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Gateway cities in global production networks: exemplified by the oil and gas sector [1]

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Introduction

The global economy is organised along global production networks (GPNs) and world cities, including those in the Global South. Capturing the wider context of commodity chains, GPNs 'incorporate all kinds of network relationships [and] encompass all relevant sets of actors' with regard to a specific process of production and commercialisation (Coe, Dicken and Hess 2008, p. 272). It is not an overstatement to say that GPNs have become one of the most widely used approaches in Economic Geography. World cities meanwhile serve as 'basing points' of global capital (Friedmann 1986, p. 69). They are 'highly concentrated command points' from where global economic processes are controlled (Sassen 2001a, p. 3).

Some authors suggest that world cities integrate their respective hinterlands in the global economy because of the decisive role that they play in

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GPNs. Taylor et al. (2002c) label certain world cities 'regional command centres', arguing that these cities are hinges between their respective spheres of influence and other world cities. Rossi, Beaverstock and Taylor (2005, 2007) show that Brazilian cities, especially Rio de Janeiro and São Paulo, serve as stepping stones or 'service cities' for Brazilian companies that seek to internationalise their business. Sigler (2013) explains how 'relational cities' intermediate between global and regional economies. Parnreiter (2010, 2015) shows that corporate services in Hamburg and Mexico City interlink the respective hinterlands globally.

We think that much conceptual and empirical work remains to be done to integrate the GPN approach and research on world cities. Taylor et al. do not go into detail regarding the characteristics of regional command centres. The research by Parnreiter and also the articles by Rossi, Beaverstock and Taylor are focussed on advanced producer services, which we find too narrow to fully understand world cities as hinges in GPNs. Sigler conversely describes numerous features that demonstrate the special role of relational cities, not only with regard to economics but also as cultural and political hotspots. However the features he addresses do not always say something about cities being intermediaries. In the edited volume *Commodity Chains and World Cities*, which serves the purpose of bringing GPNs and world cities together, we miss a conceptual piece that would explain what features make world cities crucial for GPNs and how – except for the provision of advanced producer services – they are linked not only to other world cities but also to their hinterlands.

This paper widens the research on the interplay of GPNs and world cities by addressing five dimensions that make world cities hinges in GPNs: logistics and transport, industrial processing, corporate control, service provision and knowledge generation. We derive these dimensions from the state of the art on GPNs, world cities and related approaches. They are not necessarily fulfilled by every world city. The five dimensions rather mark places – sometimes even places that are not world cities – in different ways and explain how they connect their hinterlands with the global economy. Given the interlinking function that some world cities play in GPNs, we refer to these cities as 'gateway cities'.

This paper is structured as follows: First, we bring GPNs and world cities together, arguing that the latter are a sine-qua-non for the former. Second, we contextualise the five gateway dimensions in broader debates on GPNs and world cities. For each dimension we provide examples from our own research on the oil and gas sector in the Global South. These empirical examples are based on data retrieved from the fDi Markets database, the website 'A Barrel Full', expert interviews conducted in Brazil and South Africa in 2014, 2015 and 2016 and desk studies.

World cities in GPNs

The idea that cities are decisive for the organisation of global production and commercialisation is not new. Knox remarked in the late-1990s that cites are the 'nodal points in global commodity chains' (1997, p. 17). Rabach and Kim argued a few years earlier that 'without the integrating and coordinating function fulfilled by services, global commodity chains would not be viable in today's highly competitive economic environment' (1994, p. 123), which implies that GPNs and world cities, the latter being key providers of services, have to be thought together.

GPNs and world cities also have the same roots: the former is a refinement of the commodity-chain approach, firstly advanced in 1994 in *Global Commodity Chains and Global Capitalism*; the latter goes back to an article by Friedmann and Wolff from 1982. Therein the authors adopt the terms core, periphery and semi-periphery, arguing that control is exercised from world cities in the core and semi-periphery of the world-economy. They suggest that the economic, political and social development of cities results from how they are integrated into the world-economy. Research on commodity chains is also grounded in world-systems analysis. The editors of *Global Commodity Chains and Global Capitalism* refer to a definition of commodity chains by Hopkins and Wallerstein (1986). The volume itself is to advance this concept so as to 'better analyse structure and change in the world-economy' (Gereffi; Korzeniewicz and Korzeniewicz 1994, p. 2).

World cities as gateways

So what role do world cities play for the global economy? According to Friedmann and Wolff, world cities are the top level of the hierarchy of the global economy. They are 'tightly interconnected with each other through decision-making and finance, [constituting] a worldwide system of control over production and market expansion' (1982, p. 310). World cities 'serve as banking and financial centres, administrative headquarters [and] centres of ideological control […]. Without them, the worldspanning system of economic relations would be unthinkable' (1982, p. 311-312). Not the size of their population but their economic and political role hence defines world cities, which is why this category includes places as different as Cairo, Tokyo and Zurich.

World cities are best described by the form and strength of their integration in the global economy. Friedmann and Wolff suggest that whereas some world cities are of global scope, others remain limited to their respective regions or even to their respective national economies, which they connect globally. What distinguishes world cities from other places is that they are integrated into the global economy not exclusively on a basis of dependency. Those who carry out research in the tradition of Friedmann and Wolff concentrate on the headquarter–subsidiary relations of transnational companies (e.g. Alderson and Beckfield 2004, 2012, Wall and van der Knaap 2012), which is one dimension of gateway cities that we exemplify further below. Other features that interconnect world cities are not excluded: business services, the financial sector and infrastructures for communication and transport have been studied (e.g. Cai and Sit 2003, Knox and Taylor 1995).

Some researchers, in particular those from the Globalisation and World Cities (GaWC) research network, shift the analytical focus to practices of control, concentrating on advanced producer services. Advanced producer services – accountancy, advertising, banking/finance and law – are, according to Sassen (2001a, 2001b), essential for transnational enterprises because of the increasing complexity of globalised production and commercialisation. World cities possess a business environment that is necessary for the generation of these services because world cities are information loops that cannot be replicated through telecommunication. By bundling and providing advanced

producer services, world cities become, as said, 'highly concentrated command points' from where global economic processes are controlled or at least managed (Sassen 2001a, p. 3). From this perspective, corporate service providers – not corporate headquarters – make world cities and we address them as another dimension of gateway cities.

A problem of both approaches is that they define world cities by what they contain. Yet world cities gain their competitive advantage from their connectivity. Beaverstock, Taylor and their co-authors (1999, 2002a, 2002b) therefore try to capture the flows between world cities. They identify important providers of advanced producer services such as KPMG in accountancy and Standard Chartered in banking. They then count the offices of these companies in potential world cities and rank the cities according to the number and size of offices. Assuming that large offices generate more intense flows than small offices, these leading scholars of the GaWC research network and numerous of their disciples derive the intensity of inter-city flows from office size. Strictly speaking, this methodology remains at the level of counting what world cities contain. The concept of gateway cities that we develop in this paper addresses this shortcoming because it enables us to assess the conditions of flows from various angles instead of guessestimating them.

The argument from the debate on world cities that interests us most is that some world cities have specialised in connecting their respective hinterlands globally. As noted, Rossi, Beaverstock and Taylor (2005, 2007) demonstrate how Brazilian cities, especially Rio de Janeiro and São Paulo, serve as stepping stones for Brazilian companies that seek to internationalise their business. Sigler (2013) analyses the intermediary role of Doha, Dubai and Panama City. Parnreiter (2010, 2015) shows how corporate service providers from Hamburg help their clients to become globally active and how according firms from Mexico City interlink other places in the country globally. From a slightly different perspective, Martinus and Tonts (2015) suggest that Calgary and Paris serve as gateways to Africa for North American and European energy firms respectively. Martinus et al. (2015) call such cities 'globalising centres'; they are pathways for flows of capital and information, connecting regional systems to world-spanning circuits. Unfortunately their quantitative analysis is not backed by qualitative information that would better explain how and why

globalising centres interlink regions globally. Table 1 provides an overview of these concepts, their respective foci and weaknesses:

Table 1
World cities as intermediaries

Concept	Authors	Focus	Weaknesses
Regional command centres	Taylor et al. 2002	integration of hinterlands in the global economy	vague concept; characteristics of regional command centres unknown
Service cities	Rossi, Beaverstock and Taylor 2005, 2007	cities as stepping stones for internationalisation of firms	only deals with advanced producer services, limited to inside-out gateways
Relational cities	Sigler 2013	cities whose economies are focussed on an intermediary role	not all features of relational cities are relevant for interlinking
World cities in commodity chains	Parnreiter 2010, 2015	advanced producer services that connect the hinterland globally	only deals with advanced producer services
Globalising centres	Martinus and Tonts 2015, Martinus et al. 2015	connection of regional systems with the global economy	no qualitative analysis of how and why globalising centres function

Source: Authors' compilation based on the quoted texts.

Long before research on world cities began, Burghardt defined gateway cities as 'an entrance into (and necessarily an exit out of) some area' (1971, p. 269). Gateway cities serve as transmission channels between their respective hinterlands and the outside world, he suggested. Whereas Christallerian central places are economic hubs of their immediate surroundings, gateway cities are found in the contact zone between differing homogeneous regions. The interlinking function of gateway cities comes along with control over economic processes and a clear territorial hierarchy: 'the [gateway] city is in command of the connections between the tributary area and the outside world', as Burghardt put it (1971, p. 269).

It appears that gateway cities assume their special role because of their favourable business environment. Burghardt referred to examples from North America and Southeast Europe in the early 19th to mid-20th century. He

pointed out that gateway cities perform outstandingly well in terms of business services such as loan and trust companies, real estate agencies, hotels and restaurants; the latter two being a basic condition for travelling businesspeople. He also stressed transport infrastructure – gateway cities host large harbours and/or are places where different transport routes meet – and wholesale trade. The more recent publications to which we just referred conversely focus on advanced producer services as feature of gateway cities. Considering Burghardt's work and for reasons that we provide further below, we include non-advanced producer services in our analysis.

In the Global South gateway cities are moreover islands of stability, located within seas of unrest or at least areas marked by serious problems for doing business. This explains why Miami is considered the best place in (!) Latin America to do business and why Dubai has become a business hub for Africa, Central Asia, the Middle East and South Asia (Kanna 2007, Nijman 2007). Companies interviewed by us in South Africa in 2014 and 2016 pointed out that Mauritius has become more than a tax haven. Because of economic and political stability and the very investor-friendly policies of the island state, it is increasingly considered as an alternative to South African hubs.[8]

The global interlinking via gateway cities moreover appears to be crucial for economic development in the hinterland. Short et al. suggest that 'a region's prosperity now more than ever resides in its gateway city' (2015, p. 323). In other words, gateway cities transmit impulses for economic development – that is, impulses that originate outside the region. This argument is somewhat similar to a key message from the 2009 *World Development Report*, which points at the considerable economic dynamic of emerging economies or 'leading areas'. The authors of that report suggest that developing countries tie themselves neatly to nearby leading areas – for example Johannesburg in South Africa and São Paulo in Brazil – so as to benefit from impulses for economic development. It is furthermore argued that sound policies aim at boosting economic activities in the leading areas, better connecting them to the periphery by building transport infrastructure and

(8) Personal interview with two managers of an international engineering company, Cape Town, 6 March 2014; personal interview with a manager of an international service provider to oil exploration, Port Elizabeth, 22 July 2016; personal interview with a manager of an international maritime engineering company, Cape Town, 10 August 2016.

overcoming tariff and non-tariff trade barriers by advancing regional economic integration.

Nonetheless city-hinterland connections are a rare issue in the world-cities literature, although it is increasingly recognised that global flows are just one aspect of the connectivity of cities (e.g. Surborg 2011, Smith 2014). This might also be because Sassen's work – still the main point of reference in research on world cities – is alien to regionalising world cities. Sassen argues that 'unlike other types of services, [advanced producer services] are only weakly dependent on proximity to the consumers served' (2001a, p. 11). If this were true, there would be no need for gateway cities. GPNs in the Far East and Sub-Saharan Africa would be kept functional by service providers based in London and New York. Brazilian firms that seek to internationalise their business would do so with the help of banks and consultants from any world city, not necessarily from a city in Brazil. We do not find this convincing. We argue that the gateway function that some world cities fulfil is based on a set of assets that are specific to distinct regions.

