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# Filtering strategic coupling: territorial intermediaries in oil and gas global production networks in Southeast Asia

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## Abstract

The Global Production Network (GPN) approach has not yet considered the importance of territorial intermediaries for strategic coupling. This article demonstrates how the prospects of strategic coupling for the case of Vietnam and Indonesia with the oil and gas GPN are affected by the gateway role of Singapore. Based on interviews, the analysis reveals how Singapore influences regional economic development along the GPN through different filtering mechanisms, limiting the potential for strategic coupling for Vietnam and Indonesia. For GPN research, the identified filtering mechanisms illustrate how the territoriality of GPNs contributes to differentiated territorial outcomes. The findings therefore indicate the need to intensify the appreciation of the particular territorial configuration of GPNs as this yields considerable explanatory power for understanding the unequal contours of the global economy.

**Keywords:** Global production networks, gateway cities, oil and gas, Southeast Asia, territoriality, strategic coupling

**Jel classifications:** Q32, F23, O19

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## 1. Introduction

The integration of diverse regions around the globe into circuits of global production has taken place indirectly via certain cities that bundle, channel and coordinate material and immaterial flows (e.g. Kleibert, 2015; Phelps et al., 2015; van Grunsven and Hutchinson, 2016; Atienza et al., forthcoming). Curiously, the Global Production Network (GPN) framework (Henderson et al., 2002; Coe et al., 2004; Coe et al., 2008; Coe and Yeung, 2015), a key approach in Economic Geography, has not paid sufficient attention to this characteristic territorial configuration of production networks in order to address its central concern, which is explaining ‘economic development in an interconnected world’ (Coe and Yeung, 2015, p. 167). Even in recent advancements of the GPN framework, termed as ‘GPN 2.0’, the role of cities in contemporary global production is not taken explicitly into consideration. While Coe and Yeung (2015, pp. 186–187) derive a helpful typology of key regional strategic coupling types, which includes logistics hubs and global cities among others, these types are not placed into the wider context of other locations in the same production network. In other words,

<sup>1</sup> the GPN approach has so far said little about the intermediary role of certain cities and their influence on differentiated territorial outcomes. We agree with Phelps (2017, p. 218) that '[it] is important to retain an appreciation of the territoriality of business participation [...] since place in some way or other mediates the international relations that constitute GPNs'.

In this article, we pursue this claim for a greater appreciation of the territoriality of GPNs by focusing on the above-mentioned gateway role of certain cities in GPNs. Gateway cities are defined as places from which the articulation of production and consumption sites across the nation and/or macro-region into GPNs is enabled. These cities thus represent focal points for the strategic coupling of other regions (Parnreiter, 2010; Scholvin, 2017). We argue in this article that gateway cities constitute a crucial territorial component that explains why 'the strategic coupling process is not automatic and always successful' (Yeung, 2015, p. 6). Based on a case study on Vietnam and Indonesia in the oil and gas (O&G) GPN, we elaborate how the indirect integration of regions via gateways influences the prospects of strategic coupling. The analysis reveals that Singapore's gateway role exerts a filtering effect on the territorial outcomes in both resource-holding countries. The case study thereby not only highlights the importance of territorial intermediaries in GPNs, but, more importantly, also points to the need to consider the particular territorial configuration of GPNs in order to understand why many regions are not able to reap the benefits associated with the coupling with GPNs. By identifying three filtering mechanisms, the present article shows how the territoriality of GPNs may contribute to differentiated GPN outcomes. It thereby deepens the understanding of the territoriality of GPNs. Moreover, by bringing gateway cities into the GPN literature as a territorialized notion of intermediaries, the article shifts attention from exploring successful cases of coupling (e.g. Yeung, 2016) to seeking to 'acknowledge and understand the close relationship between dark and bright sides and what analysis of one brings to the other' (Phelps et al., 2017, p. 237).

In the following section, we review the literature on the strategic coupling of regions and their implications for economic development. In a next step, we extend this body of literature by introducing the gateway city concept into the GPN framework. In the next section, the case studies are presented and the research methodology is explained. The main part of the article consists of two steps. First, the nature of the strategic coupling process between the O&G GPN and Vietnam and Indonesia is analysed. Second, the relationships between the limited prospects of coupling for the two resource-rich countries and Singapore's role as a gateway in the GPN are revealed and discussed. In conclusion, we summarize the main findings of the article and consider their conceptual value for the GPN framework.

## 2. Strategic coupling and regional economic development

The GPN approach has been developed since the early 2000s as a broad relational framework that allows the study of the increasingly complex organizational and geographical configuration of contemporary global production for the ultimate purpose of analysing the developmental impact on territories that are articulated in these networks (Henderson et al., 2002; Coe et al., 2004, 2008). It focuses on the interconnected actions of firms and institutions through which production processes are realized, while at the same time taking into consideration that these actions and

actors are embedded in specific territories (Coe et al., 2008). Thus, it provides a multi-actor and multi-scalar framework which possesses a geographically sensitive perspective, unlike related concepts (Global Commodity Chains, Global Value Chains).

The notion of strategic coupling constitutes a central concept within the wider GPN framework (Coe et al., 2004; Yeung, 2009). It describes the interaction 'between regional economies and global production networks that is mediated through specific action and practices of key actors and institutions' (Coe et al., 2004, p. 482). From this perspective, the proponents of the GPN framework understand regional economic development as the outcome of the interaction between regional and global dynamics. The coupling process only occurs when regional assets complement the strategic needs of companies operating in GPNs (Coe et al., 2004; Coe and Hess, 2011). In this context, the role of regional institutions is to promote and transform the regional assets according to the strategic needs of the multinational enterprises (MNEs) and to bargain with MNEs in order to promote the territorial embeddedness of the GPN in the particular region (Yang et al., 2009; Coe and Hess, 2011).

