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Probing the position of the Jakarta metropolitan area in global inter-urban networks through the lens of manufacturing firms

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This paper presents an analysis of the position of the Jakarta metropolitan area (JMA) in global inter-urban networks. Our starting point is our aim to provide a more nuanced understanding of the JMA's connectivity in world city networks (WCNs). To this end, we steer clear of top-down approaches, which tend to analyze cities in singular taxonomies of global prominence, and instead propose a framework that is attuned to the JMA's contexts to provide an alternative and complementary reading of how the JMA has been inserted into the WCN. To this end, by drawing on the interlocking network model, which helps to proxy inter-urban networks based on the multi-locational operations of manufacturing firms, we examine the JMA's network positionality on the global and national scales. The results provide evidence of the JMA's global inter-city relations being strongly geared toward East Asian cities. In addition, the results suggest that the JMA cannot be detached from its national geography, as evidenced by its strong connections with cities located on the island of Java.

Keywords: inter-urban networks; Jakarta metropolitan area; manufacturing; world city network

1. Introduction

Recent scholarship emphasizes that the prospect of cities in contemporary globalization is increasingly determined by their connectivity and accessibility to other places, with geographical patterns oftentimes transcending Euclidean distance (Hesse 2010; Sheppard 2002; Taylor, Hoyler, and Verbruggen 2010; Torre and Rallet 2005). This standpoint is largely built upon the spatial logic that Castells (1996) deemed the “space of flows”, in that cities are viewed as a network of interlinked places, in which the flows

of goods, people, ideas, etc. are the principal components shaping a city. Embedding cities in a “space of flows” has redirected attention from seeing cities in terms of what they contain to focusing on their connections with other cities. As a result, there is a perceived need to re-address the functionality, wealth, and power of urban places based on their positionalities as nodes within urban networks of capital, knowledge, and information (Castells 1996; Dicken et al. 2001; Sheppard 2002).

Indeed, since the turn of the 21st century, there have been a rising number of efforts to unpack cities’ positionalities through the perspective of their global networking potential (for an overview, see Liu and Derudder [2012]; Taylor and Derudder [2016, 31-43]). The world city network (WCN) research agenda is arguably one of the most conspicuous research areas in this regard. In this stream of research, cities are situated in the broader context of the development of the world economy. In particular, WCN research essentially aims to reveal the socio-spatial dimension of the world economy’s power asymmetries, in that some cities matter more as strategic sites for global economic operations than others. Drawing on the emergence of a broader urban network paradigm (Camagni 1993; Capello 2000), the WCN approach examines cities’ global importance in the context of their relations with a myriad of other cities. Based on the observation that transnational corporations (TNCs) are key shapers of the geographies of the global economy, these cities are deemed connected through the cross-border flows generated within corporate networks (e.g., Alderson and Beckfield 2004; Sigler and Martinus 2016; Taylor, Catalano, and Walker 2002). From this vantage point, various WCN maps have been devised from the perspective of a diverse set of economic sectors to understand the network positions and the roles of different cities within the global economy (e.g., Jacobs, Koster, and Hall 2011; Krätke 2014; Krätke and Taylor 2004; Martinus and Tonts 2015)..

Despite their obvious merits, such singular taxonomies tend to focus on uncovering the overall structure and pattern of WCNs from a specific point of view, so that individual cities' specificities tend to be somewhat lost in subsequent interpretations. As a case in point, different capital cities from economically less-developed countries, such as Jakarta, Bangkok, or Lima, fall under the same category in these maps, e.g., as "places-to-be" (Yang et al. 2017) or as having "important subsidiary functions" (Wall and van der Knaap 2011). Nonetheless, the different contexts and the differential ways in which these cities shape and are (re)shaped by global economic processes remain of key importance (e.g., Mans 2014a; Robinson 2002, 2005). Therefore, further research is needed to arrive at a refined understanding of how a particular city is being inserted into the WCN.

Against this backdrop, the meta-purpose of this paper is to show how globalist "top-down" appraisals of cities can be complemented with approaches that are attuned to the context in which a city or group of cities is situated. The case of the Jakarta metropolitan area (JMA), the politico-economic capital of Indonesia, is at the center of our analysis. Over the past two decades, many studies have been undertaken to capture the JMA's changing urban landscape (Firman 1998; Hudalah, 2017; Hudalah and Firman 2012; Hudalah et al. 2013; Soegijoko 1996). From these studies, it can be inferred that the "globality" of Indonesia's capital is strongly linked to the expansion of global manufacturing firms. Nevertheless, research on the subject has largely been confined to an intra-metropolitan rubric in that the focus is on local adaptation to economic globalization processes. Consequently, how the JMA is connected to other cities through the relational network structure of manufacturing firms has not been documented. To this end, drawing on the interlocking network model (INM) (Taylor 2001, 2004), we examine the inter-urban networks in which the JMA is embedded

through the lens of manufacturing firms in what are arguably key economic sectors for Indonesia in general and the JMA in particular. Cast in this way, this paper lends further empirical insights to the emerging body of research exploring how insights from ‘non-core’ cities complement globalist WCN readings (cf. Kleibert 2016; Rossi, Beaverstock, and Taylor 2007).

The remainder of this paper is organized as follows. We first clarify what we mean by a “contextually attuned” approach to the analysis of WCNs. Our particular focus is on the “prime sectors” conception and the multi-scalar nature of cities in globalization. After discussing the bearing of manufacturing development in the context of the JMA’s urban transformation, we briefly outline the INM methodology that guided our data collection and calculations. We then provide an assessment and discussion of the JMA’s inter-urban networks at the global and national scales from the perspective of the JMA’s “prime sectors” (i.e., electronics, automotive and transportation, and food and beverage industries). The last section briefly summarizes the main findings and points to some avenues for further research.

2. A “contextually attuned” approach to WCNs

The contemporary “world city” research agenda can be said to begin with Friedmann’s (1986; see also Friedmann and Wolff 1982) seminal paper on “the world city hypothesis”. In this paper, Friedmann posits that as the global reorganization of TNCs’ operations has altered the spatial configuration of the global economy, a number of cities have emerged as their main anchoring points. In her classic “The Global City” Sassen (1991) extended this research by focusing on the specific functioning of a few selected cities (most notably, New York, London, and Tokyo) that wield the “global control capability” of the global economy based on the concentration of advanced producer services (APS) firms.

Although the writings of Friedmann and Sassen embody scattered suggestions on the emergence of a “hierarchical/transnational urban system” (cf. Sassen 2000, 33) that is deemed to provide the operational scaffolding of the global economy, they do not systematically specify and analyze this system of interconnected cities (Derudder and Parnreiter 2014). Drawing in particular on the insights of Sassen (1991) and Castells (1996), scholars associated with the Globalization and World Cities (GaWC) research group have tried to overcome this evidential lacuna through the lens of the WCN (Beaverstock, Taylor, and Smith 1999; Taylor 2001). The focus of much of the initial WCN work was on the inter-urban networks produced through APS firms, thus foregrounding cities as the strategic places in contemporary economic globalization for this particular sector.

In addition to this pioneering work, an increasing number of scholars have argued that this represents just one viewpoint of WCNs. As Krätke (2014) puts forward, “the world city network includes global cities that focus on advanced producer services, particularly in the financial sector, as well as many other cities with *differing profiles* of their globally connected activities” (p. 124, italics in the original). Subsequently, various WCN maps have been devised through the lens of different economic sectors, such as Islamic financial services (Bassens, Derudder, and Witlox 2010), manufacturing (Krätke 2014), maritime services (Jacobs, Koster, and Hall 2011), media firms (Hoyler and Watson 2013; Krätke and Taylor 2004), and energy corporations (Martinus and Tonts 2015).

Taken together, these diverse WCN maps suggest the growing interest in studying cities in globalization in the context of “multiple globalizations”, thus recognizing that different cities occupy different functional roles in the global economy. A key example is a recent paper by Krätke (2014), in which the author discloses

Tokyo's strategic role for high-tech manufacturing, while New York and London – commonly referred to as the prime locations for APS (e.g., Taylor et al. 2014) – is are nowhere to be found at the apex of the global manufacturing ranking. Another obvious case in point is a WCN map of the energy sector revealing a key global role for Houston and Moscow (Martinus and Tonts 2015).

While these appraisals value cities' different profiles in the global urban system, such a “top-down” approach needs further elaboration to provide a more nuanced understanding on the specific context in which a city (or city-region) is articulated into the WCN and, accordingly, plays a particular functional role in the global economy. This parallel empirical framework is particularly relevant for cities that do not commonly feature in WCN maps, as Mans (2014b, 189) notes that this “top-down” toolkit tends to “place a strong emphasis on the most affluent parts of the world economy”.