We also think that concentrating on advanced producer services in order to find out which cities qualify as gateways and how they interlink their respective spheres of influence leads to a very limited picture. The interlinking function that gateway cities assume in GPNs is much broader. Different researchers have shown that some world cities – especially those that fulfil a gateway role – are transport hubs (e.g. Grubesic and Matisziw 2012, Hesse 2010, Jacobs et al. 2010). Sigler's relational cities play a key role in the global network of flows because they are, first of all, hubs for transport services: logistics, warehousing and wholesaling. Central banks and stock exchanges are not defining features for them.

What is more, world cities in the Global South are home to large-scale industries. São Paulo is a key starting point for GPNs in South America because of car manufacturing, which receives inputs from the neighbouring countries, especially from Argentina, and also concentrates on South American markets (e.g. Humphrey 2003, Schiffer 2002, Santos 2001). South Africa's province of Gauteng, which hosts the city of Johannesburg, is the industrial heartland not only of the country but also of the whole of Sub-Saharan Africa (e.g. Akinboade and Lalthapersad-Pillay 2009, Tribe 2002). Only few publications on world cities recognise the relevance of the industrial sector and aim at building according network models (e.g. Krätke 2014, Wall and van der Knaap 2011).

We therefore address two more dimensions of gateway cities: they are key sites of industrial processing and also major transport hubs. Before providing some empirical examples, it is worthwhile to shed light on this phenomenon from the perspective of GPNs.

From Commodity Chains to GPNs

Following the fundaments laid in *Commodity Chains and Global Capitalism*, commodity chains represent all actors involved in the production and commercialisation of a particular good or service along a chain, revealing the sequential stages of production and commercialisation too. This approach enables researchers to direct their attention to the locations of particular segments of the chain, whilst simultaneously illuminating how these discrete locations are connected to each other as constituent links that collectively comprise the commodity chain.

Gereffi (1995) proposes that global commodity chains have four dimensions. First, the input-output structure captures how products, resources and services are linked along a chain of relevant industries (and consumers). Second, territoriality refers to the geographical dimension of these chains, which can be concentrated or dispersed to different degrees and in different ways. Third, every commodity chain is marked by a particular form of governance, meaning the distribution of power amongst all actors involved. Fourth, commodity chains are affected by an institutional framework, which is politically determined and shapes commodity chains at the sub-national, national and international level.

With regard to governance, Gereffi (1994) distinguishes between buyer and producer-driven commodity chains. In buyer-driven chains, the power to organise the chain lies essentially with brand-name merchandisers, large retailers and trading companies. Producer-driven chains are those in which large transnational companies control a tightly integrated chain, notably in capital- and technology-intensive industries.[9] However power should be seen as a practice, not merely as a position (Dicken et al. 2001). This means that governance describes the non-market co-ordination of activities in the chain.

(9) Gereffi, Humphrey and Sturgeon (2005) provide a much less generalised conceptualisation of governance, deriving five types of governance – hierarchy, captive, relational, modular and market – from three sets of causal factors: the complexity of inter-firm transactions, the ability to codify these transactions and the capabilities in the supply-base. We do not refer to this concept because our focus is not governance.

This co-ordination is achieved through the setting and enforcement of product and process parameters,[10] with some companies apparently setting and enforcing parameters that others have to accept (Humphrey and Schmitz 2001). As Kaplinsky (2000) points out, the ability to govern a commodity chain often rests in intangible competences such as design, branding, marketing and research and development. These competences are characterised by high barriers of entry and command high returns, allowing only a very limited number of companies to determine key parameters. The features addressed by Kaplinsky can be summarised as knowledge generation, which is another dimension of gateway cities to which we return in the next section.

Although there is no hierarchy of the four dimensions of commodity chains, empirical studies often concentrate on governance and related power asymmetries (e.g. Gereffi 1996, Gwynne 2006). The reason for this is that governance determines the opportunities to upgrade the segments of a chain that characterise the economy of a specific place, meaning that it determines prospects for economic development (e.g. Barham et al. 2007). The focus on governance has led to a neglect of institutional and territorial embeddedness. Territoriality is included in many studies only at a very high level of aggregation, distinguishing between lead firms from the Global North and labour-intensive manufacturing in the Global South. Institutions are hardly analysed in depth because the distribution of power amongst the firms directly involved in the chain is considered the key to understanding the distribution of profits.

The gateway-city perspective helps to overcome this neglect. Some parts of global commodity chains, especially their co-ordination and management, must take place in cities; amongst other reasons because the place-specific institutional setting there allows transnational companies and their partners to choose modes of governance that they consider suitable for their business (Meyer and Revilla Diez 2014, Meyer, Schiller and Revilla Diez 2012). Cities hence provide the links between regional production and extra-regional marketing, becoming gateways. Port cities, for example, do not only host physical infrastructure but also specialised corporate service providers that manage maritime transport. Hamburg and Rotterdam are amongst the largest

(10) These parameters determine what is produced, how it is to be produced, which includes environmental and labour standards as well as quality systems, when it is to be produced and how much is to be produced. In some cases the costs of production are also set by parameters (Humphrey and Schmitz 2001).

ports worldwide and perform much better as providers of maritime corporate services than on the general GaWC ranking (Jacobs et al. 2010).[11] In other words, corporate services pin down commodity chains at specific places, giving them a clear territorial dimension.

Global commodity chains have not only been criticised for neglecting institutional and territorial embeddedness. Depending on how the concept is applied, it tends to narrow the perspective, excluding the various inputs that are not directly part of the process of production and commercialisation but nevertheless necessary to keep the commodity chain functioning properly. For instance, from a commodity-chain perspective one would analyse how crude oil is extracted off the coast of Cabinda (Angola), refined and stored in Durban and eventually sold at a petrol station in Johannesburg. The respective power and profits of oilfield operators, logistics companies, refiners and owners of petrol stations would be examined. Numerous services are overlooked this way: banks allow transnational companies to transfer money from their home countries to the places where extraction, processing and marketing take place; oilfield operators depend on partners that maintain and repair equipment; the territorial splitting-up of the commodity chain is influenced by what consultants say about tax issues.

For this reason, we find the GPN approach more useful than the commodity-chain perspective. The GPN approach is marked by an understanding of the input-output structure and territoriality – the latter being decisive for economic development – that resembles the one from commodity chains. Governance is seen much more nuanced, as an outcome of the power and preferences of all actors involved in the respective GPN. Given that labour organisations and public authorities are considered components of the GPN, the institutional framework that Gereffi conceptualises as an external factor becomes internalised (Henderson et al. 2002). Hence the GPN approach deals with input-output structure, territoriality and governance of 'organizationally fragmented and spatially dispersed production that increasingly drives the complex global economy and its uneven developmental outcomes' (Coe and Yeung 2015, p. 1).

(11) Jacobs and his co-authors (2010) mostly refer to institutional factors that explain why some cities play a key role as maritime service providers and admit that major service centres such as London and Piraeus are off the major trade routes. Parnreiter's (2010, 2015) studies are closer to what we have in mind when bringing GPNs and world cities together.

GPNs are not aspatial. They are embedded in territories. Territories meanwhile are also embedded in networks and analysing these networks – the global and regional links of gateway cities, for example – helps us to understand regional economic development. This also demonstrates that the GPN approach is based on multi-scalar thinking: local and non-local dynamics are seen in interaction so as to explain economic development (Dicken et al. 2001). A region can be integrated into GPNs through brown- and greenfield investments by extra-regional firms, joint ventures of regional and extra-regional firms and extra-regional connections developed from within the region. This obviously means that there will be capital flows to observe; and with regard to economic development it matters how much from these flows is captured and reinvested locally. By asking which inputs gateway cities provide to GPNs, we address this crucial feature, being able to explain regional economic development (or the lack thereof).

Concerning the functions or purpose of integrating a region into GPNs, one can distinguish between the utilisation of human and non-human resources from the region under question, the access to the region's market and the goods and services that the region may export. These purposes tell us a lot about the firms that we find in the region under question: displacement and foundation of firms, clustering dynamics and deep or superficial connections of subsidiaries. All this affects employment creation, both in qualitative and quantitative terms. The purposes also have implications for a region's access to knowledge and technologies. Regionally available knowledge can, of course, also be exported if according firms participate in GPNs (Coe and Yeung 2015, Dicken 2015).

The GPN approach itself offers a bridge to research on world cities: Coe and Yeung (2015) point out that GPNs depend on critical intermediaries, meaning firms active in finance, logistics and standards. Apparently these intermediaries provide the advanced producer services that make world cities. Financial intermediaries not only make sure that financial flows across borders run smoothly. They also assess various opportunities and risks for transnational companies and provide them with credits. Logistics intermediaries do more than merely transport a manufactured or semi-manufactured product from a factory to a customer. They are responsible for intra-GPN information sharing – for example the transfer of blueprints and prototypes – and transport of components in spatially fragmented just-in-time production. Sometimes they also handle export/import requirements and develop transport-related software

for their customers. Standards intermediaries are involved in the establishment, enforcement and harmonisation of codified knowledge and routines in GPNs.

We suggest modifying the notion of intermediaries as advanced in *Global Production Networks*. First, we do not find the focus on sophisticated services convincing. When it comes to globally interlinking peripheral places from the Global South, not only these sophisticated services matter. Issues such as maintaining electrical equipment on an offshore oil rig and having access to a nearby port that possesses adequate storage facilities have to be addressed so as to keep a GPN running. Second, Coe and Yeung see intermediaries as 'enablers that global production networks need to function effectively' (2015, p. 51). Research on world cities has shown, however, that providers of advanced producer services sometimes strongly influence the business strategies of transnational companies (Parnreiter 2010). Coe and Yeung themselves write that financial service providers help lead firms to plan and restructure their production networks so as to operate more efficiently. It may often be the service providers that effectively take key decisions and not the lead firms.

Functions of gateway cities

The term gateway city helps to focus on how some world cities interlink their respective peripheries globally. We agree with Parnreiter, who argues that the world-city network has 'extensions at various geographical scales, and that is why it is built upon ramifications that link [world] cities to the countless [locations], where production for global markets is carried out' (2014, p. 404). Similar to Sigler (2013), we are not interested in assessing the centrality of gateway cities in the world-city network. Gateway cities are not necessarily amongst the top-performers in the GaWC rankings and there are also gateways outside of world cities (more on this later). Instead of ranking the world-cityness of urban places, we seek to show how urban places participate in the global and especially in the regional economy, meaning how they connect and shape these two spheres.

We address the five aforementioned dimensions that make world cities gateways: (1.) logistics and transport, (2.) industrial processing, (3.) corporate control, (4.) service provision and (5.) knowledge generation. The five dimensions are also a refinement of an analysis of South Africa as a gateway by Draper and Scholvin (2012) and a study of Brazil as a geo-economic node

by Scholvin and Malamud (2014). Scholvin and his co-authors concentrate on the interplay of physio-geographical conditions, transport infrastructure and flows of capital, goods and services so as to assess the relevance of Brazil and South Africa for the respective regional countries. In the case of cities, the focus apparently shifts to man-made material structures in geographical space such as infrastructures for industrial production and transport and to immaterial structures, for example informal networks of innovative entrepreneurs.

It is crucial to bear in mind that the five gateway dimensions are not necessarily additive. Gateway cities are not defined as world cities that interlink the periphery of the global economy in all five dimensions. Gateway cities is a category that includes various places that matter for one or several of the gateway dimensions. This is also why the empirical examples that we provide are not taken from a single city. They involve places as different as Durban, Rio de Janeiro and Singapore. What these places have in common is that they interlink their respective periphery globally in one way or another, which makes them gateways.

Logistics and transport

The fact that some places – gateways – interlink the periphery of the global economy worldwide is nothing new. During the colonial era there were numerous small gateways in the Global South. The European conquest of Africa, the Americas and large parts of Asia started at bays that offered protection from ocean currents and storms or at least places that allowed the Europeans to unload goods safely. The colonial powers then built railway lines from these ports, which also served as administrative headquarters and warehouses, into the hinterland to export agricultural and mining products and exert territorial control.