These elements influence how regions are coupled with GPNs. The wide spectrum of ways in which regional economies couple with GPNs is reflected in the conceptualization of different modes (indigenous, functional and structural) (Yeung, 2009) and types of strategic coupling (e.g. global cities, market regions, commodity source regions) (Coe and Yeung, 2015) and indicates that the integration into GPNs does not guarantee positive developmental outcomes and does not necessarily maximize a region's economic potential. While MNEs might enter into commodity source regions to exploit natural resources, this coupling is not necessarily accompanied by additional functions beyond this single strategic need. Instead, MNEs can strategically balance their various activities across multiple locations according to the required regional assets (Rugman et al., 2011). Negative consequences have been subsumed under the term the 'dark sides' of strategic coupling and encompass ruptures and frictions between the GPN and the region as well as within the region (Coe and Hess, 2011; MacKinnon, 2011, 2013). Nonetheless, the GPN approach has frequently been criticized for downplaying unfavourable outcomes of the coupling process for regional development (Dawley, 2011; MacKinnon, 2011, 2013; Werner, 2016; Phelps et al., 2017). In this context, Kleibert's work (2015) has contributed to a more critical appraisal of how regions are integrated into GPNs and the resulting regional development opportunities. By combining the GPN literature with insights from the branch-plant literature, Kleibert developed a list of indicators for assessing coupling processes. This analytical framework includes among other things the nature of activities, network position, linkages and fixed investments. The nature of activities refers to the degree of sophistication of functions. A firm's network position in a GPN along a spectrum ranging from a peripheral (e.g. local representative office) to a nodal position (e.g. regional headquarters) is closely linked with the control exercised. Local linkages, in the form of forward and backward production linkages, are one expression of the territorial embeddedness of a GPN and represent a crucial mechanism that contributes to the degree of value creation in the host region (e.g. Morris et al., 2012; Narula, 2018). Moreover, fixed investments, such as the establishment of capital-intensive processing plants, constitute an important factor that influences the degree of spatial flexibility and thus also the temporality of the strategic coupling process (Clark and Wrigley, 1995).

An important component that affects how regions are integrated into GPNs and the consequent regional development opportunities is implicitly revealed in various studies on different GPNs (Meyer et al., 2009; Kleibert, 2015; Phelps et al., 2015; van Grunsven



and Hutchinson, 2016; Atienza et al., forthcoming). These studies show that the integration of diverse regions into GPNs does not occur directly. Instead an 'intermediate step' is taken via certain cities from which these regions become articulated with GPNs (Breul and Revilla Diez, 2018). For instance, two studies on the mining industry in Chile (Phelps et al., 2015; Atienza et al., forthcoming) reveal that most mining services are concentrated in Santiago from where the integration of the commodity source regions, such as Antofagasta, is organized. The commodity source regions themselves only host ancillary services. In her study on the offshore service GPN in the Philippines, Kleibert (2015) identifies Metro Manila as a gateway, connecting second-tier cities to the GPN. The division of labour between these cities is clear-cut. The offices in Metro Manila are responsible for higher value-added services and possess decision-making power for operations in second-tier cities like Baguio. A study by van Grunsven and Hutchinson (2016) about the evolution of the electrical and electronics industry in Johor (Malaysia) shows that Singapore serves as a gateway for the integration of Johor into this particular GPN as an assembly platform. A depiction of the evolution reveals that the nature of the coupling of Johor depends on Singapore's coupling objectives. In sum, these insights show, first, that the strategic coupling of diverse regions with distinct GPNs takes place via a certain city that bundles, channels and coordinates material and immaterial flows. Second, it suggests that these cities affect the prospects of the strategic coupling process in the regions they integrate.

While recent advances of the GPN approach have integrated intermediary actors such as financial intermediaries or logistics providers into the framework as a missing link (Coe and Yeung, 2015), the importance of territorial intermediaries as depicted in the aforementioned empirical studies has not yet been addressed. In general, little attention has been paid to the role of cities as nodes in contemporary global production in the GPN framework. This is reflected, for instance, by the absence of city-related concepts from Economic Geography such as world cities or global cities in the subject index in Coe and Yeung's 'Global Production Networks'. Even though Coe and Yeung (2015, pp. 186–187) derive a useful typology of key regional strategic coupling types, which also encompasses logistics hubs and global cities, these types are not set into the wider context of other locations. In other words, the intermediary role of certain cities and their influence on differentiated territorial outcomes in other locales of the GPN has so far been neglected in the GPN framework. The gateway city concept helps to fill this gap.

## 2.1 Gateway cities in GPNs

The idea of gateway cities dates back to Burghardt (1971). He defines gateway cities as 'an entrance into (and necessarily an exit out of) some area' (1971, p. 269). Gateway cities are situated in the contact zone between regions with varying levels of sophistication as regards regional assets and institutions (Burghardt, 1971; Meyer et al., 2009). Especially in a Global South context, these cities serve as 'islands of relative prosperity' (Scott, 2012, p. 61), highlighting the disparities between them and their surrounding regions that are characterized by difficulties in conducting business. Gateway cities thus provide the necessary proximity to the operation, while their regional assets meet the strategic needs of the GPN more appropriately compared to the actual region of interest.

Burghardt's notion of gateway cities has been taken up by world city researchers to refer to cities from which MNEs integrate economic activities in the national and/or

macro-regional economies into GPNs. Rossi et al. (2007), for instance, explore via which cities economic activities in Brazil become globally interlinked. For this purpose, the authors map the transaction links between producer services and the locations of their clients' headquarters. Efforts to identify synergies between the study of world cities and GPN research (e.g. Brown et al., 2010; Derudder and Witlox, 2010; Parnreiter, 2010) follow Rossi et al. (2007) and conceptualize world cities as strategic nodes in GPNs, due to their importance for the provision of producer services. Parnreiter (2010, p. 50), for example, reveals that Mexico City 'is a place from where the articulation of peripheral labour processes in Ciudad Juárez and other Mexican cities that serve as export platforms is made possible through service inputs'.

While this understanding already provides a helpful analytical lens to study the intermediary role of cities in GPNs, the focus on producer services has been criticized as being too narrow (Robinson, 2002; Coe et al., 2010; Vind and Fold, 2010; Krätke, 2014). Beyond the provision of producer services, other essential functions exist in GPNs which create gateway cities in the spatial configuration of global production processes and contribute to the articulation of production and consumption sites across the nation and/or macro-region (ESPON, 2013; Ducruet et al., 2014). In order to take into account a broader, functionally more open perspective on the integration function of particular cities, this article follows an understanding suggested by Scholvin et al. (2017), who conceptualize gateway cities on the basis of five functions: transport, industrial processing, corporate control, service provision and knowledge generation.

These functions do not characterize a spatial 'container', but represent 'the intended and unintended outcome of a wide range of relational networks constituted and governed by diverse actors and institutions' (Coe et al., 2010, p. 143). Gateway cities are thus the product of the strategies pursued by MNEs and regional institutions. Transferred to Coe and Yeung's (2015, pp. 67–74) understanding of territoriality, gateway cities can be defined along a vertical and a horizontal dimension. With regard to the vertical dimension, that is the vertical scales of GPN organization, a gateway city is positioned between the global scale and the national and/or macro-regional scale (see also Sigler, 2013). It therefore constitutes a component (e.g. regional headquarters, logistical distribution hub) in the organization of a GPN, which connects two otherwise unconnected scales. At the same time, the particular function in the GPN that bridges the two different scales must 'touch down' at the territorial interface (horizontal dimension). Here developmental outcomes of the value activity materialize, e.g. in the form of spillovers and the creation of industry clusters (e.g. Phelps et al., 2015).