In response to this, a number of studies have recently attempted to devise a “contextually attuned” approach to WCN research (Schmitt and Smas 2012; Mans 2014a; Zhang and Kloosterman 2016). Instead of unpacking the overall structure and pattern of WCNs from a “top-down” perspective, this “contextually attuned” approach traces the inter-urban networks from a particular city or set of cities as a starting point (cf. Lüthi, Thierstein, and Hoyler 2017). This paper follows this particular line of investigation to explore the JMA's extra-local networks under conditions of contemporary globalization. In our reading, such an approach attunes the framework to relevant geographical contexts and thus provides an alternative and complementary reading of how the JMA has been articulated into the WCN. To clarify the “contextually attuned” approach devised in this paper, we concentrate on elaborating two aspects of the “top-down” appraisals.

First, the globalist vantage point adopted in the “top-down” approach may – even if implicitly and unwantedly – lead to suggesting a “blanket process” of homogenous globalized urbanization, potentially overlooking various contexts underlying cities’ insertion into the WCN (Hill and Kim 2000; Olds and Yeung 2004; Robinson 2002). This issue can be related to the initial objective of unraveling the basic skeleton of the global urban system: the selection of firms for measuring urban connectivity has, in many cases, concentrated on “leading global” firms (e.g., by assembling the largest firms sourced from the Fortune and Forbes databases). Accordingly, other “presumably less-global” firms or sectors, which may have played a critical role in the globalization process of particular cities and regions, remain concealed. This has led some to call for parallel empirical frameworks that appraise “the spatial dimension that marks a globality that is specific to a region” (Sassen 2010, 157), including cities’ positionalities that “are not central in terms of western economies” (Robinson 2005, 759). Mans (2014a), for example, disclosed the globality and worldwide inter-city connections of Khartoum (Sudan), which remains mostly “undetected” in many WCN calculations, through the lens of oil firms. In this study, we use a particularly relevant economic sector as an indicative vector of the JMA’s articulation into the WCN. Our starting point is based on Mans (2014a) conceptualization of “prime sectors” analysis, i.e., to start tracing extra-local linkages from a city’s local/regional economic context that drives its urban economic dynamism. As noted in the earlier section, manufacturing has been widely perceived as the key economic sector that characterizes the JMA’s globality. In our analysis, we adopt the “prime sectors” toolkit by singling out a number of manufacturing sub-sectors / industries that represent the JMA’s most leading industries.

Second, the “top-down” approach involves singling out of the global scale as the major playing field for defining cities’ positionalities, and this may obscure the multi-scalar nature of cities’ positionality in the “global” economy. In reality, the global economy is a ramification of “different geographical scales (...) in network formation and network processes” (Dicken et al. 2001, 95). Or as Brown et al. (2010, 19) noted: “world city studies need to address leading cities in the global economy to be sure, but there is no need to be ghettoized into one-scale analysis”. In light of this, we would argue that the JMA’s global role is, in many ways, premised on its connections to Indonesian cities, whose economic relations also serve the purposes of global capital accumulation. Therefore, in this paper, we add the national scale as a means of making sense of how other cities in Indonesia are also connected to the wider WCN and play an important role in the articulation of the JMA’s positioning in contemporary globalization (cf. Brown et al. 2010, 16; Rossi, Beaverstock, and Taylor 2007).

Before zooming in on the JMA’s “prime sectors”, the following section takes a closer look at the bearing of manufacturing sector in the context of the JMA's globalization processes.

3. Manufacturing as the driver of the JMA’s globalization

The widening and deepening insertion of the JMA into the global economy can be traced back to the interplay between Indonesia’s shifting political economy and the global economic restructuring that began unfolding in the 1970s. On the one hand, once an oil-rich nation, Indonesia’s economy faced sudden difficulties following the steep decline in global oil prices in the early 1980s, as its oil-based economy was no longer sufficient to support the inefficient inward-looking economy. As a consequence, by the mid-1980s, the national government initiated a diverse set of deregulation and liberalization measures to restore macroeconomic stability as well as to reduce the

country's heavy dependence on oil (Thee 2012, 90-106). On the other hand, manufacturing offshoring in search of new places with lower production costs – particularly as a direct consequence of global economic restructuring – provided the right mix of conditions for Indonesia to undergo an economic transformation from an agrarian and oil-based country to an industrial-based economy (cf. Dunning 1998).

It could be argued that from the late 1980s onwards, industrial development has been put high on the national development agenda, notably as an instrumental sector to bolster the national economy in the midst of heightened international competition (Cascade Asia 2016). Although its progress was disrupted for approximately one decade due to the severe impact of the 1997 Asian financial crisis, the country's manufacturing sector seems to have revived, demonstrated mainly by gross domestic product (GDP) growth, the surge of foreign direct investment (FDI) inflows, and increasing global competitiveness (Deloitte 2016; Linblad 2015; World Bank 2012). A large part of this recent revival has been due to the country's overall economic recovery as well as the refocusing of the state's national agenda on industrial development. For instance, as outlined by the national industrial policy, the share of the manufacturing sector to the total GDP is targeted to increase from 24% in 2010 to 30% in 2020 (Tijaja and Faisal 2014). The declaration of Indonesia's Masterplan for Economic Acceleration and Expansion 2011-2025 (MP3EI) under Susilo Bambang Yudhoyono's presidency and its subsequent Packages of Economic Policy under Joko Widodo's presidency have further laid the basis for national manufacturing development in the long run.

The intensified national economic integration into a global economic system has, in turn, spurred the country's urban experience (Firman 2002; Thee 1995). As the politico-economic capital of the country, a large part of industrial capital accumulation has manifested itself in and through the JMA (Firman 1998; Soegijoko 1996; Thee

2009). Situated in the most populous island of Java, the JMA is the country's largest urban agglomeration and the most suburbanized megacity in Southeast Asia (Murakami et al. 2005). This metropolitan area consists of the Special Region of Jakarta and eight city-level administrative areas, i.e., three *kabupatens* (Bekasi, Bogor, Tangerang Districts) and five *kotas* (Bekasi, Bogor, Depok, Tangerang, South Tangerang Municipalities). Many studies have documented that the industrial boom in the early 1990s and its post-Asian crisis revival since the late 2000s have profoundly driven the JMA's urbanization process (e.g., Firman 1998; Hudalah 2017; Hudalah et al. 2013; Soegijoko 1996). Manufacturing firms have not only altered the JMA's urban socio-economic landscape but also, in turn, reasserted the JMA's position as the country's global powerhouse (Hudalah and Firman, 2012). The JMA remains the country's industrial center. For instance, 134 out of 167 manufacturing firms listed on the Indonesia Stock Exchange (IDX), as of 15 July 2015, are headquartered in the JMA. Furthermore, according to the National Industrial Database (BPS 2014), the firms located in the JMA employ almost one-third of the total manufacturing workforce nationally. Meanwhile, in terms of economic output, the JMA alone contributes approximately a quarter of the country's GDP in manufacturing (BPS 2016).

4. Methodology

4.1 The interlocking network model

This research draws on the INM developed by Taylor (2001, 2004) and widely used by GaWC researchers to analyze inter-urban networks through the lens of corporate networks. Although initially designed to gauge urban connectivity through the office networks of APS firms (finance, consultancy, accountancy, etc.), this method has been utilized beyond its initial remit and applied to areas such as Islamic financial services

(Bassens, Derudder, and Witlox 2010), non-governmental organizations (Taylor 2005), media (Krätke and Taylor 2004), and manufacturing (Lüthi, Thierstein, and Goebel 2010). This also includes its application at diverse geographical scales, from global to intra-regional (Hoyler, Freytag, and Mager 2008; Taylor, Evans, and Pain 2013; Zhao et al. 2015).

The basic idea behind the INM is that the spatial organization of firms is an outcome of their (long-term) operational strategies, reflecting their considerations of the potential values of different cities. A city chosen by a firm to be a part of its office network is interlocked with other cities through the flows of information, knowledge, capital, personnel, etc. within this network. Thus, when two cities are home to offices of the same firm, this can be used as a proxy for “the channel system and city intersections of potential flows” (Krätke 2014, 126). Its operationalization requires an $n \times m$ matrix V , summarizing the locational strategies of m firms across n cities. The values in the matrix cells estimate the importance of individual offices to a firm’s network through a standardized “service value” v_{ij} .

Drawing on the basic principles of spatial interaction modeling (see Derudder and Taylor 2005, 73-75), the city-dyad connectivity (CDC) between cities a and b is generated by intra-firm flows within firm j ($CDC_{ab,j}$). This relation is calculated by multiplying the service values of city a (v_{aj}) and city b (v_{bj}) for firm j in both cities:

$$CDC_{ab,j} = v_{aj} \cdot v_{bj} \quad (\text{where } a \neq b). \quad (1)$$

The inter-city connectivity between two cities a and b (CDC_{ab}) is subsequently calculated by aggregating intra-firm connections $CDC_{ab,j}$ across all firms:

$$CDC_{ab} = \sum_j CDC_{ab,j} \quad . \quad (2)$$

4.2 Data collection

4.2.1 Selection of firms

To identify the “prime sector(s)” that represent(s) the urban-regional economic context in which the JMA is situated (see also Lüthi, Thierstein, and Goebel 2010; Schmitt and Smas 2012), we selected some industries of the manufacturing sector. This leads to the selection of three manufacturing sub-sectors, that is, (1) electronics, (2) automotive and transportation, and (3) food and beverage. Here, we mainly assess the global importance of these industries from the perspective of FDI. According to the Investment Coordinating Board of Indonesia, most of FDI in the manufacturing sector to the JMA has been concentrated in these three industries (BKPM 2015). During 2009-2014, the electronics (including machinery) industry accounted for 28% of the JMA’s cumulative FDI in manufacturing, followed by automotive and transportation (26%) and food and beverage (12%). Although the proportion of food and beverage industry with respect to FDI is relatively small compared to the other two industries, this industry is considered to be a strategic “national industry” as outlined by Indonesia’s recent national industrial policy (RIPIN). It is worth to note that, on the basis of national GDP, the food and beverage industry is the nation’s largest manufacturing sub-sector (Cascade Asia 2016).

