were upgrading did so on multiple, reinforcing fronts. For example, firms investing in new machineries usually did so in conjunction with workers' training and improvement of quality management procedures.

Figure 20 Supply firms' trajectories in Zambia's copper value chain

		Shallow → Deep upgrading	
High sales growth ↑ No	<b>STATIC</b> Defending their market, but not on the basis of dynamic capabilities 7 firms Sales growth, no upgrading effort	<b>GROWING</b> Growing markets on the basis of dynamic capabilities 24 firms Sales growth, continuous upgrading efforts	
	<b>EXITING</b> Shrinking sales, low capacity to defend their markets 7 firms Declining sales, no upgrading effort	<b>STRUGGLING</b> Struggling to defend their markets, reactive upgrading 12 firms Declining sales, upgrading efforts, but with problems	

Source. Author's fieldwork data. Note. n=50

Along the sales growth and upgrading axes, it was possible to identify four trajectories of suppliers, as summarised in the matrix above (Figure 20). I discuss each of them separately.

### 7.2.2 Growing suppliers' trajectory

Of the total sample, 24 firms, or 48 percent, were positioned on a growing trajectory. They experienced both profit and sales growth.<sup>88</sup>

Three quarters of the growing firms was established after 1990 (Table 31). Investment taking place after 1990 aimed at seizing opportunities in new, opening markets rather than supplying markets protected by high tariff and investment barriers. It follows that newly-established firms either had strong locational advantages or were internationally competitive. Moreover, for these firms, third-party certification and auditing were instrumental for entering the supply chains: one third of the growing firms identified them as entry channels (Table 32). Reputation and past experiences mattered for 71 percent and 62 percent of the firms, respectively, confirming the importance of social embeddedness.

Table 31 Growing suppliers' trajectory: year of establishment (frequency)

	Before 1990	After 1990	Sub-total
No linkage	4	3	7
Linkages	2	15	17
Sub-total	6	18	24

Source. Author's fieldwork data. Note. n=24

Table 32 Growing suppliers' trajectory: entry channels to the value chain (percentage)

Entry channels	Audit	Reputation	Work together	Certifications	Recommended	Others
%	33.3%	70.8%	62.5%	37.5%	25.0%	12.5%

Source. Author's fieldwork data. Note. n=24. Multiple answers allowed.

Firms in this category pursued deep forms of upgrading (Figure 21). In total, process upgrading was undertaken by 83 percent of the firms. More than half of the firms (54

<sup>88</sup> Sales growth always refers to sales to the mining sector, even when not specified.

percent) focused exclusively on process upgrading, mainly in terms of improvement of production processes. They did so by investing in capital equipment, upskilling their workforce, and introducing or improving their quality management systems. Actions to improve product quality, lead times or management were relatively less common. A third of this group invested in a combination of product, process or functional upgrading.

Lastly, three firms upgraded functionally and, an exception in our total suppliers' sample, moved into more demanding value chains. The three trajectories were remarkable: the first firm moved from cleaning services to civil engineering, and then within this value chain expanded upstream (construction materials) and downstream (real estate services). The second firm moved from specialised transport to civil engineering, to commercial properties construction and management, to small-scale mining. The third firm moved from marketing and distribution, to distribution under FPAs, to engineering services in partnership with a specialised firm.

Figure 21 Growing suppliers' trajectory: type of upgrading processes (frequency)

	13 firms	5 firms	1 firm	1 firm	1 firm	2 firms	1 firm
Process							
Product							
Functional							
Chain							

Source. Author's fieldwork data. Note. n=24

Given the decline of the manufacturing sector in Zambia and the stiff competition created by import and investment liberalisation, I explore whether the upgrading trajectory of this group could have been explained by sectoral or ownership patterns. In other words, whether firms were doing better because they were service providers or foreign-owned firms. If this held true, I expected this group to be dominated by services-oriented, foreign-owned firms. Yet, no such pattern emerged: 42 percent of the group were manufacturing firms. They produced plastic and steel products, office furniture, paints, consumables and PPE. With regard to foreign equity, almost one third of the group was Zambian-owned, which together with joint ventures brought the share of partly or totally Zambian-owned firms to 46 percent of the group (Table 33). Foreign ownership in this group mainly originated from South Africa and Europe.

Sectoral distribution and foreign equity relations therefore could not explain local upgrading. By contrast, two patterns dominated the firms in the growing trajectory: 71 percent of the firms were tightly inserted into GVCs and all firms were inserted in the supply chains driven by Traditional lead commodity firms.<sup>89</sup>

Box 4 Ndola Lime Company: between the state and the market

Ndola Lime Company (NLC) was a state-owned lime mining company. In 1982, NLC became part of ZCCM and supplied lime to the mines at cost, without making any profit. This reduced the capacity of NLC to re-capitalise and led to deterioration of its three equipment systems: a hydrator (purchased second-hand from Zimbabwe and installed in 1963), a horizontal kiln (installed in 1972), and a vertical kiln (installed in 1986).

Because NLC was supposed to be privatised after 1998, government had no incentive in re-capitalise. As privatisation efforts failed, in 2006 government decided to retain public ownership. NLC profitability, nevertheless, was hampered by the DAs, which locked the price of NLC lime from 2000 to 2006. Supply contracts with the mines were denominated in US\$, which involved significant risks for NLC given that 80 percent of costs (fuel, labour) were in Kwacha. Indeed, NCL incurred significant exchange rate-related losses.

When the DAs' price provisions expired in 2007, NLC had the first opportunity to negotiate. Prices were set in Kwacha, protecting the company from exchange rate fluctuations risks. The latter were significant: lime was sold at 2.70 US\$/tonne in 2007/08 but at 1.80 US\$/tonne in 2009. In 2007, the company registered increased financial profits. Dysfunctions at the plants nevertheless made production volumes erratic, forcing the mines to import at high cost. Government planned capital investment in the 2007 budget, with US\$ 74 million set aside for a new kiln. These plans were put on hold by the economic crisis, and only unblocked in March 2009, when new equipment was commissioned for late 2010/early 2011.

These two value chain governance drivers were critical in supporting the growing trajectory of these firms. The only noticeable exception was SOE Ndola Lime Company (Box 4). A critical supplier of lime, which was used to neutralise acids in

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<sup>89</sup> 'Tighter' forms of governance are those in which lead firms are closely involved in assisting suppliers to comply with value chain parameters (cf. sub-section 2.2.1).

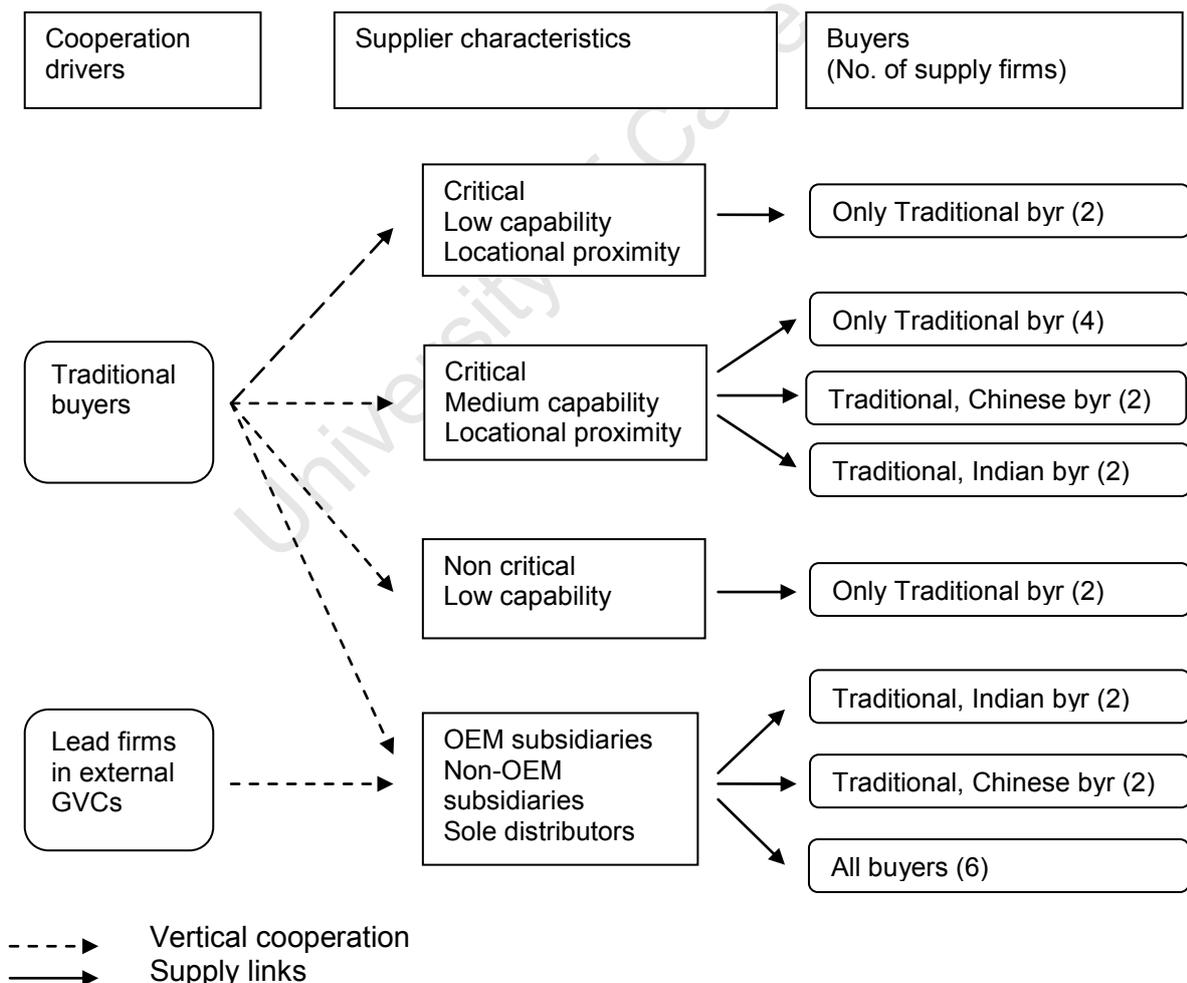
the leaching process, this firm had a monopolistic position. Given such a high-volume, low-value commodity, high transportation costs protected the company from South African competition.

Table 33 Growing suppliers' trajectory: ownership and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Zambian	5	-	-	2	7
Joint	1	-	1	2	4
Foreign	1	5	7	-	13
Sub-total	7	5	8	4	24

Source. Author's fieldwork data. Note. n=24

Figure 22 Growing suppliers' trajectory and value chain dynamics



Source. Author's fieldwork data. Note. n=24

Figure 22 displays the value chain dynamics of this group of suppliers. Firms in the growing trajectory were positioned in the Traditional buyer-driven value chain. One third of these firms were inserted only in these Traditional supply chains. For some, this constituted an explicit corporate strategy to position themselves in value chains more conducive to growth. For others, cooperation with Traditional buyers was the only opportunity to enter the mining supply chain under the IFC SDP. The remaining two thirds of this group also supplied Chinese and Indian buyers. Another group of firms were tightly inserted into GVCs, as subsidiaries or sole distributors, and positioned themselves in two or more value chains. One should consider that there was some overlap as Traditional buyers also cooperated with some of these firms. I discuss cooperation with Traditional buyers first.

### ***Vertical cooperation with Traditional buyers.***

Traditional buyers cooperated with their suppliers directly and indirectly. In terms of direct cooperation, Table 34 shows the type and frequency of assistance received by supply firms. This was largely consistent with data reported by Traditional buyers (cf. Table 30). Information flows and negotiations were intensive. Between 41.7 and 50 percent of suppliers cooperated with buyers on an ad hoc basis or, to a less extent, consistently on the following: joint product development, actions to improve product quality, lead times, and delivery reliability (through FPAs).<sup>90</sup> More than half of the growing firms moved towards longer-term relationships with their buyers.<sup>91</sup>

Cooperation, nevertheless, did not target other firm bottlenecks. The Traditional lead commodity firms did not allocate personnel and resources for more demanding cooperative tasks. Even the most pro-active buyer was recruiting a supply chain development officer only at the time of the interview. This explained the low share of suppliers being assisted with production and quality assurance systems, technical

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<sup>90</sup> For example, one manufacturer received regular feedback on product quality and engaged in joint product design and development on the installation of a gas plant (Supplier 4, 11.2009). A respondent explained: “[the Traditional buyer] is willing to discuss with us how to improve delivery reliability...they understand that it is more difficult for a manufacturer than for a trader to meet deadlines” (Supplier 27, 11.2009).

<sup>91</sup> One supplier explained moving to two year-long contracts enabled it to expand its business and plan investment (Supplier 6, 11.2009).

upgrading and staff training.<sup>92</sup> Only 1 to 3 firms out of 24 received any assistance in these areas.

Table 34 Growing suppliers' trajectory: type and intensity of vertical cooperation with buyers (frequency and percentage)

Type of cooperation	Intensity n (%)			
	Not at all	Sometimes	Consistently	NA
Information exchange	5 (20.8)	10 (41.7)	9 (37.5)	
Negotiation of payment and delivery conditions	3 (12.5)	8 (33.3)	13 (54.2)	
Joint product development	14 (58.3)	10 (41.7)		
Cooperation for product quality improvement	12 (50.0)	10 (41.7)	2 (8.3)	
Actions to improve delivery time	12 (50.0)	11 (45.8)	1 (4.2)	
Actions to improve delivery reliability	14 (58.3)	8 (33.3)	2 (8.3)	
Actions for adapting production to smaller / larger batches	18 (75.0)	3 (12.5)		3 (12.5)
Change suppliers less than before	10 (41.7)	9 (37.5)	4 (16.7)	1 (4.2)
Cooperation in technical upgrading	23 (95.8)	1 (4.2)		
Cooperation in staff training	22 (91.7)	1 (4.2)	1 (4.2)	
Cooperation in developing quality assurance system	21 (87.5)	3 (12.5)		

Source. Author's fieldwork data. Note. n=24

Direct cooperation involved two groups of supply firms. Firstly, specialised, critical suppliers placed in supply links characterised by high capital- and knowledge-related entry barriers. Because locational proximity was required for their services, they supplied all groups of buyers. The respondent from one such firms explained "all the mines request high quality products...Hydraulics on a machine are critical, if there is a break down, the mines lose money on a shift, on the oil, on significant labour to move a pump and fix it..." (Supplier 35, 11.2009). As a result, these firms operated on a premium in all the supply chains, including the Chinese and Indian value chains. For example, a service provider reported selling at a premium price to Traditional and Indian buyers: its unit price was at least 25 per cent higher than the competition, but it provided a wider range of critical services and at very short lead times (Supplier 6, 11.2009). Nevertheless, the firm only developed a trust-based relationship with Traditional buyers.

<sup>92</sup> Only one buyer established a routine to send staff from the quality assurance department to the supply firms, to assess systems and provide recommendations for improvement.

For one important sub-group, engineering firms, market expansion opportunities were curtailed by two factors. Firstly, they were locked out of a valuable market as the Chinese buyer vertically integrated engineering services whilst the Indian buyer internalised some maintenance services. Secondly, their competitive advantage was progressively eroded by an ageing workforce. Such workforce was difficult to replace due to the poor public technical education system and market failures which made internal training costly. Skills scarcity constrained upgrading into high-tech repairing services and expansion into larger volumes of business.

Secondly, direct cooperation also involved suppliers positioned in supply links characterised by very low competition, low capabilities and requirement for locational proximity. These suppliers were critical because of scarcity, which also ensured they accrued high-rents from their activities. Traditional buyers needed to build suppliers' capabilities because they could not vertically integrate these peripheral activities. In order to do so, buyers developed trust-based, long-term relationships and provided resources for upgrading. Such resources included capital (advance payment, lease) as well as commitments to place orders with them. This encouraged functional and chain upgrading in very short time frames (see Box 5).

Traditional buyers also cooperated with suppliers indirectly, through the IFC SDP (IFC, 2005, 2007). The programme targeted manufacturers of non-critical consumables, subject to intense competition from imports. These firms supplied a diversified market (non-mining sectors, regional markets), and cooperation allowed them to enter the mining supply chain: it granted access to information flows and an opportunity to quote, and discuss product specifications and delivery times with buyers. Whilst not reaching ISO-certification, they were supported in product and process upgrading by improving internal management and quality control systems. It is noteworthy that Traditional buyers did not cooperate directly with these suppliers. Their direct supply chain development efforts focused on a few critical suppliers, whether medium- or low- capability, with strong locational advantages.

Box 5 Direct cooperation, low supply capabilities and upgrading

One Traditional lead commodity firm situated in a remote geographical area found it difficult to localise its supply chain because firms had been mostly unwilling to relocate. This created an incentive for the mine to assist the few local suppliers (Buyer 5, 11.2009, Supplier 15, 11.2009). In one particular case, the mine entered into a long-term relationship, assisting with capital investment by purchasing the equipment required and renting it out to the supplier. The supplier specialised in products which required geographical proximity, such as low value, large volume supplies. The combination of high rents and intense cooperation allowed this firm to expand its market size and move into different value chains – moving from low skilled services (cleaning) into higher skilled ones (civil engineering). Within the new value chain, the firm also upgraded into new functions to control both upstream and downstream stages of the value chain.

In another case, a Zambian-owned supplier played a valuable intermediary role between mining companies and local coal producers (Buyer 8, 11.2009; Supplier 20, 12.2009). Because Zambian coal producers were small-scale and scattered, the Traditional lead commodity firms imported from South Africa, which was reliable but not cost-effective due to high transportation costs. By linking producers (sometimes with exclusive distributorship rights) and mining companies, the supply firm created a profitable, niche market, not contested by other firms. The supplier reduced search and monitoring costs for the mines, as well as their transportation costs. Cooperation with one Traditional buyer took the form of an FPA, which allowed the firm to expand the range of products supplied and reduce delivery times, thereby meeting the JIT requirements of the buyer. The firm expanded its market into other mining supply chains, upgraded into after-sale services by partnering with an engineering firm, and moved into the small-scale mining value chain.