While some scholars expect positive effects for regions as a result of their connectivity to gateway cities with 'developmental impulses flow[ing] outward from them into their surrounding territorial dependencies' (Scott, 2012, p. 62), the aforementioned empirical studies on various global industries (Atienza et al., forthcoming; Kleibert, 2015; Meyer et al., 2009; Phelps et al., 2015; van Grunsven and Hutchinson, 2016) suggest that the integration via gateway cities may instead adversely affect the prospects of strategic coupling. We argue that gateway cities exert a filtering<sup>1</sup> effect on the prospects of

<sup>1</sup> The use of filtering in this article does not refer to the 'filtering-down' theory introduced by Thompson (1968). Studies that build on this theory apply the term filtering to describe the decentralization of economic activities. In contrast, in this article, the filtering function of gateway cities describes the spatial concentration of sophisticated economic activities to the detriment of the actual regions of interest.

<sup>1</sup> strategic coupling for the regions that become globally interlinked by them on the basis of the following three mechanisms.

First, compared to the actual region of interest, gateway cities provide GPN actors with more appropriate regional assets because, as per definition, ‘Gateway cities often develop in the contact zones between areas of differing intensities or types of production’ (Burghardt, 1971, p. 270). The presence of a gateway city permits proximity to the actual region of interest and at the same time offers a more frictionless production environment (Scholvin et al., 2017). The availability of regional assets that meet the strategic needs of the GPN actors in proximity to the actual region of interest reduces the necessity and willingness of MNEs to embed operations in the latter region by investing in the creation of an efficient local production environment in the host region. Andersson (2000, p. 16), for instance, explains that the ‘economies of scale that have already been achieved and the accessibility advantages that have developed over long periods of investment in the transport and communication infrastructures have brought [gateway cities] lasting locational advantages’. Thus, while the strategic coupling process via regional assets such as attractive markets or natural resources holds the potential to embed the operations of MNEs and trigger the emergence of industrial clusters [e.g. by means of follow-sourcing strategies (Hassler, 2011)], the presence of a gateway city enables MNEs to reach these regional assets without depending on the local production environment of the actual regions of interest. The prospects of the strategic coupling are likely to unfold at least to some extent in the gateway city.

Second, while highly entangled with the endowment of regional assets, regional institutions can initiate an additional filtering process. Regional institutions in the gateway city may not only expand but also mobilize regional assets to bargain with MNEs aiming to strengthen the territorial embeddedness of the GPN in the gateway city. The greater complementarity of these region-specific assets with the strategic needs of the GPN puts the regional institutions in the gateway city in a powerful bargaining position (Coe and Hess, 2011). These influences may be expected to contribute to the filtering of certain activities, thereby driving prospects of the coupling process away from the actual region of interest. Thus, the prospects of the strategic coupling process between the actual regions of interest (e.g. commodity source regions, assembly platforms or market regions) and GPNs does not simply depend on the quality of their own regional institutions and assets, but also hinge to a certain extent on the objectives of the gateway city. The study by van Grunsven and Hutchinson (2016) on Johor’s integration into the electrical and electronics GPN, for instance, suggests that the prospects of the coupling process in Johor are closely intertwined with Singapore’s coupling objectives.

Third, while regional assets and institutions can significantly affect how a strategic coupling process takes place in another region, it is ultimately firm strategies that decide whether this process will materialize (Coe and Yeung, 2015). In order to understand firm strategies, it is important to perceive MNEs not as monolithic organizations in GPNs, but as heterogeneous organizational entities that belong to a trans-territorial network (Fuller and Phelps, 2018). The existence of a business unit that has been established for the purpose of serving other regions in the nation and/or macro-region (e.g. regional headquarters, logistic hubs) affects the prospects of upgrading for other corporate units situated in this geographical sphere of influence, among other things through the sunk costs of past investments (Clark and Wrigley, 1995), increasing



internal economies of scale, and the territorialized dynamic capabilities required to fulfil a particular role in the GPN (Fuller and Phelps, 2018). Phelps and Fuller (2000) demonstrate that intra-corporate competition for reinvestments may represent a constraint for the upgrading of other affiliates positioned at a peripheral position in the division of labour.

Taking these three filtering mechanisms (regional assets as a filter, institutional and corporate filter processes) into account, the potential of strategic coupling can be expected to be closely connected to the dynamic relationship to the gateway city. Our empirical analysis sheds light on this relationship.

### 3. A case study of Vietnam and Indonesia in the oil and gas GPN

In this study, we elaborate how the indirect integration of regions via gateway cities influences the prospects of strategic coupling for the case of the O&G GPN. The O&G GPN provides a relevant case study for two reasons. First, while natural resources are 'landed' in nature (Dicken, 2011) and, therefore, scattered across remote places, extractive GPNs bundle their activities in central city-nodes outside the commodity source regions from where they integrate the latter (e.g. Phelps et al., 2015; Scholvin, 2017; Atienza et al., forthcoming). These complex interactions between the actual regions of interest and the regions where the GPN actors concentrate their investments and functions make the O&G GPN an illustrative case.

Second, the integration into extractive GPNs is 'central to the national/regional development imaginaries' (Bridge, 2008, p. 390) of a diverse range of territories across the globe. Benefits from the coupling process largely depend on the degree of territorial embeddedness of the extractive GPN in the host region (Hirschman, 1981; Morris et al., 2012; Kaplinsky and Morris, 2016; Ovadia, 2016; Narula, 2018). Some scholars argue that current changes in the configuration of extractive GPNs have opened up new opportunities for the greater participation of host economies (Morris et al., 2012). These changes include lead firms in the extractive sector outsourcing non-core activities to specialized contractors (Bridge, 2008; Molina et al., 2016) and an increasing preference for having these suppliers close to the operations (Morris et al., 2012). However, despite these changes, the prospects of coupling with extractive GPNs remain limited in the majority of cases (Narula, 2018). Studies from diverse commodity source regions, such as the Chilean Antofagasta region (Arias et al., 2014; Atienza et al., forthcoming), the Zambian Copperbelt (Kragelund and Carmody, 2016) or Pilbara in Australia (MacKinnon, 2013), reveal that their coupling with extractive GPNs has only produced very limited local linkages and spillovers. The few existing local linkages are limited to generic, ancillary services. It is crucial to understand why these optimistic expectations associated with the integration into extractive GPNs largely fail to materialize.

Vietnam and Indonesia serve as adequate case-study regions for three reasons. First, both countries serve as commodity source regions in the O&G GPN. Second, the O&G industry is a central component of the national developmental imaginaries of both countries. Third, Vietnam's and Indonesia's articulation with the O&G GPN are characterized by an 'intermediate step' via Singapore.

