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# How TNC subsidiaries shine in world cities: policy implications of autonomy and network connections

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The study examines the relationship between performance and patterns of autonomy and the network relationships used by the foreign subsidiaries of transnational corporations (TNCs) in world cities compared to those subsidiaries outside these locations. This is done by exploring if these patterns differ in foreign subsidiaries in Greater Copenhagen compared to elsewhere in Denmark. The findings reveal that there are important differences in the relationships between performance and the autonomy and network structures in foreign subsidiaries. These findings are discussed and policy implications distilled. The study finds that the scope of inward foreign direct investment (FDI) policy could be usefully extended to encompass urban development thereby helping cities develop assets, institutional support and infrastructure that can enhance agglomeration benefits and global connectivity. The findings indicate policies, aimed at helping subsidiaries embed in host location networks and incorporate these networks into other parts of the parent company, could be beneficial. The paper also discusses economic and social inequality that can stem from network patterns and the inclination of subsidiaries to operate autonomously in world cities. It proposes policy options that can lead subsidiaries to undertake high-value activities and innovation in world cities.

**Keywords:** autonomy; competitive advantages; network relationships; policy; world cities

## 1. Introduction

The competitive advantages for transnational corporations (TNCs) of locating in world cities stem from agglomeration benefits arising from pools of high quality and heterogeneous resource pools combined with institutional characteristics that are supportive of high value-added activities (Derudder & Witlok, 2010; Duranton & Puga, 2004; Goerzen et al., 2013; Nachum & Wymbs, 2007; Sassen, 2013; Storper, 2013). These cities also have good global connectivity with infrastructure

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that provide effective transportation of goods and people, and information technology (IT) infrastructure conducive to effective data transmission (Derudder et al., 2010; Lee & Rodríguez-Pose, 2014; Mans, 2013). Cities that provide TNCs with such competitive advantages offer attractive features that influence their location decisions (Iammarino et al., 2018; Kilroy et al., 2015; OECD. 2006). There are a wide variety of classifications of world or global cities depending on the factors considered to be important in ranking such cities (A.T Kearney, 2019; Beverstock et al, 2000; Cook & Pandit, 2018; Leff. & Petersen, 2015; Trujillo & Parilla, 2016). In most ranking systems Greater Copenhagen (the city examined in this study) is normally classified as a middle-ranking world city. It is ranked 46/500 globally and 16/156 in Europe as an innovative city (Innovation Cities Index, 2019) and as a Beta + city in the GaWC ranking (GaWC, 2018). Greater Copenhagen is not a top-ranked world city but is located in the top range of the middle-ranking world cities. Most studies on TNCs in world cities are based on the top 10 or 20 world cities or on Chinese cities that attract significant levels of foreign direct investment (FDI). Such studies often examine these locations for various types of head quarters (HQs) or for core operations of TNCs (Cook & Pandit, 2018; Derudder et al., 2018; Nachum & Wymbs, 2007; Wang et al, 2011; Zhao et al., 2005). A few studies consider cities that are not in the top range of world cities but focus on the agglomeration benefits of cities in emerging economies (Ning et al., 2016; Sridhar & Wan, 2010). This study adds to the literature by considering the organizational systems in TNCs in a type of world city that is not often examined. The implications for policy making for different types of world cities are considered in the discussion section of the paper.

Most of the literature on cities and FDI focuses on the locational factors that are attractive for TNCs (Araya, 2008; Groezen et al., 2013; Ma et al., 2013; Wang et al., 2011). The importance of the organizational systems used by TNCs to secure the benefits of these locational factors is not, however, adequately addressed in the literature. An important organizational factor permitting TNCs to secure the competitive advantages available in host locations is the configuration of autonomy and network relationships (CANR) used in their subsidiaries. The concept of CANR relates to organizational structures composed of inter-organizational network relationships (external to TNC relationships; network connections in the host location) and intra-organizational network relationships (internal to TNC relationships; within the TNC network). These network relationships exercise significant influence on the performance of subsidiaries (Andersson et al., 2001 and 2007). The coordination and control procedures for managing these external and internal relationships are set by parent companies according to the autonomy granted to subsidiaries. Autonomy refers to the degree of independence a subsidiary has to make decisions in various strategic and operational matters (Young & Tavares, 2004), that in comparable organization typically are made at a higher hierarchical level. In this paper we analyse how autonomy relates to the operation of inter and

intra-organizational networks (Ambos et al., 2011; Andersson et al., 2005). The importance of CANR for firm performance has been investigated at national level (Andersson et al., 2005 and 2007; Birkinshaw and Hood, 2000; Birkinshaw et al., 2005; Gammelgaard et al., 2012; Kawai and Strange, 2014; McDonald et al., 2008) but not at city level. This study examines this issue by considering the links between CANR and performance in subsidiaries in a world city (Greater Copenhagen) and in subsidiaries located elsewhere in Denmark.

Knowledge on the relationship between CANR and performance (e.g. sales, productivity, market share and customer satisfaction) would help strategic and operational planners in TNCs to better understand some key organizational system requirements to find, access and absorb the competitive benefits available in world cities. Public policy makers and advisers would also gain insights into the role of CANR for helping foreign firms to embed in world city locations. This has implications for the provision of and, especially, the access by subsidiaries to resource pools, supporting institutional systems and appropriate physical and IT infrastructure. Lower levels of autonomy and the organizational network linkages of subsidiaries not located in world cities are likely to have implications for regional development policy. Subsidiaries with high levels of inter and, especially, intra-organizational links are more likely to be involved in innovation and the development of technologies (Andersson et al., 2005; Bartsch and Ebers, 2011; Partuchuri, 2010). Subsidiaries not located in world cities may not have the CANR characteristics that encourage innovation and the development of technologies. This may have implications for the role of FDI to help achieve regional policy objectives such as seeking to unlock innovation and the enhancement of productivity in underdeveloped regions of a country.