***Backward integration in tightly governed GVCs.***

Tight insertion in GVCs implied intense cooperation between lead firms and local supply firms. Local supply firms inserted in such value chains included three groups of firms: mining OEM subsidiaries, distributing mining equipment and spares, and providing after-sale services (only one subsidiary undertook local assembly and re-conditioning operations); supply firms owned by international or regional MNEs, producing a range of non-critical consumables (*non-OEM subsidiaries*); and sole distributors, with agreements with lead firms based in South Africa, the US, Europe, and Australia. The latter engaged in higher-value added activities, such as assembly, maintenance, repairs, and stock-holding. All these firms operated on global

standards: OEMs and non-OEM subsidiaries were ISO certified; sole distributors met high standards imposed and monitored by the GVCs' lead firms. Their lead firms set their standards, monitored their performance and assisted their upgrading.

GVC linkages were more critical for manufacturers than for services suppliers: only one manufacturer out of 9 succeeded without such external linkages, compared to 6 out of 15 in the services sector (40 per cent) (Table 35).

Table 35 Growing suppliers' trajectory: sectoral distribution and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Services	6	4	2	3	15
Manufacturing	1	1	6	1	9
Sub-total	7	5	8	4	24

Source. Author's fieldwork data. Note. n=24

Tight insertion in GVCs granted local suppliers access to capital and knowledge as well as reputational assets. This was echoed in the interviews with respondents from these supply firms, which gave examples of their competitive advantages in the following terms: access to capital from the parent company allowed them to hold large stocks and offer short lead times (Supplier 37, 11.2009); "the size of the group" (Supplier 29, 11.2009); a global network to tap into in order to solve problems - when the Chinese lead commodity firm commenced production, the OEM subsidiary employed staff from its subsidiary in China (Supplier 40, 11.2009). In these GVCs, South Africa-based subsidiaries or lead firms would also provide specialised technical skills not available in Zambia, either flying out personnel or receiving machineries for repairs.

Whilst all the firms invested in varying degrees of product and process upgrading, mining OEM subsidiaries had the largest investment in process upgrading. This targeted workers' upskilling (they established two training centres), capital equipment, quality control systems and internal management structures. Their contribution to job and skills creation was significant, with three subsidiaries employing 100, 400, and 500 semi to highly skilled Zambian employees. Process upgrading was very important for OEMs, as it reduced lead times and increased the

quality of after-sale services. In the mining equipment supply link, product quality was an order-qualifying CSF: because all OEMs operated at the technological frontier, competitive pressures shifted to lead times and after-sale services. Lead times were particularly important because after decades of under-investment in production capacity due to stagnant hard commodity prices, the copper price boom found mining companies and OEMs largely unprepared to meet the surge in demand (Farooki and Kaplinsky, 2011).

In Zambia, OEMs were among the largest beneficiaries of the investment boom in the 2000s, in terms of overall profits and turnover. OEMs had three distinctive sources of competitive advantage. Firstly, they held more power than other suppliers in their relations with buyers. This reflected a global process of capital equipment suppliers' becoming more powerful due to increased technological sophistication of their activities and market dominance (Sturgeon, 2002). This power granted more leverage in the negotiating stage, and in securing payments in 2008-2009 when the Indian buyer suspended payments to most of its suppliers.

Secondly, OEMs were exclusive beneficiaries of their high-value intellectual property rights and brands, which ensured exclusive appropriation of related rents. As discussed in sub-sections 4.2.3 and 4.2.4, OEMs were the key source of technological innovation in the mining GVC. Lastly, through the warranty system, they locked other suppliers out of the spares, repair, and maintenance supply links. In fact, only one local manufacturer still produced spares and components, but these were for old equipment which was no longer produced by OEMs. Though it was estimated that, in some mines, up to 50 percent of the spares were not sourced from OEMs, these supply links remained highly profitable (Supplier 40, 11.2009). Indeed, OEMs were willing to agree on large discounts on capital equipment in order to tie large buyers to their after-sale services.

Equity relations were not the only way through which chain governance supported suppliers' upgrading processes. Lead firms granted sole distributors access to external resources and expertise, credit facilities, and obviously exclusive access to their products, which increased the profitability of the firms and, in turn, their internal

resources for upgrading (Box 6). The exclusivity clause was very important for suppliers because, in its most stringent applications, it protected them from competition not only from the parent company and from subsidiaries/distributors in other countries but also from briefcase businessmen attempting to import from South Africa.<sup>93</sup>

Irrespective of whether suppliers were Zambian or foreign-owned, sole distributorship agreements encouraged process and functional upgrading. Sole distributors had to improve the quality of services to the standards expected by the parent company. For example, firms invested in equipment and workers training to operate specialised mechanical equipment, and to maintain and repair equipment with computerised components. In fewer cases, firms also invested in management systems and quality control systems. Firms also moved into new functions: components assembly according to customised designs, and after-sale services. One firm invested in two workshops in order to ensure total control of the quality of maintenance and repair services. Upgrading spurred a deep learning process. For example, one sole distributor had to develop customised solutions and undertake maintenance services. This firm developed in-house technical competences as well as coordinated second-tier specialised engineering firms based in Zambia and South Africa. The outcome was two-fold: firstly, the firm entered new sectors (fuel distribution, agro-processing, cement); secondly, it moved into maintenance services independently from distribution.

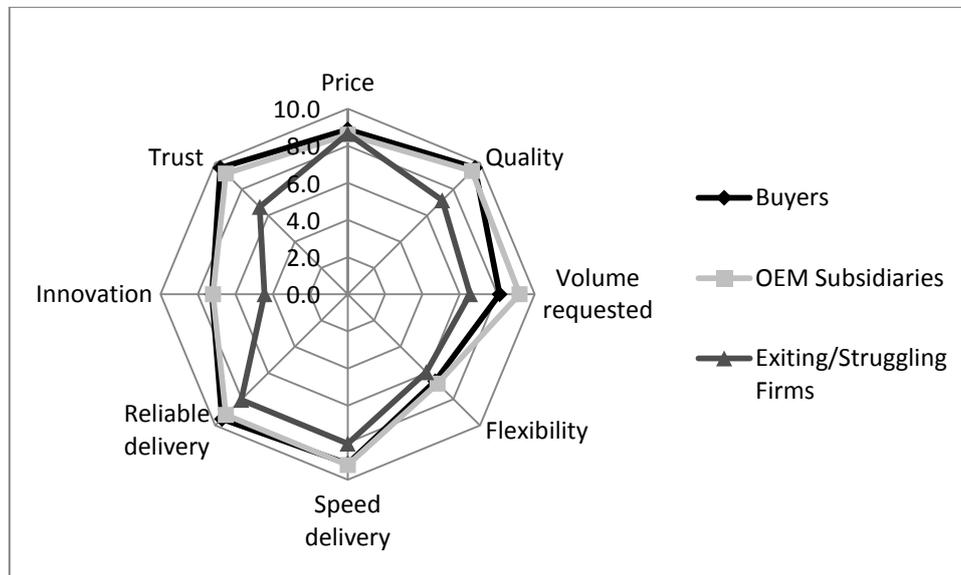
One of the resources transferred from lead firms to their subsidiaries and sole distributors was better knowledge of the order-winning CSFs. This was corroborated by a comparison between the firms most tightly integrated into GVCs, the OEM subsidiaries, and the firms at the bottom of the performance scale, the struggling and exiting firms. Figure 23 displays a comparison between the ratings of supply chain

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<sup>93</sup> Some dealership agreements were so tight that the mines could not buy from dealers based in other countries, as the latter would have to pay an infringement fee to the local distributor. Under more restrictive agreements, parent companies in South Africa did not sell the products to the briefcase businessmen and informed the sole distributors in Zambia.

CSFs by these two groups of suppliers. Rating by OEM subsidiaries was closely aligned to the buyers' own rating.

Figure 23 Comparative rating of CSFs by Mining OEM subsidiaries, exiting/struggling firms, and buyers



Source. Author's fieldwork data. Note. n=28

On the contrary, ratings by struggling and exiting firms were misaligned in all but one parameter, price. Not only did firms inserted in GVCs have a better understanding of current CSFs, but they also understood future developments within their industry. A services provider was pursuing an ISO certification because, even if the mines had not requested it yet, the firm could “see it becoming one of the requirements” (Supplier 35, 11.2009).

The potential for functional upgrading for suppliers tightly inserted in GVCs was limited because their value chains were highly organised at a global or regional level. The highest value-added stages, such as R&D, product development and marketing, took place outside Zambia. Mining OEMs, in particular, cooperated intensely with mining houses on joint product development, through questionnaires, prototypes, feedback systems, and joint testing. Participation from local subsidiaries and sole distributors, nevertheless, was limited. This confirmed Lall (1992) argument that FDI in developing countries often transferred “the results of innovation, rather than the innovative process itself” (p. 179). Local firms developed limited technological

capabilities, a process called *truncation* of technology transfer, which, in turn limited technological and production linkages with other firms and with the technology, research and education system.

In sum, supply firms positioned in the growing trajectory undertook deep forms of upgrading, which were supported by the value chain governance of Traditional buyers, both directly and indirectly, and/or by their backward integration into tightly governed GVCs in which lead firms provided additional resources for upgrading. Process upgrading was the most common form of upgrading. Whilst there were constraints on functional upgrading, these firms had significant opportunities to expand in the DRC mining supply chain. All the OEM subsidiaries, indeed, already supplied the DRC mining value chain, directly or through branches based in the Katanga Province.

### 7.2.3 Static suppliers' trajectory

The group of static firms included 7 firms (14 percent of the sample) characterised by sales growth and, in all but one case, profits growth. Indeed, these firms were still able to defend their markets but, with no significant upgrading efforts, they relied on past investments.

All firms were established after 1990 and, similarly to other new firms, audit and third-party certification were relatively more important entry channels than for old firms (Table 36). All firms relied on reputation, explained by the fact that they were mostly individually owned and managed businesses. All the firms were services providers, evenly distributed across ownership and linkages patterns (Table 37).

Table 36 Static suppliers' trajectory: entry channels to the value chain (percentage)

Entry channel	Audit	Reputation	Work together	Certifications	Recommended	Others
%	43%	100%	43%	29%	14%	29%

Source. Author's fieldwork data. Note. n=7. Multiple answers allowed

Table 37 Static suppliers' trajectory: ownership and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Zambian	1	-	-	1	2
Joint	1	-	-	1	2
Foreign	1	-	-	2	3
Sub-total	3	-	-	4	7

Source. Author's fieldwork data. Note. n=7

The static firms' efforts to upgrade were, at best, shallow. One respondent from an agent explained: "the volume of business does not justify investing in a sole distributorship agreement. If we had a contract [with the mines] it would be different....The volume of business does not justify an investment in a facility for maintenance or investment in large stocks" (Supplier 11, 12.2009).

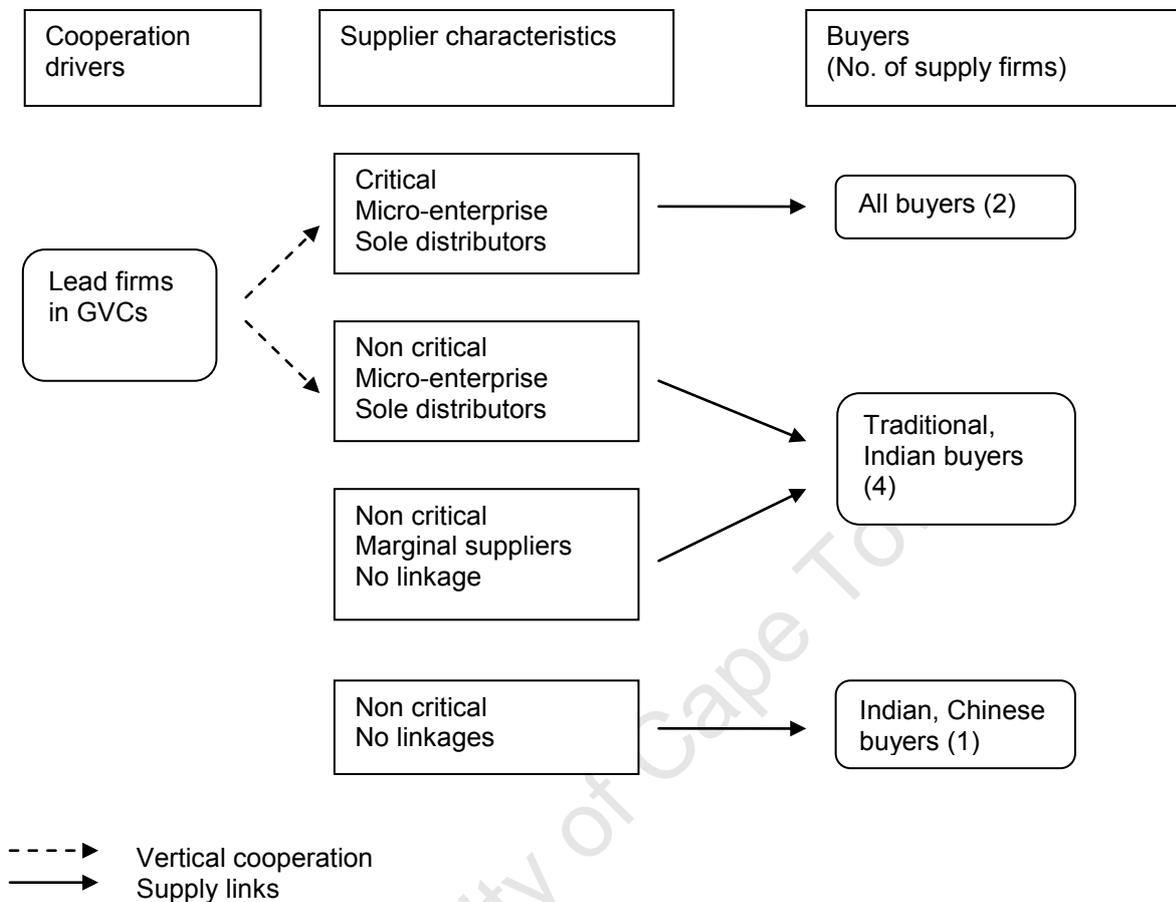
Figure 24 shows the dynamics of this group. Six firms supplied Traditional buyers, though not exclusively. Yet, Traditional buyers did not cooperate with this group of firms. All but two firms were placed in non-critical supply links characterised by high levels of competition and low entry barriers.<sup>94</sup> Indeed, for two of them the mining sector was a marginal market. Traditional buyers operated mostly at arm's length.

Table 38 represents the type and content of cooperation. Except for intensive negotiations on price and delivery terms, there were no information flows for more than half of the static firms. Between 86 and 100 percent of the group received no assistance with product development, quality improvement, longer term contracts, technical upgrading, workers' training or quality assurance systems. Only two firms were assisted by buyers, and that was through collective transport services for suppliers, and, in one case, occasional supply of raw materials from scrap available at the mines.

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<sup>94</sup> In one case only, there was some level of competition. The competitor, nevertheless, was a large OEM subsidiary which offered integrated products, that is drilling rigs and compressors. The static firm, on the other hand, only supplied compressors and had no back-up services infrastructure.

Figure 24 Static suppliers' trajectory and value chain dynamics



Source. Author's fieldwork data. Note. n=7

The two firms that supplied critical supplies to all buyers had sole distributorship arrangements. Yet, as in the case of the other two sole distributors, these linkages were not instrumental in supporting upgrading processes. Underlying this, was a very small-sized ownership structure: one individual owned and managed the firm, with no employees or facility to host equipment. Notwithstanding increased sales to the mines, these micro-enterprises failed to grow into more complex managerial and organisational structures that could accommodate upgrading processes.

Table 38 Static suppliers' trajectory: type and intensity of vertical cooperation with buyers (frequency and percentage)

Type of cooperation	Intensity n (%)			
	Not at all	Sometimes	Consistently	NA
Information exchange	4 (57)	2 (29)	1 (14)	
Negotiation of payment and delivery conditions	2 (29)	1 (14)	4 (57)	
Joint product development	7 (100)			
Cooperation for product quality improvement	6 (86)	1 (14)		
Actions to improve delivery time	5 (71)	2 (29)		
Actions to improve delivery reliability	5 (71)	2 (29)		
Actions for adapting production to smaller / larger batches	6 (86)			1 (14)
Change suppliers less than before	6 (86)			1 (14)
Cooperation in technical upgrading	6 (86)	1 (14)		
Cooperation in staff training	7 (100)			
Cooperation in developing quality assurance system	6 (86)	1 (14)		

Source. Author's fieldwork data. Note. n=7

One last firm, in Figure 24, was placed in the Indian and Chinese value chains, with no external linkage. Because Indian and Chinese buyers did not purchase spares and maintenance contracts, both the incentive and resources for this agent to upgrade into stock-holding and after-sale services diminished, whilst the agent was also having to face competition from other general dealers.

#### 7.2.4 Exiting suppliers' trajectory

Seven firms were exiting the mining supply chain (14 per cent of the sample).<sup>95</sup> Their sales declined in the five years before the crisis. Profits stagnated or shrank for five firms, while for two firms they increased as they moved to other markets. In the absence of upgrading efforts, they had weak prospects to escape this trajectory.

Three firms out of seven were established before 1990, two manufacturers as far back as 1970 and 1971 (Table 39). The most common entry channels were past

<sup>95</sup> These firms were moving out of the supply chain, but were still in the process of doing so. *Exited* firms, that is already out of the supply chain, were not included in the sample.

working relationships, reputation and auditing. Third-party certification was noticeably less relevant for this group of suppliers (Table 40).

Table 39 Exiting suppliers' trajectory: year of establishment (frequency)

	Before 1990	After 1990	Sub-total
No linkage	3	3	6
Linkages	1	-	1
Sub-total	4	3	7

Source. Author's fieldwork data. Note. n=7

Table 40 Exiting suppliers' trajectory: entry channels to the value chain (percentage)

Entry channels	Audit	Reputation	Work together	Certifications	Recommended	Others
%	29%	43%	86%	14%	14%	

Source. Author's fieldwork data. Note. n=7. Multiple answers allowed

While there was no specific sectoral pattern, the distinctive feature of this group was the lack of backward linkages to GVCs, which characterised six out of seven firms (Table 41).

Table 42 shows that firms with no linkages had no distinctive ownership pattern. Exclusion from GVCs had negative implications for both manufacturing and services firms. Manufacturers lost market shares because they had being excluded from the supply links for spares and components, controlled by the OEMs and their subsidiaries. Moreover, they could not compete with the R&D, global production networks and economies of scale of global MNEs. For services providers, exclusion from GVCs prevented access to external knowledge and resources, in particular capital. An agent explained: "the main problem with the private mines is that they refuse to pay upfront and our company has to find finance to pay for equipment.... We get paid 30/60 days after delivery, which is a problem because capital is immobilised in one deal for too long... ZCCM used to provide advance payments or letters of credit. This is a big problem for us because machinery is expensive and it's virtually impossible to access finance from the banks" (Supplier 10, 11.2009).