Vietnam has been 'plugged in' the O&G GPN since the 1980s as a result of the foundation of the Russian–Vietnamese-owned exploration and production (E&P)



company Vietsovpetro. The Doi Moi reforms implemented since 1986 as a move towards a market-oriented economy, together with the lifting of the post-war trade embargo by the USA and most European countries in 1994, contributed to the stronger integration of Vietnam into the O&G GPN. The country holds 4.4 billion barrels of proven oil reserves and 21.6 trillion cubic feet of gas reserves. It produces 365,000 barrels per day and 10.2 billion cubic feet of gas (Energy Key Facts, 2015). Prior to the drop in the price of crude oil in 2014, about one-quarter of Vietnam's gross domestic product (GDP) was generated by the national oil company PetroVietnam (Le Trung et al., 2016). Nearly 30% of incoming Foreign Direct investments (FDI) to Vietnam between 2003 and 2016 took place in the coal, oil and natural gas sector (fDi Markets, 2016).

Indonesia has been integrated into the O&G GPN since the first commercial oil discovery in 1885. It holds 102 trillion cubic feet of gas reserves and 3.7 billion barrels of proven oil reserves. In terms of production, the country is among the world's top-20 oil producers and ranks 10th in world gas production. E&P is dominated by foreign lead firms such as Chevron or Total (PwC, 2017). Although not as dominant as in former decades, revenues from O&G-relevant activities still account for one-fifth of Indonesia's budget revenue (Dutu, 2016). The dominance of the O&G industry for Indonesia's articulation with the global economy is reflected in its share of incoming FDI. About 30% of the total incoming FDI from 2003 until 2016 was directed towards the coal, oil and natural gas sector (fDi Markets, 2016).

Insights from previous research (Breul and Revilla Diez, 2017, 2018; Revilla Diez et al., 2018) have shown that lead firms in the O&G GPN and their strategic partners use Singapore as a gateway to access markets and natural resources in other Southeast Asian economies. Quantitative insights into the destination of material linkages to Vietnam and Indonesia support this finding. The total imports of products associated with upstream- and downstream-related linkages to Indonesia and Vietnam with the amount sourced from Singapore has been compared in Table 1. The large share of imports from Singapore for all the products listed in the last column reflects the relative importance of Singapore for Indonesia and Vietnam in the O&G GPN. While the role of Singapore in global production circuits and its relevance as a gateway for the macro-region has been explored in various studies (e.g. Poon, 2000; Yeung et al., 2001; Olds and Yeung, 2004; Bastide, 2011), its role as a gateway in an industry where the actual resources of interest are territorially tied to their geological occurrence has not been the subject of any of these studies. Despite Singapore's lack of its own hydrocarbon resources, the O&G GPN has bundled activities there, aiming to serve the resource-rich surrounding Southeast Asian countries. In 2015, the O&G equipment and service sector in Singapore generated an output of 5.13 billion US dollars (Economic Development Board, 2018b), which illustrates the extent of backward linkages. In addition, since the 1960s Singapore has developed into an oil-refining and petrochemical hub for the region (Ng, 2012). The energy and chemical industry accounted for 81 billion US Dollars in 2015 (Economic Development Board, 2018a). When many of the benefits linked to the coupling with extractive GPNs materialize in Singapore, instead of in the actual regions of interest, it casts doubt on the success of the strategic coupling for the two resource-rich countries.

To study the strategic coupling of Indonesia and Vietnam as well as its interdependencies with Singapore, 56 semi-structured interviews were conducted from September 2016 until June 2017 in Singapore, Indonesia (Jakarta, Balikpapan) and

**Table 1.** Role of Singapore for imports of selected goods to Indonesia and Vietnam, 2009–2015

Products	Total imports in mn US Dollars	Imports from Singapore in mn US Dollars	Share of Imports from Singapore (%)
<b>Floating, submersible drilling or production platform</b>			
Indonesia	498.64	337.15	68
Vietnam <sup>a</sup>	762.35	428.35	56
<b>Refined Petroleum</b>			
Indonesia	149,300	80,310	54
Vietnam	51,830	18,980	37
<b>Lubricating oil additives with petroleum, bitumen oil</b>			
Indonesia	1118	485	43
Vietnam	277.5	181.1	65

Note: <sup>a</sup>Missing data for 2009 and 2013.

Source: Own calculations based on BACI International Trade Database.

Vietnam (Hanoi, Ho Chi Minh City, Vung Tau, Hai Phong). In-depth interviews with business elites are regarded as the most suitable method to gather information on complex network relations and location rationales of MNEs (Schoenberger, 1991; Yeung, 1995) because conversations with business elites yield information about the spatial organization of firms and their vast network of intra- and inter-firm relations. Most importantly, interviews with individuals who are actively involved in shaping the economic landscape contribute to an understanding of the actual rationales behind the decision-making (Clark, 1998). This type of qualitative information cannot be obtained from corporate websites or mere trade statistics, but is necessary in order to understand how GPNs function (Vind and Fold, 2010). In this context, the semi-structured interview is the most common interview form as it provides not only the possibility to ask respondents broad questions on key themes, but also the flexibility to discuss specific responses and the openness for new aspects to be raised (Hughes, 1999; Wengraf, 2001).

However, collecting data based on corporate interviews also entails challenges that have to be considered. Typical respondents in corporate interviews are powerful and busy business elites. Welch et al. (2002) note that the research can be affected by access to and the openness of business elites. Gaining access to business elites can be time-consuming and costly. Recommendations and personal contacts may facilitate the access (Ostrander, 1993). Moreover, the quality of the interview depends on the respondent's openness. Researchers rely on interviewees reporting the truth about their company and the industry (Clark, 1998). Furthermore, it must be taken into account that even business elites do not possess perfect information (Crang, 2002). This is especially the case for MNEs that encompass different business areas and geographical divisions. Apart from these challenges 'corporate interviews are sometimes the 'closest' we can get to our research subjects and their corporate worlds' (Hughes, 1999, p. 365) and therefore provide exclusive access to relevant types of knowledge. For this reason, corporate interviews are the main research method for studying GPNs (e.g. Yeung,

**Table 2.** Overview of interviews

Countries	lead firms upstream downstream		Contractors	Advisory services	Business associations	Public authorities	Total
Indonesia	6 (2)	2	9 (4)			3	20
Singapore	3	3	3	2			11
Vietnam	2	3 (1)	16 (7)		2	1	24
Total	11	8	28	2	2	4	56

*Note:* Number of domestic companies in bracket.

2007; Kleibert, 2015; Yang, 2017) and also serve as the data collection method for this study.

The interviews were mainly conducted with high-level managers of different types of companies with regard to their role in the O&G GPN and their ownership (see Table 2). In addition, we conducted interviews with representatives of business associations and public authorities. In contrast to other industries, the personal contact information of employees in O&G companies is highly secure. We therefore identified and contacted relevant interviewees via industry conferences, LinkedIn and snowball sampling (Biernacki and Waldorf, 1981). These measures enable us to overcome the aforementioned challenges associated with gaining access to business elites. An interview guideline was used that covers topics on the spatial organization of companies and location criteria. In the following sections, we use codes to refer to particular interviews. The first letter refers to the location where the interview took place (S = Singapore; I = Indonesia; V = Vietnam). The second letter provides information on the origin of the company (D = domestic; F = foreign), the third letter refers to their role in the GPN (A = advisory service; B = business association; C = contractor; L = lead firm; P = public authority) and the fourth letter represents the segment (D = downstream; U = upstream).