To explore these issues this study examines the relationship between the performance of foreign firms and CANR and performance in subsidiaries in Greater Copenhagen compared to other locations in Denmark. As the study is based on one country there are no distortion effects introduced by the possible influence of distinctive national economic and institutional features that affect the potential for world cities to deliver good performance (McCann and Acs, 2011; Therborn, 2011). This study provides findings that shed light on how key characteristics of CANR in subsidiaries in a middle-ranked world city are related to performance. This permits informed discussion on major public policy implications for such cities and also offers some generic views about CANR in different types of world cities.

## **2. Competitive advantages in world city locations**

Converting assets available in host locations to firm level competencies to create and develop competitive advantages requires interconnections between agents in the various locations of the different parts of TNCs (Cohen and Levinthal, 1990; Teece, 1998 and 2000; Zahra and George, 2002). Developing competitive advantage requires the acquisition of assets and knowledge and the ability of firms to transform them into products and processes to create and sustain firm specific advantages (FSA) that lead to competitive advantages (Pitelis & Teece, 2010). Often firms need to cross space within the global value chains (GVC) of the industries they are situated in to obtain and absorb assets and knowledge to develop competitive advantages (Derruder et al., 2010; Dickens et al., 2001). The more heterogeneous and complex the environments in which TNCs operate, the greater is the need to develop interlinking social and business networks in the various locations in which they locate subsidiaries (Gammelgaard and McDonald, 2018; Liebeskind et al., 1996). Subsidiaries in world cities need therefore to create and sustain CANR that embed them into complex interconnected networks in host locations and to link effectively to the other locations in which TNCs operate in a GVC. Failure to create and sustain such CANR will lead to a failure to secure the potential competitive advantages available in host locations. The subsidiary strategy of TNCs therefore face the need to design, implement and operate inter and intra-organizational networks that enable them to achieve a fine balance between embeddedness in host locations and with the rest of the TNC. There is also a need to maintain control over subsidiaries through appropriate allocation of autonomy that enables TNCs to secure their GVC objectives, and simultaneously ensure that the subsidiary does not become peripheral to the strategic priorities of the parent company. Subsidiaries require appropriate autonomy to enable them to have sufficient authority to unlock the potential competitive advantages available via inter and intra-organizational networks in host locations that are woven into an effective means to provide the resources, know-how and other factors necessary to achieve the GVC objectives of the TNC (Gammelgaard et al., 2012; Kawai & Strange, 2014).

In world cities, a rich set of assets and wide array of infrastructure that provide good connectivity backed by effective institutional structures generates large potential competitive advantages for firms (Immarino et al., 2017; Sassen 2103; Storper, 2013). These potential competitive advantages are underpinned by complex networks and connectivity that leads to multifaceted and complicated business environments that make extracting and exploiting these assets a difficult task (Dicken et al., 2001; Henderson et al., 2002). Foreign firms in world cities therefore require CANR that enables them to navigate the complex economic, social and business environments of such cities to facilitate the acquisition and integration of the benefits into their GVC objectives. In locations with fewer scarce and heterogeneous resources and less developed infrastructure bundles with lower

global connectivity, the likelihood is that less complex CANR is required to secure the potential competitive advantages available in these places. This is likely to lead to CANR in such locations having simpler interconnections compared to those in world cities.

### **3. Network and autonomy relationships**

Network and knowledge-based theory indicates that the use of intra and inter-organizational networks to embed in host locations and to link to the rest of the TNC is core to subsidiary strategy that seeks to secure the competitive advantages of host locations (Andersson et al., 2001; Birkinshaw et al., 2005; Frost et al., 2002). These theoretical approaches also highlight the importance of a level of autonomy that permits subsidiaries to exploit the potential benefits of location while fulfilling the GVC objectives of parent companies (Andersson et al., 2007; Chiao and Ying, 2013; Gammelgaard et al., 2012; Mudambi and Swift, 2011; Young and Tavares, 2004). Using this theoretical foundation that emphasise the importance of networks and autonomy combined with the theory of competitive advantage in world cities, a set of hypotheses are developed on CANR in subsidiaries located in world cities and those in other locations.

#### **3.1. Inter and intra-organizational networks**

Embedment in inter-organizational networks helps to secure scarce and valuable resource bundles (Andersson et al., 2002 and 2005; Gammelgaard et al., 2012; McDonald et al., 2008). The acquisition of such resources enables the development of innovation that deliver FSA leading to competitive advantages (Pitelis and Teece, 2010; Zahra and George, 2002). The concentration of rich asset bases with supporting institutional and well-connected infrastructure systems in world cities lead to dynamic environments that are underpinned by complex network connections (Beaverstock, 2004; Cook and Pandit, 2018; Iammarino et al., 2018; Turok, 2004). Developing inter-organizational networks enable firms to embed into the “economic buzz” and effective “face to face” communication available in world cities (Jones, 2007; Storper and Venables, 2004). The pool of assets and access to well-developed networks induce subsidiaries to develop extensive inter-organizational network relationships to acquire and absorb the potential benefits for world city locations. Increasing embeddness in inter-organizational networks also helps to mitigate liabilities of foreignness and outsidership (Elango, 2009). The lesser pools of resources (normally in terms of both size and diversity) and lower levels of infrastructure and connectivity of non-world city locations are likely to lead to less intensive embedment in inter-organizational networks.