Table 41 Exiting suppliers' trajectory: sectoral distribution and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Services	3	-	-	1	4
Manufacturing	3	-	-	-	3
Sub-total	6	-	-	1	7

Source. Author's fieldwork data. Note. n=7

Table 42 Exiting suppliers' trajectory: ownership and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Zambian	2	-	-	1	3
Joint	1	-	-	-	1
Foreign	3	-	-	-	3
Sub-total	6	-	-	1	7

Source. Author's fieldwork data. Note. n=7

Box 6 The challenges of moving into sole distributorship

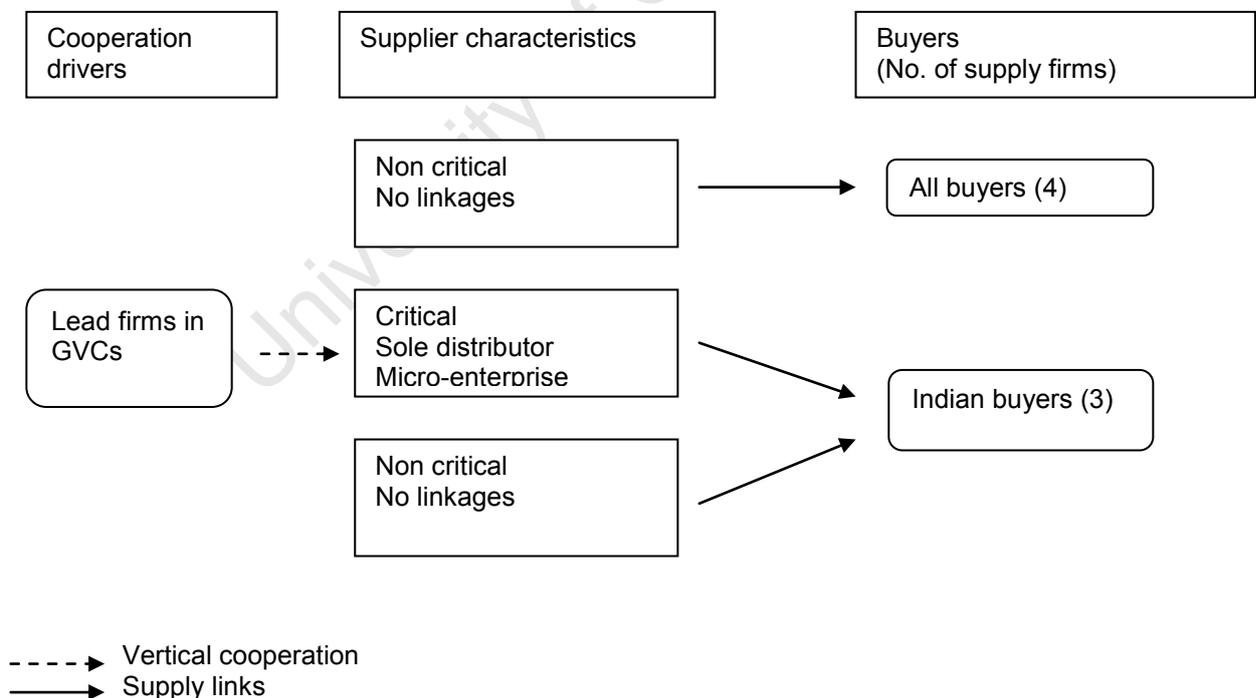
Developing linkages with GVCs' lead firms was difficult. Overseas manufacturers were often reluctant to partner with local firms. The reasons for this included low trust, insufficient volumes, and lack of credible judicial redress. The example of a local, non-exclusive agent was illustrative (Supplier 25, 11.2009). He sourced from second-tier suppliers through loose agreements. The firm aimed at moving into after-sale services but, in order to do so, required an exclusive, long-term relationship with the manufacturers. Yet manufacturers were not willing to enter in sole distributorship agreements and incur training costs because the local firm did not offer large volumes.

There were also variations in the upgrading opportunities offered by overseas manufacturers. Indian and Chinese manufacturers were willing to come to Zambia at the initial stages to explore opportunities and finalise contractual arrangements, but would not engage in repeated visits. This limited the extent to which they interacted with staff and supported the firm to move into post-sale services. For the Chinese firms, there were added constraints of language barriers and requirement for upfront payment. Whilst less competitive than Asian suppliers, South African manufacturers were willing to cooperate and offered more local upgrading opportunities. Moreover, unlike Chinese manufacturers, South African companies depending on type of distributorship agreement worked on a credit facility of up to 45 days. But South African suppliers required minimum volumes of sales that the local firm could not secure.

Firms were positioned in supply links governed by arm's length market relationships and subject to intense competition from briefcase businessmen and direct imports

(Figure 25). This held true for the three firms positioned in the Indian supply chain and for the four firms supplying all buyers, given that Traditional buyers did not have an interest in supporting their upgrading and they were excluded from the IFC SDP. Table 43 shows the type and content of cooperation extended from Traditional buyers to this group of firms. Information exchange and negotiations were intensive, with 72 percent of firms reporting ad hoc or continuous engagement. Nevertheless, between 71 and 100 percent of firms received no assistance with product development, product quality, delivery reliability, production flexibility, longer contractual relationships, technical upgrading, workers training or quality systems. The only exceptions were two firms benefiting from the collective transport arrangements set up by Traditional buyers. If one compares these results with cooperation received by growing suppliers, there are significant differences (cf. Table 34). Between 41.7 and 50 percent of growing suppliers cooperated on joint product development, product quality, lead times and delivery reliability.

Figure 25 Exiting suppliers' trajectory and value chain dynamics



Source. Author's fieldwork data. Note. n=7

As they operated in price-driven supply links, profit margins were very low and often squeezed further by operating through briefcase businessmen.<sup>96</sup> Lack of backward and forward linkages implied that these firms were neither required to undertake nor guided into an upgrading process, and the ones who did some upgrading did so at very shallow levels. For instance, none of them was ISO certified. One respondent argued that “the priority is expanding the market rather than investing in upgrading” (Supplier 39, 11.2009).

Table 43 Exiting suppliers’ trajectory: type and intensity of vertical cooperation with buyers (frequency and percentage)

Type of cooperation	Intensity n (%)		
	Not at all	Sometimes	Consistently
Information exchange	2 (29)	2 (29)	3 (43)
Negotiation of payment and delivery conditions	2 (29)	3 (43)	2 (29)
Joint product development	6 (86)	1 (14)	
Cooperation for product quality improvement	5 (71)	1 (14)	1 (14)
Actions to improve delivery time	4 (57)	2 (29)	1 (14)
Actions to improve delivery reliability	5 (71)	2 (29)	
Actions for adapting production to smaller / larger batches	7 (100)		
Change suppliers less than before	7 (100)		
Cooperation in technical upgrading	7 (100)		
Cooperation in staff training	7 (100)		
Cooperation in developing quality assurance system	7 (100)		

Source. Author’s fieldwork data. Note. n=7

### 7.2.5 Struggling suppliers’ trajectory

What set apart the struggling firms from the exiting firms was their efforts to upgrade their capabilities, with the aim of entering or remaining in the mining supply chain. Sales to the mining sector, for this group, declined. Profitability declined or stagnated for eight firms, and grew for four firms as these moved to other value chains.

<sup>96</sup> OEM subsidiaries would charge briefcase businessmen the same price they would charge the mine, sometimes more. As they were the only distributors, briefcase businessmen had no choice but to accept the price. Manufacturers, on the other hand, were competing with each other to receive orders from well-connected briefcase businessmen.

This group was largely composed of manufacturing firms (10 out of 12) that were established and flourished during the period of import-substitution industrialisation. Indeed, two thirds of the group were established between 1960 and 1980 (Table 44). For this reason, a past working relationship with the mining companies was overwhelmingly important (91.7 percent of firms) (Table 45). Third party certification was an entry channels for only 16.7 percent of the group, less than half of the growing firms group (cf. Table 32).

Table 44 Struggling suppliers' trajectory: year of establishment (frequency)

	Before 1990	After 1990	Sub-total
No linkage	4	4	8
Linkages	4	-	4
Sub-total	8	4	12

Source. Author's fieldwork data. Note. n=12

Table 45 Struggling suppliers' trajectory: entry channels to the value chain (percentage)

	Audit	Reputation	Work together	Certifications	Recommended	Oths
	33.3%	58.3%	91.7%	16.7%	8.3%	16.7%

Source. Author's fieldwork data. Note. n=12. Multiple answers allowed

Two thirds of the struggling firms had no backward linkage to GVCs (Table 46). The only sole distributor became linked to GVCs in order to move out of manufacturing. Similar to the other three groups, struggling firms were evenly distributed between Zambian and foreign ownership (Table 47). The latter originated, similar to growing firms, mainly from South Africa and Europe but also included two Indian firms.

Table 46 Struggling suppliers' trajectory: sectoral distribution and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Services	1	-	1	-	2
Manufacturing	7	-	2	-	9
Other				Both services/manufacturing	1
Sub-total	8		3	1	12

Source. Author's fieldwork data. Note. n=12

Table 47 Struggling suppliers' trajectory: ownership and linkage types (frequency)

	No linkage	Mining OEM subsidiary	Non-OEM subsidiary	Sole distributorship	Sub-total
Zambian	6	-	-	-	6
Joint	-	-	-	-	-
Foreign	2	-	3	1	6
Sub-total	8		3	1	12

Source. Author's fieldwork data. Note. n=12

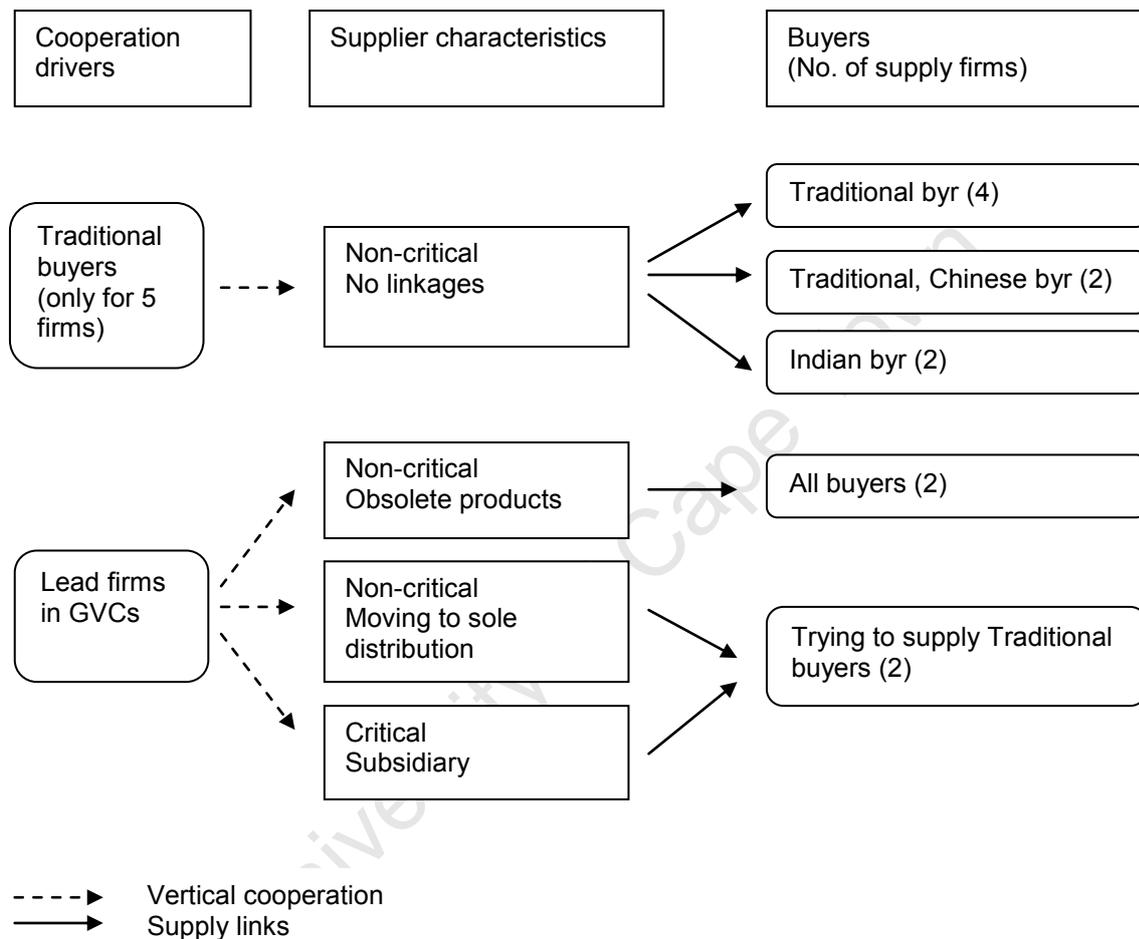
As discussed in the previous section, manufacturers with no linkage were excluded from the spares and components supply links, controlled by OEMs through their warranty system. Moreover, OEM spares and components were highly standardized, which removed the potential advantage that local production could have presented in terms of in-country adaptation. For other components, competition from direct imports and from briefcase businessmen was fierce. Cost competitiveness of struggling firms was low due to intra-firm productivity bottlenecks and a high cost environment. As demand for their products became fragmented and discontinuous, struggling firms lost the volumes required to achieve minimum economies of scale. A respondent from a plastic manufacturing firm recalled that sales of insulators for ZCCM amounted to 200,000 insulators per year (Supplier 8, 11.2009). Machines were working 24/7 and these sales covered all his running costs for one year. After privatisation, the orders decreased dramatically and machines were in operation once per week.

By disaggregating the dynamics of this group, we gain further insights (Figure 26). Eight out of 12 firms had no linkages and were supplying the Indian buyer, or Traditional buyers (with or without additional orders from the Chinese buyer). Vertical cooperation was only forthcoming in terms of IFC SDP from the Traditional buyers. Interviews highlighted variance in the experience of supply firms inserted in mixed value chains. Firms supplying Traditional and Chinese buyers benefitted from a combination of IFC SDP support and prompt payments by the Chinese buyer. By contrast, firms supplying the Indian buyer tried to upgrade notwithstanding decreasing profit margins and delayed payments by the Indian buyer.

Four firms were inserted in GVCs as subsidiaries or sole distributors. In two cases, technological innovation made their products obsolete. The other two firms were

particular cases: the first one was repositioning itself into a sole distributorship agreement targeting Traditional buyers, and the second one was the largest steel foundry in Zambia whose circumstances are explained later in this section.

Figure 26 Struggling suppliers' trajectory and value chain dynamics



Source. Author's fieldwork data. Note. n=12

Three quarters of the firms undertook product or process upgrading or, more often, a combination of the two (Figure 27). The other 25 percent changed their functions within the chain or moved into new chains. Mostly excluded from GVCs, these firms had to look elsewhere to upgrade their capabilities.

As mentioned above, five firms that undertook process, product and, in one case, functional upgrading did so under the IFC SDP. Table 48 shows the intensity of

value chain cooperation for struggling firms, mostly due to the IFC SDP. Cooperation privileged improvement in delivery times, delivery reliability, product quality, longer term contracts and joint product development.

Figure 27 Struggling suppliers' trajectory: type of upgrading processes (frequency)

	1 firm	5 firms	3 firms	1 firm	1 firm	1 firm
Process						
Product						
Functional						
Chain						

Source. Author's fieldwork data. Note. n=12

Yet, the effectiveness of the IFC SDP's impact was reduced by two factors. Firstly, intra-firm institutional capabilities were weak. Firms' organisational structures were centred around the owner, who managed every aspect from production and finances to human resources and marketing, and often had established its business at the times of ZCCM. This limited the *absorption* capacity of the firm. Secondly, firms lacked investment capital. They operated with little working capital, which hampered their stock holding and lead times competitiveness. The IFC SDP operated on a cost-sharing basis but, in terms of investment capital, firms were expected to access the banking system which was too costly.

Table 48 Struggling suppliers' trajectory: type and intensity of vertical cooperation with buyers (frequency and percentages)

Type of cooperation	Intensity n (%)		
	Not at all	Sometimes	Consistently
Information exchange	3 (25.0)	4 (33.3)	5 (41.7)
Negotiation of payment and delivery conditions	1 (8.3)	7 (58.3)	4 (33.3)
Joint product development	8 (66.7)	3 (25.0)	1 (8.3)
Cooperation for product quality improvement	6 (50.0)	5 (41.7)	1 (8.3)
Actions to improve delivery time	5 (41.7)	4 (33.3)	3 (25.0)
Actions to improve delivery reliability	6 (50.0)	5 (41.7)	1 (8.3)
Actions for adapting production to smaller / larger batches	9 (75.0)	2 (16.7)	1 (8.3)
Change suppliers less than before	6 (50.0)	4 (33.3)	2 (16.7)
Cooperation in technical upgrading	10 (83.3)	2 (16.7)	
Cooperation in staff training	11 (91.7)	1 (8.3)	
Cooperation in developing quality assurance system	9 (75.0)	3 (25.0)	

Source. Author's fieldwork data. Note. n=12

In five cases, upgrading processes masked a more complex reality. In order to remain in the mining value chain, two manufacturers progressively reduced plant operations and moved into distribution. This was therefore a case of functional *downgrading* as the firm shifted to less technologically demanding functions. In three other cases, process and product upgrading was pursued with the objective of diversifying into non-mining sectors: generic consumer goods and components for the transport industry. Hence, upgrading was an exit strategy rather than a strategic shift into more profitable and technologically complex value chains.

Only in the case of two firms was upgrading supported by own resources and aimed at retaining their market share in the mining supply chain. Cost competitiveness with briefcase businessmen proved to be the key challenge for these firms.<sup>97</sup> One case was particularly important because it concerned the largest steel foundry in the country, established in 1960 as a SOE and key supplier to the mines and employing over 1500 workers at full capacity. Privatised in the 1990s, it was later recapitalised, with a multi-million dollar investment. Notwithstanding the level of investment, the firm had been progressively excluded from the supply link for its main product: mill balls. The firm increased the quality and variety of balls on offer but buyers resorted to imports, arguing that the poor quality of the mill balls affected the maintenance of their crushers. From interviews with different actors in the value chain, misalignment over supply chain parameters and firm performance emerged as a key challenge.<sup>98</sup> Notwithstanding the attempts to involve government as a mediator, the situation was still unresolved at the time of fieldwork.

