

Nordic 'intercity connectivities' in a multi-scalar perspective

Peter Schmitt and Lukas Smas

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Nordic co-operation

Nordic co-operation

takes place among the countries of Denmark, Finland, Iceland, Norway and Sweden, as well as the autonomous territories of the Faroe Islands, Greenland and Åland.

The Nordic Council

is a forum for co-operation between the Nordic parliaments and governments. The Council consists of 87 parliamentarians from the Nordic countries. The Nordic Council takes policy initiatives and monitors Nordic co-operation. Founded in 1952.

The Nordic Council of Ministers

is a forum of co-operation between the Nordic governments. The Nordic Council of Ministers implements Nordic co-operation. The prime ministers have the overall responsibility. Its activities are co-ordinated by the Nordic ministers for co-operation, the Nordic Committee for co-operation and portfolio ministers. Founded in 1971.

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Stockholm, Sweden, 2012

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Preface

This report was initiated by the Working Group for the exchange of experience and knowledge development (Urban Policies) under the Nordic Council of Ministers.

In their joint Regional Policy Co-operation Programme for the years 2009-2012, the Nordic ministers with responsibility for regional policy seek to inform us about the common actions they want to take within the field of regional policy and territorial planning. The Nordic Working Group on Urban Regions is part of this Programme.

One of the most important tasks of this Nordic Working Group is to contribute to the creation of knowledge about the new trends in urban and regional development resulting from globalisation processes.

Globalisation makes networks of firms more important than ever before. In order to produce, firms are selling goods and services to each other, they establish different patterns of connections related to buying and marketing, and they amalgamate and build branch plants. Firms are located at different locations and their relationships thus also represent geographical connections between different cities or towns. The division of labour between different cities is becoming increasingly important for the activities within individual cities.

Connections between cities are expressed through the practices of different actors. Such connections are to be found between firms, inside corporations, between different branches and between institutions of all kinds. These actors build connections between each other often designating different functions or tasks to people employed or engaged in the corporation process or the

institution in different cities. The roles designated within different networks thus determine what actually happens in a specific place, town or city. Global pipelines are significant and might even become more decisive for urban growth and economic well-being.

Economic growth in the Nordic countries is increasingly connected to knowledge activities. Such activities can be defined as those delivering input to businesses and production in the form of qualified services as e.g. financing, ICT, designing and marketing. The geographical connections between firms engaged in these activities are thus of specific interest for regional development and regional policy.

The relationship between a city and the outside world is often described by referring to the city's participation in the global division of labour. The Working Group is however interested in going one step further by moving from a general description of a specific city's role in the division of labour to highlighting the connections between specific cities - thus drawing geography of flows. The Working Group wishes to explore this new paradigm for regional development, based on networks, connections, flow theory and global pipelines.

Against the backdrop of this type of reasoning the Working Group asked Nordregio to carry out this project on the connectivities within the core area of knowledge intensive business services (KIBS) related, specifically, to Nordic metropolitan regions.

Nordic Working Group on Urban Regions
Nordic Council of Ministers

A few words from the authors

We, the authors, would first of all like to thank the Working Group for the exchange of experience and knowledge development (Urban Policies) for their feedback, support and for the stamina they showed throughout this study. This is worth mentioning since the work on the empirical part of this project saw several challenges emerge which significantly slowed the project's rate of progress.

We would also like to take this opportunity to thank all of our collaborators at Nordregio: Veera Lehto, Aslı Tepecik Diş and Moa Hedström for undertaking the lion's share of the empirical analysis upon which this study is based, as well as Mitchell Reardon and Johanna Roto for designing the many illustrative maps in this report. We would also like to thank Michael Hoyler (Senior Lecturer in Human Geography and Associate Director of the Globalization and World Cities Research Network at Loughborough University, UK) for his valuable feedback on methodological issues. Last but not least, we want to thank Ben Derruder (Geography Department, Ghent University, Belgium) for sending us the latest data from a survey on the world city network from 2010 (cf. Table 1).

Peter Schmitt and Lukas Smas (May 2012)

Executive summary

Right from the beginning, when the Working Group for the exchange of experience and knowledge development (Urban Policies) was set up in 2009, the potentials and possibilities relating to the exploration of inter-city relations in a Nordic perspective were discussed. A seminar on this topic was organised in September 2009 where around 30 policymakers and researchers were gathered together to further discuss contemporary and innovative approaches to the study of relations between cities. Inspired in particular by the work of the Globalization and World Cities Research Network (GaWC, cf. exemplary Taylor 2004) and the POLYNET-study (cf. Hall/Pain 2006) on exploring connectivity values for cities through intra-firm office networks, a ‘modified Nordic-based bottom-up study’ was designed and carried out by Nordregio. The present report illustrates and discusses the results of this quantitative study, which was conducted between January 2010 and December 2011.

Similar to the POLYNET-study (cf. Hall/Pain 2006), we also used a select number of metropolitan areas (here Stockholm, Helsinki, Oslo and Copenhagen) as geographic focal points. By using data sources from 2010 we explored the network connectivities of cities through the multi-scalar locational strategies of ‘Financial and Market service firms’ as well as ‘ICT service firms’. In other words, we analysed the extent to which our sample of firms in the given branches connect each of these four Nordic capital regions with other cities at the national, Nordic, European and global scales. The calculated values define aggregated linkages between each Nordic capital region and all other cities at the respective scale by the presence and functional importance of offices (in the respective sector). Hence these values express the extent to which cities are interconnected through the analysed sample of firms at the national, Nordic, European or global scale, by considering only those intra-firm networks that incorporate (in terms of office locations) at least either the Stockholm, Helsinki, Oslo or Copenhagen metropolitan area.

The report begins by discussing the underlying specific conceptual approach, as well as the applied methodology, data sources and also the restrictions of this survey and reflects critically on the explanatory power of the approach. The results are then discussed and contrasted between the two chosen sectors, as

well as between the four Nordic capital regions. Specific focus here is placed on the scale dependency, i.e. the different patterns in regards to the connectivity of the Nordic capital regions related to other cities within their respective countries, at the Nordic, but also at the European and global scale. These results are then presented in a number of maps and tables.

Our results at the national scale indicate quite clearly the relative monocentricity of Nordic national urban systems. One explanation for this is certainly the unitary nature of the Nordic nation states compared, for instance, to Federal Systems which might have fortified this picture. Also the relatively small critical mass of the Nordic national cities here in terms of their city-regional market potentials for the two sectors under consideration is another aspect of note, since many of the analysed firms serve the national market with only a small number of offices.

Considering the non-Nordic (i.e. European scale) it appears that the Iron Curtain has been overcome to a large extent, since we see a rather balanced ‘West-East picture’ here. But there are some differences between the two sectors; the ICT service sector seems to be more oriented towards Western Europe. In particular the factual geographic proximity to the major cities of the Baltic States (here in particular the comparatively small markets in and around Tallinn, Riga and Vilnius) is mirrored in terms of strong ‘intra-firm proximity’.

The most surprising results, particularly as compared to recent global top-down approaches (cf. Taylor *et al.* 2010, 2011), are to be found at the non-European (i.e. global) scale. Indeed most of the cities with the highest global network connectivities are also to be found in our Top 25 list (such as New York, Tokyo, Shanghai, Singapore etc.). It is however interesting to note the extent to which the pattern of cities (and their connectivity indices) belonging to global macro-regions (such as Middle and South America, Asia) are changing between the four maps of the Nordic capital regions. It appears that in this perspective the Nordic capital regions seem also to be well-connected with these emerging or fast growing macro-regions/countries or cities at the global scale.

In terms of policy implications one central lesson from this study is the need to challenge established notions and perceptions of the national, Nordic and even European and Global urban systems.

Since our results illustrate a ‘relational perspective’ in terms of urban systems, they challenge our traditional maps as well as our policy frameworks in so far as they focus on the networking agent (i.e. the firm) and the decisions/practices of specific key actors instead of a static ensemble of institutions and infrastructures, which are qualified in terms of market size and/or the economic performance of spatial units within jurisdictional boundaries. Certainly such a relational perspective is less tangible and before formulating concrete ‘place-based’ policies, one needs to further investigate the nature of such relations and what could be done in order to optimise them.

This study represents, in this sense, an initial attempt to re-think established notions relating to the Swedish, Danish, Finnish or Norwegian urban system and their integration into other urban systems which continue to dominate our strategic policy approaches. An in-depth survey focusing on firms and on the rationales and functioning of intra-firm networks as well as on the particular role of the city at hand could, in our view, offer further interesting results which

themselves would be the basis from which to inform and fine-tune urban policies in this respect.

From a Nordic perspective we would like to suggest a more complementary approach. Certain path-dependences and degrees of functional economic specialisation exist among the Nordic cities in general and the four Nordic capital regions in particular. Here one could try to optimise place-based policies in order to strengthen the relative inter-city connectivity of the one or other city/capital region (e.g. in terms of ICT services). This should be done, however, in careful cooperation with other Nordic cities in order to avoid a situation where Nordic cities each follow similar strategies. Such an occurrence could lead to unhealthy competition and to the less efficient application of policy incentives, due in general to the small market size and the high level of integration prevalent across the Nordic economies. One should also be careful when comparing and contrasting the maps and tables in this report since the firms differ from capital region to capital region.

1. Nordic-based intercity connectivities: concepts, methods and data

1.1 Purpose and scope of the study

Right from the beginning, when the Working Group for the exchange of experience and knowledge development (Urban Policies) was set up in 2009, the potentials and possibilities relating to the exploration of inter-city relations in a Nordic perspective were discussed. A seminar on this topic was organised in September 2009 where around 30 policymakers and researchers were gathered together to further discuss contemporary and innovative approaches to the study of relations between cities. Inspired in particular by the work of the Globalization and World Cities Research Network (GaWC, cf. exemplary Taylor 2004) and the POLYNET-study (cf. Hall/Pain 2006) on exploring the ‘connectivities’ of cities through intra-firm office networks, the working group decided to set up a related survey with a specific Nordic focus. This has required a number of modifications in regards to methods and data (cf. below), but also in particular concerning some conceptual issues (cf. chapter 1.2).

The present report illustrates and discusses the results of this quantitative study, which was conducted between January 2010 and December

2011. The Working Group has functioned as a kind of ‘sounding board’ throughout this process and has commented on the preliminary findings. In addition, and in view of the limited mature of resources, the Working Group helped also to define the scope of the study, as strategic decisions had to be undertaken relating, for instance, to the number of ‘Nordic focal cities’, their geographic demarcations and the selection of economic sectors (cf. below).

Before outlining and discussing the results, it is necessary to explain the background and major concepts that have been used here. This will be done in the form of a short synthesis of the area of research to which our study is related (cf. chapter 1.2). The specific methodology used will then be summarised (cf. chapter 1.3). These two chapters will help the reader not only to understand issues related to the origin and calculation of the data (cf. in particular the many tables in the appendix), but also with the interpretation and positioning of the results of this study, which are explained in part 2).

1.2 Conceptualising inter-city connectivities

Economic transformation processes, the rise of the knowledge economy and the application of new technologies have each played an important role in the change of focus in respect of the role of cities in both policy terms and in spatial research over the last three decades. Cities have increasingly become important strategic elements within the political debate in particular in terms of the ongoing discourses around territorial competitiveness and

cohesion. Specifically a more economic figure of thought suggests that some specific cities are playing a critical role in the global network economy, often labelled as Global or World Cities. These cities are conceptualised as being central nodes in the space of multifarious flows since they (apparently) provide the appropriate functional profile to take part, to a relatively high extent, in transnational flows of capital, commodities,

knowledge, labour, tourists and cultural symbols than cities at a lower level of the urban hierarchy. In this sense, they function as important 'hubs' for instance in relation to the interaction of skilled labour and their 'tacit knowledge', as control centres for financial assets or as the major points of origin for the generation of different kinds of innovations (i.e. social, cultural organisational, process-related and material). Consequently, this specific policy discourse is targeted at the extent to which a given city can be considered as providing the competitive assets to sustain (or even improve) its socio-economic performance in a globalising world.

The academic debate surrounding these issues has focused in particular on the emerging networks of cities and their (re-configured) hierarchical relations caused by (more or less) tangible labour divisions and functional differentiation (see for example Friedmann 1986, Sassen 1991, Taylor 2004, Taylor *et al.* 2010). This has been followed by distinct selections and rankings of cities at both the national and, particularly, at the international scale. In recent years a number of international business magazines or consultancies, which base their investigations upon some specific and partly questionable indicators, have produced such rankings about the world- or global-'cityness' of a selected number of candidates (cf. the recent study by the international consulting company ATKearney in 2012).