Today geographically and functionally fragmented production processes, which are often ‘just in time’, make logistics and transport essential for the functioning of GPNs. Logistics services not only enable flows. They are also decisive for competitive advantages by mitigating the cost of distance. Places that do not offer an adequate endowment in logistics and transport risk being excluded from global economic processes, as a study of the electronics industry in Southeast Asia by Bowen and Leinbach (2006) exemplifies. Of course, different GPNs are marked by different needs in terms of logistics and transport: the production and commercialisation of electronics heavily rely on

air freight services, whilst coal mining depends on transporting large quantities of bulk cargo by rail and ship. Table 2 summarises the main attributes of different modes of transport and links them to exemplary goods:

Table 2
Modes of transport and related goods

	Road	Rail	Sea	Air
Attributes	most flexible option, fast and reliable, short/medium distances	cheaper than road and air, large volumes, medium distances	cheapest option, large volumes, long distances	fastest but most expensive, small volumes, long distances
Typical goods	manufactured goods	raw materials	petroleum products, vehicles	high-tech products, pharmaceuticals

Source: Roy (2016).

The decisive role of transport is acknowledged in research on GPNs. Robinson (2002) points out that harbours are important components of GPNs. Port authorities must recognise their central role in value creation and adapt their strategies accordingly. Notteboom and Rodrique (2005) argue that we are witnessing a process of port regionalisation, as exemplified by dual hub port systems such as Hong Kong–Shenzhen, Palapas–Singapore and Ningbo–Shanghai. These ports serve as gateways to regional hinterlands. Taking up an argument made by Rimmer (1999), Wang and Cheng (2010) show that the relevance of hub ports extends beyond a logistics function that could simply be measured in container throughput. Logistics companies not only organise the transport of goods from the hub to locations in its wider hinterland. They also make supply chains more efficient, saving their customers costs. This includes logistics providers getting involved in match-finding for overseas companies due to their considerable inventory of firms that operate in the hub's sphere of influence. Logistics providers hence influence the strategic decision making of transnational enterprises. The key point, which Wang and Cheng exemplify by the case of Hong Kong, is that transport hubs in GPNs possess non-physical logistics components that add value to trade through better supply chain management.

However this does not mean that physical infrastructure has become irrelevant. Land transport to the hinterland is the most basic condition for ports

that serve as gateways. Maritime transport is crucial for global connections. Air transport comes into play when time sensitivity is high. The combination of the different physical and non-physical components depends on the level of globalisation and trade and the sophistication of trade organisation, as shown by Table 3.[12] In other words, Wang and Cheng propose a hierarchy of hub cities based on logistics components. Hubs for land transport are not that much exposed to globalisation, trade and sophisticated trade organisation. If globalisation, trade and the sophistication of trade organisation increase, transport hubs will first become dominated by maritime transport and, at an advanced stage, by air transport. The hubs that participate strongest in sophistically organised global trade concentrate on non-physical logistics. Physical and non-physical logistics components can be spatially separated: the management of logistics takes place in highly advanced hubs but the physical movement itself does not pass through these hubs anymore.

Table 3
Types of logistics hubs

	Land transport hubs	Sea transport hubs	Air transport hubs	Non-physical logistics hubs
Degree of globalisation	+	++	+++	++++
Intensity of trade	+	++	+++	++++
Sophistication of trade organisation	+	++	+++	++++

Source: Wang and Cheng (2010).

We carried out interviews in Durban (South Africa) so as to learn more about the role of this city for the oil and gas sector. Durban hosts South Africa's largest port and the country's biggest oil refineries with a capacity of 165,000 and 135,000 barrels per day respectively, representing 60 per cent of South Africa's total refining capacity. Durban is also connected by pipeline to Gauteng, which is, as noted, the economic core of South Africa. The fact that Durban is a hub for land and sea transport – and, for that matter, also for refining crude oil – opens opportunities for local firms to partner with foreign investors. An interviewee from one of the world's major oil and gas companies, which

(12) Wang and Cheng add another factor: the economic prosperity of the hub in comparison to its near surroundings. This factor explains local processes because if the surrounding areas of a city that prospers as a transport hub are relatively poor, the re-location of space-consuming physical transport infrastructures will be eased.

operates one of the refineries in Durban, told us that his company decided to outsource local transport a long time ago because it is not part of their core business and there are capable local logistics providers. These opportunities for local firms are reinforced by local content legislation: black economic empowerment (BEE), which is an affirmative action programme launched by the South African government to redress the inequalities that have resulted from the apartheid era. Partnering with non-white firms increases a company's BEE rating, giving them better chances to win bids for contracts with public authorities and semi-statal enterprises. Because not all potential local partners possess the necessary skills, our interviewee's company is involved in upskilling potential partners, transferring key skills to them.[13]

A representative of the national port authorities explained to us that the port authorities are also promoting economic transformation. They try to enable individuals and firms from a previously disadvantaged background to participate in logistics and processing activities in the oil and gas sector and beyond. The main means used for this purpose is the allocation of land inside the port area. Companies that want to work in the port of Durban can thus be put under pressure to partner with non-white individuals or firms and transfer skills to them.[14] Another interviewee, who works for Trade and Investment KwaZulu-Natal, elaborated on attracting foreign investors, who he puts in contact with potential local partners. This interviewee argued that much had to be done to upskill locals in terms of processing and production, pointing out that some essential inputs for the oil and gas sector 'cannot be produced in South Africa at the moment' and that foreign companies have 'to mentor locals' so that the locals will, at a later point of time, be able to produce more inputs.[15] This mentoring, the transfer of skills from established to emerging companies (or individuals), is only possible because Durban is a gateway city that opens its hinterland for transnational enterprises that seek market access, especially to Gauteng.

Durban's role as a logistics and transport hub – the territorial embeddedness of oil and gas GPNs – does not mean though that the city plays an important role in terms of GPN governance. Our interviewee from the major

(13) Personal interview with a manager of a major transnational oil and gas company, Durban, 13 July 2016.

(14) Personal interview with a representative of Transnet, Durban, 13 July 2016.

(15) Personal interview with a representative of Trade and Investment KwaZulu-Natal, Durban 5 July 2016.

oil and gas company said that all the decisions taken by him and his colleagues were embedded in the global policies of his company. Key decisions, also those affecting his company's business in Durban, are taken at the global headquarters. The South African headquarters of his company plays a somewhat important role for adapting global policies to local particularities. It possesses some sort of autonomy for decisions that affect the national level. The responsibility of the company's employees in Durban is mainly customer relations and, to a rather limited extent, market research in the province of KwaZulu-Natal.[16]

Industrial processing

Sigler (2013) points out that relational cities are different from cities – or rather towns – of the colonial era that connected their respective African, American and Asian hinterlands with the European colonial powers. The most apparent change is due to industrialisation. Gateway cities are not mere logistics hubs. As noted, they host industries that process raw materials and/or semi-manufactured products, sometimes reaching a level of highly sophisticated industrial production, as exemplified by the electronics industry in Singapore (e.g. Vind and Fold 2007, Rasiah 2009). Being industrial hubs, some world cities in the Global South take a twofold gateway role: they process inputs from their regions – the finished products are sold worldwide – and they host overseas companies that produce for regional markets.

The term gateway possesses some political relevance in South Africa with regard to industrialisation. President Zuma declared in a meeting with businesspeople in the United Arab Emirates that his country's 'position as regional business hub and gateway into [Africa] provides us with the muscle to increase our economic and trade outcomes' (quoted in Draper and Scholvin 2012, p. 5). A functioning South African gateway can also be expected to deepen investment in Southern Africa, as a recent World Bank (2016) study suggests. Along with foreign investment come knowledge transfers or at least the potential for knowledge transfers since such transfers depend on local absorptive capacities. Those capacities are weak in Botswana, Lesotho, Namibia and Swaziland, the four countries that together with South Africa form the Southern African Customs Union (SACU). Assuming that those absorptive

(16) Personal interview with a manager of a major transnational oil and gas company, Durban, 13 July 2016.

capacities can be enhanced, the four small SACU countries would be well-placed to leverage off a South African gateway by plugging into GPNs and over time, upgrading within them.

However it appears that the South African government, in particular the Department of Trade and Industry, is driven by a different vision: regional production networks instead of global ones (Scholvin and Wrana 2015). This strategy is based on the relative success of South African enterprises expanding into Southern Africa and beyond. Given the prominence of overseas companies in South Africa and their regional orientation, linked increasingly to the 'Africa rising' proposition, it can be expected that overseas companies in certain industries will also set up regional production networks, using South African cities, most likely Johannesburg, as the hub. South Africa's fellow SACU members and also other African countries – especially those that belong to the Southern African Development Community (SADC) and the proposed Tripartite Free Trade Area (TFTA)[17] – would need to plug into these South Africa-centric regional production networks by providing resources or, if possible, manufactured and semi-manufactured niche components. Such an approach could be attempted in the clothing and textiles sector, with South Africa providing capital-intensive textiles to labour-intensive clothing factories in Lesotho, using cotton grown in Swaziland.

Yet South Africa as an industrial hub suffers from relatively high cost of labour, its small domestic market, which remains small in global comparison if one adds all SADC members, and monopoly pricing for industrial inputs such as chemicals and steel. The aforementioned World Bank study therefore concludes that South Africa – or rather Gauteng and to a certain extent also Cape Town, Durban and maybe East London and Port Elizabeth – should rather serve as the gateway for transnational companies to invest into the region. Policies should be drafted so as to boost foreign investment that seeks using these cities as industrial hubs, servicing regional markets. Regional economic integration should be advanced in order to allow not only overseas companies based in South Africa but also South African firms to source from the region, enabling the latter to plug into GPNs. That entails relative freedom to move

(17) The TFTA is to merge three existing regional economic communities: the Common Market for Eastern and Southern Africa, the East African Community and SADC. Negotiations officially started in 2008. It now appears that these efforts will largely remain without concrete results.

capital, goods, people and services across borders within SACU, SADC and potentially also the TFTA.

In research on world cities, industrial processing is seldom discussed for the simple fact that the world cities that perform best in the GaWC rankings are de-industrialised. Yet oil refineries illustrate how certain places, including world cities, interlink their respective peripheries globally through industrial processing. Because of economies of scale, increasingly large refineries are concentrated at relatively few places. Around 650 refineries exist worldwide. Shifting markets and a tendency of refineries to locate close to markets account for growing capacities in the Global South, especially in the Far East (Bridge and Le Billon 2013). Tables 4, 5 and 6 confirm that refining capacities are not necessarily built where crude oil is extracted. Whereas resource-rich Brunei and Vietnam only possess minor refining capacities, in 2013 more than half of Southeast Asia's refined oil was produced in resource-poor Singapore and Thailand. Angola, Congo-Brazzaville, Gabon and Nigeria reach the highest volumes of crude oil production in Sub-Saharan Africa but refining largely takes place elsewhere. South Africa – with almost no domestic crude oil production – conversely accounts for half of the refined oil production in the region. Argentina and Brazil conversely not only extract but also process the resource. This appears to be a general pattern in South America as it also applies, at least to a certain extent, to Colombia, Ecuador and Venezuela.

Maps 1, 2 and 3 bring this empirical example to the urban level. The map on Southeast Asia shows the outstanding relevance of Singapore as an oil processing hub. ExxonMobil and Shell, amongst others, produce their products for the Asia-Pacific region in the city state. Other refineries in the region tend to be located at the outskirts of major metropolitan areas, for example in Limay (40 kilometres from Manila), Port Dickson (70 kilometres from Kuala Lumpur) and Rayong (140 kilometres from Bangkok). In Sub-Saharan Africa several refineries are also located near major metropolitan areas – Sasolburg (80 kilometres from Johannesburg) for instance – or at key harbours such as Durban, Mombasa, Port Harcourt and Tema. Although almost 30 per cent of the total refining capacity of Sub-Saharan Africa is located in Nigeria, this potential is by far not utilised, as a comparison of Map 2 and Table 5 suggests.

Table 4
Crude and refined oil production in Southeast Asia

	Crude oil production (in 1,000 tonnes)	Refined oil production (in 1,000 tonnes)
Brunei	6,061	392
Indonesia	39,944	40,699
Malaysia	27,631	25,753
Myanmar	851	723
Philippines	754	7,605
Singapore	0	43,853
Thailand	12,323	59,594
Vietnam	17,148	6,521

Source: International Energy Agency 2016.
Note: Data is for 2013.