Firm data from these three sub-sectors were collected from three main sources: Forbes 2000 (2015), IDX (as of 15 July 2015), and the National Industrial Database (2014). A firm is selected if it has at least two offices/enterprise units (i.e., only multi-locational firms are included) of which at least one is located within the JMA. Specific to the National Industrial Database, in addition to the previous criterion, a firm is selected if it belongs to the largest manufacturing firms in Indonesia, measured by means of employment size. The result of this selection process was a basic set of 196 firms (53 in electronics, 73 in automotive and transportation, and 70 in food and

beverage). Of the 196 firms under study, 134 are headquartered across 47 international cities, whereas the rest are headquartered across 14 Indonesian cities. A more detailed summary of the distribution of firms' headquarters is presented in Table 1.

[Table 1 near here]

4.2.2 Assigning service values and the selection of cities

The process of collecting the locations of the firms' locations was conducted by analyzing each firm's website. We also did a triangulation of these firms' websites with two databases: LexisNexis and the National Industrial Database. Because manufacturing firms operate within an interconnected suite of activities, their enterprise units comprise a diverse set of functions, from managerial (headquarters, sales, etc.) to production. In this paper, we include all of these units, except for small local sales offices. After recording the presence of firms and the location of their units, we estimated the importance of the presence of firm j in city i through the standardized "service value" (v_{ij}). These values were allocated on a scale from 0 to 5 and indicate the importance of a particular city within a firm's overall multi-locational networks: 5 for global headquarters (HQs), 4 for regional HQs or global HQs of smaller firms (having no more than 20 enterprise units), 3 for national HQs, 2 for ordinary offices/units, 1 for ordinary offices/units with reduced functions, and 0 for no presence.

All international and national cities in which enterprise units (excluding small local sales offices) of our 196 firms are located are included in the analysis. Adjacent cities were grouped into metropolitan areas. The classification of these metropolitan areas draws upon metropolitan area categorizations from each country, *inter alia* the

Metropolitan Statistical Areas (MSA) in the United States and Urban Employment Area (UEA) in Japan. Judgment calls were made regarding some extended metropolitan areas, for instance, by merging the cities of Toyota, Miyoshi, and Anjo into the Nagoya metropolitan area. The exercise of constructing our city-firm database took several months, running from September 2016 to January 2017. The final list is made up of 7,633 units of 196 firms that are spread across 58 Indonesian cities/metropolises (including the JMA) and 1,850 international cities/metropolises.

4.3 Data calculation

To explore the JMA's inter-city connections through manufacturing firms at the global and national scales, equations (1) and (2) were applied. The JMA's inter-city connections at the global scale were calculated on the basis of a global matrix of 1,851 cities (1,850 international cities plus the JMA) x 196 firms. In addition, the metropolis' inter-city connections at the national scale were calculated based on two different matrices that represent firms' geographical reach. The first is a national matrix of 58 cities (57 national cities plus the JMA) x 196 firms. The first matrix consists of all firms (international and national), including Indonesian firms that have only national branches. The second is a national matrix of 58 cities (57 national cities plus the JMA) x 133 firms. This second matrix comprises firms that have global geographical reach, including Indonesian firms with extra-national branches, excluding all national firms that have only a national geographical reach.

Drawing on these two matrices, the JMA's national inter-urban relations were divided into two categories, which we term as combined (CCDC) and global (GCDC) city-dyad connectivity. CCDC was calculated on the basis of the first matrix, and reflects the geographical pattern created by firms operating both globally and nationally. In this sense, CCDC mirrors places that are not only prominent for servicing the global

economy but are also important urban nodes for the national economy. In contrast, GCDC was calculated based on the second matrix and represents the geographical pattern produced by firms having global operations. GCDC thus reflects places that are linked directly to global circuits of capital and, therefore, rather function to support the global economy. In short, this demarcation is applied to detect potentially different roles that cities in Indonesia play with regard to their links with the JMA.

5. JMA's inter-urban networks through the lens of manufacturing firms

This section examines the JMA's positionalities through the lens of the networks of manufacturing firms. As we clearly cannot discuss all cities, we sketch the general spatial pattern and therefore predominantly focus on the most-connected city dyads. We start by discussing the connectivity patterns at the global scale, and then zoom in on the national level.

5.1 JMA's inter-urban networks at the global scale

We can see in Table 2 that, in general, East Asia is by far the most-connected region.. For instance, approximately half of the top 30 metropolises with the strongest connections with the JMA are located in this region, with Tokyo, Singapore, and Bangkok atop the ranking. Our observation corroborates previous observations that link world city formation in East Asia with the region's economic interconnection, or indeed interdependence, propelled by shifting industrial location (Lo and Marcotullio 2000; Lo and Yeung 1996; Yeung 1996, 2011). In particular, with the emergence of the international division of labor that resulted from the regional industrial offshoring, the region's major cities have in turn become functionally interconnected, serving as the strategic loci for the globalization and networking of corporations and nations.

[Table 2 near here]

Tokyo's strong connection is based on its hosting of the highest number of global HQs in every manufacturing sub-sector under study (Figure 1), including the food and beverage industry, which in fact does not belong to Japan's vanguard industry (McKinsey 2015). This role means that the JMA's manufacturing circuits are tightly linked with global capitalist expansion brought by Japanese TNCs, which largely use Tokyo as their global base (Hill and Fujita 1995). It should be noted, though, that Tokyo's legacy in the JMA's manufacturing circuits can be ascribed to the complex interplay between prevailing political-economic conditions and historical dependency. For instance, apart from Japan's status as the pace-setter of development and the first industrialized economy in Asia, its firms are among the first TNCs that invested heavily in the JMA in the 1970s (Soegijoko 1996). Since then, Indonesia has consistently been one of the hotspots for Japanese investments (JBIC 2015; Syamwil and Tanimura 2000), mostly clustering within the JMA's wider urban agglomeration (Sjöberg and Sjöholm 2004). From the perspective of Japanese firms, Indonesia's competitiveness is based on the availability of a low-cost and skilled workforce as well as supporting assemblers, the concentration of related industries, and, more recently, the size of the local market as the middle-income population has grown significantly (JBIC 2015).

[Figure 1 near here]

Singapore's and Bangkok's positionalities within the JMA's connectivity profile are distinct from that of Tokyo. Singapore's strong relation with the JMA, for the most part, is due to its highly strategic position as the main 'regional hub' in Southeast Asia and, to a wider extent, in East Asia and the Pacific (Yeung and Olds 1998). Apart from its geographic proximity to the neighboring countries in Southeast Asia, Singapore provides state-of-the-art transportation and telecommunication infrastructures and a broad range of producer services, mainly financial services, that attract many large TNCs to locate their regional HQs therein (Edgington and Hayter 2013; Perry 1992). Among other sectors, the regional HQs in Singapore are mainly dominated by manufacturing firms due to the presence of a large number of production centers across selected Southeast Asian countries, including Indonesia (Holt et al. 2006; Yeung and Olds 1998). Singapore specifically functions as the regional base for logistics coordination and service support for production integration and product development as well as market sales across different cities and regions within Southeast Asia and beyond, including the JMA. Nonetheless, the specific activities being performed by these regional HQs greatly depend on each firm's strategy and regional organizational structure. For instance, with a large manufacturing and sales presence of Sony and Panasonic in Southeast Asia, the coordination role played by their regional HQs in Singapore is composed of four main functions, i.e., logistics, sales and marketing, corporate services, and engineering and manufacturing (Edgington and Hayter 2013). In comparison, the Singaporean-based regional HQs of Ricola, a Swiss pharmaceutical and confection firm, only focuses on marketing and distribution, given that all manufacturing activities are carried out in Switzerland (Grünig and Morschett 2017, 200; see also Yeung, Poon, and Perry 2001, 176). In addition to being a regional "command and control" center, Singapore also functions as the springboard of many

Indonesian companies to “go global”. For instance, by capitalizing on Singapore’s standout endowments in logistics and financial services, Indofood (a Jakarta-based food company) established its Singaporean-based office (Indofood Singapore Holdings Pte. Ltd.) for expanding its global markets and setting up new overseas branches.