Nonetheless, the aforementioned geo-economic transformation has helped to change our perception of cities, or city-regions respectively, from sub-national, bounded areas to nodes in global networks and, finally, to 'regional motors of the international economy' (Scott 2001). As a response to this we now witness an increasing global competition to attract first-class technological, social and cultural infrastructures (real assets), human resources and transnational firms. However, despite the flattening potential of information and communication technologies (ICT) and decreasing transport costs, the aforementioned flows are not initiated by, or directed to all cities in the same way, so that the world, in the words of Florida (2005), can be still described as a 'spiky place'. Since only a small number of cities can be characterised as 'outstanding' urban nodes in this respect, other cities can be qualified rather as being of secondary (or even less) importance, be it at the national, at the European or at the global scale. These considerations formed the starting point for this study, namely to position a number of Nordic cities within this changing geography of urban systems at different scales.

Inter-city connectivities through the lenses of knowledge intensive business services (KIBS)

Cities (or city-regions respectively) are connected by flows of information, capital, goods, ideas and persons, travelling along infrastructure routes such as roads, railways, airlines and, increasingly, telecommunication linkages. Contemporary urban studies place great emphasis on the significance of these networks in explaining the economic, social and cultural functioning of cities (cf. Castells 2002, Sassen 2010, Taylor 2004).

In so doing, the authors emphasise that by using such a relational perspective it is possible to complement (or overcome) a more static understanding of place-based functions, infrastructures, institutions etc., which is rather concerned with the city's critical mass (in terms of population or jobs) and its infrastructural endowment. The empirical study of flows, as well as the factual integration (the so-called connectivity) of the city at hand in these resulting inter-city networks is, however, a challenging task.

Many such studies have, for instance, used transport flows to get an indication of the extent to which cities are interacting in this perspective. Here indicators such as the origin and destination of flights have been used (cf. the analysis in Schmitt/Dubois 2008:58-60 for the metropolitan areas in the Baltic Sea Region). Other more in-depth approaches consider data on airline bookings as a better estimate of the factual flows of passengers between (airport) cities (cf. Derudder *et al.* 2010a), although the problem still remains the need to filter out business related flights from those motivated by other reasons. This approach also overemphasises those cities with well-equipped airports and corresponding strategies by the operating airlines and thus tends to neglect second or third tier cities in national urban systems, as they are generally less integrated into international airline networks. In addition it is important to bear in mind that the hub and spoke system is not only shaped by e.g. the infrastructural endowments and market sizes of city-regions, but also by the specific strategies and capacities of the various airlines involved to exploit (profitable) air links.

Another approach has been developed within the Globalization and World Cities (GaWC) Research Network (cf. e.g. Taylor 2004, Taylor *et al.* 2010). Here 'intra-firm office networks' of Advanced Producer Services (APS) are considered in order to anticipate 'service flows' between cities. Since a direct measurement of the myriad of such flows is hardly possible (cf. the discussion by Derudder 2008) this method can be used as a surrogate regarding the analysis of the intensity of

knowledge-based flows between office locations and, more generally, between cities in the world economy. The resulting interlocking network model of inter-city relations thus helps to interpret advanced producer service firms as key actors in world-city network formation.

In an interlocking model the network-making agents are not the nodes but are to be found within the nodes thus producing three levels of operation: sub-nodal, nodal and net. In our analyses the APS (= Advanced Producer Firms, which are by definition almost similar to those that we call here KIBS, note by the authors) firms constitute the sub-nodal; they 'interlock' cities through their everyday servicing work. It is the flows of information, knowledge, direction and advice in planning and strategic work for clients across firms' offices that create worldwide inter-city relations. These can be electronic messages, telephone conferences, face-to-face meeting through expert travel that together, across myriad APS firms, have generated a world city network. The key point is that cities are the service centres (nodes) in this model but they are not the agents: world city network formation is the work of APS firms (Taylor et al. 2011).

Based on the observation that many such APS-firms have created global networks of offices to provide a seamless service to their corporate customers, one can consider each office network as the outcome of a firm's specific locational strategy. Hence, through flows of information, ideas, people and their tacit knowledge etc., such firms build-up linkages between their offices and, more abstractly, between the cities where these offices are sited.

In recent years this interlocking network model of the Globalization and World Cities (GaWC) Research Network has been enlarged and fine-tuned. From a spatial and methodological perspective two approaches can be distinguished: a so-called 'top-down approach' that studies the world city network from the perspective of the world's largest advanced producer service firms (cf. Taylor 2001, Taylor et al. 2010, Taylor et al. 2011), and a 'bottom-up approach' that considers key knowledge-intensive firms located within a selected number of cities or metropolitan areas (cf. Hall/Pain 2006, Grove/Blotvogel 2011, Lüthi et al. 2010, Lüthi et al. 2011). The present study has used such a bottom-up approach by using the four Nordic capital regions (Stockholm, Copenhagen,

Helsinki and Oslo) as starting points for our investigations in a multi-scalar perspective (cf. chapter 3).

Nevertheless, one should not forget that the interlocking network model (and its several modifications and applications) represents just one approach to the approximation of very specific flows. It allows only for the construction of a rather rudimentary picture in respect to inter-city connectivities as it does not capture at all the imaginative multifarious flows related to commodity chains and their inherent logics nor all thinkable places which actually constitute the nodes and hubs for the origin, destination and crossing of such flows (cf. Castells 2002, Sassen 2010). In addition, one could argue that the investigated connectivities represent an extremely small portion of the city's functional profile as being a centre of economic, social, cultural and political life (cf. Smith/Timberlake 2002).

Some findings from the 'top-down' application of the interlocking network model

The following table illustrates some of the most recent findings that have been produced by the key scholars within the Globalization and World Cities (GaWC) Research Network (cf. Taylor et al. 2011). It illustrates the application of the interlocking network model, yet within a top-down approach (cf. chapter 1.3 for our application of a bottom-up approach).

It should also be noted here that the data calculated in the table is based upon the 175 most important service firms in total (cf. for further details on the selection process Taylor et al. 2010b, 7-8). The roster of cities for this survey included some 525 cities in total. These are thus the centres where the APS firms have installed (for strategic reasons) offices to service their clients. The calculation of the so-called global network connectivities followed the same principles as explained in chapter 1.3 (cf. here steps 6 and 7).

Compared to previous studies with a similar approach, but slightly different set of firms (because of mergers, bankruptcies, firms doing well/poorly etc.) and in part also because of the smaller roster of cities, we nevertheless see the same picture emerge among the top placed cities with London, closely followed by New York, having the highest relative Global Network connectivity in this respect. In the ranks below, however, several changes have occurred, such as the rise of Singapore and the relative decline of cities such as Tokyo, Frankfurt and Amsterdam (cf. also Derudder et al. 2010b for a

comparison of 2000 and 2008 data). Most interesting from our perspective is the position of the Nordic Capital Cities. Here we can see similar tendencies as compared to the two other aforementioned European cities, namely a relatively decline in significance as regards the formation of service firms' networks. One explanation for this is certainly that the ongoing geo-economic shift favours the rise of service centres e.g. in the BRIC-countries (such as Shanghai, Beijing and Moscow), as well as centres such as Seoul, Tel Aviv, Riyadh etc., which in turn leads to a relatively weaker position for already established service centres in this respect, such as many European and American Cities (cf. Derudder *et al.* 2010b, 1873).

Table 1. *GaWC 2011 Ranking of Global Cities*

rank	city	relative GNC
1	London	100.00
2	New York	94.63
3	Hong Kong	72.80
4	Paris	69.23
5	Singapore	68.30
6	Tokyo	62.23
7	Chicago	62.19
8	Shanghai	61.96
9	Sydney	60.79
10	Dubai	60.46
	:	:
45	Lisbon	39.60
46	Johannesburg	39.12
47	Stockholm	38.88
48	Düsseldorf	38.49
49	Prague	37.77
50	Philadelphia	37.72
	:	:
55	Berlin	36.31
56	Houston	35.91
57	Copenhagen	35.81
58	Athens	35.46
59	Tel Aviv	34.93
60	Cairo	34.71
	:	:
70	Oslo	32.32
71	Kiev	32.20
72	Caracas	31.96
73	Luxembourg	31.85
74	Bucharest	31.63
75	Chennai	30.72
	:	:
85	Detroit	27.16
86	Geneva	27.15
87	Nicosia	27.11
88	Brisbane	27.00
89	Helsinki	26.53
90	Birmingham (UK)	26.47

Source: Taylor et al. (2011).

1.3 About this study: interpretation of results and methodological notes

How to construe the results

As noted previously the methodology used in this study is largely based on the work of the Globalization and World Cities Research Network (GaWC) (cf. Taylor 2004) and the more recent GUCP¹/GaWC project as presented in Taylor *et al.* (2010a), but has been modified in some crucial respects in order to respond to the specific objectives of this study. In contrast to the aforementioned GUCP/GaWC project, which basically uses global lists of large firms (e.g. provided by the 'Forbes Global 2000' list) as a starting point to explore (in this sense 'top-down') the extent to which firms belonging to a specific sector act to inter-connect cities through their office networks, we decided instead on a 'bottom-up approach' similar to the POLYNET-study (cf. Hall/Pain 2006). This entailed use of the aforementioned interlocking network model to analyse the extent to which each Nordic capital region (here the metropolitan areas of Copenhagen, Helsinki, Oslo and Stockholm) is connected with other cities by such 'intra-firm office networks' at different spatial. In other words, our analysis indicates the extent to which intra-firm office networks incorporate the four Nordic capital regions with other cities at the national, Nordic, European and global scale in the sectors selected by the Working Group (i.e. Financial and Market services and Information and Communication Technologies). In so doing, we have considered so-called 'non-local firms' that have, for instance, at least one office in the Stockholm capital region and at least one other office in a Swedish city and/or abroad (i.e. in another Nordic, European or non-European city).

Otherwise, in technical terms, we have in principal followed the data collection and processing for a 'top-down approach' as illustrated in Taylor *et al.* (2010, 412-425) for steps 6 and 7, whereas steps 1 to 5 are specific modifications for our 'bottom-up' approach which uses the four Nordic capital regions as 'focal points'.

A crucial step here has undoubtedly been to study the functional importance of each office within its intra-firm network. Here the question was to assess whether the particular office under consideration in the city at hand was, for instance,

the firm's headquarters or only a minor office with few significant employees. In sum, we have studied:

- indications of the size/importance of a presence in a city (e.g. number of employees working in an office, number of offices), and
- indications of whether the office carries out extra-local functions for the firm (e.g. management, research).

Because the form of the information gathered is unique to each firm we needed to convert it into a common data matrix to enable comparisons to be made across firms and cities. Service values indicate how important a city is within the operation of a firm's overall network of offices. To illustrate the results of this exercise we calculated two values: 'direct connectivities' and 'network connectivities'. The first depicts the extent to which e.g. the city of Bergen is directly linked to Oslo through firms that have at least one office in the Norwegian capital region and another located elsewhere. In other words, this value defines the 'linkages' between the two, whereas (as regards the ICT service sector) for Bergen the calculated value is 51 and for Oslo per definition 100, since the value is indexed, i.e. size and function of offices in Bergen relative to Oslo. The latter ('network connectivities') expresses the aggregated linkages between each Nordic capital region and the respective city at various scales in the respective sector.

The word 'aggregated' here means that the values incorporate not only the connectivity of e.g. the city of Turku in direct relation to the Helsinki capital region in the sector at hand, but also the extent to which Turku is connected to all other cities at this particular spatial scale (here for instance within Finland). Hence the value of 48 for Turku (here ICT service sector and related to the Helsinki Region, which is per definition valued as 100) indicates the extent to which Turku is interconnected within the 'Finnish' urban system through the sample of ICT service firms (all of which have at least one office in Helsinki) used for this study (see map 6). In this sense we have explored the extent to which the four Nordic capital regions are interconnected through intra-firm office networks with other cities at four different spatial scales (national, Nordic, European and global).

As touched upon above through the use of Turku as an example, this methodology allows us

¹ = Global Urban Competitiveness Project

not only to generate some interesting insights in respect of the extent to which ‘other Nordic cities’ (e.g. Reykjavik, Odense, Gothenburg, Bergen or Pori) are interlocked with the Nordic capital regions in the first place, but also to which the intra-firm office networks that include the Nordic capital regions can link them with other cities at the respective spatial scale (e.g. national or Nordic).

The same goes for the European (here non-Nordic) and global (here non-European) scales: The proportionate connectivity of London related to the Copenhagen Region is 135 in the Financial and Market service sector, which means that London is not only highly related to Copenhagen, it also shows a ‘very’ high connectivity in relation to all other cities at this particular spatial scale (here the European one) (see map 13). Despite the fact that in this particular dataset only non-local firms that have at least one office in the Copenhagen capital region were considered, London displays an even higher connectivity than that of Copenhagen (which is per definition 100). This indicates London’s central position in this sector *per se* (which is also confirmed by the aforementioned ‘top-down study’ by Taylor *et al.* 2011a) as it is literally ‘a spider in the net’ that (at least potentially) inter-connects firms ‘across this particular sector’ in many European cities (and certainly also beyond). Using the same set of firms (and their corresponding intra-firm networks related to the Copenhagen capital region) at the global scale, New York City and Singapore can also be easily identified as such central hubs, since their network connectivities are also above 100 and thus higher than that of the Copenhagen capital region (see map 17). This is noteworthy insofar as we should recall that we have considered here a ‘Copenhagen biased set of firms’, which means that all firms have an office in the Copenhagen capital region, but apparently most of them also have an office in New York and Singapore which is, in many cases, of even higher functional importance.