Intra-organizational relationships are also necessary to facilitate the effectual transfer of resources and knowledge across the various activities of TNCs to help embed subsidiaries into the GVCs of the industries in which they operate (Andersson et al., 2005; Frost et al., 2002; Holm, et al., 2003). Location in world cities provides good global connectivity that enhances the use of networks in world cities to link to useful agents in other locations in the world that are part of the GVCs of particular industries (Neal, 2016; Sigler and Martinus, 2016). Discovering, assessing and absorbing knowledge-intensive assets from the geographically dispersed activities of TNCs to develop effective GVCs require the development of intra-organizational networks. The more the host location provides scarce and valuable resources that can be embedded in the GVC the more likely it is that relevant subsidiaries will be strongly linked by enhancing intra-organizational networks to parent companies and other subsidiaries in the TNC (Mudambi and Swift, 2011; Reilly and Scott, 2014). This is because subsidiaries located in world cities are able to absorb knowledge from these cities but need good intra-organizational networks to transfer this knowledge to other units in the TNC. Locations that are not world cities and that have lower concentrations of scarce and valuable resources and poorer global connectivity present foreign firms with a simpler and less diverse milieu. These types of locations are therefore likely to require lower level development of intra-organizational networks to enable foreign firms to find and exploit the potential benefits available in these locations. A stronger relationship is therefore likely to exist between inter and intra-organizational network relationships and performance in world city locations compared to other regions. This reasoning leads to the first hypothesis:

**Hypothesis 1:** The development of network relationships exert a stronger effect on the performance of subsidiaries in Greater Copenhagen compared to other locations in Denmark.

### **3.2. Autonomy**

Autonomy helps subsidiaries to effectively utilize the competitive advantages in host locations by reducing the time and transaction costs expended in negotiating with headquarters for permission to develop policies and routines (Birkinshaw et al. 2005; Chiao et al., 2013; Kawai and Strange, 2014; Young and Tavares, 2004). Subsidiaries with autonomy are often better able to attract headquarters' attention and have more influence to promote initiatives to headquarters (Ambos et al., 2010; Dörrenbächer and Gammelgaard, 2016). Subsidiaries that develop high levels of autonomy can better engage in entrepreneurial activities as local managers often have a better understanding of important factors in negotiations in host locations. This enhances the potential to achieve good and/or innovative deals at lower cost and risk than if the decisions require approval from some distant headquarters.

Studies also find that marketing innovations and subsidiary growth connects to evolving autonomy (Johnson and Medcof, 2007; Vernaik et al., 2005). Given the lower concentrations of scarce and valuable assets, lower levels of “economic buzz” and global connectivity in locations that are not world cities there is a reduced likelihood that making important deals will be a regular feature in such locations. This implies less need for quick and low-cost decision taking at local level and consequently a lower requirement for developing high levels of autonomy. These arguments suggest it is likely that there is a stronger relationship between developing autonomy and performance in world cities compared to firms in other locations. The second hypothesis is therefore:

**Hypothesis 2:** The development of autonomy exerts a stronger effect on the performance of subsidiaries in Greater Copenhagen compared to other locations in Denmark.

### 3.3. Interconnections between networks and autonomy

The ability of TNCs to secure and exploit potential competitive advantages available in host locations depends in large part on the use of the many possible interconnections within their CANR (Birkinshaw et al., 2005; Chiao et al., 2013). Evidence exists, at the national level, that effective connections between autonomy and the various inter and intra-organizational network relationships of foreign firms affect performance (Gammelgaard et al., 2012). The capacity of firms to accurately assess and transform into competitive advantages the potential benefits available in world city locations depends on careful balancing and control of internal and external relationships to achieve the strategic objectives (Cohen & Levinthal, 1990; Elango, 2009; Pitelis and Teece, 2010; Zahra and George, 2002). The processes involved in managing GVCs to create and sustain competitive advantages therefore require effective development of connections between the various components of CANR. Enhancing the autonomy of subsidiaries enables them to construct and operate systems amenable to effective management of the complex interconnections between a variety of internal and external networks used by subsidiaries (Gammelgaard and McDonald, 2018; Mudambi, 2011; Mudambi and Swift, 2011).

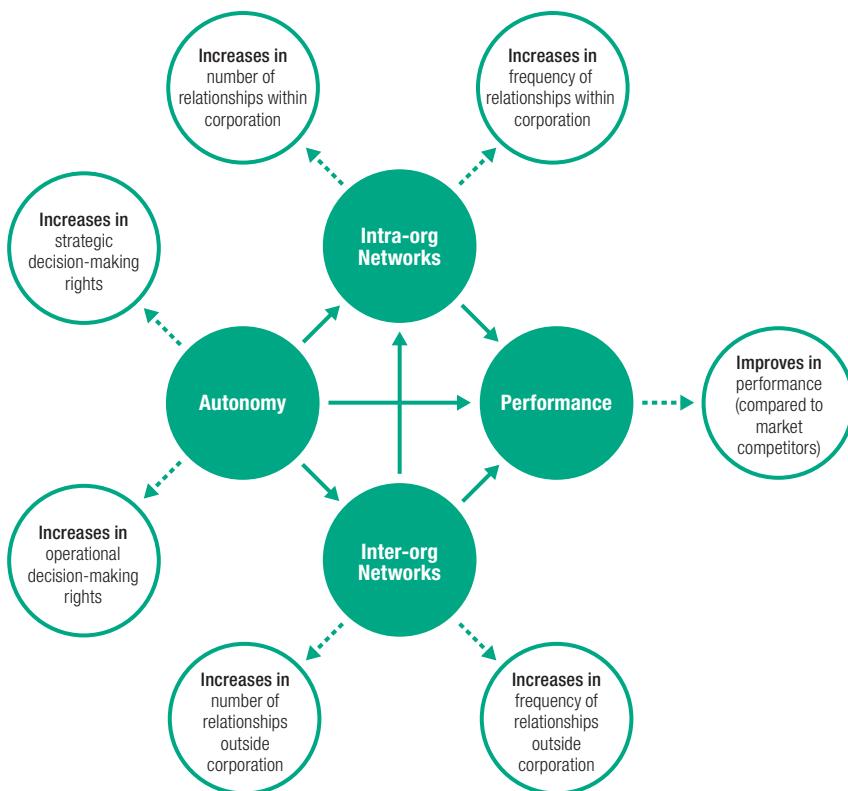
The scarce and valuable nature of the resource pools and global connectivity in world cities provide potential benefits requiring foreign firms to develop sophisticated CANR capable of securing these advantages. This requires complex communications between the various parts of CANR to negotiate and implement the many deals that enable the acquisition and transformation of the potential benefits into competitive advantages. Locations that are not world cities do not have the same scarce and heterogenous pools of knowledge-based assets and connectivity as world cities and therefore do not require the same level of