In contrast to Singapore, Bangkok’s regional function is far more specific, i.e., as a regional coordination center in automotive industries for mainly Japanese firms. This specific position of Bangkok, a textbook model of a primate city, is indeed an embodiment of the country as a whole. Since Thailand has been strategically positioned as the “Detroit of the East” (Busser 2008), Bangkok has undisputedly become the nation’s center of gravity in the automotive industry and beyond. One important pull factor driving the establishment of Bangkok-based regional HQs is the presence of a large amount of manufacturing centers in Bangkok metropolitan area and its neighboring regions, such as Chonburi and Rayong (Edgington and Hayter 2013). Thailand is indeed the largest automotive producers in Southeast Asia and the twelfth largest in the world (Natsuda and Thoburn 2013). The regional HQs in Bangkok mainly carry out coordination function in manufacturing and engineering activities and, to a certain extent, marketing support and human resources administration. However, activities related to financial services are largely limited due to Thailand’s restriction on financial mobility (Edgington and Hayter 2013).

Meanwhile, other cities in the region are connected through other means. Owing to China’s rapid economic rise, its cities appear to be well connected within the top 30, with Shanghai ranked highest in fourth position. Without hosting any global HQs, Chinese cities’ networks with the JMA are generated by the worldwide multi-locational operations of the JMA’s prime sector through the complex co-existence of collaboration, competition, and emulation within the regional configuration of

production and consumption networks (Douglass 2000, 2002). Except for Seoul, Osaka, and Nagoya, which host a considerable number of global HQs (Figure 1), a similar mechanism applies to other East Asian cities' connections.

Outside the East Asian region, the JMA is above all connected with European cities. This is especially the case for Paris and London, confirming their traditional role as Europe's major hubs in various globalized circuits (e.g., Alderson, Beckfield, and Sprague-Jones 2010; Bassens, Derudder, and Witlox 2010; Martinus and Tonts 2015; Wall and van der Knaap 2011). In contrast, United States' cities are less connected. New York, the innovation center of financial circuits (Wójcik 2013), positions just outside of the top 30 (35).

Taken together, although several Indonesian large manufacturing firms (e.g., Indofood, Mayora) have established branches in several cities in the Middle East and Africa in recent years, these firms' organizational networks constitute only a small part of the JMA's global inter-urban networks. The current geographic footprint, instead, indicates that the global inter-city relations of the JMA are still chiefly rendered by the organizational networks of firms headquartered overseas, mainly those originating from Japan and other parts of East Asia. This finding is in tune with Yeung's (2012) recent observation that the urban trajectories in East Asian developing countries are still exogenously driven, depending critically upon geographic proximity, social-cultural similarity, and state-market capitalism.

As this exogenously driven pattern seems to be entrenched in the JMA's global spatial configuration, Therborn's (2011) observation on state/city-coupling in contemporary globalization may provide an underlying argument for this paper's findings. As Tijaja and Faisal (2014) summarized, Indonesia's national policy in terms of manufacturing development is essentially exogenously driven. It leans on attracting

global investments without vivid efforts to branch out domestic firms. The Investment Coordinating Board (BKPM) office, for instance, records only data of FDI inflows, not outflows, suggesting the country's focus in terms of investments paths. This direction differs strikingly with Singapore's persistent efforts to strategically reposition itself in the global economy. Having a traditional function as a trading hub in its pre-independence history (Dick and Rimmer 2009), it was not until the mid-1980s that a set of well-defined policies were introduced to transform Singapore from a mere export-oriented industrial center into a regional hub (Yeung and Olds 1998). In the wake of this gateway function, the Singaporean government has also enthusiastically embraced globalizing its domestic firms since the early 1990s through the so-called "Regionalization 2000" (Yeung and Olds 1998). The recent venturing out of mainland Chinese firms can also be attributed to a similar outward shift by the state (Yeung and Liu 2008). In addition, the outward-looking strategies of the Japanese government have been long established, and Tokyo has emerged as the country's symbol of global power since the late 1930s (Hill and Fujita 1995; Saito 2006). Taken together, the dynamic and complex interplay between Indonesia's inward-looking global policy and the expansive strategies of its neighboring countries have further cemented the JMA's position as the country's gateway. The next section sheds additional light on this particular national pattern.

5.2 JMA's inter-urban networks at the national scale

Table 3 displays the 15 cities with the strongest inter-urban relations with the JMA for the combined (CCDC) and global (GCDC) city-dyad connectivity categories. As explained earlier, this differentiation aims to detect potential different roles that national cities play with regard to their links with the JMA. As might be expected, in the combined connectivity, except for Karawang, the cities most strongly connected with

the JMA are mostly large metropolitan areas that are also seats of provincial governments. These metropolises are basically the traditional nodes shaping the core of the national urban system. Here, we term these cities to be “regional centers”. Surabaya, the provincial capital of East Java and the country’s second largest economy, appears to have the strongest link in this regard. The leading position of Surabaya (i.e., in comparison to Karawang as the second most-connected city, which has 50% less connectivity than Surabaya) points to its complementing role to the JMA in the global and national economies. As Franck (2005, 183) indicates, “Surabaya has become a conjunct of Jakarta, but as a gateway to Eastern Indonesia it shares with Jakarta the servicing of the national territory”.

[Table 3 near here]

Following Surabaya, four regional centers, i.e., Semarang (Central Java), Medan (North Sumatera), Bandung (West Java), and Makassar (South Sulawesi), stand out from other cities. More generally, given their political and economic significance, these regional centers tend to be involved in multifarious lines of manufacturing activities, such as distribution, marketing, and front-shopping, at both the global and national scales. These also include HQ functions, notably those of major national firms. For instance, as the most-connected city, Surabaya houses the highest number of HQs of these firms (11) after the JMA (35) (Figure 2). It is clear that these metropolises do not simply and solely function as the JMA’s “factory”.

In contrast, Karawang, Pasuruan, and Batam occupy relatively higher inter-urban relations with the JMA compared to the regional centers (with the exception of

Surabaya) in terms of global connectivity (Table 3). However, none of these cities host any HQ functions of major national firms (Figure 2). These cities have instead been the traditional homes for industrial activities for decades. As such, their high levels of connectivity suggest their functional specificity as global production sites. Not surprisingly perhaps, the significance of these “production cities” in patterns of global connectivity can be explained by the fact that Indonesia is among the brightest hotspots in the world for the global production base (Deloitte 2016).

Moreover, although they have less complex functions than regional centers, it is obvious that these production cities tend to cluster within the wider urban agglomeration of large metropolises. For example, Karawang is closely located to the JMA, positioned mainly as Jakarta’s “extended” hinterland (Hudalah et al. 2013). Meanwhile, Pasuruan capitalizes on its adjacency to Surabaya, whereas Batam, which was among the earliest free trade zones (FTZs) established in Indonesia, has long become the “back office/factory” of Singapore (Perry 1991; Phelps 2004).

[Figure 2 near here]

Taken together, the fact that many of the most-connected metropolises, particularly Surabaya, Bandung, and Semarang, plus a series of production sites’ cities are located in Java portrays the geo-economic bias toward this island vis-à-vis other regions/main islands in Indonesia. Interestingly, the more “national-based” industry of food and beverage exhibits a similar pattern. Most of the largest companies in this particular industry locate their headquarters in Java’s major metropolises (see Table 1), thus contributing to the overall uneven and Java-based pattern of the inter-urban

network. Such a Java-based concentration corresponds to the persistent west-east inequality in Indonesia's socio-economic development (Hill and Vidyattama 2016); or, more specifically, an inter-urban disparity between major metropolitan areas and other cities (Firman 2004, 2016).

We argue that the core of the JMA's manufacturing city network is, in certain ways, conditioned on the nature of the country's geographic disparities. On the one hand, manufacturing is a highly urban-based sector, as the operation of these firms rests on the availability of better transportation infrastructure, specific services, cultural amenities, and a pool of talent and skilled workers (Kuncoro and Wahyuni 2009; Sjöberg and Sjöholm 2004). On the other hand, despite the fact that since the early 2000s, Indonesia has embarked on a wide-ranging devolution process (Miller 2013), with one of the main long-term objectives being to reduce inter-regional inequality, many studies have indicated that decentralization has had a minimal impact on urban and regional development dynamics (Firman 2003, 2009; Hill, Resosudarmo, and Vidyattama 2009; Hill and Vidyattama 2016). Accordingly, owing to Indonesia's historically cumulative development disparities (Akita, Kurniawan, and Miyata 2011; Hill, Resosudarmo, and Vidyattama 2009), large metropolitan areas in Java are usually equipped with better social assets and physical infrastructures (Hill and Vidyattama, 2016). For instance, major regional centers such as Surabaya and Semarang have the largest seaports in terms of volume after Jakarta's Tanjung Priok (World Shipping Council 2017). Furthermore, in addition to its internationally connected airport, Bandung also hosts some of Indonesia's top-ranked universities.