To sum up, the network connectivity value can be understood as a potential approximation of ‘intra-firm’ linkages in the city at hand. A comparatively high value thus expresses the fact that the city at hand has a (relatively) high ‘intra-city connectivity for the sector that is under consideration expressed by the sample of firms studied. Having said this, it is worth mentioning once again that such ‘linkages’ are captured through the physical office location and functional importance of a particular firm (or a set of firms). Hence, these linkages are thus the result of strategic place of location decisions by the respective responsible persons of the firm(s) at hand. In addition, we should stress here once again that

terms like linkages or even relations remain problematic, since we have not considered how those can be further characterised nor how (or to what extent) they are in fact articulated through particular flows (e.g. communication and information, different sorts of knowledge, financial means etc). The only indication in this respect is that not only the presence of the particular office of firm ‘a’ or ‘b’ in city ‘x’ or ‘y’ has been analysed, but also its functional importance within its intra-firm network. Here the question was to justify whether the particular office under consideration in the city at hand is, for instance, the firm’s headquarters (which received the value 5) or an office of minor importance with few employees (which received the value 1). Consequently, as noted previously, the applied methodology can be viewed as a surrogate for the anticipation of linkages or relations between firms and, in this sense, also cities, due to the firm’s physical presence (and service work) there.

To analyse the factual relations expressed by different kinds of flows within one firm or even across a number of carefully selected firms would thus be an interesting and significant further step to take, and represents something which could be effectively tackled in a follow-up study. As such then, the results presented here (cf. part 2) illustrate only an understanding of how firms, in relation to the geographical outreach of ‘their’ offices in a particular pre-defined set of cities, try to serve specific markets (e.g. to be close to their clients/other firms etc.). So we can see that firm ‘a’ has developed (perhaps over the period of some decades) a unique internal office network. We assume that there are some strategic decisions behind this though without knowing the exact rationales. This issue could also provide a useful starting point for a follow-up study. As noted previously, by calculating the network connectivity values we consider how the city under consideration inter-connects a specific sample of firms (at least potentially) ‘across this particular sector’. Again, we can say for instance that in London with a comparatively high connectivity value of 135 (here expressed through intra-firms networks that incorporate the Copenhagen capital region) there is apparently a high potential for factual ‘inter’-firm linkages across this sector (here financial and market services), although we have not studied any particular intra-firm relations *per se*.

A final remark which will help to set our results in their proper context is that we have selected our sample of firms based on a specific Nordic database that gave us data about the physical presence of firms in the respective Nordic capital region and sectors (ranked by its annual turnover). As the selected set of non-local firms with the

highest annual turnover differ for the most part between the four Nordic capital regions, the direct comparability between them is limited. Naturally, the same goes for comparisons between the two chosen sectors as the set of firms also differ. Direct comparisons across scales within one Nordic capital region are, however, reasonable as they stem from the same set of firms. These and other aspects will be further highlighted below, where the methodology and the data sources are further explained.

Research design: An analysis undertaken in seven steps

Although explanations about methods and data are normally left only for those who have a specific interest in these issues, we would encourage readers to go through this section as it is fundamental to understanding the results as presented in Chapter 2.

The research design was rolled out in a ‘seven step’ process, which will be further explained below. For each step a number of decisions had to be taken in close cooperation with the Nordic Working Group in order to define the scope of the study.

Step 1: Functional Demarcation of the four Nordic capital regions

As the four Nordic capital regions formed the focal points of our study we had to make a comparable functional demarcation at the city-regional level. This was crucial given the fact that the core municipalities of the four differ enormously in terms of size (population and jobs). In addition, we wanted to enlarge the respective geographic scope since service firms do not necessarily only place their offices in the inner city areas of these Nordic capital regions, but often locate in adjacent municipalities, thus making it necessary to take into consideration the entire city-region’s assets as a location factor.

The principal method chosen to demarcate the four Nordic capital regions has been derived from previous approaches (cf. Knapp/Schmitt 2003), although we have chosen here a slightly simplified version of this approach. One basic principle has been to initially identify significant economic cores (here defined by the number or

concentration of jobs) and the areas from which these economic centres draw their workforce, and extend their economic influence (in-commuting to these cores). These two constitutional parameters were tested with several ‘numeral indices’. The resulting Functional Urban Regions (FURs) are the outcome of the Working Group’s discussion to define reasonable geographic entities that best capture the urban economies and their intra-regional relations.

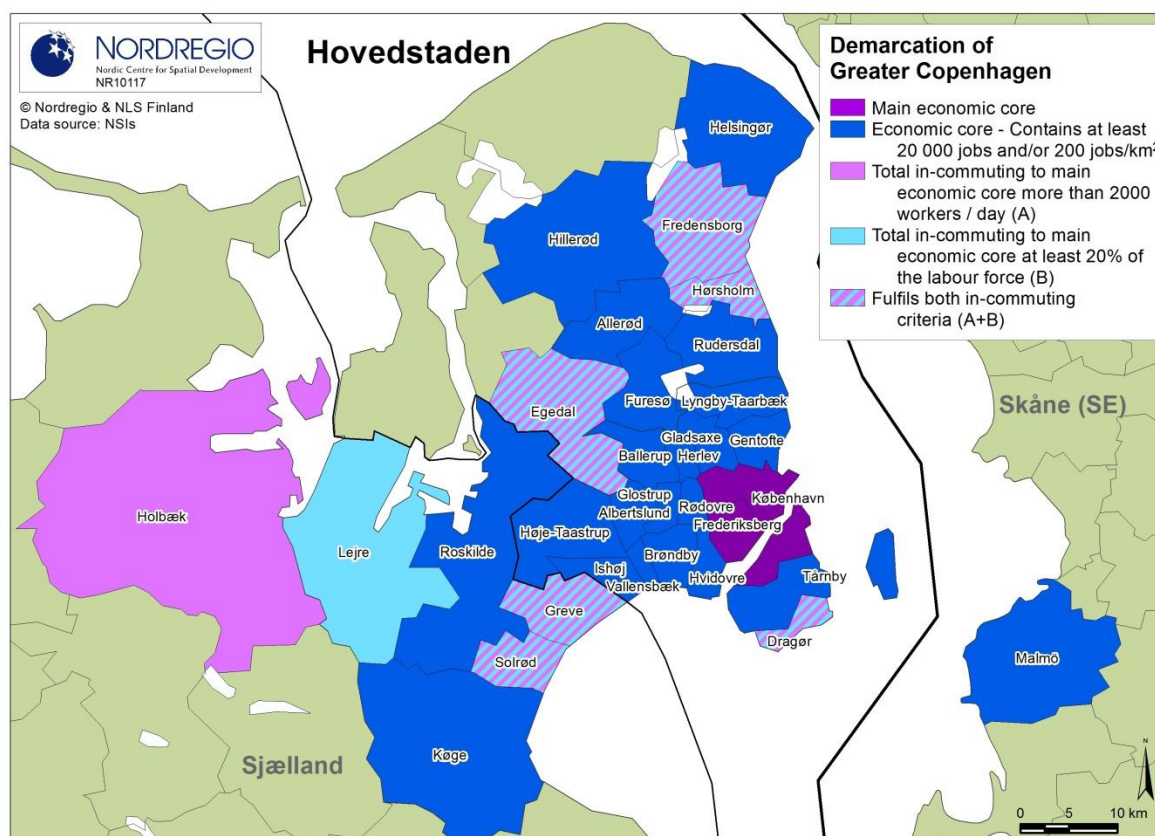
The economic cores define a municipality containing at least 20,000 and/or 200 jobs per km². The other municipalities belonging to the Nordic capital region in question are then added from where 20% or more of their economically active population work in the ‘main’ economic core, namely, the municipalities of Oslo, Stockholm, Helsinki and Copenhagen. In order to define the outer border of the capital regions the contiguity criteria has been applied, which means that only those municipalities that, together with the economic cores, form a contiguous metropolitan area, were considered. In the following the results of this exercise are illustrated based on NordStat data from 2007 (see map 1-4).

Hence, these functional demarcations help to make meaningful comparisons between the four Nordic capital regions. Nonetheless, differences in terms of size (here in respect to population and jobs) still remain.

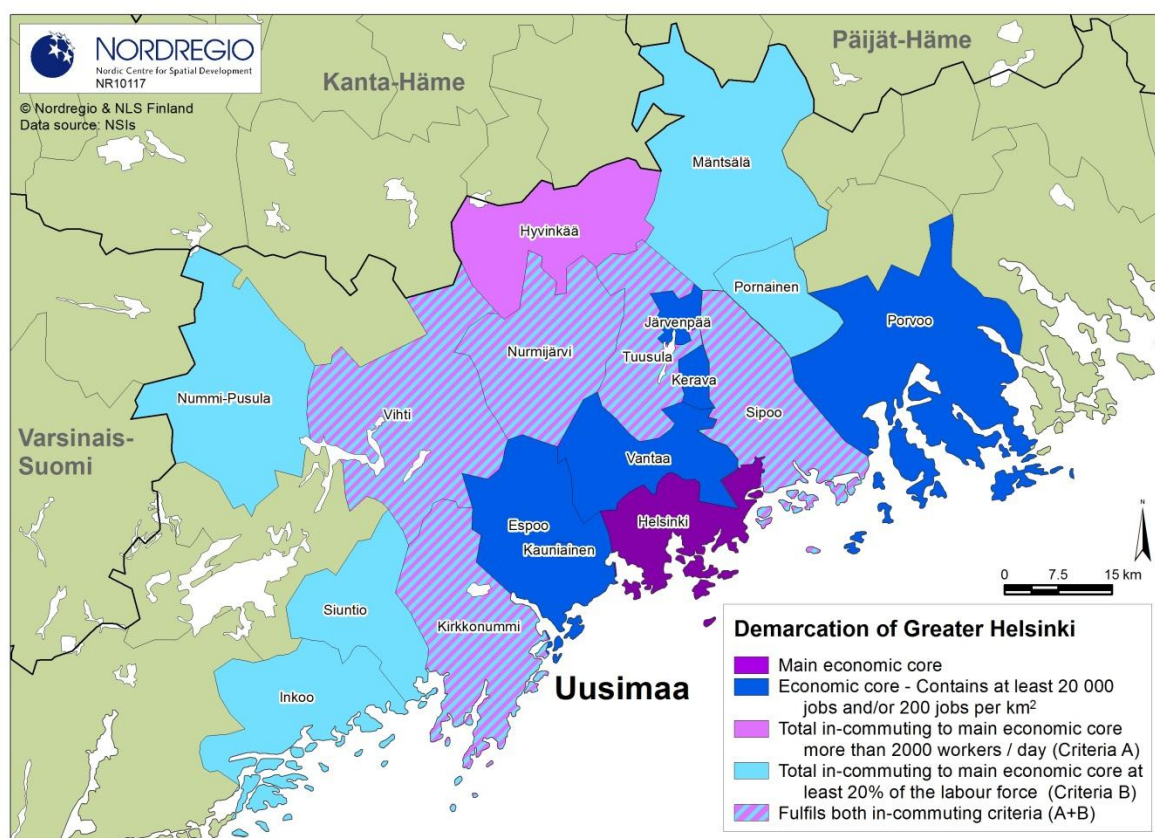
Table 2. *Population and jobs in the four Nordic capital regions (based on definition of FURs, see maps 1 to 4).*

	population (in mill)	jobs (in mill)
Copenhagen	2,093	1,165
Helsinki	1,388	0,730
Oslo	1,086	0,735
Stockholm	2,436	1,175