Table 5
Crude and refined oil production in Sub-Saharan Africa

	Crude oil production (in 1,000 tonnes)	Refined oil production (in 1,000 tonnes)
Angola	85,778	2,268
Cameroon	3,367	2,372
Congo-Brazzaville	12,442	889
Congo-Kinshasa	1,316	0
Ivory Coast	1,181	3,731
Gabon	11,786	1,044
Ghana	5,267	1,418
Kenya	0	627
Mozambique	49	0
Niger	890	818
Nigeria	106,732	4,761
Senegal	0	862
South Africa	66	23,370
South Sudan	4,950	0
Sudan	5,750	3,908
Zambia	0	627

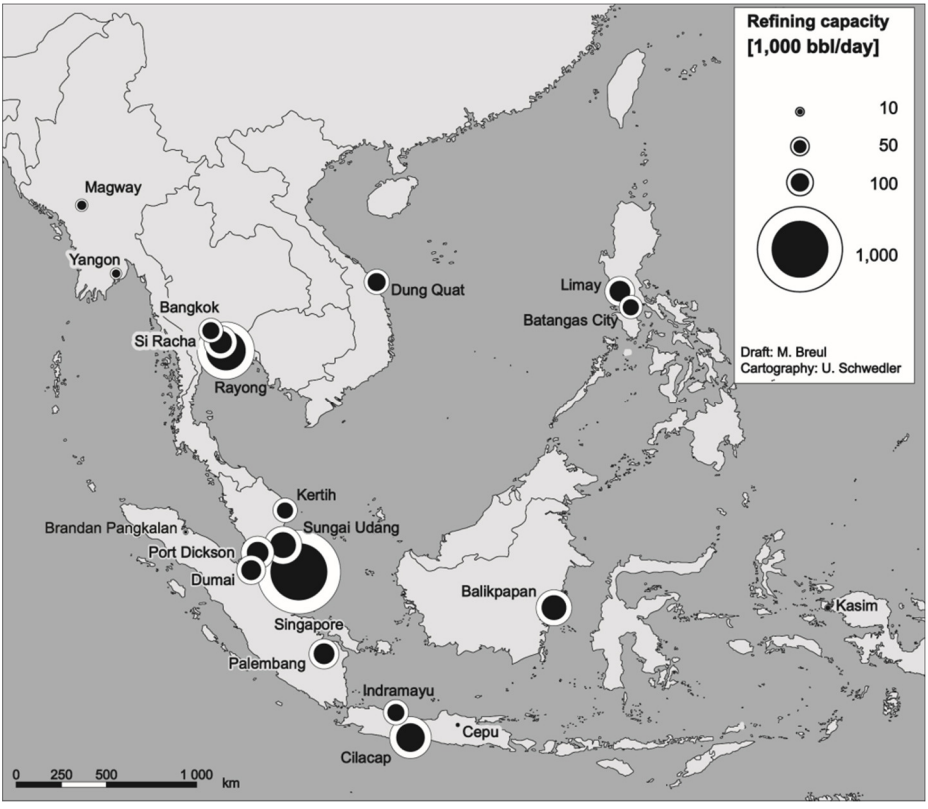
Source: International Energy Agency 2016.
Note: Data is for 2013.

Table 6
Crude and refined oil production in South America

	Crude oil production (in 1,000 tonnes)	Refined oil production (in 1,000 tonnes)
Argentina	26,978	26,582
Bolivia	2,906	2,491
Brazil	102,879	103,195
Chile	340	9,406
Colombia	51,660	14,833
Ecuador	27,473	7,992
Peru	3,121	9,244
Uruguay	0	2,069
Venezuela	146,769	48,706

Source: International Energy Agency 2016.
Note: Data is for 2013.

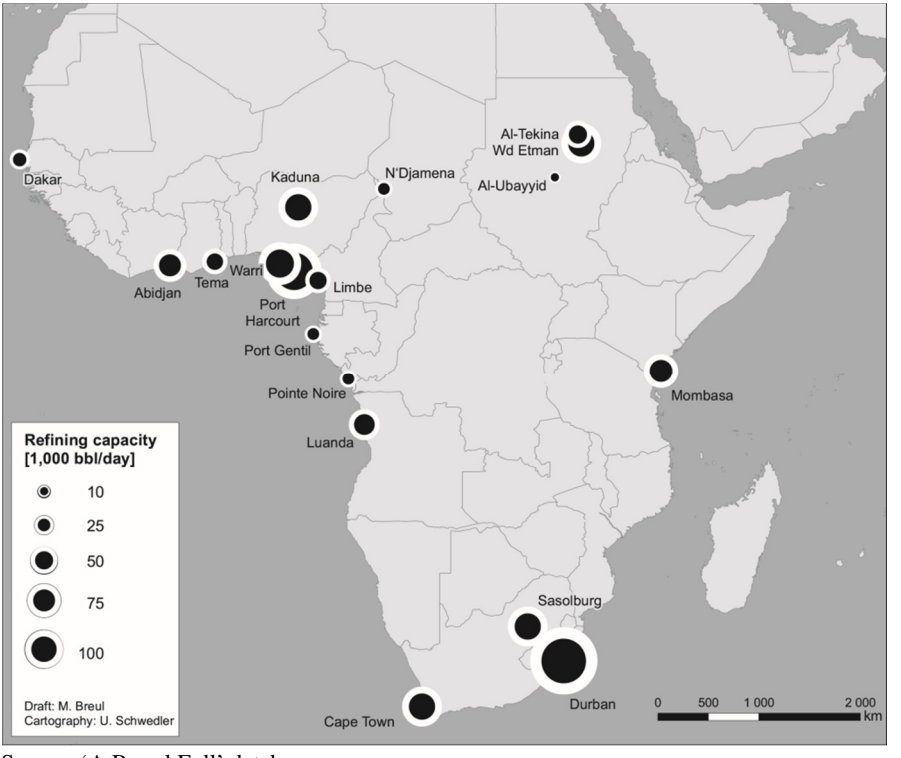
Map 1
Oil refineries in Southeast Asia



Source: 'A Barrel Full' database.

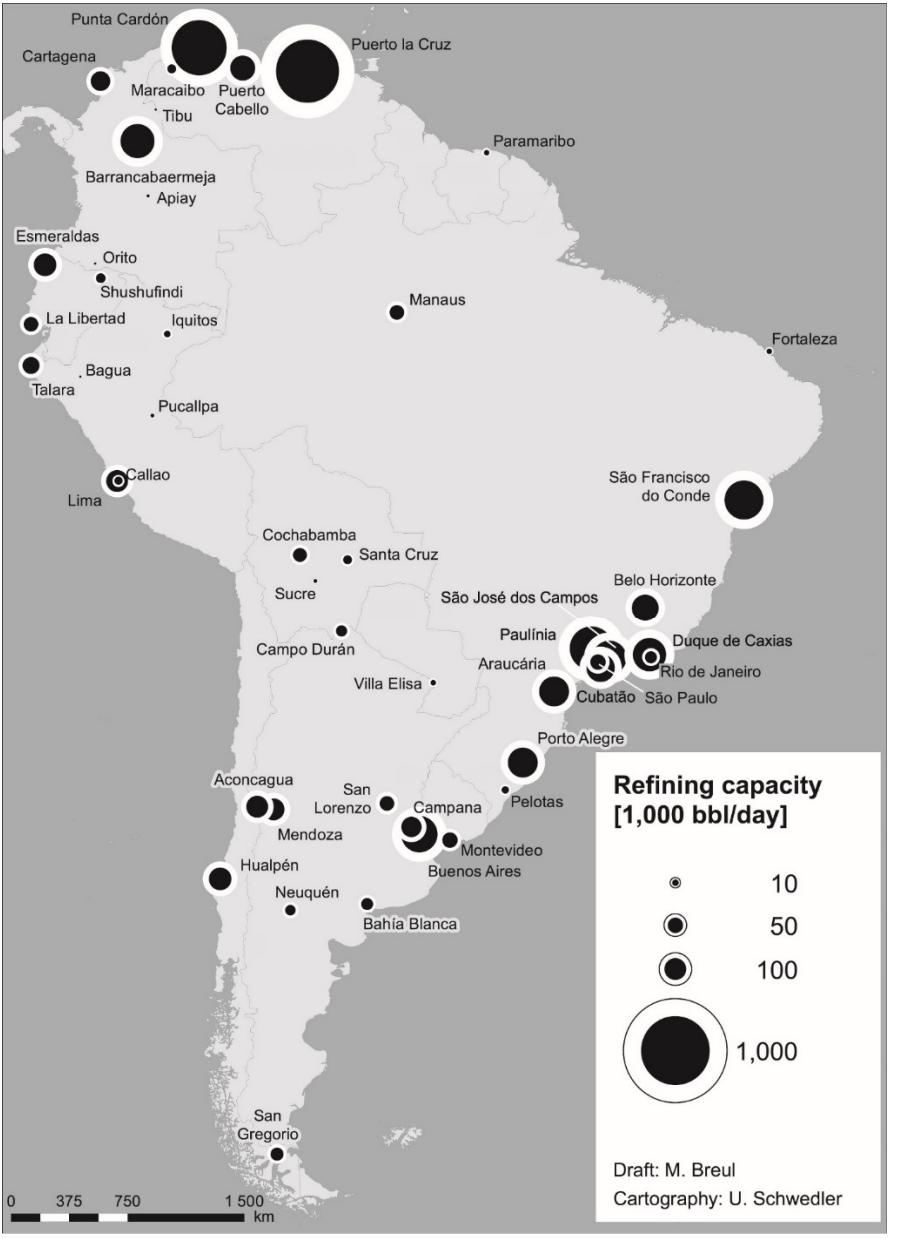
The South American map reveals a focus on metropolitan areas when it comes to processing oil. Sixty per cent of Argentina's refining capacities are in greater Buenos Aires. Greater Lima reaches a similar share of Peru's refining capacities. In Brazil, which is South America's leading refiner, São Paulo and cities nearby account for 43 per cent of the national refining capacities. Only 13 per cent of the refining capacities take place in Rio de Janeiro and its surroundings, which have historically dominated the upstream sector. Ninety-two per cent of Venezuela's refining capacities are conversely located near the country's deposits (Puerto la Cruz and Punta Cardón), not in Caracas or nearby. This is not surprising given that Venezuela's oil sector has always been export-oriented, whereas the Argentinian, Brazilian and Peruvian downstream sectors primarily serve the respective domestic markets. Similar thoughts on metropolitan versus port locations can be applied to Sub-Saharan Africa, which demonstrates that gateways – for the export-oriented oil industry in this case – are not necessarily world cities.

Map 2
Oil refineries in Sub-Saharan Africa



Source: 'A Barrel Full' database.

Map 3
Oil refineries in South America



Source: 'A Barrel Full' database.

What this overview shows is that some world cities in the Global South are key sites of industrial processing. It is plausible to conclude that they supply not only local markets but also the markets of their wider hinterlands, thus being gateways. In order to better understand economic development that results from this territoriality of oil GPNs, it would be necessary to analyse the governance of these GPNs: Are the owners of the refineries shown on Map 1, 2 and 3 firms from the respective countries or from abroad? Do these firms co-operate with local partners, for example for maintaining and upgrading the refineries? How is the profit made by selling the products from the refineries distributed? Are the refineries related to any research activities or transfer of skills to locals? Further below we shed light on the last-mentioned question.

Corporate control

Ernst and Kim (2002) argue that due to globalisation, transnational companies have to be present in all major growth markets. They have to disperse globally in order to prevent being outcompeted by others. Transnational companies moreover have to integrate their activities globally so as to benefit from possible linkages between various locations, gaining access to capabilities, knowledge and resources. GPNs allow transnational companies, acting as lead firms, to do so. Ernst and Kim point out that 'the real benefits [of GPNs] result from the dissemination, exchange and outsourcing of knowledge and complementary capabilities' (2002, p. 1420). Although Ernst and Kim focus on lead firms from information technology and suppliers that manufacture products that these lead firms sell, we think that the logic behind these processes can be generalised.