#### 1 4. The strategic coupling of Vietnam and Indonesia in the oil and gas GPN

In this section, the insights gained from the interviews are used in order to characterize the coupling of the two resource-holding countries with the upstream and downstream segment of the O&G GPN. For this purpose, we refer to the four aforementioned indicators suggested by Kleibert (2015): the nature of activities, network position, linkages and fixed investments.

##### 4.1 Vietnam

The E&P activities performed by extractive lead firms in a mandatory partnership with the national oil company PetroVietnam have created a supply industry in Vietnam over the years. First, multinational oilfield service companies (e.g. Schlumberger, Baker Hughes) have followed their clients and established activities in Vietnam. Second, a domestic supply industry has emerged, which is largely dominated by subsidiaries of the national oil company PetroVietnam (e.g. PV Drilling, PTSC). Head offices, equipped



with administrative functions, are situated in Ho Chi Minh City (HCMC) and the operational bases and workshops for maintenance and repair activities are located in proximity to the O&G fields in Vung Tau. The range of activities offered in Vietnam has increased during the last decades, such that extractive lead firms now perceive that most services are available in Vietnam.<sup>2</sup> This becomes especially apparent in the increasing scope of activities offered by subsidiaries of PetroVietnam, which have constantly upgraded their range of services through joint ventures with multinational oilfield service companies (Le Trung et al., 2016).<sup>3</sup> The willingness of multinational oilfield service companies to enter into these joint ventures results from the fact that they are only able to acquire contracts in Vietnam via a PetroVietnam-owned company.<sup>4</sup>

At first glance, Vietnam seems to be a successful case where the prospects of the strategic coupling have materialized. The section above shows that linkages have developed. However, when positioning these Vietnamese business entities in the wider GPN, it becomes apparent that the breadth of activities is characterized by a rather limited depth, meaning that the end product or service entails a limited share of local content (Morris et al., 2012). The activities offered are mainly restricted to the provision of services by a domestic workforce. The equipment, which constitutes a crucial component of the job, is not available in Vietnam but has to be sourced from abroad.<sup>5</sup> Multinational oilfield service companies, for instance, provide a wide range of services from their Vietnamese entities, but 'the equipment originally comes from Houston or Celle. It could come from the Middle East or Singapore as a hub of the region, so they transfer them here and whenever it fails [...] we have to send it back and they are going to send a new one for us. [...] And for the support equipment, small parts and so on we assemble here, it could be from local or also from international. They just provide us with additional auxiliary equipment'.<sup>6</sup> The upstream-related services of PetroVietnam's subsidiaries also rely on skills and technology from abroad. For example, during the past decade, a Vietnamese drilling contractor has emerged, offering offshore drilling rigs and related services to the oil majors. Six rigs were purchased from the Singaporean company KeppelFels (see also Table 1). If there are problems with a rig, then a technical expert flies in from Singapore or spare parts are sent from Singapore.<sup>7</sup> 'Not all, but most of the rigs before they start going offshore then they stop in Singapore for maintenance, for rig up, for installation of the equipment. Then probably you need to ship your equipment to Singapore to install it in Singapore before it goes offshore to Vietnam'.<sup>8</sup> Domestic companies that are not affiliated with PetroVietnam mainly focus on tool rental, the maintenance and repair of equipment, and the manufacture of simple components. The tools (e.g. drill bits, compressors) that these companies rent for upstream operations in Vietnam are mainly sourced from original equipment manufacturers based in Singapore. Sometimes the maintenance and repair are also performed in Singapore.<sup>9</sup> With regard to fixed investments, foreign suppliers, with few

<sup>1</sup> VFLU1; VFLU2;  
<sup>2</sup> VDCU6;

<sup>3</sup> VDPI; VFCU2; VFCU8; VFCU9;  
<sup>4</sup> VFCU1; VDCU1; VFCU2; VDCU2; VFCU3; VDCU3;

<sup>5</sup> VFCU2;  
<sup>6</sup> VDCU2; VDCU7;

<sup>7</sup> VFCU6;  
<sup>8</sup> VDCU4; VDCU5.

exceptions,<sup>10</sup> limit their investments to a minimum. These companies largely rent offices and workshop spaces. For instance, the PetroVietnam subsidiary PTSC provides a supply base in Vung Tau where most suppliers rent facilities. This reflects a high degree of spatial flexibility in the coupling process (Clark and Wrigley, 1995; Kleibert, 2015).

Apart from possessing hydrocarbon resources, Vietnam represents a growing market for petroleum products, with consumption doubling between 2000 and 2012 (Energy Key Facts, 2015), and has therefore attracted lead firms in the downstream segment of the O&G industry. Due to the limited scope of this article, we focus on one particular refined product—lubricants—to illustrate how Vietnam is coupled in the downstream segment. Various oil majors such as British Petroleum (BP) and Chevron have entered Vietnam to serve the increasing lubricant demand. In order to obtain an import licence, the lead firms were asked by the Vietnamese government to establish lubricant blending plants, which have been set up in HCMC and Haiphong.<sup>11</sup> In addition, the corporate units are responsible for some business functions such as sales, finance and human resources concerning the Vietnamese market. However, the entities largely depend on support from the regional headquarters based in Singapore, as a representative of one of the aforementioned companies explained to us: ‘Everything, all the technical, the supply chain office they also support us with optimizing, [...] the packaging design and things like that, sales as well’.<sup>12</sup> This highlights the peripheral position of the corporate entities established in Vietnam in the wider production network.