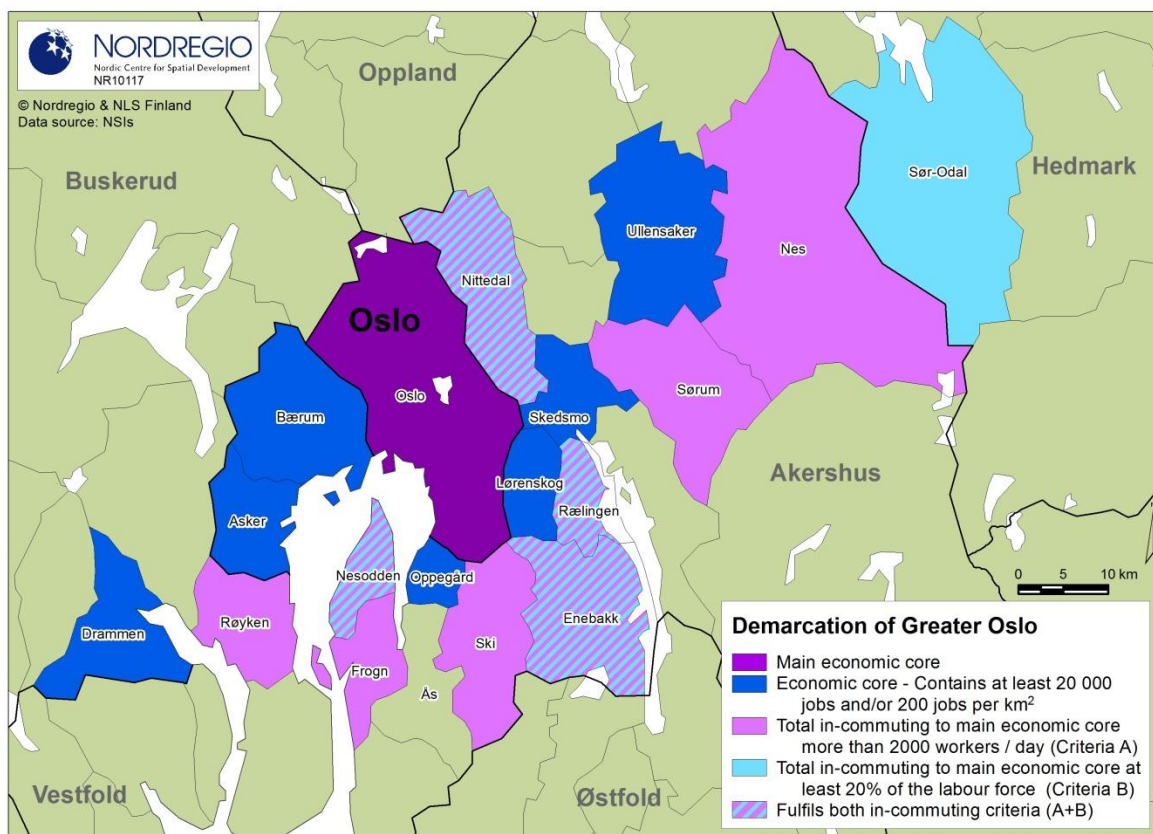
Source: Calculation based on NordStat data from 2007



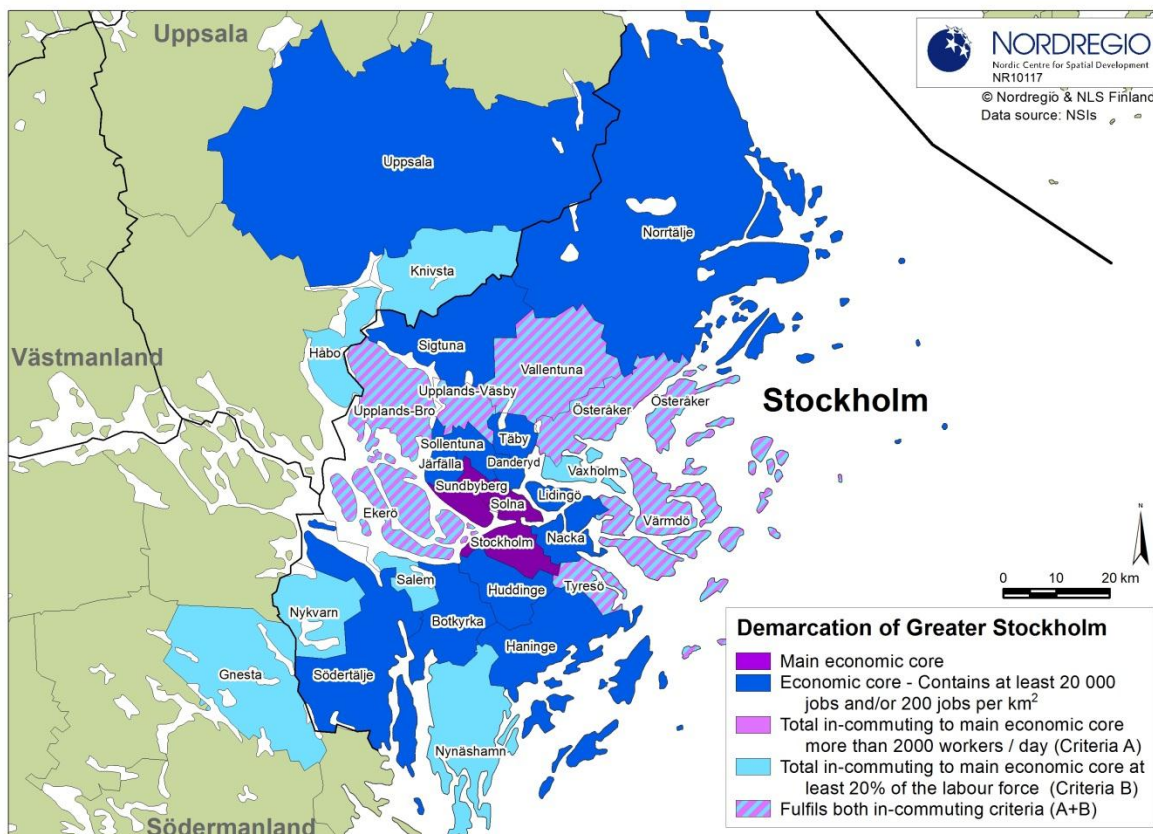
Map 1: The geographical scope of the Nordic capital region of Copenhagen



Map 2: The geographical scope of the Nordic capital region of Helsinki



Map 3: The geographical scope of the Nordic capital region of Oslo



Map 4: The geographical scope of the Nordic capital region of Stockholm

Step 2: Identification of the sectors to be studied

Based on the discussion within the Nordic Working Group the following sectors were selected for this study as they were viewed as the most promising for the envisaged investigation from a Nordic perspective: 'Financial and other Market services' and 'Information, Communication and Telecommunication services' (ICT). Pragmatic issues had undoubtedly also to be taken into consideration here, since clearly there are other sectors which would also have been interesting to analyse. However, this would have gone beyond the scope and available budget of our study. From the outset, the intention was to focus on services rather than on industrial processing and/or manufacturing firms. In other words, in both sectors under consideration here KIBS (Knowledge intensive Business Services) provided the primary focus. Moreover, it should also be noted here that at a later stage we had to merge the initially separated sectors of *financial services* and other *market services* in order to achieve reasonable samples of firms across all four Nordic capital regions. Hence, we have defined our two sectors slightly differently as compared to the large GUCP/GaWC project (cf. Taylor *et al.* 2010 and Table 1).

In order to be able to identify relevant firms from the two sectors in our Nordic firm databases (see below) we used the standardised Europe-wide NACE code typology (*Nomenclature générale des activités économique dans les Communautés Européennes*). For the first sector (Financial and other Market services) we looked at firms linked to codes 64 to 66 and 69, 70 and 73. This included firms active, for instance, in monetary intermediations (such as Banks) and pension funding, insurance, legal and accounting services and management consultancy services as well as advertising and market research. The other sector (Information, Communication and Telecommunication services (ICT)) was a little more difficult to define. NACE codes 61 to 63 provided our initial point of departure. Subsequently, we identified those that focused on services and those that were involved in developing hardware. In the study we only included ICT firms with a clear focus on services. In general we have only included firms in our study that have their core economic activities in the selected sectors. Another point worth mentioning here is that we have only considered the firm and its office network by following its 'original name'. In other words, further subsidiary enterprises or branch establishments etc., under another company's name have not been considered. This was done for pragmatic reasons since it turned out that it is almost impossible to trace such relations and the respective locations of

'their' offices. Another aspect in this regard is that we have also 'scaled-up' information. If for example a transnational firm has organised its enterprise in a global concern with national subsidiary firms we viewed the global concern as our primary research object (e.g. *Nordea Denmark A/S* was considered as a part of the *Nordea Group*, with its head office in Stockholm (5) and a national office in Copenhagen (3)).

Step 3: Identification of firms in the selected sectors/branches that have one or more offices in the four Nordic capital regions

This was done by using three Nordic firm databases from 2010: ISIS (for insurance firms), Bankscope (for banks) and ODIN, all provided by the company *BvD (Bureau van Dijk)*. The respective lists of firms having one or more office in the four Nordic capital regions in the two sectors under consideration were organised in relation to the size of their annual turnover. Thus we began the process by looking at those with the highest turnover, since we expected such firms to have a number of other offices (see also step 4).

Step 4: Sorting out the purely 'local firms'

Since we are interested in intra-firm office networks and how they create interconnections between cities, we removed firms that only had offices in the Nordic capital regions. This information as well as other data was gathered from the firms' websites, which generally indicated quite clearly where the company's other offices were located while also noting their functional importance.

Step 5: Devising a roster of cities at the respective scale

In order to limit our database for each Nordic capital region we had to define a meaningful roster of cities at the respective scale. For this we applied the following principles to devise in each case four lists of cities:

- National cities (in Norway, Sweden, Finland and Denmark): Municipalities with more than 20,000 jobs (in total between 15 (Norway) to 35 (Sweden) cities)
- Nordic cities: Also the same municipalities with more than 20,000 jobs (but excluding the national cities) and adding the other three Nordic capital regions (in total between 71 and 90 cities) per Nordic capital region.
- European cities: over 200,000 inhabitants (by excluding all Nordic cities that meet this criterion). In total the data roster included 341 European cities per Nordic capital region.

- Non-European cities: population over 1,000,000 (but excluding all Nordic and European cities that meet this criterion). The data roster included, in total, 381 non-European cities.

The latter two lists of cities were retrieved from: <http://www.citymayors.com/index.html>. It is also noteworthy that each of these four lists comprise cities within their local jurisdictional boundaries (i.e. as municipalities), whereas only the four Nordic focal cities of this study, were demarcated as Functional Urban Regions (i.e. as larger city-regions comprising a number of adjacent municipalities).

Step 6: Assigning service values to the firm's presence and functional importance in the city under consideration

For the following steps 6 and 7 we followed the methodology as suggested in Taylor *et al.* (2010, 412-426). As noted previously, the required information was gathered directly from the firms' websites and then interpreted. As such, while tracing the firm's presence in a city is straightforward, in most cases it took considerable additional effort to understand the importance of a given city to a firm's service provision structure. For this, two types of information were considered as suggested in Taylor *et al.* (2010, 413):

- Information about the size of a firm's presence in a city, such as the number of offices or the number of partners in a law firm office.
- Extra-territorial functions of a particular office (i.e. responsibility for services beyond the city). Global headquarter functions are the obvious example, but other characteristics such as 'regional offices' or 'national offices' are also relevant.

The retrieved information was then compiled in a six-point scale (0 through 5) to define the importance of a firm's presence in a particular city by following the suggested procedure. Initially all cities that had an office location were given the value 2, and this was only changed as follows (ibid.):

- A city where contact with its office is referred elsewhere or a city with very few employees working in that office compared to other offices scores 1 for that firm (size criterion).
- A city with multiple offices or a city with a very large office with many employees compared to other offices scores 3 for that firm (size criterion).

- A city with an office assuming the role of a national headquarters scores 3 for that firm (minor extra-territorial function).
- A city with an office assuming the role of a regional headquarters scores 4 for that firm (major extra-territorial function). In cases with very good information on size, this criterion is used to score a 4 for an exceptionally large office (number of employees).
- The city housing a firm's headquarters scores 5.

Step 7: Calculation of 'direct connectivity values' and 'aggregated inter-city network connectivities'

In order to calculate the direct 'inter-city connectivity values' (cf. chapter 3), the relation between each pair of cities (here *a* and *b*) in terms of firm *j* derived from matrix *V* is calculated as follows:

$$r_{ab,j} = v_{aj} \cdot v_{bj} \quad (!)$$

As stated in Taylor *et al.* (2010a, 425) the conjecture behind this calculation is that the larger the office the more connections there are with other offices in a firm's network. The aggregated inter-city relation between cities *a* and *b* across all firms is then produced from:

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

Taylor *et al.* (2010, 425) continue by noting that "For each city there are *n-1* such links, i.e. one to every other city in the dataset. The aggregated network connectivity (here abbreviated as GNC) of a city can then be computed by aggregating these inter-city links *r_{ab}* across all cities in the dataset":

$$GNC_a = \sum_i r_{ai} \quad (a \neq i) \quad (3)$$

In order to relate the resulting aggregated network connectivities per city to each other (slightly different to Taylor *et al.* 2010, 425), the aggregated network connectivity is then expressed as the proportion of the city that has been the starting point of our investigation (i.e. the respective Nordic capital region, which will be assigned with the value 100). Consequently these intercity connectivity values are termed indices.