Globally dispersing and integrating economic activities obviously causes transaction costs. Transnational companies save transaction costs by establishing a worldwide network of headquarters that specialise in specific regions. Research on international business confirms that transnational companies tend to organise their operations at a regional rather than a global level (Enright 2005, Rugman and Verbeke 2005). Regional headquarters are hierarchically situated between a firm's global headquarters and its local subsidiaries (Laudien and Freiling 2011). The authority of regional headquarters is apparently bound to a particular region for which they control/manage all projects of the respective company. Even though the degree of autonomy of regional headquarters varies from one transnational company to another, regional headquarters always serve as hinges between the regional

and the global scale: they keep close links with all subsidiaries in their respective regions and with the parent company and other extra-regional corporate units.[18]

Hong Kong is probably the best-known example of a city hosting regional headquarters, thus serving as a gateway to the hinterland, which is the Asia-Pacific region in the case of Hong Kong. There were 2,400 regional headquarters located in Hong Kong in 1998 (Thompson 2000). This number increased to about 3,600 in 2010, including Nikon, Osram and Wal-Mart (European Chamber of Commerce in China 2011). Wal-Mart oversees its operations in China, India and Japan from Hong Kong and carries out market research on East and Southeast Asian countries from the city. Osram manages its regional marketing and sales activities from Hong Kong, benefitting from proximity to business partners and customers. Nikon controls 16 regional subsidiaries from the city.

Research on world cities also confirms that some cities are key locations for regional headquarters of transnational companies. Parnreiter (2010) points out that 63 per cent of Mexico's largest companies and 79 per cent of the foreign firms that operate in the country are headquartered in Mexico City. The city accordingly interlinks the Mexican hinterland globally. Johannesburg appears to play a similar role as a gateway to parts of Africa (Draper and Scholvin 2012). Parnreiter, Haferburg and Oßenbrügge (2013) show that economic liberalisation in Mexico and South Africa went along with a real estate boom because of transnational companies opening headquarters there. In Mexico City total inventory of office space grew by 2.2 million square metres or 65 per cent between 1997 and 2007, the year before the global financial crisis broke out. Whereas in 1998 supply for class A office space was twice as high as demand and the vacancy rate amounted to 23 per cent, by 2007 the vacancy rate had fallen to a historical low of 5 per cent. Until 2007 this increase was accompanied by a shift towards new business centres in the south and west of Mexico City, especially for class A+ office space. The same pattern applies to Johannesburg, where Midrand and Sandton (located at the northern edge of the city) have joined the historical central business district (located in the city centre) as main locations for corporate headquarters.

(18) Poon's (2000) study on Singapore nicely demonstrates the role played by regional headquarters of transnational companies.

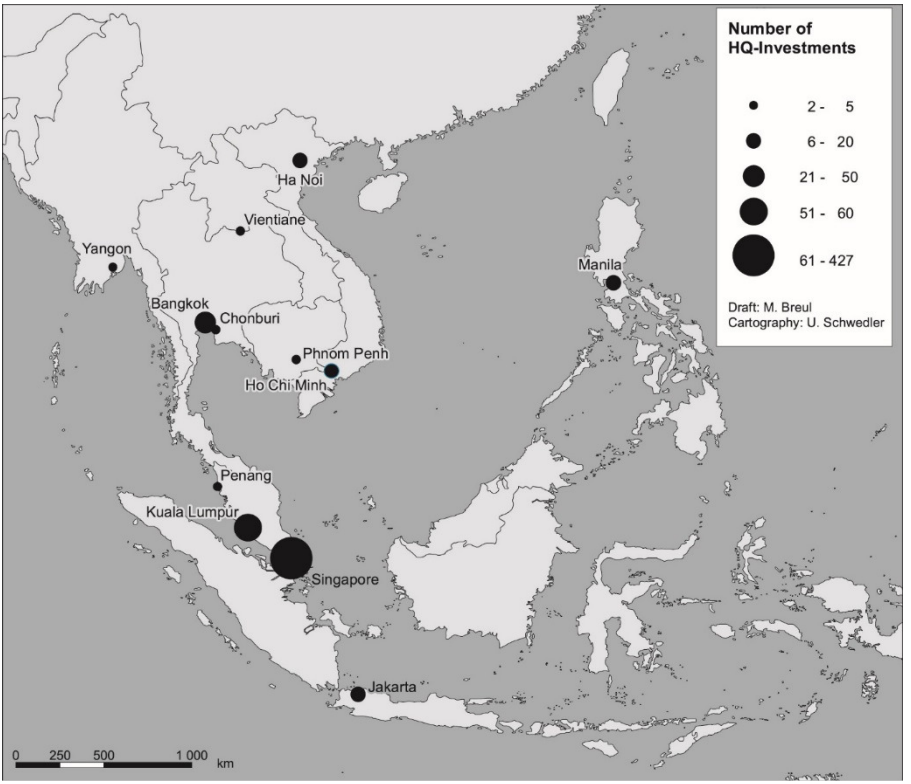
Sigler's (2013) research tells us more about the reasons for the rise of some world cities as locations of regional headquarters: these cities embed what one may call international standards into specific regional contexts. In Panama City, for example, Colombian and Venezuelan businesspeople interact with their partners from all over the world under a customised regulatory framework that is backed by the implicit stability of the monetary policy of the United States. Dubai, located at the edges of Central Asia and the Middle East, is a business hub with an impressive set of inducements all subject to English law. Business is conducted in English and with locals who have usually been educated at Western élite universities. Many of these location advantages obviously result from political strategies that aim at positioning the respective cities (or states) as intermediaries in the global economy.

Grant and Nijman (2002) – whose study on Accra and Mumbai has conceptually inspired the research by Parnreiter, Haferburg and Oßenbrügge – show that the internal dynamics of world cities, in particular the differentiation of business districts with a local, national and global orientation, are shaped by the way in which these cities participate in global economic processes. Grant and Nijman distinguish between pre-colonial, colonial, national and global developmental phases. They link 'changes in the urban landscape of cities […] to changes in the global political economy' (2002, p. 322). Accra and Mumbai saw a rapid transformation of the formerly separated European and native central business districts in the immediate post-independence era, with the former being increasingly marked by large and often nationalised companies and the latter becoming home to small-scale businesses whose activities were (and still are) locally limited. Economic liberalisation in the 1980s and 1990s then triggered a boom of foreign investment. New and globally oriented central business districts with a large share of advanced producer services, especially in finance, emerged. They are often located near international airports and in sub-urban areas.

Methodologically Grant and Nijman surveyed foreign companies in Accra and Mumbai, gathering information on their office location in these two cities, their country of origin, size, type of activity and year of establishment. Domestic companies were surveyed with regard to the relevance of global connections for their work. For our own research we have screened the fDi Markets database from the *Financial Times* for regional headquarters in Southeast Asia that were established between 2003 and 2016. This information, depicted by Map 4, indicates from where transnational companies manage their

respective regional activities: especially Singapore appears to possess an outstanding relevance.

Map 4
Regional headquarters in Southeast Asia



Source: fDi Markets database.
Note: Data is for 2003 to 2016.

To name an example, China Oilfield Services opened a regional headquarters in Singapore in 2015. This headquarters is responsible for operations across the Asia-Pacific Region, according to the information included in the database. A methodological challenge when relying exclusively on the fDi Markets database is that regional headquarters are not established frequently, meaning that the data to which we have access does not provide a complete picture. A web-based desk study revealed that Chevron manages its down- and upstream activities in the Asia-Pacific Region from Singapore. The French company Total re-located its regional headquarters for exploration and

production to Singapore in 2011. Both cases are not included in the fDi Markets database.

Interviews conducted in Namibia and South Africa with major transnational companies involved in the oil and gas sector also suggest that hierarchies within these companies are somewhat different from what the literature summarised above implies. An interviewee to whom we spoke in Namibia stressed that being present in the country where exploration or extraction takes place is highly important, not only in order to build personal relationships with people from public authorities and potential local partner companies but also to 'show that one is committed to this country'.[19] Another interviewee, whose office is located in Cape Town, pointed out that South Africa – the emerging economy that possesses key advantages to host gateway cities in the oil and gas sector (Scholvin 2017) – is still a frontier state in that sector. This means that the biggest players from the upstream sector first moved to other Sub-Saharan African countries. They later opened offices in South African cities, mostly in Cape Town, being interested in the country's own domestic resources.[20] A third interviewee explained that transnational companies in the oil and gas sector usually have managers who are responsible for sub-continental regions, East and Southern Africa in the case of this particular interviewee. At least at a time of low oil prices, many of these regional managers are based at the global headquarters of their respective companies.[21]

Service provision

As already indicated with regard to the research by Grant and Nijman, not only lead firms but also providers of advanced producer services open regional headquarters in gateway cities. The service-provision dimension of gateway cities is the closest to the debate on world cities as shaped by Sassen and, based on her work, the GaWC research network. Friedmann and Wolff (1986) also point out that the economic dynamics of world cities result from the growth of high-level business services: accounting, banking and finance,

(19) Personal interview with the national representative of a major oil and gas company, Windhoek, 18 August 2016.

(20) Personal interview with the national representative of a major oil and gas company, Cape Town, 11 August 2016.

(21) Personal interview the regional manager of an international engineering company, Cape Town, 2 August 2016.

higher education, legal services, technical consulting, telecommunication and research. Friedmann and Wolff consider international transport being part of these services as well as management itself.

Since the 1980s technological progress in telecommunication has obviously allowed for a considerable decentralisation of business services, enabling a greater number of cities to serve as gateways. As noted, the complexity and fragmentation of global production has increased at the same time, boosting the need for globally decentralised service provision. There is an increasing consent in literature on corporate services that companies providing such services have to maintain a wide network of local affiliates so as to access markets all over the globe (Daniels 2007). Dicken (2015) also suggests that there is a regional dimension to advanced producer services because the firms that provide these services follow their clients, establishing branch offices in cities all around the world. As Bryson and his co-authors (2004) point out, places integrated into GPNs are so diverse in terms of culture, language, legal institutions, politics, product specifications and technology that the in-house capabilities of even the largest transnational companies are insufficient to operate there without the support of service providers.

A study on the city of Hamburg by Parnreiter (2015) brings GPNs and world cities together by showing that the various services required for GPNs are place-specific: 'from market research to after-purchase communication, from a legal due diligence to the management of cash flows, from opening up a bank account to retirement administration, [the services provided to transnational companies by firms that specialise in corporate service provision] are needed by their clients to successfully run their businesses' (2015, p. 7). The place-specificity of these services results, first of all, from language barriers but it is also due to other factors such as, for instance, differences in education systems, which prevent transnational companies from evaluating the qualifications of potential employees in a proper manner.

Parnreiter's research moreover demonstrates that service provision often involves sub-contracting. A representative of an enterprise from Hamburg that provides services to overseas companies told him: 'Say, Indian foods, a spice trader [...] looks for a logistic firm or a port-related service, to store things, and in this moment the legal imperative for paying sales taxes leads to the legal requirement to register here, to get a VAT registration number, to apply a reverse charge mechanism to the fiscal authorities to get the input tax […] That

does the logistic firm [for the spice trader], and we do that for the logistic firm' (2015, p. 6). With regard to meeting customers face-to-face, representatives of corporate service providers interviewed by Parnreiter argued that they have to be close to their customers. It would be technically possible but practically extremely difficult if they were located in cities other than their main clients. Beyond that, Parnreiter shows that corporate service providers are highly interlinked on the global scale. They have partners or subsidiaries in relevant markets. These become crucial whenever a customer acquires a service for a distant market.

Essential as they are, corporate services are bundled in world cities, making them gateways. Parnreiter concludes in one of his aforementioned studies that Mexico City 'is a place from where the articulation of peripheral labour processes in […] Mexican cities that serve as export platforms is made possible through service inputs' (2010, p. 50). He examines, as a first step, whether firms from Mexico City supply advanced producer services that are needed by firms throughout the country to enable globally interlinked production. He finds that 'producer service firms [based in Mexico City] connect to companies within various global commodity chains that either emanate in Mexico (as in the case of petroleum), run through the country (as in the automotive industry), or end there (for example, the products sold in Wal-Mart)' (2010, p. 42). As a second step, Parnreiter refers to interviews conducted with corporate service providers. These interviews reveal that corporate service providers are essential because they supply knowhow on the legal management of foreign investment, especially with regard to Mexican legislation and the 12 free trade agreements that Mexico has signed. Relations with trade unions, buying or leasing property, tax issues and migration of non-Mexican professionals are also dealt with by corporate service providers.