The uneven pattern of the JMA's inter-urban network created by manufacturing firms at the national level can also be ascribed to the recent national economic development policies (i.e., MP3EI, RIPIN, and the national spatial plan or RTRWN)

that tend to reproduce the existing geo-economic characteristics of Indonesia. Drawing on their decades-long social-economic and physical advantages, the country's principal cities and metropolises remain privileged as the strategic sites for the most-advanced economic activities, such as producer services and non-resource-based manufacturing industries. In contrast, given their natural resources abundance, many cities and regions outside Java are more directed as the "extractive" economic outposts of Indonesia. This also applies to other non-Java-based cities and regions, most notably in Bali and Nusa Tenggara, that are economically specialized as tourist destinations. As a result, the economic performance of these cities and regions are more driven by the resource- or tourism-based economies, thus making them "less detected" in the JMA's manufacturing city network.

6. Conclusion

The overall objective of this paper was to flesh out one of the many alternative ways of studying WCNs, i.e., by devising a contextually attuned approach to arrive at a refined understanding of the JMA's positionality within contemporary globalization. By using the lens of firms from a selection of manufacturing sectors, we examined the JMA's positionality by tracing its extra-local networks at the global and national scales. Our major findings can be summarized as follows.

First, although the JMA is in general well connected to different cities across the globe, it is the East Asian cities that shape the core of the JMA's global inter-urban network. Tokyo wields a traditional "command and control" position in manufacturing circuits from the JMA's point of view, whereas Singapore and Bangkok function as gateways linking the JMA with the region's economies. From this perspective, the JMA acts as the country's principal center for receiving and channeling inward transnational flows emanating from the global economy or, indeed, the East Asian economy. Overall,

the JMA's global territorial configuration supports the argument that globalization is not a blanket process and instead shows strong regional patterns (cf. Taylor et al. 2013).

Second, and as a direct consequence of this, the JMA is connected to a number of Indonesian cities and articulates them into the global economy and the wider WCN. In the national cities network that we have encapsulated, two types of cities are identified in terms of their connection to the JMA, i.e., "regional centers" and "production cities". Surabaya is the most-connected regional center that complements the JMA for servicing the eastern part of Indonesia, whereas Karawang is the most prominent production city. More generally, whereas regional centers have relatively diverse functions in firms' day-to-day operations, production centers function solely as the country's production bases.

Third, and finally, the spatial configuration and articulation created by the JMA's manufacturing networks exhibit relatively unwavering "traditional" patterns: East Asian regionalism at the global scale and a handful of Java cities at the national scale. This spatial patterning corroborates Sigler and Martinus' (2016) recent investigation into the Australian economy context, which accentuated that WCN formation entails strong path-dependent trajectories.

Although this paper has enclosed finer-grained insights of the JMA's network position and its role within the WCN, more research is needed to understand the implications of this positionality to its socio-economic sustainability. To this end, two interrelated sets of questions are proposed. First, how can the JMA reap benefits from its global inter-urban flows to create a more sustainable route in the highly volatile economic globalization process and thereby avoid the "rust belt" trap? Second, what sort of state intervention and institutional setting are required to improve the JMA's role in global value chains?

Overall, this paper has also attempted to contribute to more constructive dialogues in “world city” research (cf. van Meeteren, Derudder, and Bassens 2016). That is, instead of viewing cities from developed and less-developed economies as completely different socio-spatial constructs, our approach provides a basic research agenda to trace the relations between places across the globe as a way to understand the world economy’s unevenness and, in turn, understand how cities’ integration into the global economy and their positions therein affect their urbanization processes (Surborg 2011). As such, considering the findings emanating from this paper, a similar “contextually attuned” approach can also be tested in other cases to enrich the discussions on cities in globalization in general and to complement the extensive studies of global urban systems in particular.

Similarly, at a smaller geographical spectrum, this paper can provide additional insights for previous research on the JMA’s global urbanization. While previous studies have revealed the implications of the JMA’s integration into the global economy for its urbanization processes, this paper has unpacked its integration through the lens of manufacturing firms’ networks. Future works on the JMA in globalization could capitalize on this network perspective to detect the growing inter-regional and inter-urban complexity within Southeast Asia or beyond, particularly after the establishment of several key regional economic cooperation organizations, such as the ASEAN (Association of Southeast Asian Nations) Economic Community and the ASEAN-Australia-New Zealand Free Trade Area. Such research could also employ different economic sectors (including different manufacturing industries than that have been discussed in the current paper) to better understand the JMA’s many positionalities and roles in multiple inter-urban networks.

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References

- Akita, T., P. A. Kurniawan, and S. Miyata. 2011. "Structural Changes and Regional Income Inequality in Indonesia: A Bidimensional Decomposition Analysis." *Asian Economic Journal* 25 (1): 55-77.
- Alderson, A. S., and J. Beckfield. 2004. "Power and Position in the World City System." *American Journal of Sociology* 109 (4): 811-851.
- Alderson, A. S., J. Beckfield, and J. Sprague-Jones. 2010. "Intercity Relations and Globalization: The Evolution of the Global Urban Hierarchy, 1981-2007." *Urban Studies* 47 (9): 1899-1923.
- Bassens, D., B. Derudder, and F. Witlox. 2010. "Searching for the Mecca of Finance: Islamic Financial Services and the World City Network." *Area* 42 (1): 35-46.
- Beaverstock J. V., P. J. Taylor, and R. G. Smith. 1999. "A Roster of World Cities." *Cities* 16 (6): 445-458.
- BKPM (Investment Coordinating Board). 2015. "Realized Investment Data in Indonesia." Accessed 20 July 2015. <http://nswi.bkpm.go.id/wps/portal>
- BPS (Indonesia Statistical Office). 2014. *National Industrial Database*. Jakarta: Indonesia Statistical Office.
- BPS (Indonesia Statistical Office). 2016. "Information System and Management for Basic Regional Data." Accessed 15 February 2017. <http://simreg.bappenas.go.id/view/data/>
- Brown, E., B. Derudder, C. Parnreiter, W. Pelupessy, P. J. Taylor, and F. Witlox. 2010. "World City Networks and Global Commodity Chains: Towards a World-systems' Integration." *Global Networks* 10 (1): 12-34.
- Busser, R. 2008. "'Detroit of the East'? Industrial Upgrading, Japanese Car Producers and the Development of the Automotive Industry in Thailand." *Asia Pacific Business Review* 14 (1): 29-45.
- Camagni, R. 1993. "From City Hierarchy to City Networks: Reflections about an Emerging Paradigm." In *Structure and Change in the Space Economy: Festschrift in*

- Honour of Martin Beckmann*, edited by T. R. Lakshmanan, and P. Nijkamp, 66-87. Berlin: Springer Verlag.
- Capello, R. 2000. "The City Network Paradigm: Measuring Urban Network Externalities." *Urban Studies* 37 (11): 1925-1945.
- Cascade Asia. 2016. *Manufacturing in Indonesia: New Options, Opportunities and Challenges*. Jakarta: Cascade Asia.
- Castells, M. 1996. *The Rise of the Network Society*. Oxford: Blackwell.
- Deloitte. 2016. *Global Manufacturing Competitiveness Index*. London: Deloitte Touche Tohmatsu Limited
- Derudder, B., and C. Parnreiter. 2014. "Introduction: The Interlocking Network Model for Studying Urban Networks: Outline, Potential, Critiques, and Ways Forward." *Tijdschrift voor Economische en Sociale Geografie* 105 (4): 373-386.
- Derudder, B, and P. J. Taylor. 2005. "The Cliquishness of World Cities." *Global Networks* 5 (1): 71-91.
- Dick, H., and P. J. Rimmer. 2009. *Cities, Transport and Communications: The Integration of Southeast Asia since 1850*. New York: Palgrave Macmillan.
- Dicken, P., P. F. Kelly, K. Olds, and H. W.-C. Yeung. 2001. "Chains and Networks, Territories and Scales: Towards a Relational Framework for Analysing the Global Economy." *Global Networks* 1 (2): 89-112.
- Douglass, M. 2000. "Mega-urban Regions and World City Formation: Globalisation, the Economic Crisis and Urban Policy Issues in Pacific Asia." *Urban Studies* 37 (12): 2315-2335.
- Douglass, M. 2002. "From Global Intercity Competition to Cooperation for Livable Cities and Economic Resilience in Pacific Asia." *Environment and Urbanization* 14 (1): 53-68.
- Dunning, J. H. 1998. "Globalization and the New Geography of Foreign Direct Investment." *Oxford Development Studies* 26 (1): 47-69.
- Edgington, D. W., and R. Hayter. 2013. "'Glocalization' and Regional Headquarters: Japanese Electronics Firms in the ASEAN Region." *Annals of the Association of American Geographers* 103 (3): 647-668.
- Firman, T. 1998. "The Restructuring of Jakarta Metropolitan Area: A 'Global City' in Asia." *Cities* 15 (4): 229-243
- Firman, T. 2002. "Urban Development in Indonesia, 1990-2001: From the Boom to the Early Reform Era through the Crisis." *Habitat International* 26 (2): 229-249.