2. Nordic-based intercity connectivities: results

In the following section the results of the quantitative study exploring the ‘connectivities’ of the Nordic capital regions through intra-firm office networks are presented. This is done by the use of 16 maps. Descriptive interpretations and some tentative initial analysis is included with each map. The presentation is structured in accordance with the bottom-up approach of the study, i.e. beginning with the national scale followed by the Nordic and via the European to the global scale.

The empirical study produced a large amount of data and thus the presentation here focuses on the intercity connectivities of the top 25 cities for the four

Nordic capital regions on each level (except in regards to Oslo’s and Helsinki’s national intercity connectivities since Norway’s and Finland’s national rooster included less than 25 cities). This amounts to 16 maps and 32 tables (see appendix). All maps include both sectors. The finance and market service firms are separated from the ICT service firms in the two different tables for each city. The maps are consecutively constructed on the basis of the top 25 overall cities for both sectors, which means that not all cities included in the tables are included in the maps.

2.1 Intercity connectivity at the national scale

Nordic capital regions’ intercity connectivity on the national scale is generally weaker than on the other levels (Nordic, European, global). In terms of network connectivity there is a significant gap on the national level between the Nordic capital regions and the other national cities. Most of the cities outside the capital regions have a network connectivity index value below 50. The gap and low index values are clearly visible if the national maps are compared with the global maps, which have the highest overall network connectivity index values. One reason is of course that larger cities usually contain more offices, and because the starting points are the Nordic capital regions (areas including several municipalities) are compared with single municipalities, not functional regions. (cf. table 2). But it is also an indication of the importance of cities outside the nation.

Copenhagen – other Danish cities

The Copenhagen region’s national intercity connectivity is stronger through the financial and market service firms than through the ICT service firms (see map 5). This is not particularly surprising since financial and market service firms include banks and accountancy agencies (such as *KPMG*, *PWC*, etc.), firms which have geographically

distributed local branches. Aarhus and Aalborg are the two most interconnected cities from a Copenhagen region perspective through both the sectors of firms. Aarhus and Aalborg could thus be thought of as constituting a second tier of national cities. But if only direct connectivity is considered Aarhus stands out as the second most important city for office locations (see appendix table 1 and 2).

Aarhus’ (and to some extent Aalborg’s) positions are further emphasised if viewed from the perspective of the other Nordic capitals. Copenhagen region and Aarhus are the only Danish cities represented in Oslo’s Nordic map and in the Finnish map (with the single addition of Kolding in the ICT service sector). Furthermore, Aarhus and Aalborg are also represented in Stockholm’s Nordic map, but here the additional Danish cities of Kolding and Esbjerg can also be found.

There is a significant gap in the network connectivity through financial and market service firms between Copenhagen region and the second most important city, Aarhus. Following Aarhus a gradual decrease in intercity connectivity occurs for the rest of the top 25 cities measured through financial and market service firms (see appendix table 1). Viborg and Sønderborg are somewhat interesting because they have relatively high network connectivity value through financial and

market firms but are not even included in the top 25 of Copenhagen region's national intercity connectivity through ICT service firms.

For Copenhagen-based ICT service firms Aarhus, and Aalborg are important, but there is also a significant index gap between the capital region and the rest of the Danish cities. ICT service firms are not as geographically dispersed as the financial and market service firms. Aarhus stands out as the second most important location for Copenhagen region's ICT service firms (especially considering direct connectivity (see appendix table 2)). Aalborg, with an intercity network connectivity of 42 and Odense at 32 also stand out. Only 18 of the municipalities in Denmark with a labour market with over 20,000 jobs are connected to Copenhagen region through ICT service firms. A majority of the cities have a network connectivity value of below 20 and a direct connectivity value of less than 2, i.e. not more than one firm office or two with minor significance.

Helsinki – other Finnish cities

The national intercity connectivity of the capital region of Helsinki is more evenly distributed between the two sectors in comparison with, for example, Copenhagen region. The network connectivity of the financial and market service firms are slightly more evenly disbursed than for the ICT service sector (see map 6). The cities with the highest network connectivity values differ slightly between the sectors, but it remains rather difficult to discern distinctively different patterns. Overall Tampere, Turku, and Oulu could be viewed as a second tier in terms of national cities after Helsinki region.

The cities of Tampere, Turku, and Oulu stand out in respect of intercity connectivity through financial and market service firms, followed by Vaasa and Pori. Regarding intercity connectivity through ICT service firms the same three cities also stand out but are accompanied by Jyväskylä. Helsinki region's intercity connectivity through ICT servicefirms with Vaasa and Pori is significantly less than through financial and market service firms.

All Finish cities included in the rooster have both finance and markets service firm, and ICT servicefirm offices. This is also the case in Norway, but not in Denmark or Sweden.

Oslo – other Norwegian cities

In Norway, there is, as with the other national Nordic capital regions, a significant gap between the Oslo region and the second tier of national cities. After the second tier of cities we see a gradually

decreasing level of intercity connectivity for the rest of the Norwegian cities in the financial and market service firms.

Bergen, Trondheim and Stavanger stand out in Oslo region's national intercity connectivity index and map both through financial and market service firms, and ICT service firms (see map 7). These three cities could also be grouped together and categorised as second tier national cities if direct connectivity is considered (see appendix table 5-6). Within the financial and market services Kristiansand could also, perhaps, be included in this category if direct connectivity is considered and since it appears in all other Nordic maps (see below Nordic section), while Tønsberg, which is also nationally important within the finance and service market sector, does not appear in any other maps.

Oslo's national intercity connectivity through ICT service firms is slightly more concentrated with more cities having a lower network connectivity value compared to the financial and service market sector. But in both sectors there is a significant middle range of cities, nine third tier national cities ranging in network connectivity index values from 28 to 40 through financial and market firms, and between 13 and 33 for ICT service firms.

Stockholm – other Swedish cities

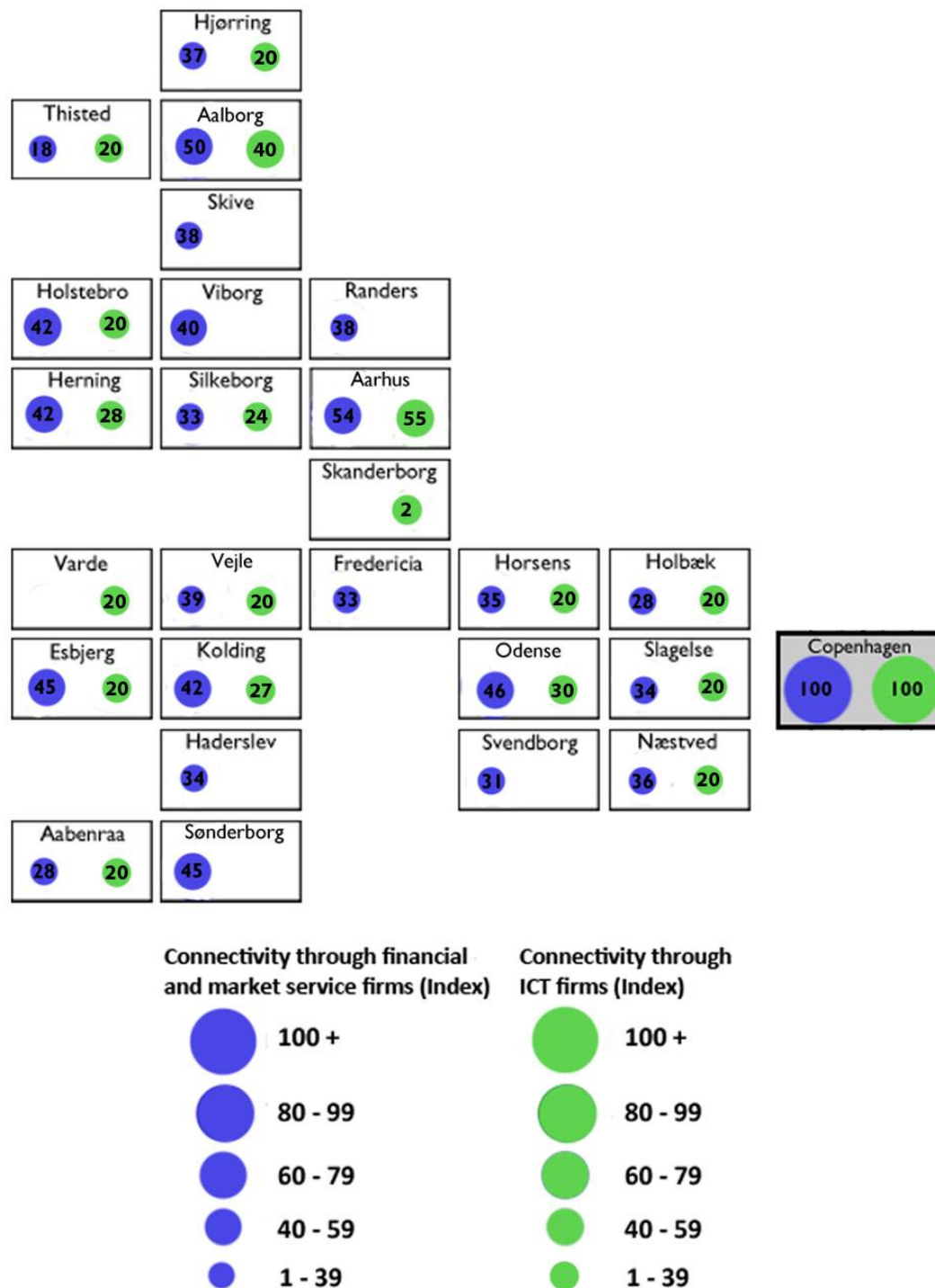
Swedish cities generally display higher intercity connectivity and direct connectivity values in comparison with the other Nordic capital regions. The gap in intercity connectivity between Stockholm region and the second tier of national cities, Gothenburg and Malmö, in terms of both sectors is less than in the other Nordic cases (see map 12). The network connectivity index value of both Gothenburg and Malmö is above 60 in terms of financial and market service firms, and respectively 60 and 52 as regards ICT service firms. As the network connectivity index values are generally higher in Sweden, the cities of Linköping, Karlstad, Sundsvall and Umeå could also be viewed as constituting a third or mid-range tier of national cities in Sweden on an aggregated level. But the distinctive pattern of a third mid-range tier of national cities in Sweden does differ slightly from sector to sector, and is not as clear if direct connectivity is considered (see appendix table 7-8)

The network connectivity index values for the top 25 Swedish cities in Stockholm region's intercity connectivity in terms of financial and market service firms are in the range between 65 and 34. If Gothenburg and Malmö are excluded the rest of the cities can be found within a range from 49 to 34, with 13 cities in the forties (Luleå, Umeå, Sundsvall, Västerås, Karlstad, Örebro, Linköping,

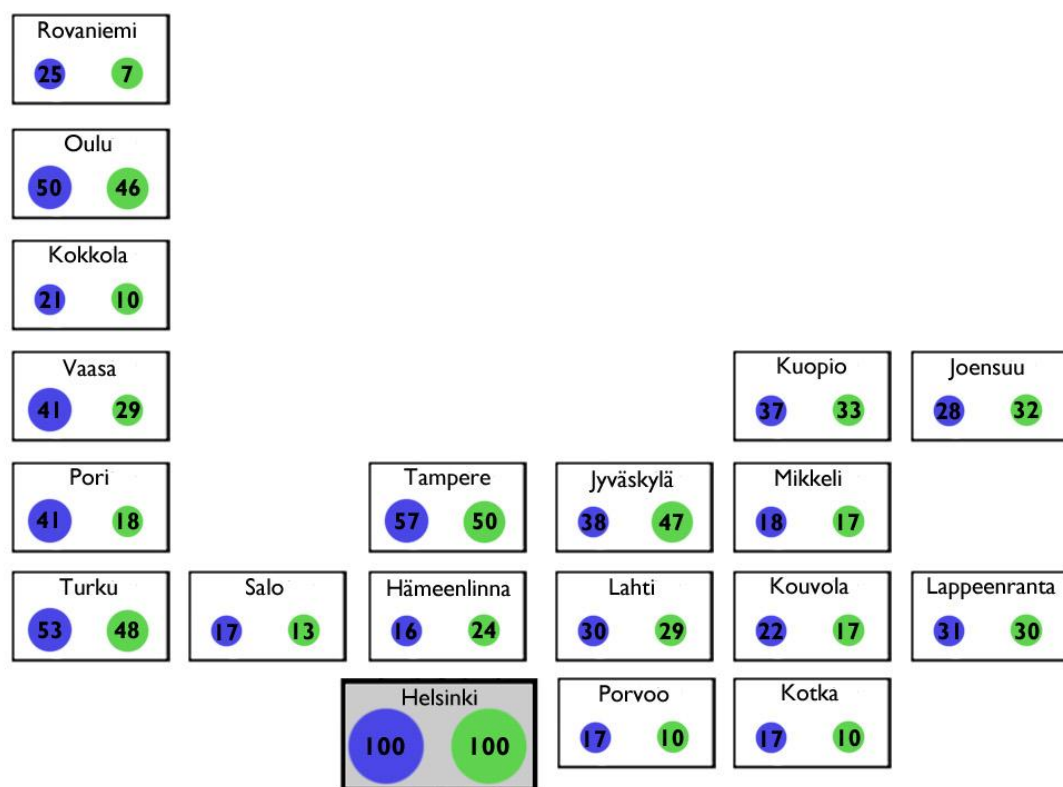
Norrköping, Kalmar, Jönköping, Växjö, Halmstad and Helsingborg). This indicates an even distribution across the sector and an even spread in terms of the mid-range of Swedish national cities from a financial and service market perspective.