In sum, struggling firms mostly lacked backward integration into GVCs, and relied on IFC SDP resources or own resources for upgrading. The IFC SDP impact was

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<sup>97</sup> Poor value chain coordination was observed in relation to a smaller-scale foundry. The firm supplied through briefcase businessmen, which squeezed its profit margins. This firm undertook product and process upgrading, with one of the few reverse engineering and in-house design efforts in the sample.

<sup>98</sup> A Traditional buyer approached the IFC and a foreign supplier to encourage a JV with the local foundry. The foreign buyer, nevertheless, expressed interest for setting up a manufacturing plant in South Africa (Buyer 6, 11.2009).

limited due to low absorption capacity and poor access to capital. When relying on own resources, supply firms were either moving into simpler functions, or they were moving into non-mining value chains.

## **7.3 Horizontal Cooperation**

### **7.3.1 Direct horizontal cooperation**

In order to identify agglomeration effects, this analysis is limited to firms clustered in the Copperbelt.<sup>99</sup> Though located at around 60 km distance, Kitwe and Ndola had partially different backgrounds. Kitwe was a historical mining town, with Nkana, one of the largest mines located in town. Most of the firms in Kitwe, before and after privatisation, were established to supply the mining companies. In the past, Ndola had a more differentiated industrial structure. It was the industrial centre of the country, with a wide range of manufacturing firms producing for the domestic consumer market. With privatisation, many of these firms closed down and some re-located to Kitwe. The economic decline reflected in very low dynamism of local businesses. For the purpose of this analysis, I focused on Kitwe, but also considered the possibility that Ndola suppliers anchored their cooperation efforts to the more dynamic neighbour town (Kitwe-Ndola).

In order to investigate the issues surrounding direct horizontal cooperation, I undertook a two-step analysis. Firstly, I looked at the type and intensity of horizontal cooperation. Secondly, I looked at the relationship between the latter and the suppliers' trajectories. Table 49 refers to horizontal cooperation involving supply firms in Kitwe and in Kitwe-Ndola. With few exceptions, horizontal cooperation was very weak, with 87 to 100 percent of the firms in Kitwe never engaging in joint product development, sales, purchase or training. Information flows were more intense involving, occasionally or consistently, 61 percent of the group. Joint orders and machinery lending were the only other actions undertaken in the cluster by,

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<sup>99</sup> Horizontal cooperation taking place in Lusaka was almost non-existent. Only one firm moving into engineering services reported occasional cooperation with a partner firm in terms of joint product development, machinery lending and joint sales. A sole distributor reported occasional joint orders.

respectively, 29 and 26 percent of the group. Local firms also failed to jointly tap into external resources; for example the firms never approached IFC for joint initiatives (P. Mwansa, 15.10.2009). If Ndola is included, results showed slightly weaker horizontal cooperation with the exception of slightly more joint training and purchase.

Table 49 Type and intensity of horizontal cooperation of Kitwe and Ndola suppliers (frequency and percentage)

Type of cooperation	Kitwe (n=31)			Kitwe-Ndola (n=43)		
	Not at all	Sometimes	Consistently	Not at all	Sometimes	Consistently
Information exchange	12 (39)	18 (58)	1 (3)	20 (47)	20 (47)	3 (7)
Joint orders	21 (68)	9 (29)	1 (3)	31 (72)	10 (23)	2 (5)
Joint product development	27 (87)	3 (10)	1 (3)	38 (88)	4 (9)	1 (2)
Machinery lending	23 (74)	8 (26)	0	31 (72)	11 (26)	1 (2)
Joint sale	28 (90)	3 (10)	0	40 (93)	3 (7)	0
Joint training	31 (100)	0	0	42 (98)	1 (2)	0
Joint purchase	29 (94)	2 (6)	0	39 (91)	4 (9)	0

Source. Author's fieldwork data

The underlying reason for weak cooperation rested on poor social capital. Industrial districts in Italy and Germany were embedded in high-trust social networks, which reduced transaction costs and supported cooperation mechanisms (Pyke and Sengenberger, 1992). From the interviews, a very different situation emerged in Zambia. Supply firms, buyers and institutional actors largely agreed that the business environment in the Copperbelt was dominated by high individualism, low trust, fierce competition and, often, a short-term perspective in business dealings. This can best be illustrated with examples extracted from the interviews: “we don't want the others to know what we are doing” (Supplier 15, 12.2009); on explaining why the respondent did not undertake joint training “otherwise the competitor would eat into our business” (Supplier 14, 11.2009); “we don't do anything for anybody, we just stick to ourselves” (Supplier 6, 11.2009); “dog eats dog” (Supplier 8, 11.2009); “everyone is in it for himself” (Supplier 19, 11.2009). The most comprehensive response was provided by a long-time supplier to the mining sector:

There is a fear that opening up to competitors would reduce the level of business one gets from the mines. This attitude works against the suppliers: if

they cooperated, they could specialise, become very competitive in a specific product and, when needed, recommend a partner firm for a complementary product. At the moment, a supplier would accept a big order which he can't fulfil, and then buy the required products from another firm, at a high price. (Supplier 2, 11.2009)

Obviously, poor social capital also impacted on the quality of vertical relationships and on the capacity to build trust-based relationships with buyers, a key supply chain parameter for Traditional and Chinese buyers.

Table 50 Average intensity of horizontal cooperation, by suppliers' trajectory, in Kitwe and Ndola

Type of cooperation	Kitwe (n=31)				Kitwe-Ndola (n=43)			
	Supplier trajectory				Supplier trajectory			
	Growing	Static	Exiting	Struggling	Growing	Static	Exiting	Struggling
Information exchange	0.73	0.5	0.5	0.6	0.7	0.5	0.14	0.75
Joint orders	0.47	0.25	0	0.3	0.5	0.25	0	0.25
Joint product development	0.2	0	0	0.2	0.2	0	0	0.17
Machinery lending	0.27	0.25	0.5	0.2	0.3	0.25	0.29	0.33
Joint sale	0.13	0.25	0	0	0.1	0.25	0	0
Joint training	0	0	0	0	0.1	0	0	0
Joint purchase	0.07	0	0	0.1	0.05	0	0	0.25
Total cooperation	1.87	1.25	1	1.4	1.95	1.25	0.43	1.75

Source. Author's fieldwork data. Note. Values range: 0 (*not at all*), 1 (*sometimes*), 2 (*consistently*). The total intensity cooperation index ranged from 0 to 14 (consistent cooperation in all areas)

As shown in Table 50, the intensity of cooperation varied between suppliers in different trajectories. In Kitwe, growing firms showed the highest engagement in horizontal cooperation, followed by the struggling, static, and last, as expected, exiting ones. In the Kitwe-Ndola group, the same order held but the difference in total intensity of cooperation between growing and struggling firms narrowed (from 0.47 to 0.2), while exiting firms lagged even further behind (intensity of 0.43 in Kitwe-Ndola vs. 1 in Kitwe). This implied that growing and struggling firms in the larger Kitwe-Ndola area cooperated more than in Kitwe alone, but there were more exiting firms, and the latter did not cooperate. Recalling that what set apart struggling and static firms was the former's effort to upgrade, it is interesting that struggling firms'

cooperation intensity suggests that they engaged in both upgrading *and* horizontal cooperation to improve their dynamic capabilities. Even if they maintained their sales, the static firms did not upgrade nor cooperate.

### **7.3.2 Indirect horizontal cooperation**

Three institutions existed in the Copperbelt to foster inter-firm coordination.<sup>100</sup> The Chamber of Mines reunited 14 big players from the mining industry and interacted with the government on pressing issues such as labour and tax laws and regulations. Suppliers were not members and their issues were largely outside the agenda of the Chamber.

Kitwe and District Chamber of Commerce and Industry (KCCI) represented around 300 firms and public institutions, including supply firms and mining companies. Many supply firms in Ndola referred to the KCCI to receive information and attend meetings. KCCI activities with regard to the mining supply chain were three-fold. Firstly, it coordinated monthly meetings between the suppliers and Mopani and, less frequently, with KCM. In these meetings, suppliers received updates on mining procurement practices and discussed problems affecting the supply chain. This was mainly useful for information sharing. Secondly, KCCI disseminated information on a daily basis. Lastly, KCCI ensured that the registered firms complied with government regulations regarding incorporation, taxes and sectoral certifications. Because it automatically excluded briefcase businessmen, Traditional buyers relied on the screening process to the Chamber by requesting KCCI registration from their preferred suppliers.

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<sup>100</sup> The Zambia Association of Manufacturers (ZAM) represented all manufacturing sectors. Whilst generally not involved in mining supply chain issues, in 2009 ZAM submitted a petition to government on behalf of its members to support manufacturers. The proposals included, amongst others, reversing tariff liberalisation under COMESA Customs Union, introducing a scrap metal ban, encouraging transparency in the mines procurement procedures, and postponing the requirement to pay VAT until suppliers have been paid (Records of the ZAM visit to the Copperbelt, 24-26 June 2009).

Respondents from Kitwe and Ndola had mixed views about KCCI. Eight firms found the Chamber useful and effective; seven firms found it useful only for information sharing purposes; ten firms found it ineffective.<sup>101</sup> Buyers generally found the meetings with KCCI useful to share information and increase awareness of “how things could be perceived in the supply chain and by the government” (Buyer 8, 11.2009). From the point of view of the KCCI Chairman, the effectiveness of the KCCI was hampered by the individualistic attitude of firm managers, too preoccupied with getting some business to undertake joint actions (“everyone wants to be in charge...they are secretive, they don’t want to share financing”) (B. Mwango, 12.11.2009).<sup>102</sup>

The only institution to exclusively represent the interests of the suppliers was the Association for Mining Suppliers and Contractors of Zambia (MSC). Known as the briefcase businessmen lobby group, MSC included around 400-500 members. By being politically well-connected and leveraging on the DAs commitment, in the pre-crisis period MSC was successful in lobbying for some level of market access for local SMEs.<sup>103</sup> Whilst well positioned to put forward the interests of the local supply chain, there were three major problems constraining the MSC’ effectiveness. Its internal cohesion and attractiveness to new members was seriously challenged by the perception that the position of president was abused to secure access to contracts. Considering that there was no board, the president held considerable power and “the large amount of money at stake exacerbates the incentive for in-fights” (Govt Official 2, 2009). Also, the MSC did not have a secretariat which implied that, unlike KCCI, it could not provide valuable services such as information sharing. Lastly, because of its membership, MSC only pursued market access in the mining value chain and was not interested in addressing structural competitiveness issues. The President explained MSC’ position: “if there is no access, there is no point in discussing infrastructure, standards, training” (F. T. Banda, 10.11.2009). One

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<sup>101</sup> For ten respondents, the answer was n/a. Only 58 percent of the 43 firms in Kitwe and Ndola responded to this question.

<sup>102</sup> KCCI had recently started to discuss with private sector and training institutions to address the skills shortages.

<sup>103</sup> Given its profile, one Traditional buyer ensured that MSC was as regularly consulted as KCCI.

respondent from the supply chain argued that “[MSC] deals with politicians, they focus more on political lobbying than other problems” (Supplier 20, 12.2009). Key issues raised during the interviews (such as skills, infrastructure and capital constraints, and cost and reliability of energy and telecoms) were not on the MSC agenda.

#### **7.3.4 The role of the government**

In terms of cluster development, government can play an important role by supporting firms to build linkages and learning networks and mediating different interests (cf. sub-section 2.2.3). Zambian industrial strategy largely ignored upstream industries to the copper mining sector (cf. sub-section 5.6.1). Instead, government focused on downstream processing and export promotion. The former was included in the Commercial, Trade and Industrial Policy and was selected for World Bank support under the Jobs, Prosperity and Competitiveness Programme. Export promotion was prioritised in the 2006-2010 Fifth National Development Plan, in the Commercial, Trade and Industrial Policy and in the draft National Export Strategy.

The DAs provided the only policy framework on upstream linkages development. After being ignored for the first years they came into force, government followed up on these provisions by establishing a Mines Procurement Committee. This was a response to a private sector outcry on the lack of opportunities with the privatised mines. The Committee was chaired by the Ministry of Commerce, Trade and Industry and included several ministries. The meetings of the Committee, which took place between 2006 and 2007, were funded by a donor, the European Commission, and not by the government budget. Respondents from the Ministry of Commerce and Ministry of Mining, who attended these meetings, explained that the initial meetings of the committee exposed the distrust between key players. Suppliers accused buyers of price transfers and setting deliberately cumbersome tender procedures to cut out local suppliers; buyers accused suppliers of poor quality supplies and fraud (Govt Official 1, 2009; Govt Official 2, 2009). Government relied on cooperation from the mines as the DAs provisions were of a ‘best endeavours’ nature. In 2007, some of the mines proposed programmes to increase local procurement, but the

Committee did not monitor implementation. The mines were supposed to provide quarterly reports of the progress on local procurement but only KCM did, and only for a limited period. The Committee was eventually disbanded. Also, government only attended few initial IFC SDP meetings and was largely excluded from the implementation process. Overall, weak institutional capabilities and the lack of allocation of resource to this process made the government a player of secondary importance in the dynamics of upstream linkages in Zambia.

By and large, the government's role as a mediator was ineffective. In 2007, one of the largest mines, Mopani Copper Mines, decided to outsource its procurement function to a Dutch company providing electronic procurement systems. Data processing was supposed to be relocated to South Africa, and requests for quotation sent automatically to preferred suppliers, who in turn had to pay a registration fee. Briefcase businessmen, through the MSC, claimed that the new system curtailed opportunities for local suppliers, and successfully lobbied government to intervene. In reality, whilst leaving the registration process relatively unchanged, the system would have reduced the power of local procurement officials in the selection process, thereby weakening the importance of social networks to secure orders. Consultations with stakeholders started late in the process, which meant that suppliers in favour of the new system were not given an opportunity to voice their support. In the interviews, many established suppliers argued that the system would have enhanced their opportunities to enter that buyer's supply chain. Whilst the Ministry of Commerce was conducting an investigation, the president of Zambia took a strong position and, in a statement, condemned the new electronic procurement system (*Lusaka Times*, 22.5.2007). As one respondent from the mining company involved put it "the Presidential speech put an end to the issue" (Buyer 7, 11.2009). Ultimately, the presidential decision was more concerned with appeasing a vocal constituency in the Copperbelt than local supply chain development issues (*Maravi*, 15.5.2007). The decision-making process unveiled the balance of powers within Zambia's political system: the capacity of firms to influence the presidency prevailed over the sectoral competency of the relevant ministries. The response of the president on this issue should be contextualised within a system that, by being largely centralised and interventionist, curtailed policy predictability (Haglund, 2010).

### **7.3.5 Crisis as a catalyst of cooperation**

The copper price decline in 2008 put listed companies under significant pressures, as capital sources dried up and share-holders expected returns on their investment. At the time, KCM had large investment commitments in a smelter, a concentrator and the Konkola Deep Mining Project. As liquidity shortages became more stringent, the Indian buyer suspended payment to the suppliers by as long as six months. The impact on the supply chain was considerable and many firms went out of business.

The response to the payment crisis differed according to suppliers' groups. In general, established suppliers strengthened their cooperation through the KCCI. The latter engaged KCM in a series of meetings to address the situation, with government involvement. The Indian buyer committed to a schedule of payments that, although delayed, ensured that every supplier would be paid within three months. It is noteworthy that this was the only successful experience of horizontal cooperation reported by respondents. Nevertheless, the Indian buyer's commitment was not met. Most respondents were still waiting to receive payments at the time of fieldwork.

The crisis highlighted the heterogeneity of the supply chain. Relying on a combination of informal cooperation and market power, critical suppliers secured payments by threatening or proceeding to stop supplies. To ensure the effectiveness of these threats, they coordinated their efforts by not accepting an order meant to replace supply from unpaid suppliers. Fuel companies and OEMs were the most successful in this respect because of their market power. Non-critical suppliers, on the other hand, were easily replaceable and failed to coordinate. Competition from new entrants, willing to lower prices, forced regular suppliers to exit or to remain in the supply chain at the buyer's terms.

One of the consequences of the joint action by suppliers was that the consultative process born to solve the payment crisis continued. It was expanded to include more mining companies and addressed more issues, such as transparency of the procurement process and supply chain parameters. Yet, the joint action failed to

address structural bottlenecks to suppliers' competitiveness. Skills, technology, capital and infrastructure constraints remained outside the suppliers' cooperation efforts.

## **7.4 External Constraints on Local Competitiveness**

Respondents underscored five key factors constraining the competitiveness of local supply firms: taxation, skills constraints, low technological capabilities, capital market and infrastructure. The first issue was treated in sub-section 5.6.2. The remaining four are discussed in the next sub-sections. A disclaimer is necessary. Whilst drawing attention to some structural issues that reduce local supply capabilities, this section does not aim to discuss these factors in-depth or assess their relative weight in determining suppliers' performance.

### **7.4.1 Skills constraints**

Undersupply of technical skills, in terms of level and quality, emerged as an important constraint to firms' expansion. Small-scale, skills-intensive businesses found it particularly difficult to replace an ageing, skilled workforce. By contrast, the largest firms, like OEM subsidiaries, had a very aggressive training policy, tapping into parent company resources. In order to address low retention, OEM subsidiaries adopted bond systems, with limited success, and were in process of moving towards closer partnerships with local training institutes. Most of the suppliers, however, undertook little or no training, and mostly in the form of on-the-job training.

Zambia's Technical Education, Vocational and Entrepreneurship Training Policy (GRZ, 1996b) highlighted the importance of skills creation for poverty reduction. Nevertheless, it failed to prioritise skills in high demand in the Copperbelt and allocate sufficient resources. Skills scarcity was especially problematic for mechanical and electrical engineers, metal fabrication, IT skills, and hydraulics. Poor quality training impacted negatively on skills levels. Training was largely theoretical, rather than practical, and schools were endowed with old equipment. Certifications

had a weak signalling value in terms of actual competencies. This translated into high selection costs for the firms.