- Firman, T. 2003. "Potential Impacts of Indonesia's Fiscal Decentralisation Reform on Urban and Regional Development: Towards a New Pattern of Spatial Disparity." *Space and Polity* 7(3): 247-271.
- Firman, T. 2004. "Demographic and Spatial Patterns of Indonesia's Recent Urbanisation." *Population, Space and Place* 10 (6): 421-434.
- Firman, T. 2009. "Decentralization Reform and Local-government Proliferation in Indonesia: Towards a Fragmentation of Regional Development." *Review of Urban and Regional Studies* 21(2/3): 143-157.
- Firman, T. 2016. "Demographic Patterns of Indonesia's Urbanization, 2000–2010: Continuity and Change at the Macro Level." In *Contemporary Demographic Transformations in China, India and Indonesia*, edited by C. Z. Guilmoto, and G. W. Jones, 255-270. Cham: Springer.
- Franck, M. 2005. "Surabaya: The Bridge to Madura." In *Directors of Urban Change in Asia*, edited by P. J. M. Nas, 183-202. London and New York: Routledge.
- Friedmann, J. 1986. "The World City Hypothesis." *Development and Change* 17 (1): 69-83.
- Friedmann, J., and G. Wolff. 1982. "World City Formation: An Agenda for Research and Action." *International Journal of Urban and Regional Research* 6 (3): 309-344.
- Gaikindo (Association of Motor Vehicle Companies in Indonesia). "Presiden mengakui industri otomotif berkontribusi besar bagi ekonomi nasional" [President acknowledges the significant contribution of the automotive industry to the national economy]. *Gaikindo*. Accessed 7 September 2017.
<https://www.gaikindo.or.id/presiden-mengakui-industri-otomotif-berkontribusi-besar-bagi-ekonomi-nasional/>
- Grünig R., and D. Morschett. 2017. *Developing International Strategies*. Berlin and Heidelberg: Springer.
- Hesse, M. 2010. "Cities, Material Flows and the Geography of Spatial Interaction: Urban Places in the System of Chains." *Global Networks* 10 (1): 75–91.
- Hill, R. C., and K. Fujita. 1995. "Osaka's Tokyo problem." *International Journal of Urban and Regional Research* 19 (2): 181-193.
- Hill, R. C., and J. W. Kim. 2000. "Global Cities and Developmental States: New York, Tokyo and Seoul." *Urban Studies* 37 (12): 2167–2195.
- Hill, H., B. P. Resosudarmo, and Y. Vidyattama. 2009. "Economic Geography of Indonesia: Location, Connectivity and Resources." In *Reshaping Economic*

- Geography in East Asia*, edited by Y. Huang, and A. M. Bocchi, 115-134.
Washington DC: World Bank.
- Hill, H., and Y. Vidyattama. 2016. "Regional Development Dynamics in Indonesia before and after the 'Big Bang' Decentralization." *The Singapore Economic Review* 61 (1): 1-26.
- Holt, J., W. R. Purcell, S. J. Gray, and T. Pedersen. 2006. "Decision Factors Influencing MNEs Regional Headquarters Location Selection Strategies." *SMG Working Paper No. 12, August 2006*. Frederiksberg: Center for Strategic Management and Globalization, Copenhagen Business School.
- Hoyler, M., T. Freytag, and C. Mager. 2008. "Connecting Rhine-Main: The Production of Multi-scalar Polycentricities through Knowledge-intensive Business Services." *Regional Studies* 42 (8): 1095-1111.
- Hoyler M., and A. Watson. 2013. "Global Media Cities in Transnational Media Networks." *Tijdschrift voor Economische en Sociale Geografie* 104 (1): 90–108.
- Hudalah, D. 2017. "Governing Industrial Estates on Jakarta's Peri-urban Fringe: From Shadow Government to Network Governance." *Singapore Journal of Tropical Geography* 38 (1): 58-74.
- Hudalah, D., and T. Firman. 2012. "Beyond Property: Industrial Estates and Post-suburban Transformation in Jakarta Metropolitan Region." *Cities* 29 (1): 40–48.
- Hudalah, D., D. Viantari, T. Firman, and J. Woltjer. 2013. "Industrial Land Development and Manufacturing Deconcentration in Greater Jakarta." *Urban Geography* 34 (7): 950-971.
- Jacobs, K., H. Koster, and P. Hall. 2011. "The Location and Global Network Structure of Maritime Advanced Producer Services." *Urban Studies* 48: 2749–2769.
- JBIC (Japan Bank for International Cooperation). 2015. *Survey Report on Overseas Business Operations by Japanese Manufacturing Companies*. Tokyo: Japan Bank for International Cooperation.
- Kleibert, J. 2016. "On the Global City Map, But not in Command? Probing Manila's Position in the World City Network." *Environmental and Planning A*. (in press)
- Krätke, S. 2014. "How Manufacturing Industries Connect Cities across the World: Extending Research on 'Multiple Globalizations'." *Global Networks* 14 (2): 121–147.
- Krätke, S., and P. J. Taylor. 2004. "A World Geography of Global Media Cities." *European Planning Studies* 12 (4): 459–477.

- Kuncoro, M., and S. Wahyuni. 2009. "FDI Impacts on Industrial Agglomeration: The Case of Java, Indonesia." *Journal of Asia Business Studies* 3 (2): 65–77.
- Linblad, J. T. 2015. "Foreign Direct Investment in Indonesia: Fifty Years of Discourse." *Bulletin of Indonesian Economic Studies* 51 (2): 217-237.
- Liu, X., and B. Derudder. 2012. "Analyzing Urban Networks through the Lens of Corporate Networks: A Critical Review." *Cities* 13: 430-437.
- Lo, F.-C., and P. J. Marcotullio. 2000. "Globalisation and Urban Transformations in the Asia-Pacific Region: A review." *Urban Studies* 37 (1): 77-111.
- Lo, F.-C., and Y.-M. Yeung, eds. 1996. *Emerging World Cities in Pacific Asia*. Tokyo: United Nations University Press.
- Lüthi, S., A. Thierstein, V. Goebel. 2010. "Intra-firm and Extra-firm Linkages in the Knowledge Economy: The Case of the Emerging Mega-city Region of Munich." *Global Networks* 10 (1): 114-137.
- Lüthi, S., A. Thierstein, and M. Hoyler. 2017. "The World City Network: Evaluating Top-Down versus Bottom-Up Approaches." *Cities*. Advance online publication. doi:10.1016/j.cities.2017.09.006.
- Mans, U. 2014a. "Revisiting City Connectivity." *Journal of Economic Geography* 14: 155-177.
- Mans, U. 2014b. "Understanding the Position of End Nodes in the World City Network: Using Peer City Analysis to Differentiate between Non-Hub Cities." *Global Networks* 14 (2): 188-209.
- Martinus, K., and M. Tonts. 2015. "Powering the World City System: Energy Industry Networks and Interurban Connectivity." *Environment and Planning A* 47 (7): 1502-1520.
- McKinsey. 2015. *The Future of Japan: Reigniting Productivity and Growth*. New York: McKinsey Global Institute.
- Miller, M. A. 2013. "Decentralizing Indonesian City Spaces as New 'Centers'." *International Journal of Urban and Regional Research* 37 (3): 834-848.
- Murakami, A., A. M. Zain, K. Takeuchi, A. Tsunekawa, and S. Yokota. 2003. "Trends in Urbanization and Patterns of Land Use in the Asian Mega Cities Jakarta, Bangkok, and Metro Manila." *Landscape and Urban Planning* 70: 251–259.
- Natsuda, K., and J. Thoburn 2013. "Industrial Policy and the Development of the Automotive Industry in Thailand." *Journal of the Asia Pacific Economy* 18 (3): 413–437.

- Olds, K., and H. Y.-C. Yeung. 2004. "Pathways to Global City Formation: A View from the Developmental City-state of Singapore." *Review of International Political Economy* 11 (3): 489–521.
- Perry, M. 1991. "The Singapore Growth Triangle: State, Capital and Labour at a New Frontier in the World Economy." *Singapore Journal of Tropical Geography* 12 (2): 138-151.
- Perry, M. 1992. "Promoting Corporate Control in Singapore." *Regional Studies* 26 (3): 289-294.
- Phelps, N. A. 2004. "Archetype for an Archipelago? Batam as Anti-model and Model of Industrialization in Reformasi Indonesia." *Progress in Development Studies* 4 (3): 206-229.
- Robinson, J. 2002. "Global and World Cities: A View from Off the Map." *International Journal of Urban and Regional Research* 26 (3): 531–554.
- Robinson, J. 2005. "Urban Geography: World Cities, or a World of Cities." *Progress in Human Geography* 29 (6): 757-765.
- Rosi, E. C., J. V. Beaverstock, and P. J. Taylor. 2007. "Transaction Links through Cities: 'Decision Cities' and 'Service Cities' in Outsourcing by Leading Brazilian Firms." *Geoforum* 38: 628-642.
- Saito, A. 2006. "Tokyo: From Japanese Capital to a Global City." In *Capital Cities in Asia-Pacific: Primacy and Diversity*, edited by K. C. Ho, and H.-H. M. Hsio, 173-188. Taipei: Center for Asia-Pacific Area Studies.
- Sassen, S. 1991. *The Global City*. Princeton, NJ: Princeton University Press.
- Sassen, S. 2000. *Cities in a World Economy*. 2nd ed. Thousand Oaks: Pine Forge.
- Sassen, S. 2010. "Global Inter-city Networks and Commodity Chains: Any Intersections?" *Global Networks* 10 (1): 150-163.
- Schmitt, P., and L. C. Smas. 2012. "Multi-scalar 'Intercity Connectivities' from a Northern European Perspective." *GaWC Research Bulletin* 411. Accessed 15 March 2017. <http://www.lboro.ac.uk/gawc/rb/rb411.html>
- Sheppard, E. 2002. "The Spaces and Times of Globalization: Place, Scale, Networks, and Positionality." *Economic Geography* 78 (3): 307–330.
- Sigler, T. J., and K. Martinus. 2016. "Extending beyond 'World Cities' in World City Network (WCN) Research: Urban Positionality and Economic Linkages through the Australia-based Corporate Network." *Environment and Planning A*. (in press)