Parnreiter furthermore points out that whilst Mexico City is crucial for the management of GPNs, the city is not so much a command and control centre. Non-first tier world cities are rather rule-keepers than rule-makers. As a consequence, their role in the governance of GPNs remains limited. This implies disadvantages in terms of value capture in comparison to first-tier world cities from the Global North.[22] Research by Rossi, Beaverstock and Taylor on Brazilian cities as stepping stones for Brazilian firms that seek to

(22) Taking up a term coined by Frank (1969), we can adequately understand world cities in the Global South as semi-peripheral 'bridgeheads'. Without these bridgeheads, the periphery of the global economy could not be integrated into GPNs (and thusly exploited by the cores).

internationalise their business confirms that the services provided in gateway cities are crucial for the management of GPNs but not usually about command and control. Sigler (2013) also argues that relational cities are hubs for offshore banking and often feature free trade zones, indirectly saying that command and control are not their main features – at least when compared to the world cities that perform best in the GaWC ranking.

Our own research suggests that gateway cities are crucial service hubs but the services they provide are not necessarily the advanced producer services commonly analysed in research on world cities. Cape Town, for example, is of outstanding relevance as a service hub for the oil and gas sector, covering mainly upstream activities all over Sub-Saharan Africa (Scholvin 2017). Ernst and Young and KPMG have offices in Cape Town. An interviewee from one of these firms explained to us that his job is about proposing business strategies to clients from overseas. These strategies require place-specific knowledge as they take into account local particularities of doing business. Given that our interviewee's company has offices all over Sub-Saharan Africa, the office in Cape Town rarely gives advice on doing business in other regional countries. It will however provide some input if it makes sense for a client to geographically split a supply chain, for example by sending an oil rig from West Africa to Cape Town for maintenance.[23]

The fact that Cape Town hosts various providers of technical services that are, in most cases, not available in the Sub-Saharan countries that possess oil and gas resources, makes the city an attractive location for transnational companies. They find critical intermediaries in the city and can use Cape Town as a repair hub for oil rigs and ships. What is more, the service providers themselves benefit from the sector-specific density. A manager of an international maritime engineering company that is active in various West African countries stressed that being in Cape Town enables his company to source almost everything locally, meaning from reliable partners and with almost no delay. When working elsewhere in Sub-Saharan Africa, supplies often have to come from Cape Town: 'we find that we can't source it locally; so we source it from Cape Town and the suppliers ship it directly to wherever we need it'.[24]

(23) Personal interview with a representative of a major provider of advanced producer services, Cape Town, 4 August 2016.

(24) Personal interview with a manager of an international maritime engineering company, Cape Town, 10 August 2016.

There are also reasons other than density that favour Cape Town as a gateway. Managers of a firm that is involved in offshore exploration pointed out that it is much easier for South Africans than for people from overseas to get visas to work in Sub-Saharan countries. Hence transnational companies rather sub-contract South Africans than firms from Europe and North America that could do the same work. The firm of our interviewees has moreover made the experience that working with logistics providers based in Cape Town or Walvis Bay (Namibia) eases getting supplies to Angola, one of the main Sub-Saharan markets for oil and gas companies: shipping urgently needed spare parts from Europe to Angola via Angolan ports takes up to six weeks; shipping these goods to Cape Town or Walvis Bay and then transporting them by road to Angola is much faster.[25]

The local companies that we interviewed expressed a strong preference for working in South Africa – meaning that a client brings an oil rig to the city or picks up a refurbished vessel there – but most of them at least send staff to Sub-Saharan countries. Some have even opened office branches in regional countries. This expansion of service providers into the region, which boosts Cape Town's role as a gateway city, is supported by the organisation Wesgro, established by the Western Cape province to promote economic development and foreign investment. Wesgro possesses a network of partners in many Sub-Saharan countries and puts firms from Cape Town in contact with these partners. The partners then provide contacts to firms in their respective home countries and help the South Africans to overcome barriers to investment such as getting local permits and supplies.[26]

Knowledge generation

Knowledge generation is the most sophisticated dimension of gateway cities. By knowledge generation we mean co-operative processes that involve local and non-local players, who work together so as to adapt existing technologies to local particularities (outside-in direction) or to market locally developed knowledge globally (inside-out direction). Existing technologies are modified this way, hence knowledge is generated, and the places where this knowledge generation occurs serve as intellectual hinges between different scales.

(25) Personal interview with two managers of a company involved in offshore exploration, Cape Town, 11 August 2016.

(26) Personal interview with a representative of Wesgro, Cape Town, 12 August 2016.

Tödtling, Lehner and Trippl (2006) propose a four-field matrix for the geography of innovation processes. These are either dynamic as collective learning or static as knowledge transfers. They occur in formal or informal relations. Storper (1995, 1997) refers to the latter categories as traded and untraded relations, suggesting that untraded relations account for the spatial concentration of innovative firms and people. The former categories go back to the milieu approach (e.g. Camagni 1991, Maillat 1998). In collective learning the stock of knowledge is increased, whereas knowledge transfers are about passing ready knowledge from one firm to another.

Tödtling, Lehner and Trippl (2006) furthermore distinguish different types of interaction related to the sharing and spreading of knowledge. In market relations company A buys equipment or software licenses from company B. Company B has been innovate. Company A has not. The level of interaction is low. Market relations tend to mark spatial scales beyond the sub-national region. Spill-overs conversely – for example from research institutions to enterprises – are highly localised. They differ from market relations because they do not involve contracts and formal compensation for the acquired knowledge. Networks are another type of interaction, in which knowledge is not only exchanged but firms engage in further development and thus increase their collective knowledge base. Networks that involve transnational companies, specialised technology firms and major research organisations are usually formalised, including written statements on the sharing of costs, tasks and revenues. These networks moreover tend to be global and highly selective regarding their membership and objectives. Formal networks at the sub-national scale, involving local universities and smaller companies, are much less important.

Innovative networks on the sub-national scale, in high-tech regions and industrial districts, tend to be informal. They are based on social cohesion: the acceptance of common rules and behavioural norms, and a shared understanding of problems and objectives. Many researchers – to whom Tödtling, Lehner and Trippl refer – have found that collective learning in these networks depends on firms and people being close to each other at a specific locality. Face-to-face interaction and personal ties that extent beyond professional relationships exemplify this. These dynamics can be reinforced by dedicated organisations and policies: science parks and universities with a particular strength in research are likely to generate innovative networks. Public authorities can furthermore support local spinoffs and technology transfers.

Table 7 summarises the conceptualisation of innovation processes by Tödtling, Lehner and Trippl:

Table 7
Innovation processes

	Dynamic	Static
Formal (and global)	global networks	traded relations/market relations
Informal (and local)	local networks and spill-overs	untraded relations

Source: Authors' own draft based on Tödtling, Lehner and Trippl (2006).

The Brazilian oil and gas sector provides a good example for innovative networks. The key company is the semi-statal giant Petrobras, which is the world leader in offshore, pre-salt exploration technology (Ribeiro and Furtado 2014).[27] Deepwater, pre-salt exploration and, at a later stage, extraction still requires considerable investments in technological innovation, in particular for the products and services provided by sub-contractors. Petrobras determines which technologies are needed; formal networks of Brazilian research centres and universities are structured according to Petrobras's preferences. A key means to get local companies involved and to foster Petrobras's co-operation with transnational enterprises is science and technology parks, at least according to government planning (Ministério da Ciência, Tecnologia e Inovação 2012, 2013). Currently two science and technology parks in Brazil concentrate, amongst other sectors, on oil and gas. One of these parks is located in Santos, which is the country's largest harbour and a one-hour drive away from the city of São Paulo. The other is in the city of Rio de Janeiro, on the Ilha do Fundão. Petrobras is the anchor company in both parks.

The science and technology park in Rio de Janeiro dates back to 1963, when the Graduate and Research Institute for Engineering (Instituto de Pós-Graduação e Pesquisa de Engenharia) was opened on the Ilha do Fundão by the Federal University of Rio de Janeiro (Universidade Federal do Rio de Janeiro,

(27) In May 2015 Petrobras received the 'OTC Distinguished Achievement Award for Companies, Organisations and Institutions' for the third time. This confirms Petrobras's outstanding performance with regard to technologies developed for pre-salt oil and gas extraction. The award is granted every year by the Offshore Technology Conference, which brings together practically all major business associations and firms involved in the offshore oil and gas sector.

UFRJ). Ten years later Petrobras founded a research centre of its own nearby: the Petrobras Research Centre (Centro de Pesquisas da Petrobras). This centre was the first major industry-university partnership in Brazilian history. It has served as a kick-off for numerous research projects carried out by scholars from the UFRJ. The science and technology park itself was approved by the council of the UFRJ only in 1997 and three years later the municipal authorities of Rio de Janeiro launched an according urban infrastructure project. It took another three years until the first research laboratory, the Tanque Oceânico, which deals with technologies applicable offshore, began its work. Other laboratories maintained by the Graduate and Research Institute for Engineering carry out research on technologies for the natural gas sector, develop methodologies for computational mechanics, test various products used in the oil sector and work on the recovery of ecosystems. Today 27 start-ups have their offices in the park; so do a total of 57 technology-based firms. The outside-in direction of knowledge generation dominates to an almost exclusive extent. Outstanding firms are:

- Baker Hughes, from the United States, supplies equipment, including software, and various services to oil and gas companies. Its research centre in the park focusses on reservoir characterisation and drilling optimisation, completion and production. It seeks to make according technologies applicable for deep-water, pre-salt operations.

- Halliburton, whose activities are concentrated on the upstream sector, has announced to open a research centre in the science and technology park so as to develop software specialised for the exploration and exploitation of pre-salt oil and gas deposits.

- The French company Schlumberger, which integrates engineering and geoscience, runs a laboratory in the park that is dedicated to solving the challenges associated with deep-water, pre-salt operations.

- Georadar Ambiental e Infraestrutura from Brazil specialises in environmental diagnostics and geological surveys with regard to oil, gas and mineral resources. The company's facilities in the park are for technology development for specific oil and gas projects and training of staff.

- Ambidados was founded by alumni of the Graduate and Research Institute for Engineering. It provides services in acquisition, processing and analysis of data relevant to offshore operations, most importantly a system to acquire real-time data anywhere offshore.

- Another Brazilian firm from the park, Oilfinder, has developed pioneering technology to identify the precise location of oil deposits in the seabed, using remote technologies only. This avoids environmental and operational risks associated with sending vessels to potential oil deposits.

The science and technology park in Santos is a much more recent project. It was officially launched in 2011 in the context of the exploration of newly found oil and gas fields off the coast of the city. The park is not limited to oil and gas. It is also dedicated to communication and information technology, port logistics, renewable energy and urban development – areas that are somewhat related to the oil and gas sector. The general objective is to strengthen the competitiveness of local companies and their innovative capacities by bringing them together with non-local partners, educational institutions and universities. According to an official from the municipal authorities of Santos, local firms are often family businesses. They have the necessary technical skills to participate in the oil and gas sector but are 'not very professional' in terms of management. In addition to that, foreign oil and gas companies that invest in Brazil do not usually speak Portuguese and their potential local partners hardly ever reach a sufficient proficiency in English. Thus local authorities seek to upskill local firms regarding business management and language skills.[28]

Our interviewee also pointed out that the city of Santos 'has opted for science', whilst nearby cities such as Guarujá concentrate on industries that matter for down- and upstream activities. She and her colleagues support the sector by organising events at which foreign investors and local firms come together. The city moreover provides office space in the science and technology park for companies, which also benefit from tax incentives. Our interviewee stressed the need – and the efforts undertaken by herself and her colleagues – to upskill local entrepreneurs and local labour. Other public authorities such as the Special Commission for Oil and Gas (Comissão Especial de Petróleo e Gás, CESPEG) of the federal state of São Paulo however only ascribe medium relevance to this issue. They argue that much more has to be done to identify the technologies that independent suppliers need and stimulate according research. The CESPEG (2010) has identified sectors in which they would like local institutions to carry out research: carbon capture and storage, different

(28) Personal interview with a representative of the municipal authorities, Santos, 18 August 2015.

forms of engineering, especially for sub-marine operations but also for using natural gas that is set free when exploiting offshore oil resources, geological surveys and specialised logistics.