Labour spillovers between the mines and the supply chain were a significant source of skills for the supply chain, easing constraints at both technical and managerial levels (Table 51). The mining companies provided training to also comply with their obligations under the DAs. Slightly more than one third of the mining companies relied on on-the-job training, while the other two thirds also relied on external institutions. The retention rate was high, but the average length of stay after training for 46.2 percent of trainees was two years or less (National Economic Advisory Council, 2007). From the end of the 1990s, the skills spillover from the mines to the supply chain intensified. Ex-employees from the mines' acquired technical skills from the operations department and marketing skills and knowledge of the procurement process at the sales departments. Suppliers also employed foreign labour, with 30 respondents out of 50 reporting doing so. In most cases, though, foreign labour occupied only managerial and technical positions, and the firms still had to train workers or poach them from competitors.

Table 51 Extent of skills spillover from buyers to suppliers

	Total
Employed ex-mining companies' employees	24
Not employed ex-mining companies' employees	21
Not responded	5
Total	50

Source. Author's fieldwork data. Note. n=50

#### 7.4.2 Technological constraints

Public and private R&D in Zambia was very low (UNESCO, 2010), with very weak linkages between public institutions and the private sector. This meant that the research conducted in public institutions was rarely transferred to commercial exploitation (GRZ, 1996a). The 1997 Science and Technology Act established a number of institutions, which from 2009 were endowed with a Strategic Research Fund. The latter, however, did not target specific industries. A respondent from the National Technology Business Centre (NTBC), the body responsible for working

jointly with the private sector on innovation technology, reported undertaking no project with the suppliers in the Copperbelt (E. Shamano, 12.2009).

Whist supported by their insertion in GVCs, OEM subsidiaries and sole distributors were scarcely involved in technological innovation. MNEs tend to retain the most knowledge-intensive activities, such as R&D, in their home countries. Their contribution to developing technological capabilities in the host countries was shaped by how new technologies were imported. Importing technologies as a *package*, transferring only the results of the innovation but not the process itself, reduced the impact on local technological capabilities (Lall, 1992; Bell and Albu, 1999).

Manufacturers and services providers with no linkage to GVCs faced higher barriers to technological innovation and know-how. Equipment was adopted with little technological adaptation. Investment in technologically advanced equipment was curtailed by different factors: capital constraints, reluctance to invest due to high competition from low-cost imports and flat or erratic demand from the mines. Moreover, the lack of local firms specialised in computerised equipment meant that suppliers would not invest in such equipment, as costs for maintenance and repair were very high. Consequently, many firms operated machineries acquired before privatisation.

Because of low skills and technological capabilities, the Copperbelt was a *shallow* cluster: the network of specialised, Tier 2 suppliers was underdeveloped and supply firms prioritised vertical integration. Fifteen respondents explained that they internalised many non-core activities, in particular maintenance and repair functions. Three suppliers invested in in-house testing facilities to reduce reliance on university or private laboratories. One specialised transport services provider explained “we do everything in-house: maintenance, repairs, servicing, engine rebuilds, gearbox rebuilds....In Zambia, it’s better to be vertically integrated because of the poor skills level....If we were based in South Africa, we would outsource tyres maintenance and repair of truck breaks...”(Supplier 26, 11.2009). Another respondent agreed “in an ideal situation, we would outsource machining workshop to engineering workshop, as well as transport services” (Supplier 34, 11.2009).

### 7.4.3 Capital constraints

In the past years, Zambia made significant progress in building a sound regulatory framework for the banking sector (IMF, 2008; Mattoo and Payton, 2007). Commercial banks, the lion share of Zambia's financial sector, operated on generally profitable and sound basis. Nevertheless, financial intermediation remained rather shallow, with low and unequal access to banking services. Zambia's ratio of private sector credit to GDP was lower than the average for low-income SSA. Moreover, access to bank credit was extremely expensive, with one of the highest interest rates in the region.<sup>104</sup> Bank loan rates ranged from 30-40 percent for local currency, and 10-15 percent on US dollar borrowing (IFC, 2005). Long term loans were rarely available. Two firms reported that they relied on loans from South African and European banks at around 6 percent interest rate, compared to 30 percent charged by Zambian banks (Supplier 24, 11.2009; Supplier 26, 11.2009).

From the interviews with suppliers, limited access to capital emerged as a key constraint to investment in technological innovation and higher stockholding functions. The manager of a supply firm explained: "the challenge in meeting large volumes is liquidity-related, as services suppliers have their capital tied up in few transactions" (Supplier 2, 11.2009). In fact, firms able to work on short lead times invested relatively high levels of capital. One supply firm provided spares with very short lead times because it held a stock worth US\$ 2 million and could rely on the parent company in South Africa to air freight goods within one day (Supplier 35, 11.2009). Another firm reported having in stock all the materials that have been used in the previous five years (Supplier 6, 11.2009).

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<sup>104</sup> The IMF (2008) suggested the high cost of financial intermediation was due to the following: high overhead costs, limited domestic competition, high shares of unremunerated required reserves, weak credit culture and inefficient institutional frameworks to facilitate creditors screening, collateral provision, and contract enforcement.

#### 7.4.4 Infrastructural constraints

Infrastructure developed around extractive industries has different levels of positive externalities, depending on its asset-specificity and location. Pipelines and helicopter services have lower externalities than roads and railways (UNCTAD, 2007). Historically, in Zambia, copper mining spurred the development of a railway from South Africa through Zimbabwe to the Copperbelt and through to the Congo and to Lobito Bay in Angola. To meet the demand of the mining industry for low-cost electrical power and energy, Kariba Dam and the hydroelectric power stations on the Zambezi and Kafue Rivers were developed as well (Chamber of Commerce, 2005).

Currently, four main trade corridors link Zambia and the southeast DRC to the sub-region and overseas markets. These are Dar-es-Salaam, Walvis Bay, Beira, and the north-south corridor through Durban. Though not the closest port, Durban was the most convenient and utilised port for Zambian firms. Transport prices for Lusaka-Durban were US\$6 per tonne/km, against US\$5 in China and US\$3.5 in Brazil (World Bank, 2009). Three factors lay behind high transport costs in the North-South Corridor. Firstly, high border crossing times, especially on the Chirundu Border with Zimbabwe. It was estimated that a 20 percent reduction in border crossing time would reduce transport prices to the importers by 10-15 percent. Secondly, high fuel prices - almost 80 percent of the fuel prices in Zambia were constituted by taxes and levies, which meant that 40 percent of total transport costs were linked to taxation. Third, quality of physical infrastructure was poor due to lack of investment from government or private mines.<sup>105</sup>

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<sup>105</sup> The Government, together with other neighbouring countries, launched the North-South Corridor Programme in April 2009. The ambitious programme aimed at reducing transport costs for two main routes: Copperbelt - Dar es Salaam, and Copperbelt - Durban. This would be done by rehabilitating the physical infrastructure and improving the regulatory regime. The programme aims to involve the expanding extractive industries in Zambia and DRC as key drivers of the programme (Regional Trade Facilitation Programme, 2009). The first concrete step to implement the programme took place in 2009, when Zambia adopted the One-Stop Border Post Act, the legal foundation for the joint administration of the Zambia-Zimbabwe border post (GRZ, 2009b).

Poor infrastructure represented a cost penalty on both buyers and suppliers. It increased lead time and stock-holding requirements for distributors and agents, production costs for manufacturers and increased market barriers to the mining sectors in the DRC.

## **7.5 Conclusion**

This chapter examined two dimensions of value chain misalignment in Zambia's copper sector. Firstly, there was a misalignment between buyers' and suppliers' views on supply chain parameters. Suppliers failed to understand changes in the Traditional buyers' supply chain management strategy. After the 2008 price crisis, these buyers were re-organising their procurement with a two-prolonged approach: cutting costs, hence the emphasis on price, and focusing on capable suppliers, hence the emphasis on learning and innovation capabilities. Suppliers, by focusing only on quality, failed to see that requirements were becoming more stringent. With regard to the Chinese value chain, suppliers underestimated that the buyer was increasingly quality-driven for critical supply-links. Only a few suppliers understood that, in this supply chain, the requirements were changing.

There also was misalignment between the buyers' view on the supply chain performance and the suppliers' own assessment. Buyers rated local suppliers' capabilities very low. The Chinese buyer was more dissatisfied with delivery reliability and lead times, and Traditional buyers were more dissatisfied with product quality. In the buyer's view, two key problems were price and trust as suppliers tried to maximise short-term profits rather than developing long-term relationships. By and large, suppliers failed to recognise their weaknesses and rated their performance significantly higher than the buyers.

By failing to "hear" the buyers' assessment of the supply chain parameters and local capabilities, the suppliers' own efforts to enhance firm competitiveness risked being less effective. Value chain misalignment also highlighted a problem on the buyers' side. Only recently have buyers made efforts to convey information about supply chain parameters through the IFC SDP started in 2007, and more recently through

meeting suppliers. This had yet to show its results and, moreover, Indian and Chinese buyers were not involved.

After this discussion at the aggregate level, I analysed firm performance and upgrading processes at the firm-level. According to these two criteria, performance (sales) and upgrading, I identified four groups of suppliers: growing, static, exiting, and struggling. This provided further insights on the dynamics of Zambia mining value chain.

The main finding is that value chain governance was critical in driving local upgrading processes. Slightly less than half of the sample of supply firms was characterised by growing sales to the mining value chain and intense upgrading efforts. These firms' upgrading processes were supported by two types of value chain governance. The first one was driven by Traditional buyers, who cooperated directly with a range of firms they needed for their outsourcing strategies. Two types of firms were targeted: highly-specialised firms that provided critical services and products, and that buyers wanted to ensure would survive the crisis; and firms with low levels of capabilities, positioned in links with strong locational advantages and scarce competition. Cooperation took the form of longer contractual arrangements, joint product development, forward purchase agreements, and advance payments. Traditional buyers also cooperated with non-critical, non-specialised firms under the IFC SDP, but the selection of these firms was not aligned to the buyers' strategic interests. Cooperation extended by the buyers was effective in supporting local upgrading processes. Nevertheless, cooperation did not tackle intra-firm competitiveness bottlenecks in terms of workers' skills and production systems.

The second type of value chain governance supporting local upgrading was driven by lead firms in external GVCs. These provided the resources, knowledge, and reputation to ensure that their subsidiaries and sole distributors succeeded. Process upgrading was particularly important for mining OEM subsidiaries that relied on high quality after-sale services and short lead times to control the profitable spares and maintenance supply links. By applying warranty systems, OEMs locked out local manufacturers and, to a less extent, services companies from these supply links.

Moreover, they were relatively more powerful in the supply chain and accrued high rents from knowledge and brands. Also, non-equity forms of linkages proved powerful channels to promote upgrading, as they provided a global or regional network of skills and capital to tap into.

It is noteworthy that only some of the firms in the growing trajectory also supplied Indian and Chinese value chains. In fact, some firms entered and remained in the mining value chain because of cooperation with Traditional buyers. Others focussed on the Traditional buyers' value chain as an explicit strategy to operate in cooperation-intensive value chains. Lastly, there were firms, in particular engineering firms, that could not enter the Chinese value chain because of its vertical integration. Due to the arm's length market relationships established by Indian and Chinese buyers, only highly capable suppliers could enter their value chains. There was nevertheless a substantial difference. Firms supplying the Chinese buyer, benefitted from an additional revenue stream due to prompt payment. By contrast, firms supplying the Indian value chain had to devote resources to negotiate and ensure payments.

Analysing the group of static firms, for which sales grew but there was no upgrading process, I identified two limitations to the value chain dynamics highlighted above. Firstly, direct cooperation from the Traditional buyers was selective. It was not in the strategic interest of the mines to assist firms positioned in links with high competition and low criticality. These firms could only rely on backward linkages to GVCs, but there were also limitations in this respect. When a firm was inserted to a considerable extent into non-mining value chains, both the firm and the mining buyers had no interest in promoting its upgrading in the mining value chain. Moreover, even if firms were indeed specialised, the size of the firms mattered. Micro-enterprises often found it difficult to grow their managerial and organisational structures to sustain upgrading processes. In other words, micro-enterprises had to invest first in facilities and employment before product quality, training, equipment and other areas could be targeted.

Struggling and exiting firms were largely composed of manufacturing firms established at the time of ZCCM, effectively caught up in a trap of low revenues, no linkages and no cooperation from buyers. Revenues were low because of intense competition, intra-firm competitiveness bottlenecks, and positioning in price-driven supply links. Also, they often supplied through well-connected briefcase businessmen who further squeezed their profits. Moreover, technological innovation played a role in specific supply links, making some products obsolete. Weak linkages to GVCs implied that, on the one hand, they could not tap into resources provided by lead firms and, on the other hand, they were excluded from the remunerative spares, maintenance and repair supply links. Traditional buyers did not engage in direct cooperation with these firms.

Struggling firms differed from exiting firms in their upgrading efforts. Part of these efforts by struggling firms was undertaken in the context of the IFC SDP. Whilst useful in supporting intra-firm capability, this programme's effectiveness was constrained by the weak organisational structure of beneficiary firms and by the lack of investment capital. When taking a closer look at the upgrading efforts by other struggling firms, it emerged that they often pursued functional *downgrading* into less technologically sophisticated activities or pursued process and product upgrading to move away from the mining value chain into less demanding value chains.

The analysis highlighted further issues. Functional upgrading was relatively rare in the local supply chain. When it took place, it was generally in the context of strong direct cooperation from the Traditional buyers and involved firms with relatively low levels of capabilities. Such an outcome shows that, when it fulfilled their supply chain strategy, Traditional buyers put significant resources into supply chain development. Functional upgrading was more difficult for firms inserted in captive value chains with their parent companies, where parameters and activities were set by lead firms abroad. In such circumstances, lead firms governed complex global production networks, which left no room for local functional upgrading processes. The same holds true for technological innovation. R&D and product development took place abroad, and cooperation with the mining companies largely excluded local suppliers. This resulted in what Lall (1992) defined a truncation of the technology transfer, with

local suppliers relegated to maintenance and repair functions. It follows that firms with no linkages were better placed to accommodate functional upgrading.

An important finding of this chapter for policy-makers is that linkages rather than ownership mattered for local upgrading trajectories. There was no distinctive ownership pattern, in terms of foreign, joint or Zambian, across the four categories of suppliers. Growing firms included one third of Zambian firms, whilst half of exiting and struggling firms were foreign-owned. This implies that policies focused on ownership rather than linkages and value addition could be highly misguided if the objective is to deepen local upgrading processes. Similarly, there was no distinctive sectoral distribution across the four categories of suppliers. It was undeniable that the manufacturing sector contracted after privatisation, and that the supply chain was more oriented towards services. Indeed, 10 out of 12 exiting firms were manufacturing firms. Yet, more than a third of growing firms were in the manufacturing sector, almost exclusively inserted in GVCs.

The Copperbelt had a long history of upstream linkages to the copper mines. It was therefore important to assess the extent to which firms addressed individual competitiveness bottlenecks by cooperating with each other. The findings highlighted that cooperation was low, considering exclusively Kitwe or Kitwe in conjunction with the neighbouring town Ndola. The underlying reason for this was poor social capital. The business environment was characterised by individualism, distrust and short-term perspectives. Notwithstanding low levels of cooperation, the findings also highlighted that growing and struggling firms were cooperating more than static and exiting firms. In their efforts to upgrade, growing and struggling firms engaged more intensely in information exchange, joint orders, joint product development and machinery lending. Such cooperation, nevertheless, was too weak to play a major role in explaining the suppliers' trajectory.

In terms of indirect cooperation, there were two key institutions. The Kitwe & District Chamber of Commerce and Industry was instrumental in promoting information sharing and consultations with some buyers, and the Association for Mining Suppliers and Contractors of Zambia represented briefcase businessmen and

lobbied for market access. The payment crisis that hit suppliers when the Indian buyer delayed payment by up to six months resulted in more intensive cooperation between suppliers through the Kitwe Chamber, and, in some cases, between themselves. This was the only successful experience with indirect cooperation in the cluster, and it resulted in a continued, and expanded, consultative process with the buyers. Indirect cooperation, nevertheless, failed to address structural issues such as skills, technological and capital constraints. This was particularly important in a context of weak industrial policy. Government largely ignored the issue of upstream linkages development, and addressed it on ad hoc basis. Although political initiatives, such as inter-ministerial committee or presidential speeches, attained high political profile, they did not translate into the allocation of resources that would have been necessary to follow through with continued engagement of relevant ministries or capacity building programmes.

## CHAPTER 8

### Conclusion

This thesis focuses on the dynamics for Zambia's upstream industries to the copper mining sector following two intertwined events: the commodity price boom, specifically the rising price of copper; and the emergence of China and India as major sources of FDI in Africa's extractive industry.

From 2003 the world copper market experienced a price boom, with a three-fold price increase between 2003 and 2007. In the second trimester of 2008, prices peaked to a then unprecedented 8,441.8 US\$/t. After an initial drop in the copper price in 2008 and 2009, prices recovered and in 2010 they overtook the 9,000 US\$/t ceiling. This copper price boom was driven largely by demand from China.

In order to meet the demand surge, four supply-side responses occurred in the global copper market. Firstly, scrap production increased, as the fastest short-term solution to increase refined copper output. Secondly, exploration activities soared across every continent - copper became the second most sought-after metal after gold (Wilburn, 2005). Third, China and India did not solely rely on imports of copper, they also invested in extractive industries overseas. They did so ahead of the price boom, and in a wide range of countries. China went in pursuit of greenfield investment, or small operations that were later consolidated and expanded. India tended to pursue brownfield investment. Lastly, the price boom spurred frenzied M&A activities, and the market structure became increasingly concentrated.

This created new opportunities and challenges for Africa. In the history of many resource-rich countries, commodity extraction has been instrumental in fostering industrial development, technological sophistication, and improvement in skills and human capital. In Africa, these linkages have generally been weak, but the traditional scepticism towards commodity-based linkages has had to be re-considered in light of the new developmental opportunities offered by large-scale investment in extractive industries, and the higher rents associated with these investments.

This thesis has investigated the Zambian case, a context in which all of the above dynamics were at play. The concluding section is organised as follows. I summarise the findings of chapters five, six, and seven on the dynamics of upstream linkages to Zambia's copper sector and the impact of Chinese and Indian FDI. In section two, I turn to the policy implications of my findings. Lastly, I discuss the contribution of this thesis to the literature.