The network connectivity values relating to ICT service firms display a wider range, namely, from 60 to 17. However the decline in connectivity

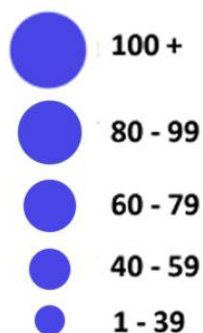
values is rather equally distributed as in the financial and service market sector, if Gothenburg and Malmö are excluded. Linköping, Karlstad, Sundsvall and Umeå do however distinguish themselves (particularly Linköping and Sundsvall through direct connections, see appendix table 8).



Map 5. Copenhagen's national intercity connectivity through finance and market service, and ICT service firms



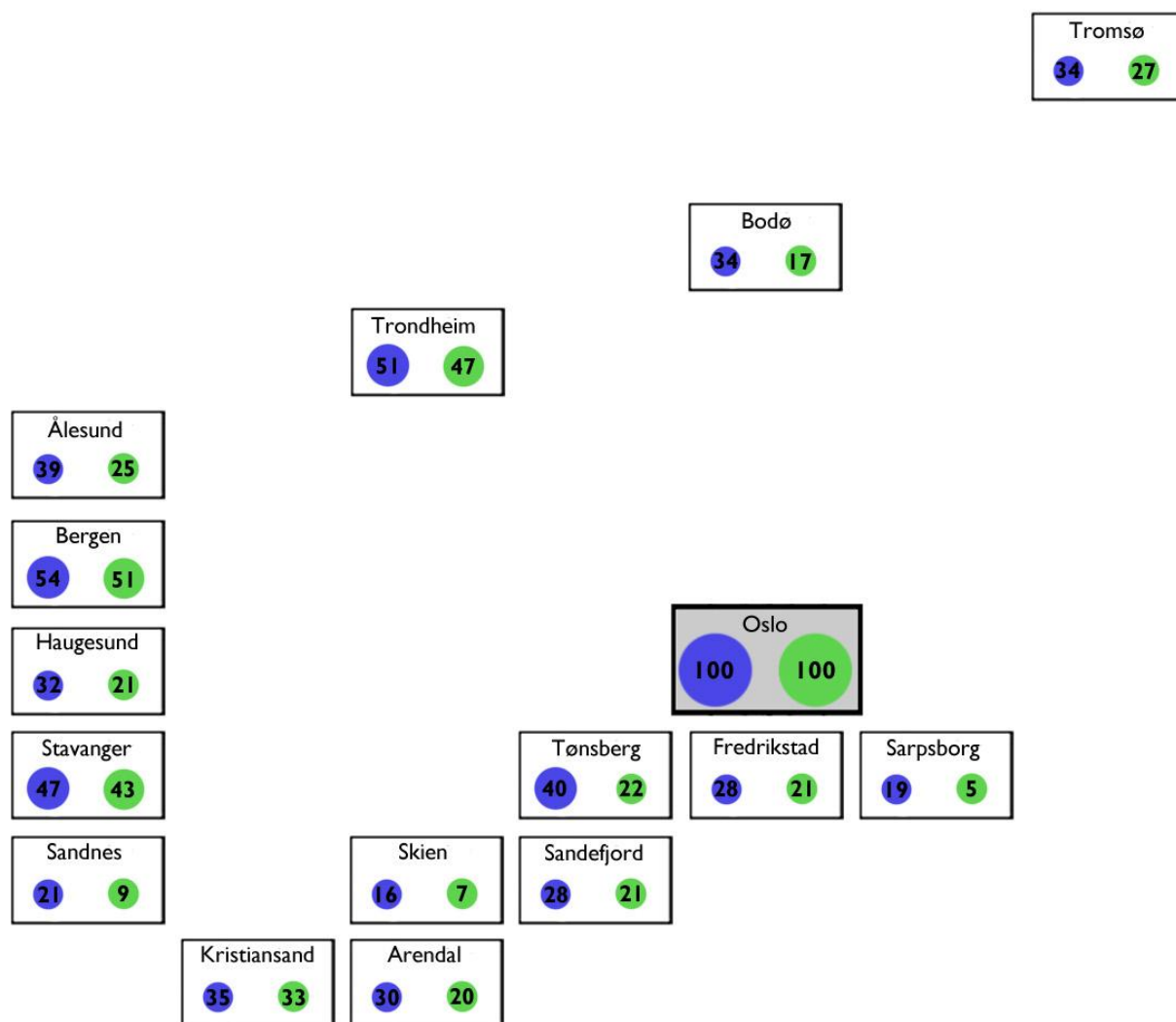
Connectivity through financial and market service firms (Index)



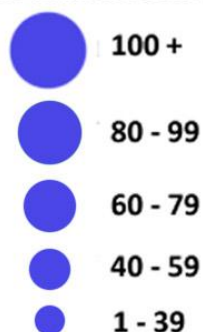
Connectivity through ICT firms (Index)



Map 6. Helsinki's national intercity connectivity through finance and market service, and ICT service firms



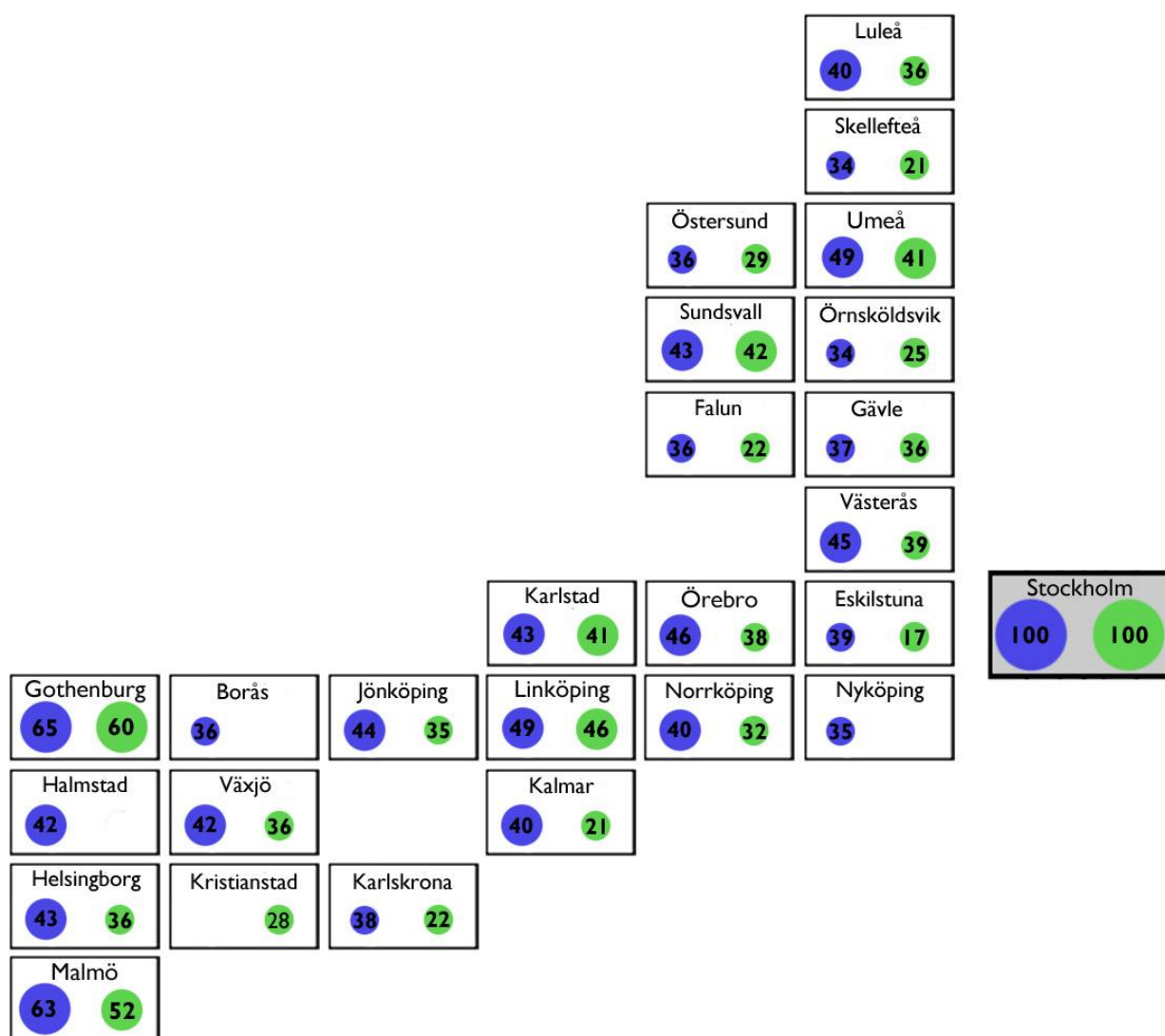
Connectivity through financial and market service firms (Index)



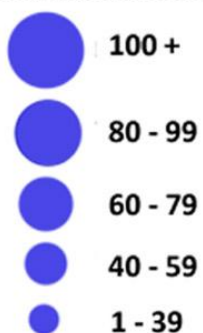
Connectivity through ICT firms (Index)



Map 7. Oslo's national intercity connectivity through financial and market service, and ICT service firms



Connectivity through financial and market service firms (Index)



Connectivity through ICT firms (Index)



Map 8. Stockholm's national intercity connectivity through financial and market service, and ICT-service firms

2.2 Intercity connectivity at the Nordic scale

Swedish cities dominate Nordic maps of intercity connectivity. In addition, Stockholm stands out at the Nordic scale in terms of intercity connectivity through financial and service firms. National capital regions however dominate in relation to intercity connectivity through ICT service firms with considerably more variations existing in respect of the ICT servicesector.

Stockholm's position in the Nordic cities context is in accordance with research based on the world's largest transnational corporations in 150 cities (see Table 1 and Taylor *et al.* 2010). All of the Nordic capital regions are generally however left undifferentiated at this scale and often classified as more or less equally important world cities instrumental in linking their state into the world economy (for more city rankings see <http://www.lboro.ac.uk/gawc/>).

Connectivity between the Nordic capitals

The Copenhagen region's Nordic intercity connectivity through ICT service firms is a bit stronger with Oslo region than with Stockholm region, with Helsinki following after Stockholm (see map 9). But the differences are more or less insignificant if direct connectivity is considered (see appendix table 10). Through the financial and service market the order is more or less reversed, with Stockholm having a network connectivity value of 109 in Copenhagen region's Nordic intercity connectivity through financial and market service firms (but the direct connectivity value for Stockholm is 58). Sweden is generally more important for firms in Copenhagen region than Norway or Finland. More specifically Karlstad, Sundsvall, Linköping and the Norwegian city of Bergen are particularly important for firms located in Copenhagen region.

Helsinki region's Nordic intercity connectivity map displays an interesting pattern where the capital regions; Stockholm, Copenhagen and Oslo have more or less the same network connectivity value in relation to ICT service firms (see map 10). The Oslo and Copenhagen regions are equally interconnected with Helsinki region through its financial and market service firms, with a network connectivity value of 83 while Stockholm has an above index value of 102.

Stockholm and Copenhagen regions score 114 and 104 respectively in Oslo region's Nordic intercity connectivity index through financial and market service firms while Helsinki region's index is

below that of Oslo. Oslo region's connectivity through ICT service firms is very similar to that of the Stockholm and Copenhagen regions but a bit less with Helsinki. Gothenburg is another important Nordic city from an Oslo perspective while Aarhus, Växjö, Linköping and Sundsvall are also highlighted in Oslo's Nordic connectivity map (see map 11).

There is a gap between Stockholm at 100 and the next Nordic city, Copenhagen at 80, in the intercity network connectivity of Stockholm region through the financial and market service firms (see map 12). Stockholm region's network connectivity value through financial and service market firms for Oslo region is 71 and 69 for Helsinki region respectively. The differences between Stockholm and the other Nordic capitals are less pronounced in the ICT service sector where Oslo has a connectivity index value of 95, Helsinki of 93 and Copenhagen of 87 (also confirmed in direct connectivity (see appendix table 16). Trondheim, Stavanger, Turku and Tampere along with Aalborg remain important cities for finance and service market firms in Stockholm, which also confirms these cities position as a second tier in terms of national cities.