Capacities to produce the feedstock (base oils, additives) required for the blending of lubricants are not yet available in Vietnam.<sup>13</sup> The Vietnamese government faced difficulty convincing lead firms to invest in refining capacities. All the invited lead firms refused to participate and eventually the first refinery was constructed by PetroVietnam as the single owner.<sup>14</sup> This illustrates that the oil majors avoid fixed investments in Vietnam as far as possible, and the deepening of production linkages depends on efforts made by the state (Kalvelage and Breul, 2017). For the blending of lubricants, the companies predominantly source the feedstock from Singapore. ‘They supply all the raw materials, base oil’<sup>15</sup> (see also Table 1). Some feedstock is manufactured elsewhere, such as in Japan or Europe, but is stored in Singapore and distributed from there. Thus, apart from the mere blending process and sales activities, companies concentrate most activities related to the production and distribution of lubricants in Singapore, as this statement by a representative of one of the oil majors illustrates: ‘They have everything there in Singapore. We [...] also have a share in [a refinery]. We have the headquarters there for the upstream and the downstream. We have the lubricant plant there, we have the terminal there, we have [the additives plant] there. So Singapore is a big hub for [our company]’.<sup>16</sup>

10 VFCU7.

11 VFLD2.

12 VFLD1.

13 VFLD1; VFLD2.

14 VDP1.

15 VFLD2.

16 VFLD1.

## 4.2 Indonesia

The Indonesian case is similar to Vietnam. Extractive lead firms, in particular Chevron and Total, dominate upstream operations in Indonesia (PwC, 2017). All major multinational oilfield service companies have followed the operations of these extractive lead firms and set up offices in Indonesia.<sup>17</sup> The head offices of these companies are located in Jakarta, whereas operational activities, including workshops, are based on commodity source regions such as in Balikpapan or Pekanbaru.<sup>18</sup> In addition, domestic service companies have been established. Most provide basic services such as logistics, catering and security, but also the simple manufacture and repair of tools in accordance with international standards.<sup>19</sup> Some more advanced companies have emerged, such as the drilling contractor Apexindo or the national oil company subsidiary Elnusa. Over time, both companies have expanded their scope to cover more sophisticated activities, such as offshore drilling or geophysical data services. A major driver behind increasing domestic capacities is the Indonesian local content policy defined in the PTK007 procurement guidelines, which extractive lead firms have to follow in order to ensure that their costs will be recoverable.<sup>20</sup> It illustrates how regional institutions mobilize their regional assets to improve the coupling process and how this affects the region (Coe and Hess, 2011).

However, similar to the situation in Vietnam, the activities of foreign and domestic service companies in Indonesia are restricted to the provision of services by a mainly domestic workforce. The capacity to produce equipment is limited to ‘rope, dope, and soap’,<sup>21</sup> as a representative of a domestic service company put it.<sup>22</sup> Despite the aforementioned efforts by the Indonesian state to drive the territorial embeddedness, the activities established by foreign oilfield service companies in Indonesia do not involve large sunk costs. The coupling with the O&G GPN did not anchor technology- and capital-intensive production facilities in Indonesia. The ease with which local branch offices have been shut down during the period with the low oil prices in the last few years indicates a low degree of territorial embeddedness of the GPN.<sup>23</sup> Most of the equipment is still sourced from abroad.<sup>24</sup> While North America and Europe are important locations for procuring equipment, many Foreign Service companies with entities in Indonesia also manufacture their patented equipment in Singapore or run spare-parts centres in the city-state, supplying equipment from there to operations in Indonesia.<sup>25</sup> A representative of an extractive lead firm explains, ‘if you need a wellhead, if you don’t have a wellhead here in Indonesia, you would go to Singapore. You go to Cameron or FMC, they have big workshops in Singapore. Gunvor or Baker Hughes are over there’.<sup>26</sup> Some companies explained that if tools break, they are usually sent to Singapore for repair. ‘It’s a more sophisticated workshop’.<sup>27</sup> Moreover, rigs are

17 IFLU1; IFLU2.

18 IFCU1; IFLU3; IFCU2; IFCU3.

19 IFCU3; IDLU1; IDPU1; IDCU1; IDCU2.

20 IDCU1; IFCU5; IDCU3; IDPU2; IFLU1.

21 A colloquial expression in the O&G industry which refers to miscellaneous items is relatively easy to supply.

22 IDCU3.

23 IDCU4; IDPU3.

24 IFLU4; IFCU4; IDCU1; IFCU3.

25 IFCU1; IFCU3; IDCU3.

26 IFLU3.

27 IFCU1; IDPU2.



provided by Singaporean yards as Indonesia still does not have the capacity to construct an entire rig<sup>28</sup> (see also Table 1).

For the downstream segment of the GPN, Indonesia represents an attractive market with a steadily growing consumption of petroleum products, from 1.3 million b/d in 2007 to 1.7 million b/d in 2014 (EIA, 2015). For this reason, various oil majors have entered Indonesia to serve the local market. For instance, Shell built a blending plant north of Jakarta in 2015. Others avoid such investment and contract Indonesian toll manufacturers or import the ready lubricants, as the spatial organization of this oil major reveals: ‘Basically my company [in Indonesia] is a sales organization because operations and manufacturing are in Singapore and also distribution, the supply chain, the delivery of the product. Warehousing and everything which is part of distribution is in Singapore’.<sup>29</sup> About 90% of the products sold by this company in Indonesia are manufactured in Singapore. Overall, the Indonesian self-supply capacity for blending lubricants covers about 40% of domestic demand.<sup>30</sup> However, ‘they just blend the base oil with the additives [in Indonesia]. Now the interesting part is actually: what is the Indonesian capacity to produce base oil? Very small. So even the national oil company [...] needs to import the base oil to produce their lubricants. So the base oil is imported and additives are imported’.<sup>31</sup> According to our interviewee, the majority of feedstock is imported from Singapore. The lack of political stability is a major reason why Indonesia struggles to attract investment to build up refining capacities and related activities. ‘If you want to invest in feedstock here, it is a huge cost and then risky, politically. [...] So they suddenly change, a new president, a new cabinet, they change the rules. That is the main reason. [...] So a lot of petrochemical companies here, European, American, invest a little bit downstream. Small plant, mixing, not big investments’.<sup>32</sup> Thus, the oil majors avoid large sunk costs in Indonesia. They also limit the corporate functions of the Indonesian business units to sales functions, as the above example demonstrates. Other competences are concentrated in the regional headquarters. This division of labour illustrates the peripheral network position of the business units in Indonesia.

Vietnam’s and Indonesia’s coupling with the O&G GPN are characterized by very similar features (Table 3). In both cases, the strategic coupling process has been driven by the availability of hydrocarbon resources and increasingly attractive markets for refined petroleum products. While this process has introduced some economic activities into the host countries, the current status of the coupling does not go far beyond the original key assets. According to Coe and Yeung’s (2015) typology of strategic couplings, Indonesia and Vietnam both represent commodity source regions and market regions. These types of strategic coupling are based on generic regional assets. We find a high degree of spatial flexibility, peripheral network positions and a low to medium sophistication of activities that characterizes Indonesia’s and Vietnam’s integration into the O&G GPN. These features are associated with the so-called ‘dark sides’ of strategic coupling, as discussed elsewhere (Coe and Hess, 2011; MacKinnon, 2013; Phelps et al., 2017). The few prospects that have derived from the strategic

28 IDC3.

29 IFLD1.

30 IFLD1.

31 IFLD1.

32 IFLD2.

**Table 3.** Features of the strategic coupling of Vietnam and Indonesia with the oil and gas GPN

Dimension	Indonesia	Vietnam
Nature of activities	Upstream: labour-intensive parts; maintenance and repair; fabrication of generic components Downstream: sales; partly blending of lubricants	Upstream: labour-intensive parts; maintenance and repair; fabrication of generic components Downstream: sales; blending of lubricants
Linkages	Limited depth	Limited depth
Network position	Upstream: National operational headquarters; few business entities have responsibilities beyond Indonesia Downstream: Peripheral position, high reliance on support functions from regional headquarters	Upstream: National operational headquarters Downstream: Peripheral position, high reliance on support functions from regional headquarters
Fixed investments	Upstream: low Downstream: low to medium (few oil majors established blending plants)	Upstream: low Downstream: medium (blending plants); avoidance of larger fixed investments
Regional coupling type	Commodity source region; market region	Commodity source region; market region
Mode of coupling	Structural	Structural

coupling (e.g. domestic service companies, blending plants) are largely the result of regional institutions demanding GPN actors to strengthen the territorial embeddedness (see also Liu and Dicken, 2006).