## **8.1 Summary of Findings**

The empirical chapters of this thesis were based on interview data and archive material. In this sub-section I present the findings on the evolution of Zambia's upstream linkages after the privatisation of the mines, the dynamics of the Chinese and Indian value chains, and their implications for local upgrading processes.

### **8.1.1 The impact of privatisation on upstream linkages development**

Analysis of archive and interview data unveiled that a deep process of internal differentiation occurred in Zambia's supply industry after the privatisation process. From the early 1970s to the late 1990s, the mining sector and a large part of its upstream industries were characterised by a symbiotic relationship: they were owned by the same corporation, Zambia Industrial and Mining Corporation, they were regulated by the same ministry, and they had to adhere to Zambia's central planning. ZCCM, the state-owned mine, was nationalised in 1969 and run with three paramount strategic objectives: to provide foreign exchange; enhance the socio-economic welfare of the workers; and promote industrialisation. After two decades none of these objectives proved to be economically sustainable. A combination of plummeting world prices and scarce re-investment from the government on exploration, mines development, and crucially, mines re-capitalisation caused the mines to become one of the world's highest-cost producers, restricted operations to deeper less accessible deposits, and caused foreign exchange and revenues to drop dramatically.

ZCCM's internal policy documents elucidated that upstream linkages development were pursued through a combination of direct state ownership of part of the supply industry, preferential sourcing, import substitution, and intense value chain cooperation between ZCCM, its suppliers, and public research and training institutions. Under this policy framework the Copperbelt saw a thriving manufacturing sector populated by state-owned enterprises, family-run businesses established by European and Indian migrants, and OEM subsidiaries. Demand for spare parts and components offered market opportunities for local manufacturers. The Zambian workforce was largely qualified owing to an extensive technical and vocational education system, and to programmes sponsored by the mining sector. Whilst the extent of local linkages was significant, local industry capabilities were low in terms of technological innovation, costs, and lead times, contributing to soaring production costs for ZCCM.

By the early 1980s, ZCCM's liquidity and foreign exchange shortages had a direct impact on the supply chain. ZCCM cut expenditure on capital equipment and spares, and delayed payments to local suppliers. State-owned firms were directed to supply ZCCM at below market price. Mine divisions were left with large discretionary power and manipulated urgency procedures and technical specification to favour particular suppliers. ZCCM was also inefficient in ensuring that suppliers met technical standards required by the mines. Non-performing suppliers were not excluded from the supply chain, and invested in personal networks in order to access and remain in the supply chain. Until privatisation, the reform process undertaken by the government failed to turn around the mines and the supply cluster. The government's focus on the maximisation of foreign exchange earnings, revenues, and employment over operational efficiency and financial sustainability is partly to blame for the stagnation of the industry.

The findings of this thesis point to the privatisation of the copper mines as the critical determinant of the extent and depth of upstream linkages to copper mining since the 1990s. The privatised mines focused on their core business, and relinquished a range of non-mining activities previously run by ZCCM. They imposed higher performance requirements on their suppliers. Moreover, competition along the

supply chain became stiff, because of trade and investment liberalisation, and the provisions of the Development Agreements granting tax exemptions on capital equipment imports. Auditing by the mines and third party certification became increasingly important for firms to enter the supply chain. Whilst the role of social networks in facilitating access persisted, over time the mining companies put in place measures to curb them.

The archival and interview data underlined the deep learning process experienced by suppliers from their buyers on the requirements of a highly modernised mining supply chain. It also found this process to be highly selective. Some suppliers succeeded in expanding their business volumes. They did so by adopting a combination of the following strategies: moving into higher quality products, increasing post-sale services, expanding size to meet increased demand, and increasing the range of specialised products offered. They became more specialised, both as a strategy to focus on core businesses, and as a forced response to the decline in input demand from other manufacturing sectors. Mining OEMs were successful in this process while other suppliers struggled or exited the mining value chain altogether. These were mainly manufacturing firms that could not compete with imported goods. In general, Zambia's upstream linkages to mining became shallow. Whilst there were specialised firms, OEM subsidiaries and some manufacturers involved in higher technology and skills activities, the supply chain was increasingly populated by micro-scale, largely informal traders, known as briefcase businessmen, which often relied on personal networks to access business from the mines. The latter were however largely excluded from the supply chain, following the copper price crisis in 2008, which made the mining companies eager to cut costs and focus on a restricted number of value-added suppliers.

Like most countries undergoing structural adjustment programmes, Zambia moved away from a developmental state model. At the policy level, Zambia embraced private sector-development growth, but did so by attracting FDI and promoting exports. Industrial policy and localisation of upstream linkages were largely ignored. Whilst the Development Agreements included relevant provisions, they were of a best endeavour nature. Government did not have the political will and institutional

capacity to implement them. It largely intervened on issues related to the supply industry on an ad hoc basis, with initiatives that, whilst attaining high political profile, such as inter-ministerial committee or presidential speeches, did not translate into sustained engagement of relevant ministries or capacity building programmes. In terms of horizontal policies, no effective technological or skills policy were put in place to support the supply firms' competitiveness. Poor access to capital and infrastructural constraints affected their cost competitiveness. In this research, the supply firms emerged as being caught in a trap of stiffer competition from briefcase businessmen and imports on the one hand and higher performance requirements on the other, which was exacerbated by no support from government. The major implication was that value chain dynamics and governance became critical to determine the growth and upgrading opportunities of the supply industry.

### **8.1.2 Firm ownership and value chain governance**

Chapter four explained how, after privatisation, Zambia's copper industry ownership structure became highly diversified. Within one decade, China and India grew from a marginal role to accounting for one quarter of Zambia's inward FDI stock. China was the fastest-growing investors with the most significant investment project for Zambia's industrial development since the 1990s: the Chambishi Zambia-China Economic and Trade Cooperation Zone (ZCCZ), including the Chambishi Copper Smelter, acid plants, as well as a copper semi-fabricates manufacturing plant.

In chapter six, I discussed on the how firm ownership shaped value chain governance in significant ways. Indeed Zambia's copper sector was characterised by not one, but several value chains: North American, European, and South African lead commodity firms (the Traditional buyers) organised their supply chains differently from Chinese and Indian buyers.

Traditional buyers focused on their core business, outsourcing any activities that fell outside their day-to-day operations. To reduce transaction costs, they relied on historical suppliers and on brand loyalty. The 2008 copper price crisis and the credit crunch forced Traditional buyers, which were mostly listed companies, to halt new

projects, reduce production, and undertake drastic cost-cutting strategies. As a result, their supply chains became increasingly price-driven. Following global management practices, they rationalised their local supply chain in order to focus on fewer, more capable suppliers. In this respect, the suppliers' dynamic capabilities in terms of innovation and learning became critical. Dynamic suppliers were able to provide technical advice, engage in joint problem solving efforts, and devise innovation that would help cut the buyers' transaction and production costs. Traditional buyers were also the only group of buyers to engage in forms of horizontal cooperation. For example, buyers directly assisted selected suppliers through intense information sharing, advanced payments, transport arrangements, and long-term contractual agreements. Their supply chain parameters were also based on quality, trust, and lead times.

Unlike Traditional buyers, the Chinese lead commodity firm vertically integrated non-critical supply links, such as fabrication and engineering services. Whilst this curtailed opportunities for some local supply-links, the Chinese buyer also outsourced a significant amount of services and goods to regional and local suppliers. Entry barriers to the Chinese supply chain were relatively low. Because of low embeddedness in the local business environment, the Chinese buyer relied on an extensive auditing process based on objective criteria. Relationships were mostly kept on an arm's length market basis, with no cooperation, and limited to repeated transactions if suppliers performed according to expectations. These expectations were driven by lead times, which were particularly important for the Chinese buyer. For critical supply links, there were also growing expectations in terms of product quality. Whilst putting much emphasis on trust, the Chinese buyer found it difficult to develop trust-based relationships. Building these required significant resources from both sides. Learning and innovation capabilities, on the other hand, were not very important in the Chinese supply chain. This weakened incentives for local supply firms to innovate and upgrade.

The Indian value chain was price-driven, and was characterised by low trust and no brand or supplier loyalty. By adopting low entry barriers and low performance requirements, the buyer ensured high levels of competition in the supply chain. This

was particularly important during the liquidity crisis in 2008 and 2009, when the Indian buyer suspended payments to suppliers. Like the Chinese buyer, the Indian buyer largely operated at arm's length. Unlike the Chinese, however, the Indian buyer's value chain governance had a negative impact on suppliers' upgrading efforts. By squeezing their profit margins, delaying payments, and failing to curb corruption in the procurement process, the buyer made it more difficult for suppliers to grow, or even survive.

This thesis also analysed value chain governance in the small-scale mining sector. The small market power of these fragmented small-scale operations resulted in a particular power relation with OEMs and other large suppliers, as these largely dictated the terms of the transactions. The small-scale buyers' value chain was characterised by low entry barriers, as buyers were willing to engage with new products and new suppliers, also from Asia. This thesis found evidence that Chinese mining OEMs started positioning themselves in these value chains, offering advantageous credit terms, and often displacing established OEMs. It is plausible that this strategy by the Chinese OEMs aimed at gaining a foothold and developing experience in Zambia's copper value chain, which would facilitate future expansion in the large buyers' supply chains.

### **8.1.3 Local supply firms' trajectories**

Zambia's upstream industries were characterised by very low levels of value-addition. This problem was accompanied by significant value chain misalignment between buyers and suppliers. These highlighted a failure on the suppliers' side to identify the market parameters of the mining supply chain, and on the buyers' side to effectively convey this information to their suppliers. Suppliers failed to understand that Traditional buyers were shifting towards global practices of supply chain rationalisation, which implied more emphasis on suppliers' selection and on their innovative and learning capabilities. With regard to the Chinese supply chain, they largely failed to see that critical supply links were increasingly quality-driven.

In chapter seven, I analysed firm-level data and identified four trajectories on which local suppliers were positioned. Firms on a growing trajectory were characterised by positive sales growth, profits, and upgrading efforts. They constituted the most dynamic segment of the local supply chain. Other firms were still operating with positive profit margins but were not able to develop dynamic capabilities to sustain increasing competition. Two other groups of supply firms were struggling to remain in the supply chain: some were not able to compete and were exiting the mining value chain altogether, others were upgrading to try to re-position themselves in the mining supply chain, or to find other profitable markets outside of it.

One of the main findings of this thesis is that value chain governance was critical in shaping these trajectories. Two orders of value chain governance were critical to support local upgrading processes. Firstly, value chain governance by Traditional buyers. Traditional buyers cooperated directly with two types of critical firms: highly-specialised firms, whose survival in the crisis was in the buyers' strategic interest; and low-capabilities firms, positioned in supply links characterised by strong locational advantages and scarce competition. Traditional buyers also cooperated with non-critical, non-specialised firms through the IFC SDP, but the selection of these firms was not aligned to the buyers' strategic interests. Whilst their direct cooperation was effective in assisting suppliers' upgrading, the indirect cooperation through the IFC SDP had mixed results: some firms were positioned on a growing trajectory; others were struggling to remain in the supply chain.

Secondly, this thesis found that local upgrading process were supported by the supply firms' backward integration in their respective GVCs. Lead firms in these GVCs, through equity or non-equity relations, provided the resources, knowledge, and reputation to support upgrading process of subsidiaries and sole distributors.

The findings suggest that insertion in the Indian and Chinese value chains was not conducive to local suppliers' upgrading. Only some dynamic suppliers were able to, or interested in, diversifying into the Chinese and Indian value chains. There was nevertheless an important difference: the Chinese supply chain offered market growth opportunities, through low entry barriers and good payment records. Given

the risks of delayed payment in the Indian value chain, only two types of suppliers were inserted in this value chain: firms providing critical goods and services, which the buyer could not easily switch away from; firms that were neither critical nor competitive enough to upgrade in the Traditional value chains, and searched for low entry barriers and some level of business volumes. These were the struggling and exiting firms. Mostly manufacturing firms established at the time of ZCCM, they were largely excluded from the OEMs spares and components supply links, and from backward integration into external GVCs. Traditional buyers did not engage in direct cooperation with these firms because their products were not critical and were subject to stiff competition from imports. They were effectively caught in a low equilibrium trap of low profits, weak linkages and no cooperation from buyers.

This thesis highlights a number of issues surrounding buyer and supplier cooperation. Firstly, direct cooperation was found to be more effective than institutionalised cooperation through the IFC SDP. Buyers were willing to allocate significant resources when supply chain development was aligned to their corporate strategy. Secondly, cooperation did not tackle intra-firm structural bottlenecks, for example in terms of workers' skills and production systems. Traditional buyers did not allocate the resources or adopt a supply chain strategy to deepen vertical cooperation. Thirdly, direct cooperation from the Traditional buyers was selective and focused on supply links characterised by high locational advantages and criticality. Fourth, criticality involved a high degree of specialisation. Suppliers of generic products, even when tightly integrated to GVCs lead firms as sole distributors, did not benefit from buyers' assistance. Fifth, micro-enterprises mostly failed to grow into more complex managerial and organisational structures that could accommodate upgrading processes.

Local upgrading processes were not one-dimensional. Functional upgrading was relatively rare. Most firms tightly inserted in GVCs focused on process upgrading to improve their competitiveness in their existing stages of the value chains. In their GVCs, parameters and activities were set by lead firms abroad. In such circumstances, lead firms governed complex global production networks, which left no room for local functional upgrading processes. Other firms pursued process and

product upgrading to move away from the mining value chain into less demanding value chains. Upgrading was more an exit strategy than a strategic shift into more profitable and technologically complex value chains.

There was no distinctive ownership pattern, be it foreign, joint or Zambian, that characterised suppliers' trajectories. Sectoral distribution of firms also emerged as unimportant. Whilst in general the manufacturing sector contracted after privatisation, more than a third of high performing firms were manufacturers. Under specific GVCs dynamics, manufacturing could be viable in Zambia's upstream industries. There are important policy implications attached to the finding that linkages rather than ownership mattered for local upgrading trajectories.

Whilst the Copperbelt Province had a long history of mining and upstream industries, this thesis found that suppliers' horizontal cooperation was low. Strong individualism, distrust, and short-term perspectives significantly lowered the quality of social capital. Growing and struggling firms, in their efforts to upgrade, cooperated more intensely than other firms. Cooperation involved information exchange, joint orders, joint product development, and machinery lending. Yet, cooperation was too weak to be effective in supporting the cluster upgrading process or to tackle structural competitive bottlenecks. The crisis caused by the Indian buyer's decision to suspend suppliers' payments catalysed suppliers' cooperation, which continued through formal information exchange mechanisms. Nevertheless, these efforts did not result in more ambitious joint actions to tackle skills gaps, technological innovation, access to capital, or infrastructural barriers. These problems were compounded by the government's failure to harness the potential for agglomeration effects in promoting upstream linkages. In many respects, the Copperbelt was aligned to what Altenburg and Meyer-Stamer defined "survival clusters" (1999).

## 8.2 Policy Recommendations

Six major policy implications follow from these research findings.

### *1) Developing and implementing a policy for the supply cluster*

With regard to the copper mining sector, the Zambian government has so far focused on revenue and labour conditions (Mutesa, 2010; Ndulo, 2008). Linkages development however should play an important role in the government's industrial policy. Currently, the supply firms are not targeted by the 2008 Commercial, Trade and Industrial Policy or the 2009 Micro, Small and Medium Enterprise Development Policy (according to the official government classification, 46 firms in the sample would not qualify for support). Government should consider expanding the reach of the current policies or creating a separate policy instrument to target this group of firms. Support should prioritise access to capital, skills creation, business development services, and building a National System of Innovation. These initiatives should have a cluster approach, in order to achieve collective efficiencies, economies of scale and scope, and build social capital and learning networks (Humphrey and Schmitz, 1996; Morris and Barnes, 2006, 2007). Trade facilitation and infrastructure development will also be important in cutting operational costs for local suppliers, as well facilitating their insertion in regional value chains.

### *2) Entry to the supply chain*

Some mining companies should address poor transparency in the procurement process. Transparency was critical to facilitate the entry of capable, local suppliers in the value chain and to improve supply chain efficiency. An electronic procurement system could be a step in this direction. In the past, a misunderstanding between the mines, the suppliers and the government over the establishment of such a system caused the project to be aborted. This experience highlighted the importance of adequate consultation before and after implementing such reforms.

### *3) Building on the IFC suppliers development programme*

Zambia should build on the IFC SDP, by taking into consideration the following issues. Firstly, the IFC SDP targeted a group of peripheral suppliers to the mining

supply chain. Targeting critical suppliers could have increased the commitment and resources availed from the Traditional buyers. Secondly, the IFC relied on the buyers only; future initiatives should have a cluster approach and find internal agents of change to drive the process together with buyers. Thirdly, services suppliers with high potential for upgrading, skills and job creation, should be included in future initiatives.

*4) Encouraging Chinese and Indian mines to deepen cooperation with local suppliers*

Chinese and Indian lead commodity firms offer the investment capital that Zambia need. In fact, the Indian investor stepped in when AAC pulled out of KCM in 2002, while the Chinese investor acquired Luanshya Mines and Chambishi Smelter, after an Indian investor and a Swiss investor pulled out due to the economic crisis. In late 2011, a Chinese firm was also concluding the process of acquiring Metorex, who owned Chibuluma mine in Zambia (*Mining Weekly*, 2.11.2011). This increased the urgency for Zambia to fill the gap in supply chain development created by weak government regulatory capacity and a failure to internalise supply chain development by the Chinese and Indian buyers. Zambia should engage the mines at a political level, with the objective of securing their commitment in this area.

*5) Increasing FDI*

It will be important to foster Zambia's integration into GVC, that policies promote FDI, JV and other forms of partnership. The 2007 Zambia Agency Development Act goes in this direction. In order to increase local value addition, however, Zambia needs to tackle the business climate, by harnessing, for example, cost and ease of enforcing contracts and trading across borders (World Bank, 2011), as well as horizontal policies highlighted in the first recommendation.

*6) State to State dialogue with the DRC*

The DRC mining supply chain offers important market opportunities for Zambia's upstream industries. Zambia should address important issues such as improvement of border management (on both sides) and facilitation of banking transactions on a bilateral basis with the DRC government.