sophisticated interconnections in CANR to obtain the desired benefits from these locations. The final hypothesis is therefore:

**Hypothesis 3:** The development of interconnections within CANR in Greater Copenhagen exerts a stronger effect on the performance of subsidiaries firms compared to other locations in Denmark.

The model for the pathways from CANR to performance used in this study follows the approach commonly employed in studies on this phenomenon (Gammelgaard et al., 2012). This model considers both direct and indirect effects to examine not only how autonomy and networks exercise a direct influence on performance but also how interaction between these factors influence performance outcomes (see Figure 1).

**Figure 1. Conceptual Model**



## 4. Greater Copenhagen as a world city

Greater Copenhagen (the City of Copenhagen and the North-Eastern part of Zealand) is a city region with a large and growing pool of high knowledge-intensity firms (Hansen et al., 2014; Winther and Hansen, 2006). Greater Copenhagen was a centre of manufacturing activities in the early post-war years, which evolved into a city region largely based on services and knowledge-based industries (Maskell, 1986). The evolution of Greater Copenhagen as a knowledge-based city region followed from developments such as an electro-medical instruments cluster (Lotz, 1993). The knowledge base of the city grew with the integration of research skills in Danish universities leading to the creation of the Medicon Valley cluster, which is the third most successful biotechnology cluster in Europe (Drejer et al., 1999; Steinfield and Scupola, 2008). Professional services and knowledge-based industries cluster more strongly in Greater Copenhagen compared to the rest of Denmark, as is reflected in employment patterns, which is also evident in foreign-owned companies located in Denmark (Nielsen et al., 2009). Greater Copenhagen is a centre of creative and design services with institutional systems that support the evolution of professional services (Vinodrei, 2015). Although there are pockets of knowledge-based industries outside of Greater Copenhagen, the largest concentration of knowledge-based industries is in Greater Copenhagen (Drejer et al., 1999). Labour productivity is considerably higher in the Greater Copenhagen labour market areas compared to the rest of Denmark (Timmermans and Boschma, 2014).

Greater Copenhagen has approximately 20 per cent of the population of Denmark but has larger concentrations of knowledge-based industries than is suggested by the proportion of the population. The high density of population in Greater Copenhagen relative to the rest of Denmark and the concentration of firms, governmental and non-governmental institutions appear to give advantages that make it the leading city region in Denmark. Greater Copenhagen together with Stockholm, moreover, provides major centres in the Nordic area with knowledge-based assets and institutions supportive of high value-added activities. Greater Copenhagen is therefore likely to confer potential competitive advantages in Denmark and the Nordic countries and may possess niche advantages in knowledge-based industries in the global economy. The potential competitive advantages of Greater Copenhagen make it a suitable city to assess whether a world city has characteristics that can lead to different CANR compared to other locations in the same country. As Denmark is culturally and institutionally quite homogenous across regions, comparison of the CANR of subsidiaries is unlikely to be affected by significant divergences as a result of heterogeneous cultural and institutional distinctions between world city regions and other regions.

## 5. Data gathering and analysis

The data for the study comes from a survey of foreign-owned subsidiaries located in Denmark. The design and administration of the survey follows the procedures recommended by Dillman (1991) supplemented by suggestions from Harzing (2000) and Harzing and Noorderhaven (2006) to improve the rigour of survey-based data gathering. The respondents were CEOs of subsidiaries in Denmark. The sampling frame came from the Experian database and yielded 2,996 firms covering all foreign-owned firms in Denmark. The survey achieved a response rate of 15 per cent. Tests for representativeness using industry characteristics indicate no significant differences. Non-response bias was tested using wave analysis, based on the observation that late respondents to mail surveys tend to be similar to non-respondents. The comparison of early and late respondents using variables on industry, age, entry mode, and nationality of CEO revealed no significant differences in response.

The partial least square (PLS) modeling approach is used (Asmussen et al., 2013; Ciabuschi et al., 2011; Vernaik et al., 2005) because this technique has advantages over Lisrel and AMOS (Hair et al., 2011). The PLS model operates with two sets of linear equations: an inner model that specifies relationships between latent variables and an outer model analyzing relationships between the latent variables and associated manifest variables. This permits the simultaneous analysis of path coefficients between latent variables and path coefficients between these variables and their constructs (Fey et al., 2009). This allows for an assessment of the reliability and validity of the measurement model, as well as an assessment of the structural model (Hulland, 1999). The PLS method is also effective in guarding against skewed distributions of manifest variables, multi-collinearity within blocks of manifest variables and between latent variables. The method also effectually deals with issues with omitted data (Cassel, Hackl and Westlund, 1999). The *t*-statistics emerging from bootstrapping procedures makes the results more reliable, as it uses repeated random samples (Vernaik et al., 2005) and the total effects include both direct and indirect effects (Albers, 2010).