Conclusion

Some world cities in the Global South serve as gateways, interlinking their respective hinterlands globally. As we have shown by summarising the state of research on GPNs and world cities and by providing examples from our own research on the oil and gas sector, gateway cities are marked by five dimensions in which they serve as hinges in GPNs. Not every gateway city fulfils all five dimensions. Each of them can stand on its own, making a world city or even places that are off the radar of the GaWC research network a gateway:

- The most basic gateway dimension is transport and logistics, which characterised gateways already in the colonial era. Today transport and logistics hubs range from cities like Durban, which is essential for land and sea transport, opening its hinterland for transnational enterprises, to places that do not matter for physical transport but even more so for the management and planning of global supply chains. Our research suggests that whilst every transport and logistics gateway creates opportunities for local firms to participate in GPNs, an influential role of these cities in GPN governance depends on highly sophisticated transport and logistics taking place there.
- World cities in the Global South are also key sites of industrial processing. This way they generate global and regional links that are decisive for economic development, as according policy debates in South Africa exemplify. In the oil and gas sector there is a concentration of refineries close to major markets: transnational companies use cities such as Durban, São Paulo and Singapore to supply nearby markets. These cities serve as gateways with a clear outside-in direction: resources purchased elsewhere are processed in the gateway cities and sold in the respective hinterlands. Refineries that process oil destined for global markets appear in traditional oil-exporting countries such as Nigeria and Venezuela. Places that are not world cities assume the role of inside-out gateways in these cases. With regard to economic development, questions of linkages between foreign investors and local firms as well as value capture are critical in both cases.

- Corporate control is one of the defining features of world cities. In order to be active in various parts of the world, many companies use a rather limited number of regional headquarters as intermediaries between their respective global headquarters and numerous subsidiaries. The cities that host regional headquarters are marked by a relatively favourable business environment. They are islands of stability within seas of unrest. Although our own research suggests that Singapore does indeed play an according gateway role for Southeast Asia (or perhaps even the entire Asia-Pacific Region), international companies from the oil and gas sector appear not to organise their GPNs via regional headquarters, at least not to a dominant extent. The companies we interviewed in Namibia and South Africa prefer a direct approach, directly linking their offices in the countries where they explore and exploit oil and gas resources to their global headquarters.
- Service provision in accountancy, advertising, banking/finance and law is another defining criterion of world cities. Parnreiter has successfully used these advanced corporate services in order to bring GPNs and world cities together. His research on Mexico City shows that some world cities become gateways to their respective hinterlands by offering advanced corporate services to transnational enterprises. We can learn from the oil and gas sector that there are several other services that make some cities gateways. Cape Town is a gateway city for Sub-Saharan Africa because of engineering companies that provide critical inputs to the oil and gas GPN, either working in Cape Town or sending employees and equipment to the regional countries.
- The most sophisticated gateway dimension is knowledge generation, meaning the adaptation of external knowledge to local specificities or the preparation of local knowledge for global marketing. In gateway cities we find informal networks of innovative entrepreneurs that are linked to formalised networks. The latter bring local research institutes and major transnational enterprises, usually from abroad, together. Gateway cities accordingly link different spheres, as exemplified by the technology parks dedicated to oil and gas in Rio de Janeiro and Santos. At least in the case of the oil and gas sector in Brazil, knowledge gateways are strongly influenced by public authorities and the semi-statal company Petrobras.

Although this paper is mainly a literature review and conceptualisation of gateway cities along the five dimensions, the empirical examples that we

have provided demonstrate that connecting GPNs and world cities generates significant important insights on global and regional economic processes. It should also go beyond advanced producer services that have traditionally formed the core of research on world cities. What is more, Short et al. argue that 'gateway cities is a shorthand term for the idea that all cities act as transmission points for globalization' (2000, p. 337). Yet whilst it is of course true that all cities somewhat channel global flows, hence serving as transmission belts of globalisation, our argument is that the role of some but not all world cities in economic processes can best be understood from the gateway perspective. This perspective is very helpful to explain the role that, for example, Durban, Rio de Janeiro and Singapore play for oil and gas GPNs. It will probably generate little insight if applied to London or New York. Moreover by advancing empirical research along the lines developed in this paper, it will not only be possible to better understand the relevance of world cities for GPNs. Research on gateways cities is also promising to generate findings concerning the concept of leading areas from the 2009 *World Development Report* and its policy implications.

References

AKINBOADE, Oludele A.; LALTHAPERSAD-PILLAY, Pinky (2009). The NEPAD Initiative and the Prospects of Business Opportunities in the Rest of Africa for South African Firms Based in Gauteng. *Development Southern Africa*, v. 26, n. 1, p. 131-155.

ALDERSON, Arthur S.; BECKFIELD, Jason. (2004). Power and Position in the World City System. *American Journal of Sociology*, v. 109, n. 4, p. 811-851.

ALDERSON, Arthur S.; BECKFIELD, Jason (2012). Corporate Networks of World Cities. In: DERUDDER, Ben et al. (Ed.). *International Handbook of Globalization and World Cities.* Cheltenham: Edward Elgar. p. 126-134.

BARHAM, Nasim et al. (2007). Relational Governance and Regional Upgrading in Global Value Chains: The Case of Package Tourism in Jordan. *Die Erde*, v. 138, n. 2, p. 169-186.

BEAVERSTOCK, Jonathan V. et al. (1999). A Roster of World Cities. *Cities*, v. 16, n. 6, p. 445-458.

BOWEN, John T.; LEINBACH, Thomas R. (2006). Global Production Networks and Competitive Advantage: Air Freight Services and the Electronics Industry in Southeast Asia. *Economic Geography*, v. 82, n. 2, p. 147-166.

BRIDGE, Gavin; LE BILLON, Philippe (2013). *Oil*. Malden: Polity Press.

BRYSON, John R. et al. (2004). *Service Worlds*: People, Organizations, Technologies. London: Routledge.

BURGHARDT, Andrew F. (1971). A Hypothesis about Gateway Cities. *Annals of the Association of American Geographers*, v. 61, n. 2, p. 269-285.

CAI, Jiangming; SIT, Victor F. (2003). Measuring World City Formation: The Case of Shanghai. *Annals of Regional Science*, v. 37, n. 3, p. 435-446.

CAMAGNI, Roberto (1991). Local "Milieu", Uncertainty and Innovation Networks: Towards a New Dynamic Theory of Economic Space. In: CAMAGNI, Roberto (Ed.). *Innovation networks*: Spatial Perspectives. London: Belhaven Press. p. 121-144.

CESPEG (2010). Petróleo & Gás no Estado de São Paulo: Panoramas, desafios e políticas públicas. Disponível em: http://www.desenvolvimento.sp.gov.br/infraestrutura/cespeg//files/relatorio_final_cespeg_7mb.pdf. Acesso em: Oct. 13, 2016.

COE, Neil M.; DICKEN, Peter; HESS, Martin (2008). Global Production Networks: Realizing the Potential. *Journal of Economic Geography*, v. 8, n. 3, p. 271-295.

COE, NEIL M.; YEUNG, Henry W. (2015). *Global Production Networks*: Theorizing Economic Development in an Interconnected World. Oxford: Oxford University Press.

DANIELS, Peter W. (2007). A Global Service Economy?. In: BRYSON, John R.; DANIELS, Peter W. (Ed.). *The Handbook of Service Industries*. Cheltenham: Edward Elgar. p. 103-125.

DERUDDER, Ben; WITLOX, Frank (2010). *Commodity Chains and World Cities*. Oxford: Wiley-Blackwell.

DICKEN, Peter (2015). *Global Shift*: Mapping the Changing Contours of the World Economy. London: Sage.

DICKEN, Peter et al. (2001). Chains and Networks, Territories and Scales: Towards a Relational Framework for Analyzing the Global Economy'. *Global Networks*, v. 1, n. 2, p. 89-112.

DRAPER, Peter; SCHOLVIN, Sören (2012). The Economic Gateway to Africa?: Geography, Strategy and South Africa's Regional Economic Relations. *SAIIA Occasional Paper*, 121.

ENRIGHT, Michael J. (2005). Regional Management Centers in the Asia-Pacific. *Management International Review*, v. 45, n. 1, p. 59-82.

ERNST, Dieter; KIM, Linsu (2002). Global Production Networks, Knowledge Diffusion, and Local Capability Formation. *Research Policy*, v. 31, n. 8-9, p. 1417-1429.

EUROPEAN CHAMBER OF COMMERCE IN CHINA. 2011. Asia-Pacific Headquarters Study. 2016. Disponível em: http://www.europeanchamber.com.cn/documents/signup/en/pdf/26. Acesso em: Aug. 8, 2016.

FRANK, André G. (1969). *Latin America*: Underdevelopment or Revolution: Essays on the Development of Underdevelopment and the Immediate Enemy. New York: Monthly Review Press.

FRIEDMANN, John (1986). The World City Hypothesis. *Development and Change*, v. 17, n. 1, p. 69-83.

FRIEDMANN, John; WOLFF, Goetz (1982). World City Formation: An Agenda for Research and Action. *International Journal of Urban and Regional Research*, v. 6, n. 3, p. 309-344.

GEREFFI, Gary (1994). The Organization of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks'. In: GEREFFI, Gary; KORZENIEWICZ, Miguel (Ed.). *Commodity Chains and Global Capitalism*. London: Praeger. p. 95-122.

GEREFFI, Gary (1995). Global Production Systems and Third World Development. In: STALLINGS, Barbara (Ed.). *Global Change, Regional Response*: The New International Context of Development. Cambridge: Cambridge University Press. p. 100-142.

GEREFFI, Garry (1996). Global Commodity Chains: New Forms of Coordination and Control among Nations and Firms in International Industries. *Competition & Change*, v. 1, n. 4, p. 427-439.

GEREFFI, Gary; HUMPHREY, John; STURGEON, Timothy (2005). The Governance of Global Value Chains. *Review of International Political Economy*, v. 12, n. 1, p. 78-104.

GEREFFI, Gary; KORZENIEWICZ, Miguel (1994). *Commodity Chains and Global Capitalism*. London: Praeger.

GEREFFI, Gary; KORZENIEWICZ, Miguel; KORZENIEWICZ, Roberto P. (1994). Introduction: Global Commodity Chains. GEREFFI, Gary; KORZENIEWICZ, Miguel (1994). *Commodity Chains and Global Capitalism*. London: Praeger. p. 1-14.

GRANT, Richard; Jan NIJMAN (2002). Globalization and the Corporate Geography of Cities in the Less-Developed World. *Annals of the Association of American Geographers*, v. 92, n. 2, p. 320-340.

GRUBESIC, Tony H.; MATISZIW, Timothy C. (2012). World Cities and Airline Networks. In: DERUDDER, Ben et al. (Ed.). *International Handbook of Globalization and World Cities*. Cheltenham: Edward Elgar. p. 97-116.

GWYNNE, Robert N. (2006). Governance and the Wine Commodity Chain: Upstream and Downstream Strategies in New Zealand and Chilean Wine Firms. *Asia Pacific Viewpoint*, v. 47, n. 3, p. 381-395.

HENDERSON, Jeffrey et al. (2002). Global Production Networks and the Analysis of Economic Development. *Review of International Political Economy*, v. 9, n. 3, p. 436-464.

HESSE, Markus (2010). Cities, Material Flows and the Geography of Spatial Interaction: Urban Places in the System of Chains. In: DERUDDER, Ben; WITLOX, Frank (Ed.). *Commodity Chains and World Cities*. Oxford: Wiley-Blackwell. p. 91-110.

HOPKINS, Terence K.; WALLERSTEIN, Immanuel (1986). Commodity Chains in the World-Economy Prior to 1800. *Review*, v. 10, n. 1, p. 157-170.

HUMPHREY, John (2003). Globalization and Supply Chain Networks: The Auto Industry in Brazil and India. *Global Networks*, v. 3, n. 2, p. 121-141.

HUMPHREY, John; SCHMITZ, Hubert (2001). Governance in Global Value Chains. *IDS Bulletin*, v. 32, n. 3.