### 8.3 Contribution to the Literature

GVC research on Africa largely focused on manufacturing and soft commodities sectors. In the 1990s, this was justified by the fact that many countries' development trajectories were informed by export-oriented strategies, often taking advantage of trade preferences in the European and North American markets. The rise of China and India forced scholars to revisit these developmental trajectories, particularly in light of the renewed centrality of the extractive industries in many African countries. This thesis contributed to the debate by providing evidence on the challenges and opportunities that new Asian investment in the extractive industries offer for another type of industrialisation, one developed around the extractive industries in terms of upstream linkages. In order to do so, I adopted the GVC framework and drew on primary data. During my analysis where I investigated key research questions on lead commodity firm ownership and local linkages, I realised the importance of framing the analysis within the context in which traditional and new investors and their suppliers interact. This required the collection of additional data through archives and interviews, to understand the cluster trajectory over a longer time frame. In other words, the local milieu in which the GVC was embedded was as important as the rise of China and India in explaining the extent and depth of local linkages, and the main challenges to further development. Moreover, because GVC research lacks a deep understanding of the underlying drivers of China and India investment in Africa, I drew from the international business literature contributions. In my view, this highlighted the benefits of a multi-disciplinary approach to GVC research.

In this section, I present the contributions of this thesis to the literature in four research areas: the dynamics of an extractive industry-based GVC, the role of firm ownership in GVC analysis; the distinctiveness of China's FDI, in particular in the African context; and lastly, the role of policy in shaping value chain dynamics. I conclude with some final reflections.

### 8.3.1 Extractive industries global value chains

The literature review in chapter two highlighted the research gap in the GVC literature with respect to extractive industries GVCs. This thesis produced a series of findings on the sectoral characteristics of a mineral GVC. Following the commodity price boom, the copper sector became a particularly high rent industry. This had two implications: firstly, competition focused on the upstream stages of the copper GVC (mining), not on the downstream stages (beneficiation, distribution, and so forth). This resulted in a concentrated market structure of the copper mining sector, dominated by few MNEs, which compete for exclusive rights to the richest deposits.

Secondly, mining involved long gestation periods and large sunk costs, which made it difficult to relocate production. Global copper prices became critical determinants of the relative power balance between the firm and the state. In the ten year period before 2003, the copper price averaged 1976.63 US\$/t. At this time, Zambia struggled to find investors for its copper mining sector, which allowed the mining companies to extract very favourable terms and conditions, especially in terms of taxation. After the price boom, between 2004 and 2010, prices averaged 5714.1 US\$/t, almost three times the pre-boom decade. This shifted power back to the state, which resulted in a unilateral scrapping of the Development Agreements and the imposition of a new mining tax regime. So far, the state has intervened to redistribute rent from the lead commodity firm to the state, but potentially, this could affect localisation of upstream linkages. Indeed in 2011, there was evidence that Zambia was studying local content policy options, following the example of oil-producer neighbouring Angola. This GVC, as Bridge (2008) pointed out for oil industry, was deeply embedded in the proprietorial and institutional structures of the nation-state.

This thesis has also shown the influence of the scale of rent and firm-state relationship in determining the population of extractive industries GVCs. Farooki and Kaplinsky (2011) reported that between 2002 and 2008, annual gross profits rose sharply, from US \$4 billion to US\$ 57 billion. In Zambia, these super-profits enabled the mining companies to tolerate in their supply chain a large group of politically-connected traders, the briefcase businessmen, which reduced efficiency, but

facilitated relationships with the government. At the apex of the copper boom before 2008, there were an estimated 5,000 briefcase businessmen. It was the temporary collapse of these rents that caused buyers to re-organise their supply chains and exclude them from the copper mining value chain.

Looking at the oil sector, Bridge (2008) argued that a distinctive characteristic of extractive industries GVCs is that ownership and property rights crucially defined the distribution of natural resource rents. This thesis corroborated and developed this argument further, by explaining that when rents accrue from natural resource rents rather than technology or marketing, there are implications for the competitive advantage of firms and countries.

In the past 100 years, the copper mining industry witnessed two major technological breakthroughs (Bartos, 2007; Crowson, 2001). Copper technology was readily available and had a long life cycle because of the high direct and opportunity costs of upgrading technologies in the mines. Expenditures in R&D were small compared to other sectors, and focused on exploration rather than research on new extraction or processing techniques or new equipment. In sum, whilst the copper mining sector was capital intensive, it was not characterised by fast-changing technologies. This differentiated the mining industry from other sectors, in which the main sources of economic rents were derived from R&D and protection of intellectual property rights (such as high-tech services and pharmaceutical products) or from marketing and branding (such as clothing sector).

To access rents, two other capabilities were critical. Firstly, the organisational capability to manage complex financial and production networks, which had multiple objectives, including coordinating globally dispersed supply chains, and improving safety and environmental standards. Secondly, access to capital to undertake high value M&A and greenfield investment. It was because of the importance of access to capital, that some developing countries were able to redefine their position in the copper GVC, and become lead commodity firms. In the past, developing countries nationalised their own mining assets. From the 1990s, some of them, especially China and India, entered the production stage of the copper GVC in other developing

and developed countries, thereby considerably expanding their rent appropriation. Whilst disadvantaged in terms of world class management and knowledge of foreign markets, Chinese lead commodity firms were particularly well placed to drive investment in new mining projects because they relied on loans from state-owned banks, especially China Development Bank and Export-Import Bank of China, direct state funding, and access to high levels of retained earnings not disbursed to shareholders. Given the high risks, long gestation periods and volume of capital required in building and operating mines, China's soft budget constraints were a clear comparative advantage. Moreover, because of access to capital, Chinese mining companies were also able to partner with Western, more experienced MNEs. This, in the long term, was likely fill China's management capability gaps.

The opportunity to move into mining production, nevertheless, was precluded to many other developing countries, including the ones where mineral deposits were located. In fact, after the experiences of nationalisation in the 1970s and 1980s, most developing countries remained with licensing and regulatory functions.

### **8.3.2 Ownership and value chain governance**

Firm ownership has been relatively ignored in GVC research (Henderson et al., 2002), both from an empirical point of view and from a theoretical one. Humphrey and Schmitz (2000, 2001, 2002) discussion of the determinants of value chain governance focused on market incentives and penalties, and the weakness of supply-side capabilities. Gereffi et al. (2005) also included in this theoretical framework product related parameters and changes across time and stages of the value chain. My findings corroborated Humphrey and Schmitz (2000, 2001) hypothesis that weak local capabilities and the risk of suppliers' failures, and related penalties, determined value chain governance. In particular, lead commodity firms differentiated how they governed different supply links according to their "criticality". This concept was defined by the financial implications of failure in that supply link. Technological sophistication did not matter as much as criticality in driving tighter forms of governance.

The role of firm ownership was generally not taken into account in GVC theorisation efforts. The major finding of this thesis was that lead commodity firm ownership mattered for value chain governance and for local upgrading trajectories. Firm ownership influenced the way mining companies selected participants in the value chain and determined their roles, set key performance standards, monitored and, in case of failure, sanctioned and assisted suppliers. Whilst all commodity lead firms faced the same parameters in terms of suppliers' capability and criticality, firm ownership underlined different responses in terms of value chain governance types. For example, low volume capabilities among local engineering services providers prompted the Chinese buyer to vertically integrate, and the Traditional buyers to deepen direct cooperation with existing suppliers. In order to reduce inventory overheads, Traditional buyers assisted local distributors to move into stock-holding, whilst Chinese buyer relied on a wider base of suppliers, operating at very short lead times. The Indian buyer, facing liquidity problems, delayed payments while increasing competition in the supply chain. This finding is important given that China and India are becoming key drivers of extractive industry GVCs. By incorporating the role of country of origin-specific variables, the GVC approach is better positioned to explain value chain governance variations that cannot be ascribed to sectoral or country characteristics.

The thesis addressed the crucial analytical question of what underlines nationality-based variations in value chain governance. At the empirical level, GVC studies pointed at different industry structures and the nature of *financialization* of buyers (Palpacuer et al., 2005), and backward integration into the home countries' GVCs (Kaplinsky et al., 2011; Morris, Staritz, and Barnes, 2011; Staritz and Morris, 2011). This thesis argues that nationality-based variations in governance are determined by differential access to capital markets and the state, different experiences with FDI in extractive industries, and cultural factors. This leads us to the next issue.

### **8.3.3 Why are China and India distinctive value chain drivers?**

In the previous section, I discussed how Chinese and Indian ownership was associated with distinctive value chain governance types. For an explanation of the

underlying reasons, I drew on the international business literature. By incorporating this perspective, I was able to understand the variables underpinning China and India corporate characteristics.

The distinctiveness of China's OFDI originated from the interaction of state-ownership and capital market imperfections, particularly in the natural resources sector. In 2006, more than four fifths of China OFDI stock and flow was controlled by SOEs, the private sector accounted for less than one percent. In Africa, 100 SOEs were active, mostly pursuing strategic market and natural resource-seeking investment. They had soft budget constraints because they relied on preferential credit from state-owned banks, government funding, and retained earnings. Under FOCAC 2006, a combined US\$ 10 billion in preferential credit and export buyers credit through China Exim Bank and China Development Bank was made available to support their expansion. Notwithstanding three decades of domestic reform process to improve market mechanisms and reduce capital imperfections, SOEs were still influenced by the Communist Party and the state, by central planning guidelines, and benefitted from officially sanctioned monopolies at home. Whilst more profit-oriented than in the past, they still performed below international standards. In terms of the behaviour of SOEs as foreign firms, these characteristics implied that they were less risk-averse and highly influenced by Beijing policy. Some argued that Chinese foreign investors were also culturally distinctive, operating on the basis of state ideology and national pride, with less power distance in corporate hierarchy, low levels of individualism, and high reliance on relationships, or *guanxi*, for business. These factors created a significant liability of foreignness.

Whilst the international business literature is silent on the implications for local development of Chinese distinctiveness, this thesis built on it and resulted in a partial corroboration of the prediction of the international business literature.

Firstly, the Chinese buyer was pursuing its parent company, CNMC, strategic objectives to expand downstream, by investing in the ZCCZ and in copper manufacturing operations. It is worthwhile to highlight that recently, Western donors advised the Zambian government that copper semifabricates manufacturing was not

economically viable, and other sectors should be encouraged (Nathan Associates Inc., 2011). For China, the same investment project was part of a wider national strategy to relocate mature industries outside of China. In this respect, therefore, the Chinese lead commodity firm was aligned to a broader policy-defined strategy. With regard to upstream linkages, nevertheless, the Chinese buyer was driven by profit-maximisation rather than Beijing-defined export promotion objectives. The Chinese lead commodity firm did not work as an enclave, and externalised as much as the Traditional firms, especially to South Africa, the nearest, most effective supply hub. This finding corroborated the argument that the behaviour of Chinese MNEs cannot be monolithically ascribed to the policy dimension, and these variations from Beijing formal policies had differential implications for local development outcome.

The influence of the state emerged in other aspects of my research. The Chinese buyer did not have a CSR policy on supply chain development, and did not participate in horizontal cooperation with other buyers or vertical cooperation with suppliers. At the same time, Zambia and China concluded 5 cooperation agreements spanning from the economic and trade cooperation zone to cooperation in the mining sector, to infrastructural projects and cultural exchanges. In fact, the Chinese buyer relied on state-to-state interaction rather than its own corporate governance to catalyse upstream linkages development.

During the economic crisis, Traditional and Indian buyers cut production, suspended investment projects and reduced operating costs. The Chinese lead commodity firm engaged in a counter-cyclical expansion. This expansion was underlined by China SOEs differential access to capital markets, and the ability to retain earnings, which allowed it to promptly seize investment opportunities.

Soft budget constraints were a key feature of China state-owned investors in Africa. This enabled them to overcome the competitive disadvantage of foreignness and weaker management capabilities.

From a cultural point of view, Chinese management staff were weakly embedded in the Zambian local business environment, because they lived in segregated spaces,

did not participate in local business associations, and language and cultural barriers. This contributed to the increased perception of foreignness of the Chinese buyer in the local social and economic context. The obvious consequence of this was the difficulty in building trust-based relationship with suppliers.

China was behind in terms of world class management. As a response to the crisis, the Chinese buyer improved the selection process, but did not appear to follow a long-term strategy of supply chain management. The buyer operated at arm's length, failing to recognise the benefits for buyers' performance of building local capabilities in critical supply links.

There was nevertheless evidence of convergence between the organisational practices of Traditional and Chinese buyers. Firstly, in critical supply links, the Chinese buyer shifted from what used to be a price-driven to a quality-driven supply chain. This was the result of a learning process. Initial emphasis on price carried significant costs in terms of delivery times and short life span of the products. The Chinese buyer increasingly focused on total costs, hence the emphasis on quality. Secondly, there were reports that shortly after acquiring Luanshya Mines, the Chinese lead commodity firm announced a suppliers' development programme. If this was implemented, it would imply a significant shift towards the Traditional buyers' cooperation efforts.

International business scholars found that, unlike China's OFDI, India's OFDI was not distinctive from other traditional sources of FDI. It was driven by competitive private firms, which relied on their past expertise in foreign markets, access to a relatively efficient capital market, and existing ownership advantages. Unlike the Chinese ones, Indian firms could not rely on extensive state support and did not operate under the influence of a central government planning.

This thesis found the Indian buyer to be highly profit-driven and, like the Traditional buyers, highly vulnerable to developments in the international capital markets. Nevertheless, this buyer was strikingly different from both Chinese and Traditional buyers. Its supply chain management capabilities appeared particularly poor. Unlike

the Chinese buyer, the Indian buyer not only did not support, but actually hampered local upgrading processes. Whilst Traditional buyers dealt with hard budget constraints by reducing output and rationalising their supply chains, the Indian buyer delayed payments to the local supply chain, forcing smaller suppliers to exit the supply chain and others to operate on very thin profit margins. Its corporate governance appeared particularly weak, in terms of CSR and local economic development issues, and in terms of internal transparency. This could be explained by a lack of experience in extractive industries, which involved long time frameworks, and sensitivities around operating in foreign countries. This finding implied that there are merits in sectorally disaggregating the analysis of Indian FDI. The international business literature argued that, compared to China, Indian investors operated according to the classic OLI theory and internationalised because of firms' expertise and competitiveness. Yet, when dealing with the extractive industries in Africa, this research suggests they were as inexperienced actors as the Chinese, but with different implications for local upgrading.

#### **8.3.4 Institutions and linkages' trajectories**

GVC research tended to privilege the relational aspects of value chain dynamics, at the expense of the social and institutional contexts in which specific stages of the chain were embedded (Bair, 2005; Cramer, 1999; Henderson et al., 2002; Lee, 2010; Raikes et al., 2000). Yet, socio-economic contexts could be important in shaping the dynamics and path-dependency of GVCs. This thesis found that the analysis of the institutional dimension in which suppliers-buyers relationships were embedded shed light on important aspects of the research. In particular, it enabled me to clarify why value chain governance was so critical for upgrading, to explain the presence of inefficient briefcase businessmen, and to assess the cost and limit to value chain cooperation. None of these issues could have been unveiled by an analysis limited to the relational aspects of GVCs.

This thesis analysed the impact of government policy in fostering first, and hindering, later, upstream linkages development. During nationalisation, a wide range of policy instruments were adopted by Zambia to promote industrialisation processes. These

supported a vibrant manufacturing sector and value-addition in the supply cluster but, ultimately, upstream industries proved not to be economically sustainable. Problems of macro and micro economic management and transactional dependency on the state-owned mining corporation, reduced their viability. Some of the factors were protected markets which stifled competition and innovation, delayed payments by the mining companies, corruption in the procurement process, and price controls in state-owned supply firms.

After privatisation, these industries had to meet higher performance requirements set by the privatised mines, while competing with imports and with foreign investors locating in Zambia. Again, government policy played a crucial role by failing to provide the policy framework and the resources to support local competitiveness. Poor access to capital, technologies, and skills, as well as a high cost infrastructures, made it very difficult to deepen the value-added content of local upstream industries. Manufacturing firms that were owned by foreign groups overcame these bottlenecks by tapping into external resources, and successfully supplied the mining companies. The same held true for service providers that could rely on the credit facilities and training of the OEMs. Other firms upgraded because they were assisted by Traditional buyers, but vertical cooperation was highly selective.

The policy environment had three impacts on the dynamics of linkages development in Zambia. First, value chain governance became the main mechanism to support local upgrading processes. Yet, as Pietrobelli and Rabellotti argue with respect to National Systems of Innovation, “The relational proximity created within GVCs cannot replace – but rather interact with – ISs [Innovation Systems]” (2009, p. 233). In other words, value chain governance can go only so far in assisting suppliers’ upgrading. Second, since the nationalisation era, social networks became important to access the mining supply chain. This continued until recently, and, together with the high rents following the copper price boom, explained the presence of briefcase businessmen in the mining supply chain. Thirdly, a combination of government failure to pursue purposive clustering, poor social capital and intense competition on low value added products, made supply chain development efforts by the buyers more costly and difficult than, often, in their home countries.

### **8.3.5 Final reflections**

In conclusion, this thesis underlined the importance of studying the impact of the current investment surge in the extractive industries on African industrialisation efforts. It highlighted the need to contribute to the debate on the rise of China and India in African economies from an evidence-based position. Future research should explore two main areas. Firstly it should expand on the number of countries and hard commodities studied. Secondly, future research should investigate Chinese and Indian lead commodity firms with different ownership patterns, in particular privately-owned Chinese commodity lead firms, and Indian SOEs. This would enhance our understanding of the distinctiveness of Asian investors in Africa.