### **Variables**

The model has four main constructs: “autonomy”, “inter-organizational network relationships”, “intra-organizational network relationships”, and “performance”. Data for these constructs involved the current period and five years before. Using change over five years alleviates problems of capturing special conditions that prevail in the current time period when the respondents complete the questionnaire. This is not therefore a cross-section study. Extending the period would in principle provide an even better guide to the underlying use of networks and autonomy of

subsidiaries but previous work involving performance data reveals that a five-year time span provides more accurate information than longer periods (Peng and York, 2001). This approach also provides an explicit relationship in real time between observed scores (or manifest variables) and the latent variables (Borsboom et al., 2003).

To capture rich data, the constructs used multiple questionnaire items using five-point Likert scales, for example, respondents provided data on the number and frequency of network relationships, using a five-point Likert scale for the current situation and five years before. The latent variable then becomes an amalgamation of the changes in the number and frequency of the various organizational network relationships. In PLS, each variable has a weight (a coefficient) that reflects the importance of the manifest variable for the latent variable. The *t*-tests for the outer relations (manifest variables) indicate whether those coefficients (weights) are significant. The coefficients for the manifest variables are determined and the R-square for the inner relation maximizes the structural model.

All constructs are self-reported information and are subjective measures. This method is widely used in the literature and there is evidence that this provides reliable and valid results (Venkatraman and Ramanujam, 1986). There are difficulties in measuring the performance of TNC operations because of problems of collecting accurate, valid performance measures using questionnaires (Miller et al., 2009; Luo, 2003). Management decisions, however, are not guided solely by objective performance indicators but are likely to be influenced by the perceptions and values of managers (Thompson, 2003). Many objective financial performance indicators are, moreover, suspect because of corporate governance systems, transfer pricing and tax avoidance issues connected to company reporting procedures (Demirbag et al., 2007; Guest et al., 2003). Furthermore, using subjective measures based on an assessment of performance in relation to their competitors permits comparison of establishments across size categories and industries (Ellis, 2007). Given these reservations about objective measures, this study used subjective measures of performance.

The performance variable uses a five-item measurement frequently used in other studies (Birkinshaw et al., 2005; Gamelgaard et al., 2012): Sales Growth by Volume, Sales Growth by Value, Productivity; Customer Satisfaction, and Market Share. Respondents assessed each of these performance items relative to their market competitors on a scale of one (much better) to five (much worse). The constructs intra- and inter-organizational networks followed Holm and Pedersen (2000). These items measure the number and frequency of a subsidiary's relationships with a range of partners. Intra-organizational partners included: Buyers, Suppliers, R&D and Innovation Centers and Other Units within the TNC. Inter-organizational partners included Customers, Suppliers, Competitors, Governmental Institutions, Universities and Science Centers. Both inter and intra-organizational relationships

were measured as the number of relationships on a scale ranging from one (none) to five (many), and as the frequency of contact with networks on a scale of one (low) to five (high). Measurement of autonomy followed Young and Tavares (2004), using strategic decision-making (policy decisions) and operational decision making (tactical decisions). The measurement of strategic and operational decision-making autonomy uses approaches and measurement scales adapted from Birkinshaw and Hood (2000). The items related to strategic decision-making authority were policies on: Market Areas Supplied, Product Range, R&D and New Product Development, Production of Goods or Services, Financial Control and Human Resource Management. Areas of operational decision-making were: Marketing Activities, R&D and New Product-Development Activities; Activities related to Producing Goods or Services, Financial Management Practices and Human Resource Management Practices. For the strategic and operational decision-making items, respondents assessed the extent of their decision-making autonomy on a scale from one (exclusively by headquarters) to five (exclusively by the subsidiary). Table 1 provides the composite variables reliabilities, Cronbach's alpha values and the R<sup>2</sup>, which indicate that the composite variables used in the PLS are robust.

**Table 1. Composite Reliabilities, Cronbach's Alphas, and R<sup>2</sup>**

	Within Greater Copenhagen/outside Greater Copenhagen*		
	Composite Reliability	Cronbach's Alphas	R <sup>2</sup>
Autonomy	<b>0.94/0.94*</b>	<b>0.93/0.93*</b>	-
Inter-organizational networks	<b>0.89/0.84*</b>	<b>0.85/0.80*</b>	<b>0.18/0.00*</b>
Intra-organizational networks	<b>0.88/0.84*</b>	<b>0.85/0.81*</b>	<b>0.56/0.41*</b>
Performance	<b>0.86/0.89*</b>	<b>0.79/0.84*</b>	<b>0.37/0.20*</b>

Note: Composite above 0.70 for each construct (Fornell & Larcker, 1981). Cronbach's alpha values above 0.70 (Hulland, 1989). When using the PLS technique, one variable (in this case Autonomy) is 'locked' and R<sup>2</sup> are reported in relation to this variable.

The control variables included in the model were: host country, size (number of employees), type of industry, entry mode (greenfield, acquisition) and if the firm was some kind of headquarters. These types of control variables have been used in other PLS tests (Fey et al., 2009).

The Harmon single factor test revealed no evidence of common methods variance (Podsakoff & Organ, 1986). In response to the view that this test is not sufficient (Chang et al., 2010) and following Podsakoff et al. (2003) and Conger et al. (2000) a single common methods factor approach using a latent common method variable was created and compared with our mode. The results of this test indicated no statistically significant likelihood of common methods variance. Following the

advice of Podsakoff and Organ (1986) the questionnaire separated questions that respondents might link. Therefore, questions about performance came before questions about autonomy and networks. The construction of change variables (current and five years ago) and the use of the complex data formulations used by the techniques of PLS also help to mitigate possible problems with common methods variation (Hair et al., 2011; Siemsen et al., 2010). Based on the test results, method of constructing the questionnaire and use of PLS the results are unlikely to be subject to common methods variance.