INTERNATIONAL ENERGY AGENCY (2016). *Statistics*. Disponível em: https://www.iea.org/statistics/statisticssearch. Acesso em: Aug. 22, 2016.

JACOBS, Wouter et al. (2010). Integrating World Cities into Production Networks: The Case of Port Cities. In: DERUDDER, Ben; WITLOX, Frank (Ed.). *Commodity Chains and World Cities*. Oxford: Wiley-Blackwell. p. 111-135.

KANNA, A. (2007). Dubai in a Jagged World. *Middle East Report*, v. 243, p. 23-29.

KAPLINSKY, Raphael (2000). Globalisation and Unequalisation: What can be Learned From Value Chain Analysis?. *Journal of Development Studies*, v. 37, n. 2, p. 117-146.

KNOX, Paul L. (1997). Globalization and Urban Economic Change. *Annals of the American Academy of Political and Social Science*, n. 551, p. 17-27.

KNOX, Paul L.; TAYLOR, Peter J. (1995). *World Cities in a World-System*. Cambridge: Cambridge University Press.

KRÄTKE, Stefan (2014). How Manufacturing Industries Connect Cities Across the World: Extending Research on "Multiple Globalizations". *Global Networks*, v. 14, n. 2, p. 121-147.

LAUDIEN, Sven M.; FREILING, Jörg (2011). Direktinvestive internationale Unternehmenstätigkeit und das GLOCAL-Dilemma: Die koordinative Rolle von Regional Headquarters. *Zeitschrift für Management*, v. 6, n. 4, p. 351-372.

MAILLAT, Denis (1991). The Innovation Process and the Role of the Milieu. In: BERGMAN, Edward; MAIER, Gunther; TÖDTLING, Franz. (Ed.). *Regions Reconsidered: Economic Networks, Innovation, and Local Development in Industrialized Countries*. London: Mansell. p. 103-117.

MARTINUS, Kirsten et al. (2015). Strategic Globalizing Centers and Sub-Network Geometries: A Social Network Analysis of Multi-Scalar Energy Networks. *Geoforum*, n. 64, p. 78-89.

MARTINUS, Kirsten; TONTS, Matthew (2015). Powering the World City System: Energy Industry Networks and Interurban Connectivity. *Environment and Planning A*, v. 47, n. 7, p. 1502-1520.

MEYER, Susanne; REVILLA DIEZ, Javier (2014). One Country, Two Systems: How Regional Institutions Shape Governance Modes in the Greater Pearl River Delta, China. *Papers in Regional Science*, v. 94, n. 4, p. 891-900.

MEYER, Susanne; SCHILLER, Daniel; REVILLA DIEZ, Javier (2012). The Localization of Electronics Manufacturing in the Greater Pearl River Delta, China: Do Global Implants Put Down Local Roots?. *Applied Geography*, v. 32, p. 1, p. 119-129.

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO (2012). Estratégia Nacional de Ciência, Tecnologia e Inovação 2012–2015: Balanço das Atividades Estruturantes – 2011. Disponível em: http://www.mct.gov.br/upd_blob/0218/218981.pdf. Acesso em: Aug. 3, 2016.

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO (2013). Estudo de Projetos de Alta Complexidade: Indicadores de Parques Tecnológicos. Disponível em: http://www.mct.gov.br/upd_blob/0228/228606.pdf. Acesso em: Aug. 3, 2016.

NIJMAN, Jan (2007). Place-Particularity and "Deep Analogies": A Comparative Essay on Miami's Rise as a World City. *Urban Geography*, v. 28, n. 1, p. 92-107.

NOTTEBOOM, Theo E.; RODRIGUE, Jean P. (2005). Port Regionalization: Towards a New Phase in Port Development. *Maritime Policy and Management*, v. 32, n. 3, p. 297-313.

PARNREITER, Christof (2010). Global Cities in Global Commodity Chains: Exploring the Role of Mexico City in the Geography of Global Economic Governance'. In: DERUDDER, Ben; WITLOX, Frank. (Ed.). *Commodity Chains and World Cities*. Oxford: Wiley-Blackwell. p. 43-64.

PARNREITER, Christof (2014). Network or Hierarchical Relations?: A Plea for Redirecting Attention to the Control Functions of Global Cities. *Tijdschrift voor Economische en Sociale Geografie*, v. 105, n. 4, p. 398-411.

PARNREITER, Christof (2015). Managing and Governing Commodity Chains: The Role of Producer Service Firms in the Secondary Global City of Hamburg. *Die Erde*, v. 46, n. 1, p. 1-15.

PARNREITER, Christof; HAFERBURG, Christoph; OßENBRÜGGE, Jürgen (2013). Shifting Corporate Geographies in Global Cities of the South: Mexico City and Johannesburg as Case Studies. *Die Erde*, v. 144, n. 1, p. 1-16.

POON, Jessie P. (2000). Reconfiguring Regional Hierarchy through Regional Offices in Singapore'. In: ANDERSSON, Ake A.; ANDERSSON, David E. (Ed.). *Gateways to the Global Economy*. Chelthenham: Elgar. p. 190-206.

RIMMER, Peter J. (1999). The Asia-Pacific Rim's Transport and Telecommunications Systems: Spatial Structure and Corporate Control since the Mid-1980s. *GeoJournal*, v. 48, n. 1, p. 43-65.

RABACH, Eileen; KIM, Eun M. (1994). Where is the Chain in Commodity Chains?: The Service Sector Nexus. In: GEREFFI, Gary; KORZENIEWICZ, Miguel (Ed.). *Commodity Chains and Global Capitalism.* London: Praeger. p. 123-143.

RASIAH, Rajah (2009). Expansion and Slowdown in Southeast Asian Electronics Manufacturing. *Journal of the Asia Pacific Economy*, v. 14, n. 2, p. 123-137.

RIBEIRO, Cássio G.; FURTADO, André T. (2014). Government Procurement Policy in Developing Countries: The Case of Petrobras. *Science Technology & Society*, v. 19, n. 2, p. 161-197.

ROBINSON, Ross (2002). Ports as Elements in Value-Driven Chain Systems: The New Paradigm. *Maritime Policy and Management*, v. 29, n. 3, p. 241-255.

ROSSI, Eliana C.; BEAVERSTOCK, Jonothan V.; TAYLOR, Peter J. (2007). Transaction Links through Cities: "Decision Cities" and "Service Cities". *Geoforum*, v. 38, p. 628-642.

ROSSI, Eliana C.; TAYLOR, Peter J. (2005). Banking Networks across Brazilian Cities: Interlocking Cities Within and Beyond Brazil. *Cities*, v. 22, n. 5, p. 381-393.

ROY, Jacques (2016). By Road, Rail, Sea and Air: The Role of Transportation Networks in Moving Canada's Merchandise Trade. In: TAPP, Stephen et al. (Ed.). *Redesigning Canadian Trade Policies for New Global Realities*. Institute for Research on Public Policy. p. 435-464.

RUGMAN, Alan M.; VERBEKE, Alain (2005). Towards a Theory of Regional Multinationals: A Transaction Cost Economics Approach. *Management International Review*, v. 45, n. 1, p. 5-17.

SANTOS, Angela M. (2002). *Reestruturação da indústria automobilística na América do Sul*. Disponível em: https://web.bndes.gov.br/bib/jspui/handle/1408/4381. Acesso em: Nov. 2, 2016.

SASSEN, Saskia (2001a). *The Global City*. Princeton: Princeton University Press.

SASSEN, Saskia (2001b). Cities in the Global Economy. In: PADDISON, Ronan (Ed.). *Handbook of Urban Studies*. London: Sage. p. 256-272.

SCHIFFER, Sueli (2002). São Paulo: Articulating a Cross-Border Region. In: SASSEN, Saskia (Ed.). *Global Networks*: Linked Cities. London: Routledge. p. 209-236.

SCHOLVIN, Sören; MALAMUD, Andrés (2014). Is There a Geoeconomic Node in South America?: Geography, Politics and Brazil's Role in Regional Economic Integration. *ICS Working Paper*, 2.

SCHOLVIN, Sören; WRANA, Jöran (2015). From the Cape to Cairo?: The Potential of the Tripartite Free Trade Area. *SAIIA Occasional Paper*, 221.

SCHOLVIN, Sören (2017). Cape Town as a Gateway City: Interlinking the Sub-Saharan Oil and Gas Sector Globally'. In: PISANI, André du et al. (Ed.). *Monitoring Regional Integration in Southern Africa 2015/2016*. Stellenbosch: TRALAC [forthcoming].

SHORT, John R. et al. (2000). From World Cities to Gateway Cities: Extending the Boundaries of Globalization Theory. *City*, v. 4, n. 3, p. 317-340.

SIGLER, Thomas J. (2013). Relational Cities: Doha, Panama City, and Dubai as 21st Century Entrepôts. *Urban Geography*, v. 34, n. 5, p. 612-633.

SMITH, Richard G. (2014). Beyond the Global City Concept and the Myth of "Command and Control". *International Journal of Urban and Regional Research*, v. 38, n. 1, p. 98-115.

STORPER, Michael (1995). The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies. *European Urban and Regional* Studies, v. 2, n. 3, p. 191-221.

STORPER, Michael (1997). *The Regional World*. New York: Guilford.

SURBORG, Björn (2011). World Cities are just "Basing Points for Capital": Interacting with the World City from the Global South. *Urban Forum*, v. 22, n. 4, p. 315-330.

TAYLOR, Peter J. et al. (2002a). Measurement of the World City Network. *Urban Studies*, v. 39, n. 13, p. 2367-2376.

TAYLOR, Peter J. et al. (2002b). Exploratory Analysis of the World City Network. *Urban Studies*, v. 39, n. 13, p. 2377-2394.

TAYLOR, Peter J. et al. (2002c). Diversity and Power in the World City Network. *Cities*, v. 19, n. 4, p. 231-241.

THOMPSON, Edmund R. (2000). Asia-Pacific Gateway Regions: Hong Kong as a Regional Strategic Hub for Manufacturing Multinationals. In: ANDERSSON, Ake A.; ANDERSSON, David E. (Ed.). *Gateways to the Global Economy.* Chelthenham: Elgar. p. 169-189.

TÖDTLING, Franz; LEHNER, Patrick; TRIPPL, Michaela (2006). Innovation in Knowledge Intensive Industries: The Nature and Geography of Knowledge Links. *European Planning Studies*, v. 14, n. 8, p. 1035-1058.

TRIBE, Michael (2002). An Overview of Manufacturing Development in Sub-Saharan Africa. In: BELSHAW, Deryke; LIVINGSTONE, Ian. (Ed.). *Renewing Development in Sub-Saharan Africa: Policy, Performance and Prospects.* London: Routledge. p. 263-284.

VIND, Ingeborg; FOLD, Niels (2007). Multi-level Modularity vs. Hierarchy: Global Production Networks in Singapore's Electronics Industry. *Geografisk Tidsskrift*, v. 107, n. 1, p. 69-83.

WALL, Ronald S.; KNAAP, Bert van der (2011). Sectoral Differentiation and Network Structure within Contemporary Worldwide Corporate Networks. *Economic Geography*, v. 87, n. 3, p. 267-308.

WALL, Ronald S.; KNAAP, Bert van der (2012). Centrality, Hierarchy and Heterarchy of Worldwide Corporate Networks. In: DERUDDER, Ben et al. (Ed.). *International Handbook of Globalization and World Cities*. Cheltenham: Edward Elgar. p. 209-229.

WANG, James J.; CHENG, Michael C. (2010). From a Hub Port City to a Global Supply Chain Management Center: A Case Study of Hong Kong. *Journal of Transport Geography*, v. 18, n. 1, p. 104-115.

WORLD BANK (2009). World Development Report: Reshaping Economic Geography. Disponível em: http://documents.worldbank.org/curated/en/

730971468139804495/pdf/437380REVISED01BLIC1097808213760720.pdf. Acesso em: Sept. 6, 2016.

WORLD BANK (2016). Is a “Factory Southern Africa” Feasible?: Harnessing Flying Geese to the South African Gateway. Disponível em: http://documents.worldbank.org/curated/en/659061467991969493/pdf/102983-WP-P149486-Box394848B-PUBLIC-Draper-et-al-Factory-SA-Framework.pdf. Acesso em: Aug. 30, 2016.