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## List of respondents

Respondents from the mining companies

Company Name	Respondents	Date/Place of Interview
Bwana Mkubwa First Quantum Minerals Ltd	Paul Weston Contracts Manager	18 November 2009, Ndola
Chibuluma Mines Plc	Willie Roux Supply Manager	9 November 2009, Kalulushi
Chilibwe Mining	Madalisu Zulu Manager	1 December 2009, Lusaka
Copperhead	Tandi Kamanga Manager	5 December 2009, Lusaka
Kansanshi Mining Plc First Quantum Minerals Ltd	Franques Lee Contract Officer – Services	5 November 2009, Solwezy
Kansanshi Mining Plc First Quantum Minerals Ltd	Kellie Stockenström Contracts & Logistics Officer	5 November 2009, Solwezy
Mopani Copper Mines	Passmore Hamukoma Chief Service Officer	20 November 2009, Kitwe
Mopani Copper Mines	Hermann J. Siegling Supply Manager	11 November 2009, Kitwe
NFC Africa Mining Plc	Pan Jincheng Vice General Manager	20 November 2009, Kitwe,
Scirocco Enterprises Ltd	Moustafa S.Y. Saadi Managing Director	16 December 2009, Lusaka
Sokotela Mines	David Sokotela Chilopa	11 December 2009, Lusaka
ZCCZ Zambia-China Economic & Trade	Zao Baosen Vice General Manager	20 November 2009, Kitwe

Respondents from the supply firms

Company name	Respondent	Date/Place of Interview
Action Auto Ltd	Brian Bentley General Manager	2 November 2009, Kitwe
Active Agents Ltd	Mr Yawawa Director	16 November 2009, Ndola
Afrope Ltd	J B Lungu General Manger	6 November 2009, Kitwe
Afrox Ltd	Kuda Ngoma Sales and marketing	19 November 2009, Kitwe

	manager	
Amalgamated Dress Ltd	J.N.Vaghela Managing Director	19 November 2009, Ndola
Andrea Machinist Ltd	Dario Sesia Director / Workshop Manager	2 November 2009, Kitwe
Art Engineering Ltd	Narendra Thakkar Managing Director	17 November 2009, Ndola
Athol Plastics Ltd	Spyros Enotiades Managing Director	2 November 2009, Kitwe
Atlas Copco Zambia Ltd	George Kapeso Product Manager GDE/RCE	20 November 2009, Kitwe
Austral Equipment Ltd	Brian Chisanga Managing Director	30 October 2009, Kitwe
Avilkram Industrial Supplies Ltd	John Liva CEO	1 December 2009, Lusaka
Barloworld Equipment Zambia Ltd	Gilbert Sinjani, Regional Sales Manager	4 November 2009, Kitwe
Bell Equipment Company Zambia Ltd	Patricia K Kalota Finance & Admin Manager	4 November 2009, Kitwe
BPT Engineering Ltd	Adam Hughes General Manager	4 November 2009, Kitwe
Bresmar Investment Ltd.	Brenda Kunda Managing Director	18 December 2009, Lusaka
C P Engineering Ltd	Chandrakant Mistry Manager	6 November 2009, Kitwe
C&B Engineering Ltd	Simon Chilongoshi Sales and Marketing Manager	12 November 2009, Kitwe
Chloride Zambia Ltd	John Musonda General Manager	3 November 2009, Kitwe
Dukon Paints Ltd	Jeremiah Manda Operations Manager Dukon Paints Ltd	20 November 2009, Kitwe
Engilex Ltd	John Kombe, Bobi K. Nebwe Directors	10 December 2009, Lusaka
Fire Prevention	Mr. Parmar Managing Director	16 November 2009, Ndola
Fox Foundry Ltd	C. Chiti Executive Chairman	12 November 2009, Kitwe
Frabec Engineering Enterprises Ltd	Alfred Lungu Managing Director	11 November 2009, Kitwe
Gomes Haulage Ltd	Reginald H. Gomes Executive Chairman	17 November 2009, Ndola
Hanekom innovations Ltd	Steven Muzipo Business Development Manager	1 November 2009, Kitwe

Kasembo Transport	Kevin Shone HR Director	17 November 2009, Ndola
Klassic Kreations	Anthony Kabaghe Managing Director	14 November 2009, Kitwe
Lamasat/ Start Investment Ltd	Mohamad A Ahmad Managing Director	2 December 2009, Lusaka
MacSteel Zambia Ltd	Johan Van Deventer Director	11 November 2009, Kitwe
Meltcast Engineering Ltd	Maybin Kombe Director	4 November 2009, Kitwe
Morganite Zambia Ltd	Steny Kampo General Manager	18 November 2009, Ndola
Ndola Engineering Company Ltd	S. Bettega Managing Director	19 November 2009, Ndola
Ndola Lime Company Ltd	Abraham Witika Acting General Manager	16 November 2009, Kalulushi
Non-Ferrous Metal Works Ltd	Wayne R. Bouverie Commercial Manager	19 November 2009, Ndola
Pex Zambia Ltd	Raj Karamchand Managing Director	10 November 2009, Kitwe
Pigott Maskew Ltd	M.C. Storti Director	3 November 2009, Kitwe
Plascon Zambia Ltd	PV Mohan Business Development and Depot Manager	9 November 2009, Kitwe
Powerflex Zambia Ltd	C Chipili Managing Director	20 November 2009, Kitwe
S D Mining Equipment Ltd	Jack A. Chakonta CEO	16 November 2009, Kitwe
Sandvik (Zambia) Ltd	George Mutali Ltd Director – Admin and Services	12 November 2009, Kitwe
Scaw Ltd	R D Gupta Managing Director	14 November 2009, Kitwe
Sky Pharma Ltd	Mr. John Kerry Managing Director	2 December 2009, Lusaka
Stanley Mining Services Ltd	Trevor Connell Country Manager – Zambia / Operations Manager – Southern Africa Region	17 November 2009, Ndola
Sterelin Medical & Diagnostics	Harish J.N. de Silva Managing Director	3 December 2009, Lusaka
Tri-Pump&Engineering	Larry Mapani Director	11 November 2009, Kitwe
Unity Garments Ltd.	Kam Shah Operations Manager	16 November 2009, Ndola
Valves and Actuators	Fidelis Chisompola Managing Director	3 November 2009, Kitwe

Weir Warman Africa	Mweemba Mulunda Finance Director	12 November 2009, Kitwe
Zamleather	Richard Franklin General Manager	18 December 2009, Lusaka
Zamchin Steel and Foundry Ltd	John Chikisanda Manager/ Accounts and HR	14 November 2009, Kitwe

Respondents from private and public sector institutions

	<b>Respondent</b>	<b>Date/Place of Interview</b>
<b>Government</b>		
Ministry of Commerce, Trade and Industry	Healey Mwemba Senior economist	7 October 2009, Lusaka
Ministry of Mines and Mineral Development	Chilandila Mbewe Senior Official	30 September 2009, Lusaka
National Business Technology Centre	Ernest Shamano Technology Audit and Validation Specialist	December 2009
<b>Private sector</b>		
Kitwe and District Chamber of Commerce and Industry	Berry Mwango Chairman	12 November 2009, Kitwe
Ndola Chamber of Commerce and Industry	Kevin Shone Chairman	17 November 2009, Ndola
Solwezy Chamber of Commerce and Industry	Brenda Kunda Chairman	18 December 2009, Lusaka
Association of Mining Contractors and Suppliers Association	Fanuel T. Banda President	10, November 2009 , Kitwe
Federation for Small Scale Mining Associations of Zambia	Pauline Mundia President	29 October 2009, Lusaka
Chamber of Mines	F. Bantubonse General Manger	13 November 2009, Kalulushi
Zambia Association of Manufacturers	Roseta Mwape Project Officer	10 December 2009
<b>Other Institutions</b>		
University of Zambia - Dept. Economics	Prof. Ndulo	7 December, 2009
Copperbelt University - Business School	Prof. Lungu	12 November 2009, Kitwe
Zambia Institute of Purchase and Supply - Copperbelt branch	Daniel Kabamba Chairman	11 November 2009, Kitwe

Association for the Welfare of Former Miners in Zambia	Lesa P. Kanyanta President	21 December 2009, Kitwe
IFC Suppliers Development Programme	Peter Mwansa Programme manager	15 October 2009, Siavonga

University of Cape Town

## Appendix A

### China's key outward investment policy reforms

Year	Policy/Regulation	Key measures
1984	<u>MFTEC</u> Approval authorities and administrative principles for opening up non-trade JVs overseas	Approval shifts from State Council to the relevant Ministry Projects exceeding US\$ 10 million to be approved by State Council Projects concerning state assets to be approved by NPC and MFTEC
1985	<u>MFTEC</u> Approval procedures for setting up overseas subsidiaries  <u>MFTEC</u> Administration and approval for establishing non-trade enterprises overseas	Opens OFDI for all economic entities with financial resources, foreign JVs and capabilities  OFDI should target acquisition of overseas' technologies, resources and markets
1989	<u>SAFE</u> Foreign exchange administration of overseas investment	<u>SAFE</u> to evaluate source of investment funds and exchange rate risks 5% of OFDI funds deposited in a special account All profits to be remitted back to China
1991	<u>NPC</u> Administration of overseas investment projects	Projects exceeding US\$ 1 million approved by NPC, projects exceeding US\$ 30 million by State Council Projects concerning state assets to be approved by State Council Approval results handed over within 60 days
1995	<u>SAFE</u> Supplemental provisions on administration measures on foreign exchange for overseas investment	Chinese OFDI firms allowed to purchase foreign exchange. This replaced the requirement that they earned the foreign exchange
2002	<u>SAFE</u> Cancelling the deposits that guarantee the profits from investment abroad	Deposits no longer required
2003	<u>SAFE</u> Simplifying foreign exchange administration relating to OFDI  <u>SNRC</u> Providing credit support to key OFDI projects encouraged by the State	<u>SAFE</u> to investigate only domestic foreign exchange sources, no longer foreign sources  OFDI projects fulfilling specified requirements to be provided with a lower lending rate credit fund
2004	<u>SNRC</u> Verification and approval procedures for OFDI  <u>MOC</u> Examination and approval of investment to run enterprises overseas  <u>MOC</u> Guiding directories of target nations and industries for OFDI (updated in 2005 and 2007)	Projects exceeding US\$ 10 million approved by SNRC, projects exceeding US\$ 50 million by State Council Approval results handed over within 20 days  All companies permitted to conduct OFDI Approval results handed over within 15 days  Define industries and countries should OFDI target to be eligible for preferential treatment (funding, tax collection, foreign exchange, customs and others)

2005	<p><u>SAFE</u> Further measures on foreign exchange administration stimulating OFDI</p> <p><u>MOC, MOF</u> Using and managing special funds for foreign economic cooperation</p>	<p>Total foreign exchange available for all investors increased from US\$ 3.3 to 5 billions</p> <p>Special funds set up to encourage Chinese enterprises invest abroad. These consist of subsidies for pre-operational fees, interest discounts for medium and long-termed loans, subsidies for operational fees</p>
2009	<p>Administration of OFDI</p> <p>Administration measures on foreign exchange for overseas investment</p>	<p>Projects exceeding US\$ 100 million approved by MOC.</p> <p>Source of foreign exchange for domestic firms undertaking OFDI include self-owned foreign exchange, the foreign exchange purchased by RMB or entity, intangible assets, domestic and overseas foreign exchange loans and other permitted source</p>

*Source.* Adapted from Ren et al. (2010). *Note.* The following are not included: regulations concerning Ministry of Commerce's post-investment evaluation of OFDI projects (2002-2004); bilateral, regional (ASEAN) and multilateral agreements protecting Chinese investors overseas. Abbreviations: Ministry of Foreign Trade and Economic Cooperation (MFTEC) later Ministry of Commerce (MOC); Ministry of Finance (MOF); National Planning Commission (NPC); State Administration of Foreign Exchange (SAFE); (SNRC)

## Appendix B

### India's key outward investment policy reforms

Year	Policy/Regulation
1969	<ul style="list-style-type: none"> <li>- OFDI should take place in non-cash modes, small amount of cash remittance that can be permitted for meeting preliminary expenses related to the setting up of overseas unit</li> <li>- Modality restricted to minority-owned JVs. Overseas JVs must be in the same line of business</li> <li>- Capitalization of export of second-hand or reconditioned machinery against foreign equity is prohibited</li> <li>- Cash remittances, except in deserving cases, are normally not permitted</li> </ul>
1978	<ul style="list-style-type: none"> <li>- Inter-ministerial Committee on joint venture established under the Ministry of Commerce to approve, monitor and evaluate OFDI projects from Indian companies</li> <li>- Indian OFDI should operate in accordance with the rules and regulations of the host country</li> <li>- Higher Indian ownerships in JV allowed if permitted by the host country government and partners</li> <li>- Relaxed restrictions on cash remittances for deserving OFDI projects</li> <li>- Indian investors allowed to provide long-term loans to their overseas JVs and to contribute to their right issue, to raise foreign exchange loans abroad, and to capitalize service fees, royalties and other payments towards OFDI</li> <li>- Reserve Bank of India receive powers to grant foreign exchange to Indian firms for meeting preliminary expenses for setting up overseas projects (backed up with 100% guarantee) and also for follow up visits by Indian technical and managerial personnel.</li> <li>- Investment insurance under the Export Credit Guarantee Corporation of India Limited (ECGC) was available but limited to projects financed by the EXIM Bank under its overseas investment scheme</li> </ul>
1986	<ul style="list-style-type: none"> <li>- Increased scrutiny of OFDI proposals with emphasis on a technical and financial viability. In addition, financial credibility and past export performance of the aspiring outward investing Indian firm became essential criterions.</li> <li>- Individuals are explicitly prohibited from undertaking overseas investment.</li> </ul>
1992	<ul style="list-style-type: none"> <li>- Guidelines for Indian Joint Ventures and Wholly Owned Subsidiaries granted automatic approval for Indian OFDI projects</li> <li>- Cash transfer restrictions removed. Firms can invest up to US\$ 2 million, of which US\$ 500,000 could be in cash, under the automatic route in a block of 3 year</li> </ul>

1995	<ul style="list-style-type: none"> <li>- Increased ceiling for OFDI under automatic approval route (US\$ 30 million for SAARC and Myanmar, US\$ 15 million for other countries). Investment must not exceed 25% of annual average exports/foreign exchange earnings in the preceding three years.</li> <li>- OFDI not falling under the automatic approval route to be approved by an inter-ministerial Committee appointed by the RBI</li> <li>- Removal of prohibition over capitalization of export of second-hand or reconditioned machinery against foreign equity</li> </ul>
1999	<ul style="list-style-type: none"> <li>- Increased ceiling for OFDI under automatic approval route: US\$ 100 million or its equivalent in any one financial year for all countries except SAARC and Myanmar; US\$ 75 million for Myanmar, Bangladesh, Maldives, and Sri Lanka</li> <li>- Indian OFDI can be funded out by the balances held in Exchange Earners Foreign Currency account, drawing foreign exchange including capitalization of exports (up to 50% of the net worth of the Indian party), funds raised through ADR/GDR issues and share swap (i.e. acquisition of the shares of an overseas concern in exchange of the shares of the Indian party)</li> <li>- Removal of obligation to repatriate the amount invested abroad in full by way of dividend, royalty, etc., within a period of five years has been dispensed with</li> </ul>
2001	<ul style="list-style-type: none"> <li>- Indian companies are permitted to invest up to US\$50 million or its equivalent (US\$ 75 million in Myanmar, Maldives, Sri Lanka and Bangladesh) in a financial year rather than in a block of three financial years as required earlier</li> <li>- The profitability condition, which requires that Indian company applying for OFDI must have earned net profit during the preceding three accounting years, has been removed.</li> <li>- Indian companies are allowed to utilize up to 100 per cent proceeds of ADRs/GDRs for overseas investments instead of the existing ceiling of 50 per cent</li> </ul>
2002	<ul style="list-style-type: none"> <li>- Existing limit of US\$50 million in a financial year under the Automatic route increased to US\$100 million</li> <li>- Investment under the Automatic route funded by drawal of foreign exchange from an authorized dealer has been raised to 50% of the net worth of the Indian party against the existing limit of 20% of the net worth.</li> <li>- An Indian entity permitted to open, hold and maintain in the name of its office/branch set up outside India, a foreign currency account with a bank outside India by making remittance for the purpose of normal business operations</li> <li>- Increased ceiling for OFDI to Myanmar and SAARC under automatic approval route: US\$150 million</li> </ul>
2003	<ul style="list-style-type: none"> <li>- Indian corporates, resident individuals and mutual funds are permitted to invest in equity of overseas listed companies. Such investments shall not exceed 25 per cent of the Indian company's net worth</li> <li>- Indian companies are permitted to invest abroad funds raised through ADRs/GDRs, for any period to meet their future forex requirements as against the existing permission for a temporary period pending repatriation to India</li> <li>- OFDI firms can acquire immovable properties abroad for business purposes subject to RBI approval</li> <li>- Within the overall ceiling of US\$ 100 million, Indian companies are permitted to invest up to 100 per cent of their net worth against the existing limit of 50 per cent by way of market purchase of foreign exchange</li> <li>- The condition of 'same core activity' for OFDI has been removed and an Indian company can now invest in 'any bona fide business activity'</li> <li>- OFDI by way of ADRs / GDRs of Indian companies and rated debt / equity instruments (within an overall cap of US\$ 1 billion) and by way of share swap are exempted of prior RBI approval</li> </ul>

	<ul style="list-style-type: none"> <li>- Minimum net worth thresholds for Indian financial companies removed for investment abroad in the financial sector</li> <li>- Removal of requirement for prior permission of RBI for transfer by way of sale of shares of a JV/ Wholly Owned Subsidiaries (WOS) abroad</li> </ul>
2004	<ul style="list-style-type: none"> <li>- Resident corporates are allowed to invest up to 100 per cent of their net worth in overseas JV/WOS without any monetary ceiling for overseas investment (the ceiling of US\$100 million is removed)</li> <li>- Resident registered partnership firms are allowed to invest up to 100 per cent of their net worth in overseas JV/WOS without any monetary ceiling (The ceiling of US\$ 10 million is removed)</li> <li>- Resident corporates and registered partnership firms are permitted to undertake agricultural activities overseas including purchase of land incidental to this activity either directly or through their overseas offices (i.e. other than through JV/WOS) under the Automatic Route</li> <li>- End use for External Commercial Borrowings (ECB) is enlarged to include overseas direct investment in JVs/WOS including mergers and acquisitions abroad</li> <li>- Short term credit to overseas offices of Indian companies is permitted without prior approval of RBI</li> <li>- An Indian Party may acquire shares of a foreign company, engaged in bona fide business activity, in exchange of ADRs/GDRs issued to the latter in accordance with domestic regulations</li> </ul>
2005	<ul style="list-style-type: none"> <li>- Eligible Indian entities are permitted to invest in overseas in JV/WOS up to 200 per cent of their net worth under the automatic route for overseas investment.</li> </ul>
2009	<ul style="list-style-type: none"> <li>- Indian majority-owned and controlled holding company (i.e. over 51% in Indian hands) allowed to invest in a “downstream” subsidiary without the foreign share (of 49% or less) counting against the new company’s FDI limit.</li> </ul>

Source. Adapted from Hattari and Rajan (2010) and Pradhan (2007)