## 6. Results

Examination of the general profile of subsidiaries in Denmark (Table 2) reveals no significant differences in the characteristics of subsidiaries in Greater Copenhagen with those located elsewhere in Denmark. There are also no statistically significant differences in the use of autonomy and inter and intra-organizational network relationships (Table 3). Subsidiaries in Greater Copenhagen are not in substance significantly different from those in other parts of Denmark, including the use of autonomy and network relationships. In the context of Denmark and perhaps other

**Table 2. Profile of Foreign Firms (%)**

		Greater Copenhagen	Outside Greater Copenhagen
<b>Sector (Parent Company)</b>	Manufacturing	70.0	70.2
	Service	17.8	21.0
	Others	12.2	8.8
<b>Size (Employment)</b>	1 – 10	39.8	39.4
	11 – 100	50.2	49.4
	>100	10.0	11.2
<b>Activity<sup>1</sup></b>	Production of Goods or Services	20.0	20.0
	Sales/Distribution	47.5	49.0
	Ancillary Service Functions	17.5	14.3
	R&D/New Product Development	2.4	2.8
	Others	12.6	13.9
<b>Entry Mode</b>	Greenfield Investment	72.5	71.0
	Acquisition	27.5	29.0

<sup>1</sup> By employment according to activity.

Chi-square tests and pair-wise T-tests reveal no significant differences in characteristics of foreign firms located in Greater Copenhagen compared to those outside.

**Table 3. Networks and Autonomy<sup>1</sup>**

	Greater Copenhagen	Outside Greater Copenhagen
Inter-Organizational Relationships	3.11	2.98
Intra-Organizational Relationships	3.03	3.12
Strategic Autonomy	2.87	2.80
Operational Autonomy	3.28	3.18

<sup>1</sup> Based on average scores of construct items at current level.

Chi-square tests and pair-wise T-tests reveal no significant differences in characteristics of foreign firms located in Greater Copenhagen compared to those outside.

similar countries the general characteristics of subsidiaries appear to be unaffected by geographical location. Examination of how CANR relates to performance, however, reveals differences between subsidiaries located in Greater Copenhagen compared to elsewhere in Denmark.

The PLS tests of the pathways (see Figure 1) provide evidence on the three hypotheses. The findings provided support H1 for intra-organizational networks (Table 4). Intra-organizational network relationships significantly influence performance in Greater Copenhagen, but not in other locations in Denmark. Inter-organizational network relationships have, however, no significant direct effect on performance in or outside of Greater Copenhagen. There is no support for H2, as autonomy has no significant direct effects on performance in Greater Copenhagen, or in other locations (Table 4). The results therefore indicate that the direct effects of autonomy and networks on performance do not significantly differ (other than for intra-organizational network relationships) in locations in Greater Copenhagen compared to other locations in Denmark.

The results of the indirect effects (interconnections) between autonomy and network relationships and performance highlight, however, that the effect of these interconnections is in general stronger in Greater Copenhagen. This provides support for H3 (Tables 4). Autonomy has significant positive effects on intra-organizational network relationships both within and outside of Greater Copenhagen. The relationship between autonomy and inter-organizational network relationships is, however, only significant in Greater Copenhagen. The link from inter to intra-organizational network relationships to performance is significant only in Greater Copenhagen. The paths from autonomy via intra and inter-organizational networks to performance are positive within and outside of Greater Copenhagen but are positive at the 1 per cent level in Greater Copenhagen and 10 per cent outside of Greater Copenhagen. The results highlight that outside of Greater Copenhagen, fewer of the interconnections between the factors in CANR are significant.

**Table 4: PLS Tests**

		Greater Copenhagen			Outside Greater Copenhagen		
		Original Sample	Sample Mean	t-Statistics <sup>1</sup>	Original Sample	Sample Mean	t-Statistics <sup>1</sup>
Path Coefficients	Intra-organizational network relationships → performance	0.54	0.52	3.99**	0.25	0.24	1.13
	Inter-organizational network relationships → performance	-0.00	-0.00	0.02	0.11	0.13	0.50
	Autonomy → performance	0.12	0.15	0.76	0.22	0.22	1.16
	Autonomy → Intra-organizational network relationships	0.29	0.30	2.47***	0.42	0.41	2.70***
	Autonomy → Inter-organizational network relationships	0.42	0.42	2.85***	0.04	0.08	0.12
Total Effects	Inter-organizational network relationships AND intra-organizational network relationships → performance	0.31	0.29	2.40***	0.23	0.25	1.26
	Autonomy VIA intra AND inter-organizational network relationships → performance	0.41	0.44	3.25***	0.34	0.33	1.89*
	<b>Inner Model t-Statistics</b>						
<b>Greater Copenhagen</b>				<b>Outside Greater Copenhagen</b>			
Autonomy	Inter	Intra	Performance	Autonomy	Inter	Intra	Performance
-	2.85	2.47	0.76	-	0.12	2.70	1.57
-	-	6.16	0.02	-	-	3.15	0.50
-	-	-	3.39	-	-	-	1.13

Note: <sup>1</sup> = t-Statistics: Original Sample divided by Standard Error; \*p<0.10, \*\*p<0.05, \*\*\*p<0.001.