Reykjavik's connectivities within Norden

Reykjavik capital region is represented in Helsinki's and Oslo's intercity connectivity maps but only in relation to financial and service market firms. Reykjavik region is not included in the top 25 cities of either Copenhagen or Stockholm regions' intercity connectivity and is not visible in the maps (see maps 9 and 12). Reykjavik is however included in Copenhagen and Stockholm regions' Nordic connectivity through financial and market service firms table because of its direct connectivity value (see appendix tables 9 and 15).

The intercity connectivity between Helsinki and Reykjavik is relatively strong with, in the Nordic context, a network connectivity value of 52. Moreover, Reykjavik is in Helsinki's intercity connectivity index of financial and market services table between the capital region of Oslo and Gothenburg. Oslo's connectivity with Reykjavik is not as strong as Helsinki's. Reykjavik is less interconnected with Oslo than many Swedish and Finish cities and could be compared in this context with cities like Turku and Borås.

Other significant intercity connectivities

The Swedish cities stand out in Copenhagen region's Nordic intercity connectivity map which includes only three Norwegian and three Finish cities (see map 9). This picture is however rather more nuanced if the ICT service sector is analysed more closely; with nine Finish cities, ten Swedish cities and two Norwegian cities included (see appendix table 10).

Oslo region's connectivity through the financial and market service sector with cities outside the capital regions (including Reykjavik region, see above) display a rather similar pattern with five Finish cities, only one Danish city, Aarhus, and the rest Swedish cities. In the intercity network connectivity index table relating to ICT service firms there are two Danish cities (Aarhus and Kolding) and seven Finish cities (see appendix table 14).

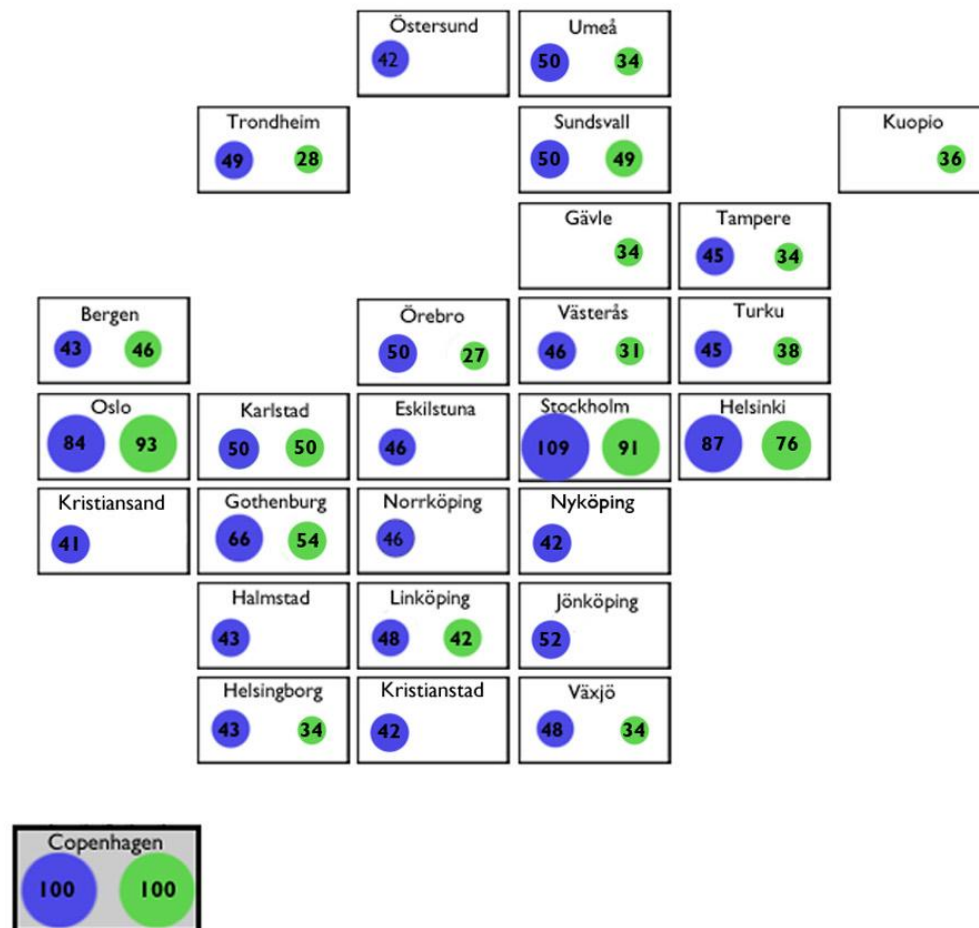
Helsinki displays a similar pattern with regards to the financial and service market. There are two Danish cities, four Norwegian cities and 14 Swedish cities excluding the capital regions (but including Reykjavik region see above) in the table of Helsinki's Nordic connectivity through financial and market service firms. However, there are 16

Swedish cities, and only three Norwegian and two Danish cities in Helsinki's Nordic network connectivity through ICT service firms (excluding the Stockholm, Copenhagen and Oslo regions).

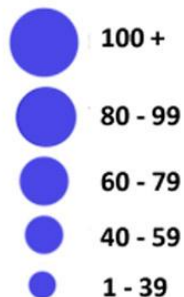
Gothenburg and Bergen seems to be equally important for firms based in Helsinki. Furthermore, Helsinki is generally more interconnected through ICT service firms than through finance and service market firms. Bergen and Stavanger in Norway and Gothenburg, Växjö, Linköping, Sundsvall and Umeå in Sweden are particularly important for ICT service firms based in the Helsinki capital region.

Seven Norwegian, five Danish and nine Finish cities are represented in Stockholm's Nordic network connectivity index table through financial and market services outside the Copenhagen, Oslo and Helsinki regions. The numbers for the ICT service sector are seven Norwegian, ten Finish and four Danish cities.

Second only to the capital regions Gothenburg stands out as an important city for finance and market service firms, based in Oslo and Copenhagen, but it does not stand out as being particularly important for ICT service firms in Norden.



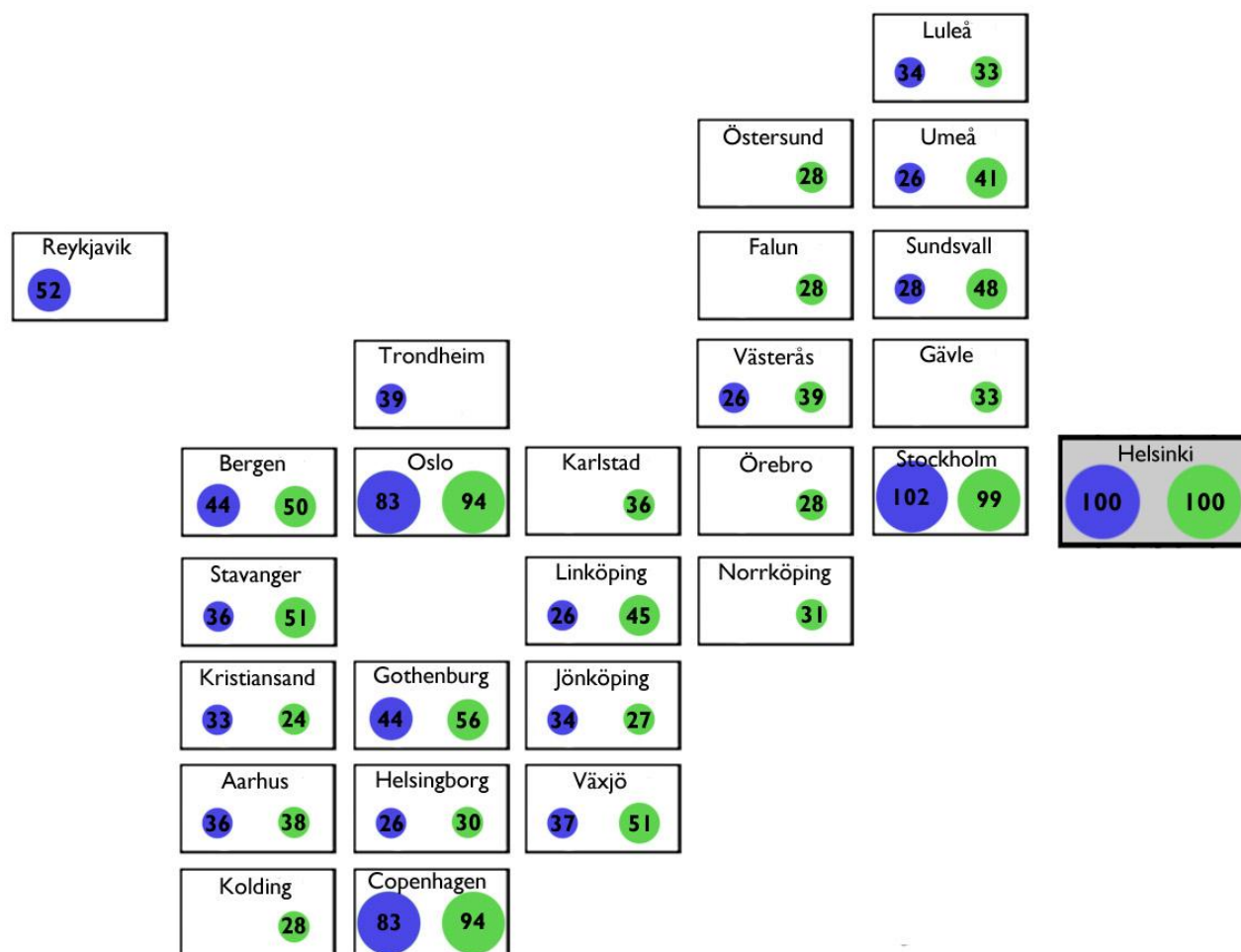
Connectivity through financial and market service firms (Index)



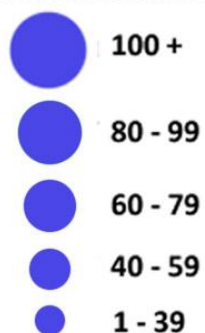
Connectivity through ICT firms (Index)



Map 9. Copenhagen's Nordic intercity connectivity through financial and market service, and ICT service firms



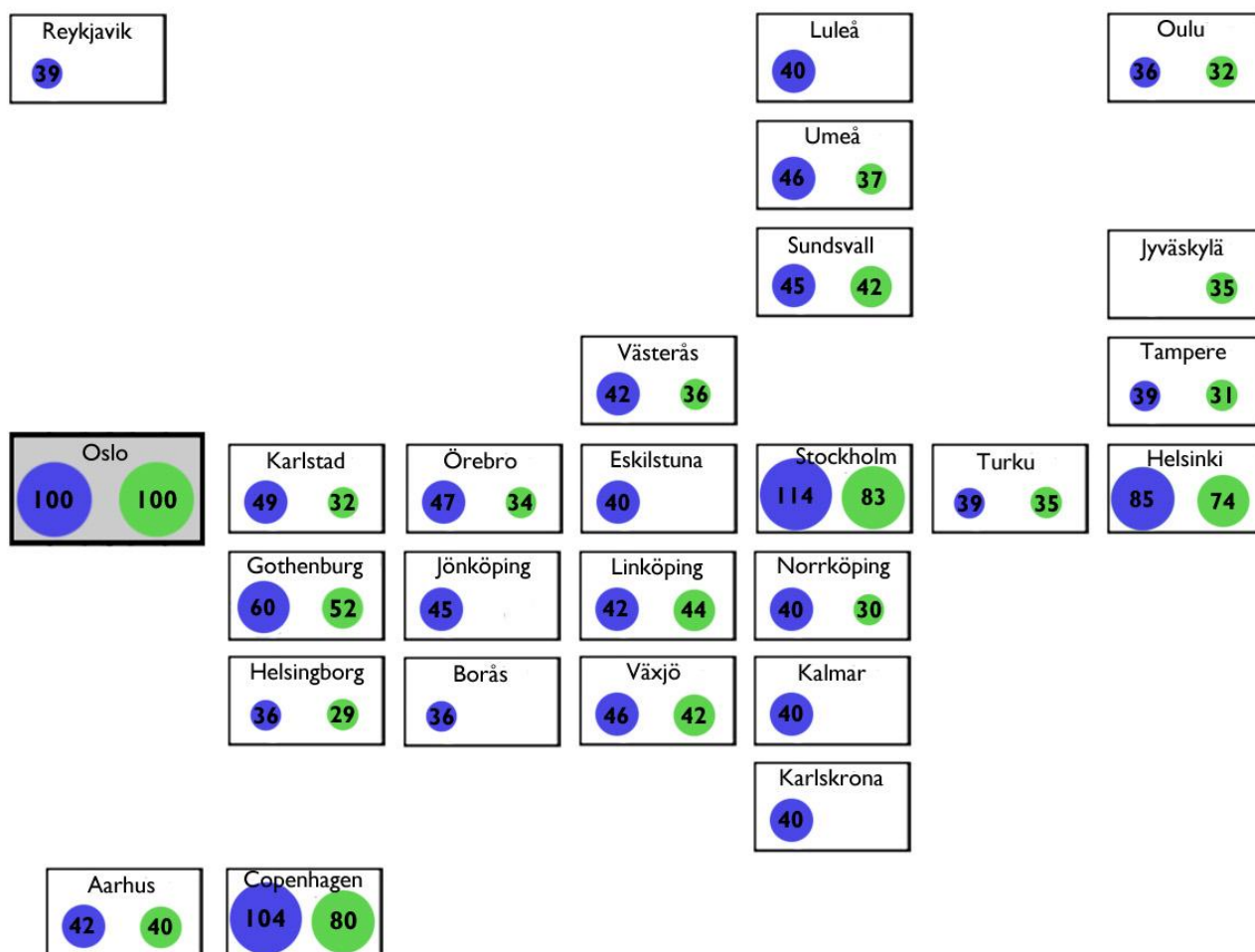
Connectivity through financial and market service firms (Index)