The analysis also reveals that activities in Vietnam and Indonesia are characterized by high external dependencies, characteristic of the structural mode of coupling (MacKinnon, 2011; Coe and Yeung, 2015). These become apparent in the reliance on material and immaterial inputs from outside the host country. While the home countries of the extractive lead firms and their global service companies constitute an important origin of these inputs, MNEs in this GPN have additionally adopted a macro-regional strategy (e.g. Yeung et al., 2001; Enright, 2005) by using Singapore as a gateway to Southeast Asia. GPN actors deliver upstream equipment, refined petroleum products, corporate functions and industry-specific services from the city-state to Indonesia and Vietnam (see also Ng, 2012), reflecting the broader conceptualization of gateway cities (Scholvin et al., 2017). Thus, many of the hoped-for prospects associated with the coupling with the O&G GPN have unfolded in Singapore. In the following section, we illustrate how the limited prospects of the coupling process in Indonesia and Vietnam are interrelated with Singapore's gateway role in the GPN.

## 5. Relationship between the limited prospects of the coupling process and the role of Singapore in the GPN

Building on our conceptual framework, we provide evidence of three mechanisms that have exerted a filtering effect on the territorial outcomes in Indonesia and Vietnam.

### 5.1 Regional assets as a filter

First of all, we illustrate how the availability of more suitable regional assets in the vicinity reduces the necessity for GPN actors to make efforts to embed activities in the actual region of interest, which functions like a filter between them and Vietnam and Indonesia. To give one specific example, a multinational oilfield service company that acts as a strategic partner for the upstream operations of extractive lead firms set up a factory in Singapore to manufacture tools for the Southeast Asian market. A central reason for establishing the activity in Singapore instead of in one of the neighbouring countries where the tools are actually used was that 'the suppliers that we use, they are available everywhere here in Singapore. And again the reason they are here is because [...] it is easy doing business, your IP is protected and there are plenty of human resources, talent that you are able to really build on and be able to support your customer. So that makes it really a lot easier to deal with. If you go to another country, for example, where you do not have that kind of flexibility I think you will really struggle'.<sup>33</sup> While such a key firm's decision to establish a factory producing high-tech offshore tools directly in a country where upstream operations take place may entail attracting such specialized suppliers by means of follow-sourcing strategies, thus leading to the emergence of an industrial cluster (e.g. Hassler, 2011), localization economies already exist in Singapore. These more suitable regional assets drive the prospects of coupling away from the extraction sites. In their study on the mining industry in Chile, Atienza et al. (forthcoming) point to similar mechanisms. Urbanization economies, localization economies and better connectivity in Santiago have contributed to the spatial concentration of the mining supply network outside the commodity source regions in Santiago.

This example is the result of the increased importance in extractive industries of establishing facilities close to the upstream operations (Morris et al., 2012). While the need for proximity provides opportunities for Vietnam and Indonesia to benefit from the coupling process, the example illustrates that the regional assets in Singapore meet the strategic needs of the O&G GPN better. The existence of Singapore, therefore, lessens the friction in MNEs' operations in Southeast Asia and at the same time reduces firms' willingness and necessity to cope with the less sophisticated production environment in Vietnam and Indonesia.

### 5.2 Institutional filtering process

Second, the filtering may be intensified and targeted towards specific activities through the proactive interference of regional institutions in the gateway city as we illustrate in the following.

Our interviews reveal that the Singapore government takes several measures to ensure the anchoring of high value-added and knowledge-intensive segments of the upstream O&G GPN in Singapore. Besides 'matching' regional assets to the needs of the industry by investing in industry-specific education programmes, creating a technologically capable support industry and establishing various industry-specific research facilities, knowledge-intensive activities have been attracted by means of financial incentives. For instance, the Productivity and Innovation Credit Scheme grants companies 400% tax

33 SFCU1.



deductions for expenditure on investments related to upgrading, such as research and development activities, the training of employees and the acquisition and leasing of IT and automation equipment (IRAS, 2017). Similar action by regional institutions has been described with regard to the positioning of Singapore in the electronics GPN by Yeung (2009).

For the case of the O&G GPN, it is noteworthy that the institutionally induced filtering process is highly targeted. Interviewees reported that there was an active push to relocate low value-added activities to the surrounding countries: ‘They tell you that if you want to grow, go and hire those low-income type employees from outside and put a branch outside [Singapore]. [...] Singapore is all based on one concept. And that concept is outsource as much as possible to low-income [countries], keep the technology, keep the brain, the research, the money, the banking, keep it all inside. But the cheap stuff, get it from outside’.<sup>34</sup> For example, a multinational equipment supplier reported having been asked by the Singapore government to increase value creation related to the land used. As a consequence, the company relocated low value-added activities, such as warehouses, to neighbouring Batam and Johor.<sup>35</sup>

These insights illustrate a filtering process induced by regional institutions in the gateway city where sophisticated, high value-added activities are concentrated in Singapore, while less sophisticated, low value-added activities are deliberately allowed to trickle through the gateway city to the actual countries of extraction. It indicates that the prospects of the strategic coupling process in Vietnam and Indonesia do not simply depend on the sophistication of their own institutions and regional assets, but also to a certain degree on Singapore’s objectives.

### 5.3 Corporate filtering process

Third, it is important to perceive MNEs not as monolithic organizations in GPNs, but as heterogeneous organizational entities connected to one another in a trans-territorial network (Fuller and Phelps, 2018). In the present context, it is important to consider what influence existing business units that have been established for the purpose of serving other regions in the macro-region have on subsequent firm strategies concerning activities in this macro-region. We present two aspects that have influenced MNEs’ strategies to the detriment of the coupling of Vietnam and Indonesia.