The picture that emerges from the results is that the interconnections within CANR in Greater Copenhagen are more related to performance than is the case for other locations in Denmark. The interconnection with CANR appears to help subsidiaries to find, assess, acquire and transform the potential competitive benefits available in Greater Copenhagen and this contributes to the performance of subsidiaries. These interconnections effects are at work in the CANR of foreign firms outside of Greater Copenhagen, but there are fewer significant interconnections and they tend to have less strong effects on performance. The findings indicate that the performance of subsidiaries in Greater Copenhagen are more associated with intra-organizational networks and more interactions between autonomy and networks compared to subsidiaries not located in Greater Copenhagen. This suggests that to secure and absorb the agglomeration and connectivity benefits available in Greater Copenhagen subsidiaries develop different CANR compared to those outside of this city.

## **7. Policy implications**

The emphasis in this study on a world city (Copenhagen), which is a middle-ranking world city with good regional connectivity to Nordic countries well as other world cities, provides insights useful for a wider audience of policy makers and investment stakeholders in both developed and emerging countries. A main take-away from this investigation is that policy makers need a good understanding of the organizational systems used in internationalization processes within TNCs. These systems enable them to deliver good performance and to contribute to overall TNC objectives, competitiveness and performance (Gilmore, Andersson and Nemar, 2008; Buzdugan and Tüselmann, 2018). Good performance by subsidiaries encourages TNCs to expand and develop in host locations and good intra-organizational network relationships enhance the innovation activities of TNCs in host locations. This has implications for policies that are conducive to safeguard and/or further progress world city regions, as well as for the development of nascent or emerging world city regions.

Existing FDI policy is centred on developing the key components of agglomeration benefits of city regions and promoting these to attract TNCs (Taube & Mehmet, 2012). The findings of this study support the view that FDI policy could usefully be extended to innovations in developing business networks in host locations that encouraged subsidiaries to become active and important players in these networks (Fu et al., 2013; Ning et al., 2016). The development of appropriate inter-organizational networks by subsidiaries in their host locations could encourage spillovers of knowledge and access to assets from subsidiaries to domestic firms. The importance of intra-organizational networks for subsidiaries in world cities also suggests useful policy innovations. Subsidiaries with good inter and

intra-organizational network connections can find, access and absorb agglomeration benefits available in host locations and can effectively incorporate these benefits into the GVC objectives of TNCs. This would help domestic firms in world city locations to gain access to GVCs that could help them acquire knowledge assets from other parts of the world. The results indicate that subsidiaries in world cities with appropriate autonomy are more likely to be able to effectively manage inter and intra-organizational networks to achieve high performance. This suggests that the CANR of subsidiaries in world cities are an important factor for foreign firms to make good contributions to the development of their host locations. The findings indicate that policy could usefully be developed to encourage subsidiaries in world cities to embed in local business and to have the autonomy to be able to effectively use inter and intra-organizational networks to enhance their performance thereby encouraging further investments in the host location. Such policy is also likely to enhance the spillover of knowledge and access to GVCs to domestic firms based in world cities.

Developing world cities in underdeveloped regions to help spread the benefits of globalization across countries is evident in many countries, notably in China (Zünd and Bettencourt, 2019). World cities can also exert centripetal forces that attract the best assets, infrastructure and global connectivity (Goerzen et al., 2013). These centripetal forces may mean that policies to create world cities in poorer regions and to attract FDI to such cities could weaken the economic potential of towns and rural areas in these regions (Tomaney and Pike, 2019). The findings of this study indicate that policies to encourage subsidiaries in world cities to develop effective CANR are likely to enhance their performance. This encourages further investment and innovative activities by such subsidiaries that can enhance agglomeration benefits thereby increasing the centripetal forces of world cities. Policy that develops CANR that enhances performance could therefore encourage an upward spiral of development in world cities but with an accompanying downward spiral in towns and rural areas. This problem is evident in many countries and contributes to the development of strong anti-globalization movements that adversely affect trade and FDI (Meyer, 2017). This suggests that policy connected to developing CANR needs to take account of regional policy issues.

The findings indicate that subsidiaries not located in middle-ranked world cities are not substantially different in the activities they undertake from foreign firms in world cities. Their CANR is also similar to that of those located in such cities. The CANR of subsidiaries in non-world city locations is, however, less sophisticated. This is probably because incentive to have highly developed CANR in non-world city locations is reduced because the benefits in terms of securing high-value knowledge and assets to enhance the objectives of the TNCs are lower in these locations. This suggests that the CANR of subsidiaries in world city locations are more likely to firmly embed them in host locations, making them more location bound than subsidiaries

in non-world cities. High-level autonomy and network connections, particularly intra-organizational network connections, are important for subsidiaries to be strongly involved in innovation and the transfer of new technologies (Andersson et al., 2005; Paruchuri, 2010). The CANR of subsidiaries in world cities are more likely therefore to facilitate innovation activities. Promoting location bound activities and innovation associated with TNCs in underdeveloped regions is likely therefore to be enhanced by the development of some type of new world city in such regions. To enhance the ability of TNCs to contribute to development of new world cities in underdeveloped regions requires not only development of the conditions for agglomeration benefits and global connectivity but also to nurture CANR developments that are conducive to developing new world cities.