- Sjöberg, Ö., and F. Sjöholm. 2004. "Trade Liberalization and the Geography of Production: Agglomeration, Concentration, and Dispersal in Indonesia's Manufacturing Industry." *Economic Geography* 80 (3): 287-310.
- Soegijoko, B. T. 1996. "Jabotabek and Globalization." In *Emerging World Cities in Pacific Asia*, edited by F.-C. Lo, and Y.-M. Yeung, 377-414. Tokyo: United Nations University Press.
- Surborg, B. 2011. "World Cities are Just 'Basing Points for Capital': Interacting with the World City from the Global South." *Urban Forum* 22: 315-330.
- Syamwil, I. B., and P. H. Tanimura. 2000. "The Spatial Distribution of Japanese Manufacturing Industries in Indonesia." *Review of Urban and Regional Development Studies* 12 (2): 121-135.
- Taylor, P. J. 2001. "Specification of the World City Network." *Geographical Analysis* 33 (2): 181-194.
- Taylor, P. J. 2004. *World City Network: A Global Urban Analysis*. London: Routledge.
- Taylor, P. J. 2005. "Leading World Cities: Empirical Evaluations of Urban Nodes in Multiple Networks." *Urban Studies* 42 (9): 1593-1608.
- Taylor, P. J., and B. Derudder. 2016. *World City Network: A Global Urban Analysis*. 2nd ed. New York: Routledge.
- Taylor, P. J., B. Derudder, J. Faulconbridge, M. Hoyler, and P. Ni. 2014. "Advanced Producer Service Firms as Strategic Networks, Global Cities as Strategic Places." *Economic Geography* 90 (3): 267-291.
- Taylor P. J., B. Derudder, M. Hoyler, and P. Ni. 2013. "New Regional Geographies of the World as Practised by Leading Advanced Producer Service Firms in 2010." *Transactions of the Institute of British Geographers* 38 (3): 497-511.
- Taylor, P. J., D. M. Evans, and K. Pain. 2013. "Application of the Interlocking Network Model to Mega-city-regions: Measuring Polycentricity within and beyond City-regions." *Regional Studies* 42 (8): 1079-1093.
- Taylor, P. J., D. M. Evans, and K. Pain. 2008. "Application of the Interlocking Network Model to Mega-city-regions: Measuring Polycentricity Within and Beyond City-regions." *Regional Studies* 42 (8): 1079-1093.
- Taylor, P. J., M. Hoyler, and P. Verbruggen. 2010. "External Urban Relational Process: Introducing Central Flow Theory to Complement Central Place Theory." *Urban Studies* 47 (3): 2803-2818.

- Thee, K. W. 1995. "Economic Reform and Deregulation in Indonesia." *Indonesian Quarterly* 23 (2): 137–148.
- Thee, K. W. 2009. "The Development of Labour-intensive Garment Manufacturing in Indonesia." *Journal of Contemporary Asia* 39 (4): 562-578.
- Thee, K. W. 2012. *Indonesia's Economy since Independence*. Singapore: ISEAS
- Therborn, G. 2011. "End of a Paradigm: The Current Crisis and the Idea of Stateless Cities." *Environment and Planning A* 43 (2): 272-285.
- Tijaja, J., and M. Faisal. 2014. "Industrial Policy in Indonesia: A Global Value Chain Perspective." *ADB Economic Working Paper Series No. 411, October 2014*. Metro Manila: Asian Development Bank.
- Torre, A., and A. Rallet. 2005. "Proximity and Localization." *Regional Studies* 39 (1): 47–59.
- Van Meeteren, M., B. Derudder, and D. Bassens. 2016. "Can the Straw Man Speak? An Engagement with Postcolonial Critiques of 'Global Cities Research'." *Dialogues in Human Geography* 6 (3): 247–267.
- Wall, R. S., and G. A. van der Knaap. 2011. "Sectoral Differentiation and Network Structure within Contemporary Worldwide Corporate Networks." *Economic Geography* 87 (3): 267–308.
- World Bank. 2012. *Picking up the Pace: Reviving Growth in Indonesia's Manufacturing Sector*. Jakarta: World Bank.
- World Shipping Council. 2017. "Top 50 World Container Ports." Accessed 6 March 2017. <http://www.worldshipping.org/about-the-industry/global-trade/top-50-world-container-ports>
- Yang, X., B. Derudder, P. J. Taylor, P. Ni, and W. Shen. 2017. "Asymmetric Global Network Connectivities in the World City Network, 2013." *Cities* 60 (A): 84-90.
- Yeung, Y.-M. 1996. "An Asian Perspective on the Global City." *International Social Science Journal* 48 (147): 25–31.
- Yeung, Y.-M. 2011. "Rethinking Asian Cities and Urbanization: Four Transformations in Four Decades." *Asian Geographer* 28 (1): 65-83.
- Yeung, H. W.-C. 2012. "East Asian Capitalisms and Economic Geographies." In *Wiley-Blackwell Companions to Geography*, edited by E. Sheppard, T. J. Barnes, and J. Peck, 118-131. West Sussex, UK: Blackwell Publishing.
- Yeung, H. W.-C., and W. Liu. 2008. "Globalizing China: The Rise of Mainland Firms in the Global Economy." *Eurasian Geography and Economics* 49 (1): 57-86.

- Yeung, H. W.-C., and K. Olds. 1998. "Singapore's Global Reach: Situating the City-state in the Global Economy." *International Journal of Urban Sciences* 2 (1): 24–47.
- Yeung, H. W.-C., J. P. Poon, and M. Perry. 2001. "Towards a Regional Strategy: The Role of Regional Headquarters of Foreign Firms in Singapore." *Urban Studies* 38 (1): 157-183.
- Zhang, X., and R. C. Kloosterman. 2014. "Connecting the 'Workshop of the World': Intra-and Extra-service Networks of the Pearl River Delta City-Region." *Regional Studies* 50 (6): 1069–1081.
- Zhao, M., X. Liu, B. Derudder, Y. Zhong, and W. Shen. 2015. "Mapping Producer Services Networks in Mainland Chinese Cities." *Urban Studies* 52 (16): 3018-3034.

Table 1. Distribution of firms' headquarters

Cities / metropolises	Electronics ^a	Automotive and transportation ^b	Food and beverage ^c	Total
<i>National</i>	2	11	49	62
Jakarta metropolitan area	1	5	29	35
Surabaya	0	3	8	11
Medan	0	0	4	4
Other Indonesian cities	1	3	8	12
<i>International</i>	53	69	24	146
Tokyo	15	28	5	48
Osaka	5	6	1	12
Nagoya	1	11	0	12
Seoul	8	0	3	11
Singapore	1	0	3	4
Other East Asian cities	11	17	1	29
Paris	1	1	1	3
London	0	0	1	1
Stockholm	1	1	0	2
Other European cities	4	3	5	12
San Jose	4	0	0	4
Other North American cities	2	2	4	8

There are ^a2 electronics, ^b7 automotive and transportation, and ^c3 food and beverage TNCs with global headquarters located in 2 different cities/metropolises

Table 2. 30 most-connected international cities with the JMA

Rank	Cities	CDC ^a	Rank	Cities	CDC ^a
1	Tokyo	1.000	16	Dubai	0.386
2	Singapore	0.831	17	Sydney	0.349
3	Bangkok	0.683	18	Osaka	0.340
4	Shanghai	0.592	19	Toronto	0.340
5	Seoul	0.562	20	Mexico City	0.337
6	Kuala Lumpur	0.510	21	Milan	0.309
7	Paris	0.479	22	Warsaw	0.300
8	Hong Kong	0.467	23	Hanoi	0.298
9	London	0.458	24	Gurgaon	0.286
10	Sao Paulo	0.442	25	Brussels	0.283
11	Beijing	0.437	26	Istanbul	0.276
12	Metro Manila	0.430	27	Johannesburg	0.271
13	Taipei	0.401	28	Auckland	0.257
14	Ho Chi Minh City	0.396	29	Buenos Aires	0.253
15	Moscow	0.387	30	Nagoya	0.252

^aCDC is shown as a proportion of the most connected city-dyad with the JMA (Tokyo)