Major oil companies set up their refineries and petrochemical processing facilities in Singapore as an export base to serve the surrounding markets<sup>36</sup> (see also Ng, 2012). These plants represent large sunk costs and require amortization periods of 30–50 years.<sup>37</sup> The existing capacities of these oil majors in Singapore, intended to serve the region, in fact constitute an obstacle for the surrounding countries like Indonesia and Vietnam, preventing them from attracting similar investments from the same companies, as this quote illustrates: ‘They are talking about making the base oil [in Vietnam]. But I don’t think they are going to do that because now the base oil supply, there is already a surplus’.<sup>38</sup> A similar situation is apparent for the upstream segment,

<sup>34</sup> SFCU1.  
<sup>35</sup> SFCU2.  
<sup>36</sup> SFA1.  
<sup>37</sup> SFLD2.  
<sup>38</sup> VFLD2.

where the major oilfield service companies have to ‘spend so many millions of dollars on these plants, robotics [in Singapore]. As long as there is sufficient demand for these types of products then they are continuing on’.<sup>39</sup> Both examples highlight the fact that sunk costs attach the respective MNEs to Singapore and influence their decisions regarding the future spatial organization of the company (Clark and Wrigley, 1995). The fixity of these functions in Singapore thus constitutes a barrier to the expansion of the Vietnamese or Indonesian subsidiaries’ scope of activities, regardless of any improvements to the regional assets in the actual regions of interest.

Our interviews with representatives involved in the downstream segment suggest that these initial investments, in addition to being ‘sunk’, may trigger an intra-corporate spatial concentration process. Companies in the downstream segment, such as the production of lubricants, strive for internal economies of scale in order to remain competitive. A representative of oil major’s Indonesian subsidiary explained, ‘the strategy for this product is if you get the scale, then you can really be very efficient in your production. Instead, this product is produced in this country, this country, this country’.<sup>40</sup> As a result, >90% of lubricants this company sells in Indonesia are sourced from the production facilities located in Singapore. This need to exploit internal economies of scale thus increases the likelihood of repeat investment in Singapore, in this case to the disadvantage of Indonesian subsidiaries.

The above three mechanisms illustrate how the limited prospects of coupling in Indonesia and Vietnam are interrelated with Singapore’s gateway role in the O&G GPN. In contrast to the overly optimistic expectations associated with the connectivity to gateway cities (e.g. Scott, 2012), the findings reveal a filtering effect caused by the gateway city to the detriment of the actual regions of interest. This filtering effect is not the mere consequence of the superiority of Singapore’s regional assets, but must also be understood as the result of strategic decisions by GPN actors and regional institutions.

## 6. Conclusion

This research has empirically assessed how the indirect integration of regions via gateways into GPNs influences the prospects of strategic coupling. Our analysis shows that despite long periods of integration into the O&G GPN, the strategic coupling of Vietnam and Indonesia does not exceed far beyond the original key assets, which comprise the availability of hydrocarbon resources and attractive markets for refined petroleum products. In both cases, the avoidance of fixed investments, a limited depth of production linkages and peripheral network positions characterize the outcomes of the strategic coupling process. Many of the material and immaterial inputs, required in geographical proximity to enable the operations in Vietnam and Indonesia, are provided from resource-poor Singapore. While Singapore’s gateway role in global production has been explored in various studies (e.g. Poon, 2000; Yeung et al., 2001; Olds and Yeung, 2004; Bastide, 2011), this analysis reveals how its gateway role in the O&G GPN interrelates with the nature of the strategic coupling in the actual regions of interest. We found that Singapore exerts a filtering effect to the disadvantage of Vietnam and Indonesia. This filtering process is shaped by three major mechanisms:

<sup>39</sup> VDCU2.

<sup>40</sup> IFLD1.

1 first, more suitable regional assets that meet the strategic needs of GPN actors in Singapore reduce the willingness and necessity of these firms to cope with the production environment in the actual regions of interest. Second, regional institutions in Singapore expand and mobilize these regional assets to strengthen the territorial embeddedness of the GPN. Only low value-added activities are deliberately permitted to trickle through the gateway city to Indonesia and Vietnam. Third, we find a corporate filtering process caused by sunk costs and the need for internal economies of scale. Both aspects create barriers for subsidiaries in Vietnam and Indonesia wishing to expand the scope of their activities and, moreover, lead to an intensified concentration in Singapore. In addition, the insights provided by the analysis suggest that the regulatory role of the state (Horner, 2017) was important in both case studies to reduce this filtering effect through institutional barriers (e.g. local content), but only within a limited scope.

On a conceptual level, this study contributes to GPN-inspired research in two respects. First, while the 'GPN 2.0' (Coe and Yeung, 2015) has shifted the focus of attention more towards firm strategies and the organizational network, this article has shown that consideration of the particular territorial configuration of GPNs is of great importance (Phelps, 2017) and must be intensified as it provides essential explanatory power for understanding the differentiated GPN outcomes. The focus on the gateway role of Singapore in this article has shown that certain places constitute influential components of GPNs as they affect the outcomes of the strategic coupling in other locales of the network. Our findings reveal that GPN outcomes are more concentrated due to the existence of the gateway city. The study therefore suggests that in addition to the recent integration of intermediary actors into the 'GPN 2.0' conceptualization (Coe and Yeung, 2015), the GPN framework needs to consider explicitly the importance and consequences of territorial intermediaries since they are present in various regional and industrial contexts (Meyer et al., 2009; Kleibert, 2015; Phelps et al., 2015; van Grunsven and Hutchinson, 2016; Scholvin, 2017; Atienza et al., forthcoming). Focusing on the gateway role makes it possible to take explicitly into consideration that some cities represent critical nodes in GPNs. Yet, it avoids the too narrow analytical focus on producer services found in earlier attempts to bridge research on world cities and GPNs (e.g. Brown et al., 2010; Parnreiter, 2014).

Second, this study emphasizes that discussions on GPNs and economic development can be enriched by focusing on how successful and unfavourable couplings are interrelated (see also Phelps et al., 2017). The gateway city conceptualization as introduced in this article provides a territorial lens that permit a focus on such relationships. The filtering process and its underlying mechanisms, which have been identified in our case study, illustrate these interrelations and contribute to a better understanding of the differentiated GPN outcomes that have unfolded in Indonesia, Vietnam and Singapore. These findings stress that 'the existence of higher value nodes in the network presumes that low-value functions [...] are also a part of global production network formation and restructuring' (Werner, 2016, p. 460) and reveal the mechanisms that have contributed to shaping this division.

It is important to bear in mind that both GPNs and the coupling process with regions are dynamic (MacKinnon, 2011; Yeung and Coe, 2015). This suggests that the relationship between gateways and the regions they integrate are also subject to changes depending on the shifting strategic needs of the GPN actors, transformed regional assets and the changing bargaining positions of regional institutions. While our findings



have indicated that regional institutions in Vietnam and Indonesia could reduce the filtering effect to a certain degree and thus change their functional relationship with Singapore, more research is needed to understand the complexity of these dynamics.

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