UNCTAD's Investment Policy Framework for Sustainable Development (UNCTAD, 2015) calls for FDI policies that are in harmony with the development goals of host countries. This implies that FDI policies should be developed that encourage the attainment of regional development goals. In the context of policies that embrace CANR, the findings of this study imply that subsidiaries located in world cities should be encouraged to link with networks in towns and rural areas near their locations. This would help to link these areas into the more dynamic activities taking place in world cities. Those subsidiaries located in towns and rural areas should be supported to develop CANR that link to domestic firms in more dynamic locations and with other parts of the parent company of the subsidiaries. Perhaps the most useful policy would be to encourage the development of CANR that helps subsidiaries in world cities to find, access and develop potential competitive advantages available in these towns and rural areas. The attraction of towns and rural areas can include: less congestion, lower costs and cheaper property prices. These locations may also offer attractive labour market conditions if unit labour costs are lower than in world cities. This is likely to be the case in lower value activities. Moving lower valued-added activities to towns and rural areas is likely to boost employment and income and could, with appropriate accompanying policies, help kick start development in such areas. Towns and rural areas also often have higher quality living conditions compared to busier and congested cities and can therefore be more attractive locations for high-valued activities that do not depend on physical proximity to secure agglomeration benefits available in world cities. Encouraging subsidiaries to develop CANR that seek to improve performance by linking to locations not in world cities may therefore help to achieve regional policy developments.

The increasing use of digital technologies also offer prospects to mitigate many of the obstacles arising from geographical location through the use of digital platforms that can organize trade, investment and services across space (Baldwin, 2011, UNCTAD, 2019). Digital business models can facilitate effective linkages over geographical space to enable meaningful participation in dynamic business environments in world cities. The ability of TNCs to contribute to these kinds of

regional policy developments is at least partially dependent of subsidiaries in dynamic places such as world cities having CANR characteristics that enable them to reach beyond their world city milieu. Developing policy aimed at encouraging CANR that embrace regional development objectives may therefore be a useful addition to policy.

Development of policy in world cities needs to take into account the wide variety of world city types (Beaverstock et al., 1999 and 2000, Taylor, 1997). Industries have diverse characteristics that require different types of locations (Beverstock et al., 2002; Dicken et al., 2001; Jones, 2007). These factors imply that a variety of types of world city exist that have different focuses with a wide range of clustering of sectors, industries and sub-industries and an increasing variety of business services and support activities. This highlights the possibility that subsidiaries in the different types of world cities may require CANR to be tailored to the conditions that prevail in the wide variety of economic conditions in such cities. Several types of economic conditions in a variety of world cities have been identified (Trujillo and Parilla, 2016). This suggests that it is possible that there are different characteristics of CANR associated with good performance in various types of city. The development of digital technologies is also encouraging the expansion of specialization in world cities leading to increasing diversity in the types of such cities (Eden, 2016; UNCTAD, 2019). The results of this study suggest that policy needs to address not only the asset, infrastructure and global connectivity in a wide variety of world city types, but that policies are also required that to foster appropriate CANR in the subsidiaries located in these diverse types of world cities.

An important development requiring examination is to assess the ability of emerging economy TNCs to develop CANR that can secure the potential advantages available in world cities. These TNCs are normally in the early stages of development and are often seeking to acquire know-how to enable them to operate effectively at the high-value end of GVC (Guillén and García-Canal, 2009; Luo and Rui, 2009). They also frequently lack experience of dealing with economic and institutional distance and commonly have different FSA and country-specific advantages compared to TNCs from advanced economies (Luo and Tung, 2007). These factors lead to latecomer disadvantages that the TNCs seek to reduce by internationalizing (Mathews, 2012). Emerging economy TNCs may, however, have some latecomer advantages arising from the development of innovative approaches used to overcome the liabilities of "emergingness" that they face (Madhok and Keyhani, 2012; Wu et al., 2010). Emerging economy TNCs are likely to have strategic and operational objectives that are different from advanced economy TNCs'. In these circumstances, they may have a different approach to creating and developing CANR that can fulfil their objectives. This poses a policy challenge to help develop CANR in such subsidiaries that allows them to embed and contribute to the development of world cities and to secure the strategic and operational objectives of their parent companies.

## 7. Conclusion

The findings of this study provide some key take-aways for policy. The characteristics of CANR in subsidiaries in world cities are important for their performance and therefore affect the likelihood that they will expand and deepen their activities in such cities. Policy that helps to develop appropriate CANR is therefore likely to be helpful for the effective creation and evolution of world cities. World cities face challenges from changes in economic, technological, social and political environments that require firms to adapt to these changes. The results of this study underscore the need to include policy to help the development of CANR in subsidiaries to the extent that they contribute effectively to key issues related to how firms influence the creation and development of world cities and their adjustment to fast changing environments. Failure to adopt and develop policy to secure the appropriate evolution of CANR may undermine the performance of subsidiaries thereby putting at risk the development or even the continuing presence of TNCs in world cities. Policy innovations that encourage the development of appropriate CANR in subsidiaries in world cities that can help to achieve key economic and social objectives, such as regional development objectives, are also likely to be helpful to achieve such objectives. This would also help to address concerns about TNCs contributing to economic inequality that can hinder the ability of TNCs to embed in the social and political milieu in host locations and come to be regarded as valuable partners in the process of spreading the benefits of economic activity in world cities.

The findings of this study, based on only one type of city in one country, need to be extended by research to discover the key characteristics of CANR that delivers good performance in different types of world cities and in the wide variety of countries in which TNCs locate. This would help to inform appropriate policy development for CANR in the diverse milieus in which world cities exist, or are being developed. This study indicates the need for the development of a CANR aspect in policy concerning FDI in world cities. It does not, however, provide any indication on the ways that policy makers could encourage the development of effective policy in this area. Conducting case studies and experiments on how policy can affect TNCs to embed in their host locations in world cities would be helpful to provide knowledge on how to develop effective policy in this area. This would enable policy to emerge that can encourage TNCs to become important and effective agents in creating and sustaining world cities. This should include how subsidiaries can help to address a variety of social and political objectives that could alleviate perceptions that TNCs contribute to economic inequality and other social and political problems associated with globalization.

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