Table 3. 15 most-connected national cities with the JMA

Rank	City	CCDC ^a	City	GCDC ^a
1	Surabaya	1.000	Surabaya	1.000
2	Karawang	0.477	Karawang	0.884
3	Semarang	0.386	Batam	0.391
4	Medan	0.364	Pasuruan	0.377
5	Bandung	0.341	Makassar	0.319
6	Makassar	0.261	Semarang	0.304
7	Pasuruan	0.199	Medan	0.304
8	Batam	0.153	Purwakarta	0.261
9	Palembang	0.142	Bandung	0.217
10	Serang	0.131	Palembang	0.188
11	Denpasar	0.114	Balikpapan	0.174
12	Sukabumi	0.108	Sukabumi	0.159
13	Balikpapan	0.108	Serang	0.145
14	Purwakarta	0.102	Bandar Lampung	0.145
15	Banjarmasin	0.080	Kudus	0.116

^aCCDC is shown as a proportion of the most connected city-dyad with the JMA (Surabaya) for each category

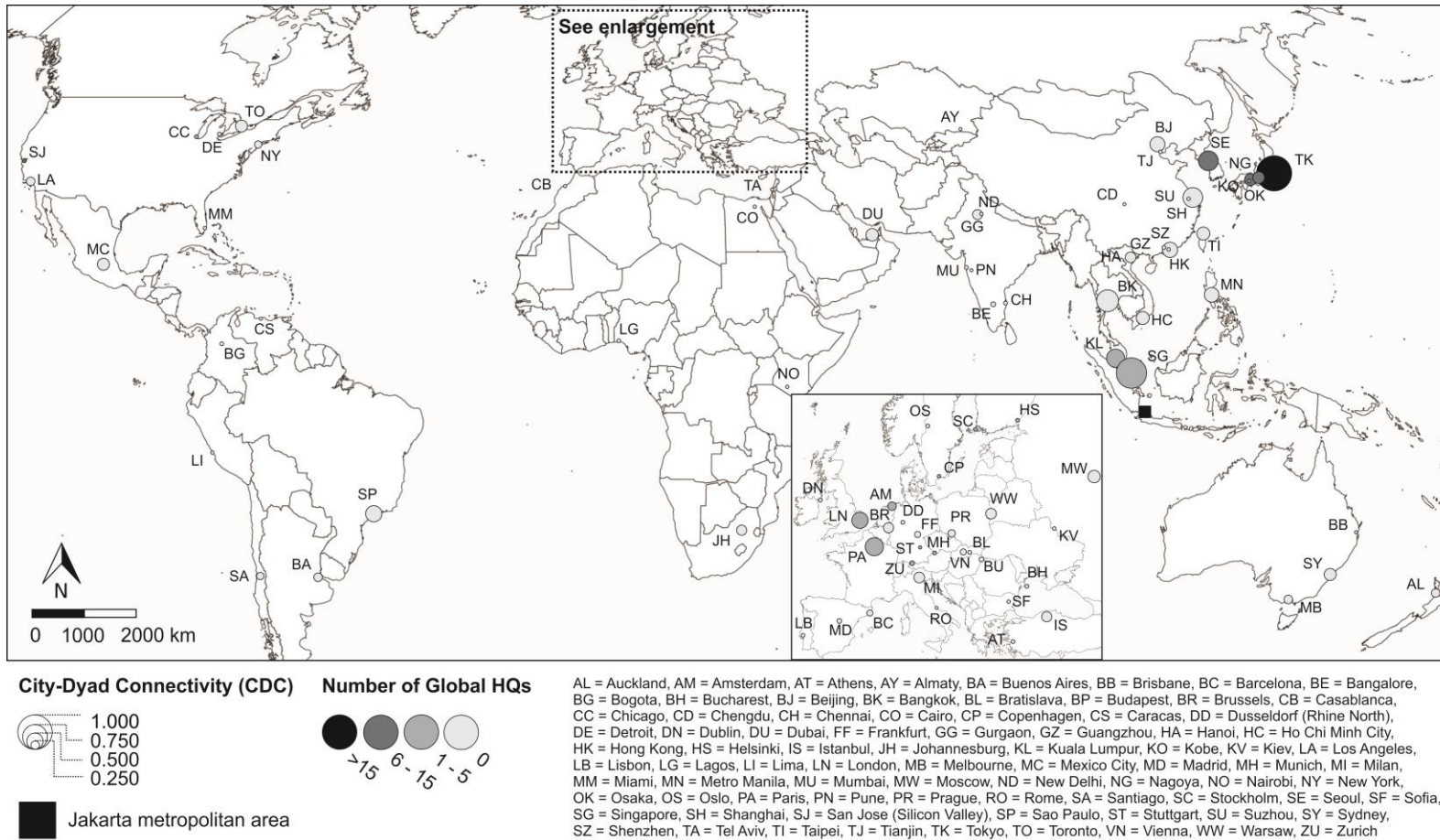


Figure 1. Most-connected international cities with the JMA (CDC > 0.1000) and their global HQs presence (source: map by Free Vector Maps, <http://freevectormaps.com>)

Note: The CDC is shown as a proportion of the most connected city-dyad with the JMA (Tokyo)

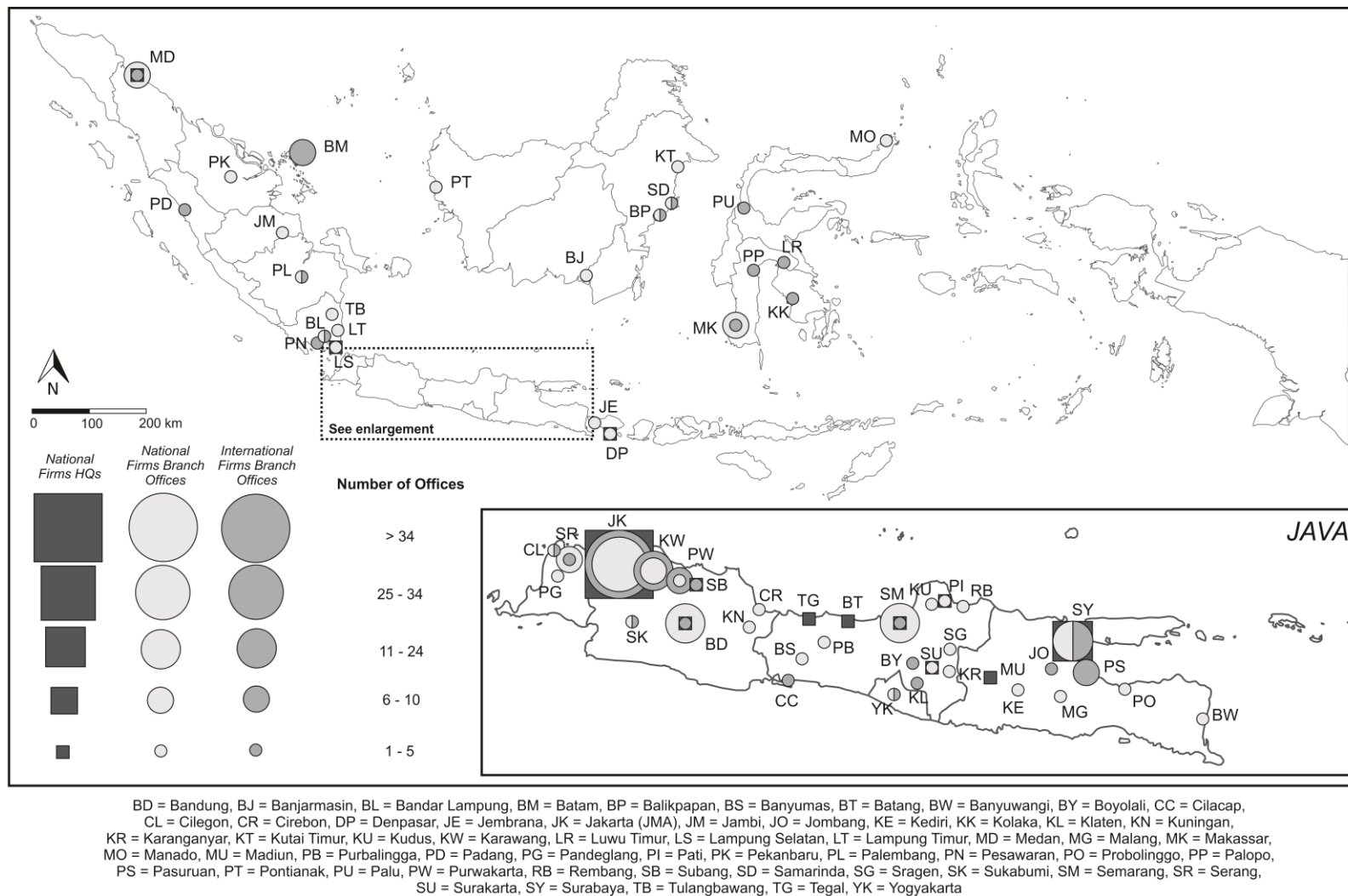


Figure 2. HQs and branch offices locations (source: map by Free Vector Maps, <http://freevectormaps.com>)