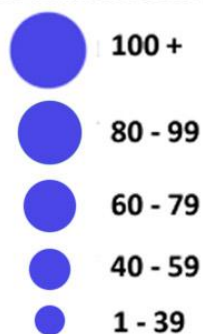
Connectivity through ICT firms (Index)



Map 10. Helsinki's Nordic intercity connectivity through financial and market service, and ICT service firms



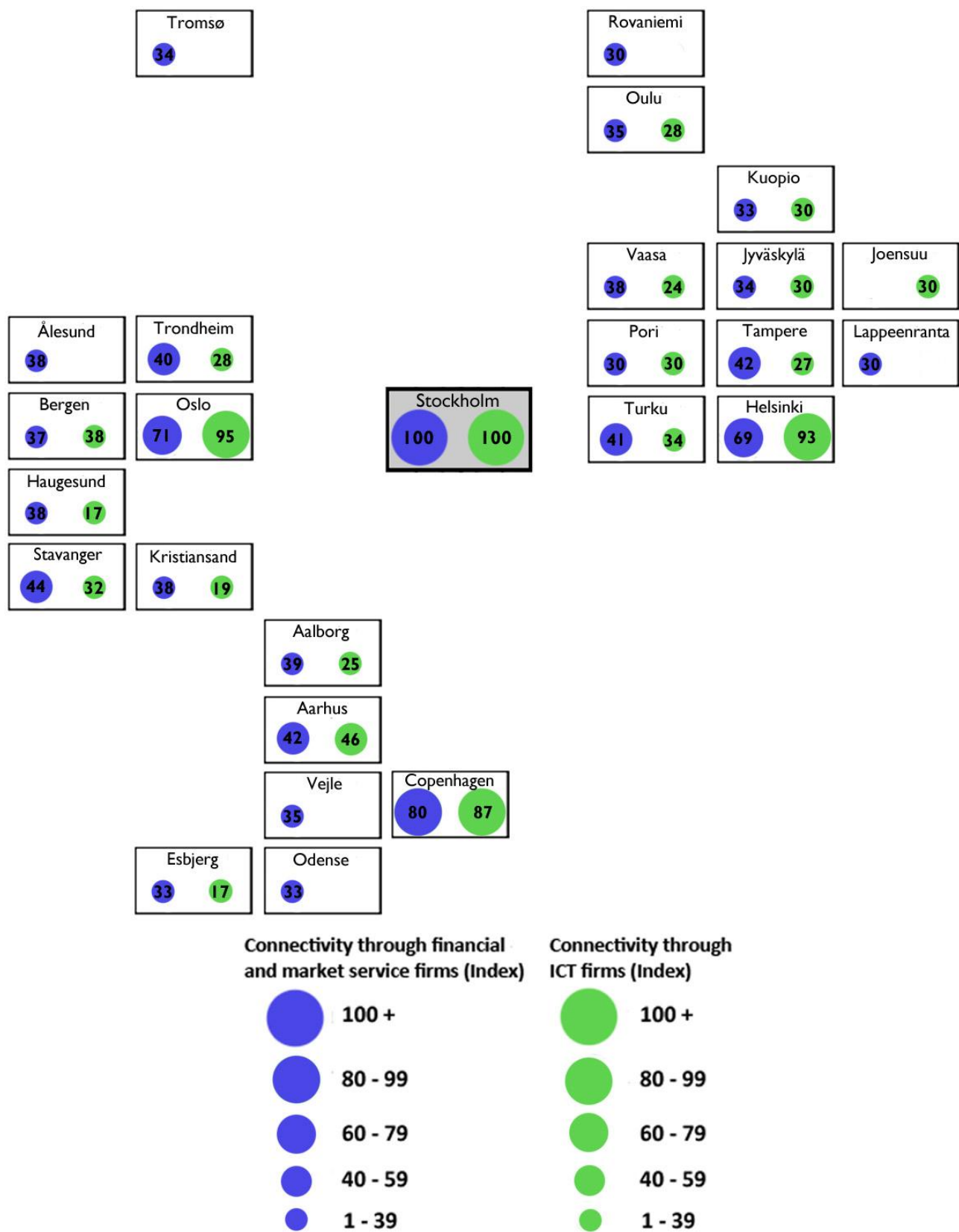
Connectivity through financial and market service firms (Index)



Connectivity through ICT firms (Index)



Map 11. Oslo's Nordic intercity connectivity through financial and market service, and ICT service firms



Map 12. Stockholm's Nordic intercity connectivity through financial and market service, and ICT service firms

2.3 Intercity connectivity at the European scale

London is the main European finance and market service city while Paris is the major European ICT city from a Nordic capital region perspective. This pattern reappears in all European maps but is perhaps most clearly visible in the Copenhagen map which generally has the highest intercity connectivity values. In the Copenhagen European intercity connectivity map Paris and London stand out but in reverse roles for each sector (see map 13).

London is clearly a very important European city for the finance and market service firms located in the Nordic capital regions. London's network connectivity is above index (i.e. 100) in all cases within the finance and market service sector. Other important cities for the firms within the finance and market service sector are Moscow and Warsaw.

Paris stands out as being particularly important in the European network of ICT service firms located within the Nordic capital regions. Other important ICT service cities in Europe are Milan and Madrid and to some extent Brussels and Munich. In general terms, cities in Eastern Europe seem to be important for finance and service market firms in Nordic capital region, while ICT service firms are more oriented towards Western Europe. This is most obviously displayed in Oslo's intercity connectivity map (see map 15).

Most countries only have one city represented in the maps but Germany has five, namely, Frankfurt, Munich, Hamburg, Stuttgart and Berlin (but not in the same map). Italy with Milan and Rome, and Spain with Barcelona and Madrid each have two cities represented. Other large countries such as the United Kingdom, France and Russia only have one city represented which means that cities such as Birmingham, Lyon and Saint Petersburg are not included.

Nordic capitals and other Baltic Sea and East European cities

Baltic Sea and East European cities are particularly important for the finance and service market in the Nordic capital regions. For financial and service market firms in Copenhagen the Baltic Sea (and East European) cities are particularly important while in relation to Germany only Frankfurt is important. Warsaw stands out in both Copenhagen and Oslo region's intercity connectivity through financial and market service firms with a network connectivity index value over 90.

The Baltic (and East European) cities also stand out in Oslo region's intercity connectivity through financial and market service firms; Warsaw,

Tallinn, Moscow, Prague and Riga are particularly important but there are also strong connectivities with Balkan cities (see map 15). The spatial pattern of ICT service firms located in Oslo region is more dispersed but German cities are important with five cities within the top 25 (Munich, Stuttgart, Hamburg, Berlin, Frankfurt) (see appendix table 22). However, this is not visible in the maps, which instead illustrates the domination of finance and market service activities over ICT service firms in the Oslo region.

For the Helsinki region there is a significant difference in the order of cities for the financial and service market between direct connectivity and network connectivity. The cities of the Baltic States have prominent positions with regards to direct connectivity but less so through network connectivity (see appendix table 19). The importance of these cities has relatively little importance for Helsinki region's European connectivity through ICT service firms (less than for example Oslo and Copenhagen) (see map 14).

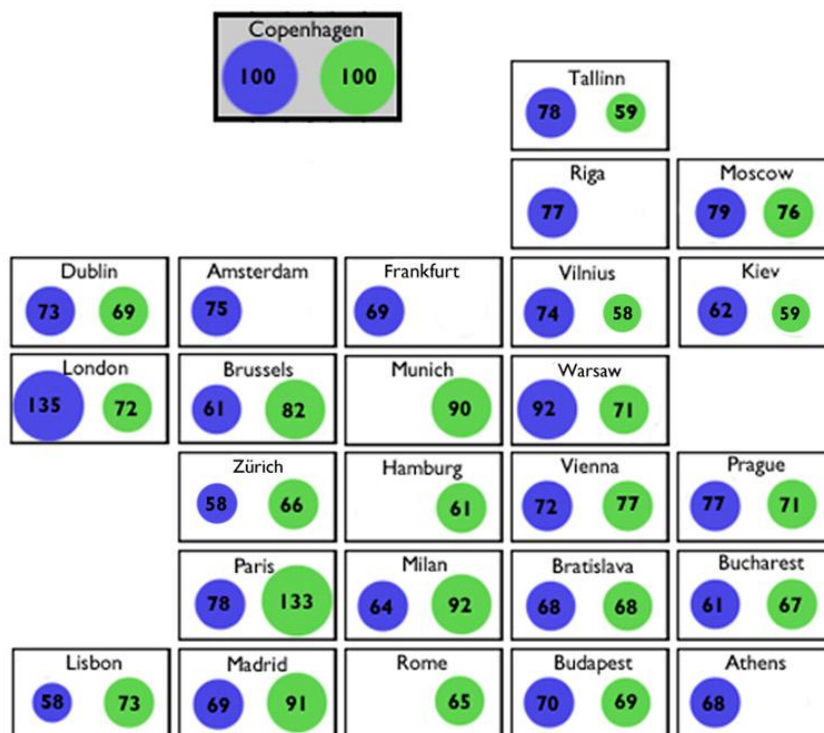
From the perspective finance and market service firms in Stockholm East European cities are important but so are Western European cities, Moscow, Warsaw and Prague in the east and Paris, Amsterdam, Madrid, Frankfurt and Zurich in the west. In the ICT service sector cities in the Western Europe are more dominant, in particular Paris, but also Madrid and Brussels (see map 16).

Nordic capitals and other European cities

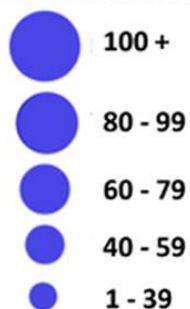
Paris stands out as the most important city for ICT service firms in the Nordic capital regions. For example, it has a network connectivity value well over index in the Copenhagen map. Madrid, Milan, Munich, and Brussels also have high network connectivity values throughout the ICT tables and maps.

London has as noted previously outstanding connectivity index values for all Nordic capital regions European connectivity through financial and market service firms though other important West European cities, such as Paris and Amsterdam, and to some extent Madrid, Dublin, Frankfurt and Milan also exist.

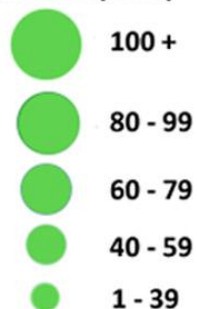
From a Helsinki finance and service market perspective Madrid, Moscow and Milan seem to be particularly important (second to London). For the ICT service sector Madrid, Milan, Brussels and London are important in addition to Paris.



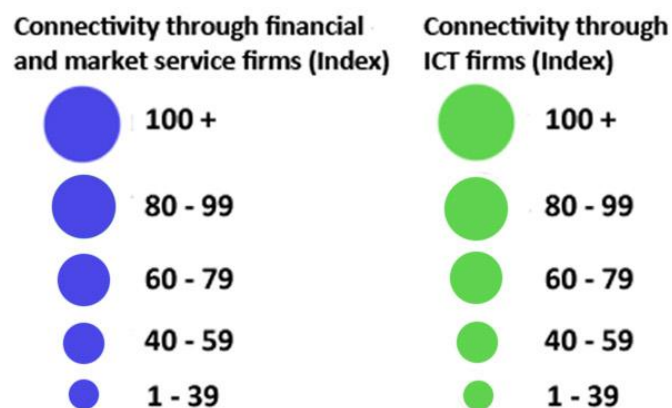
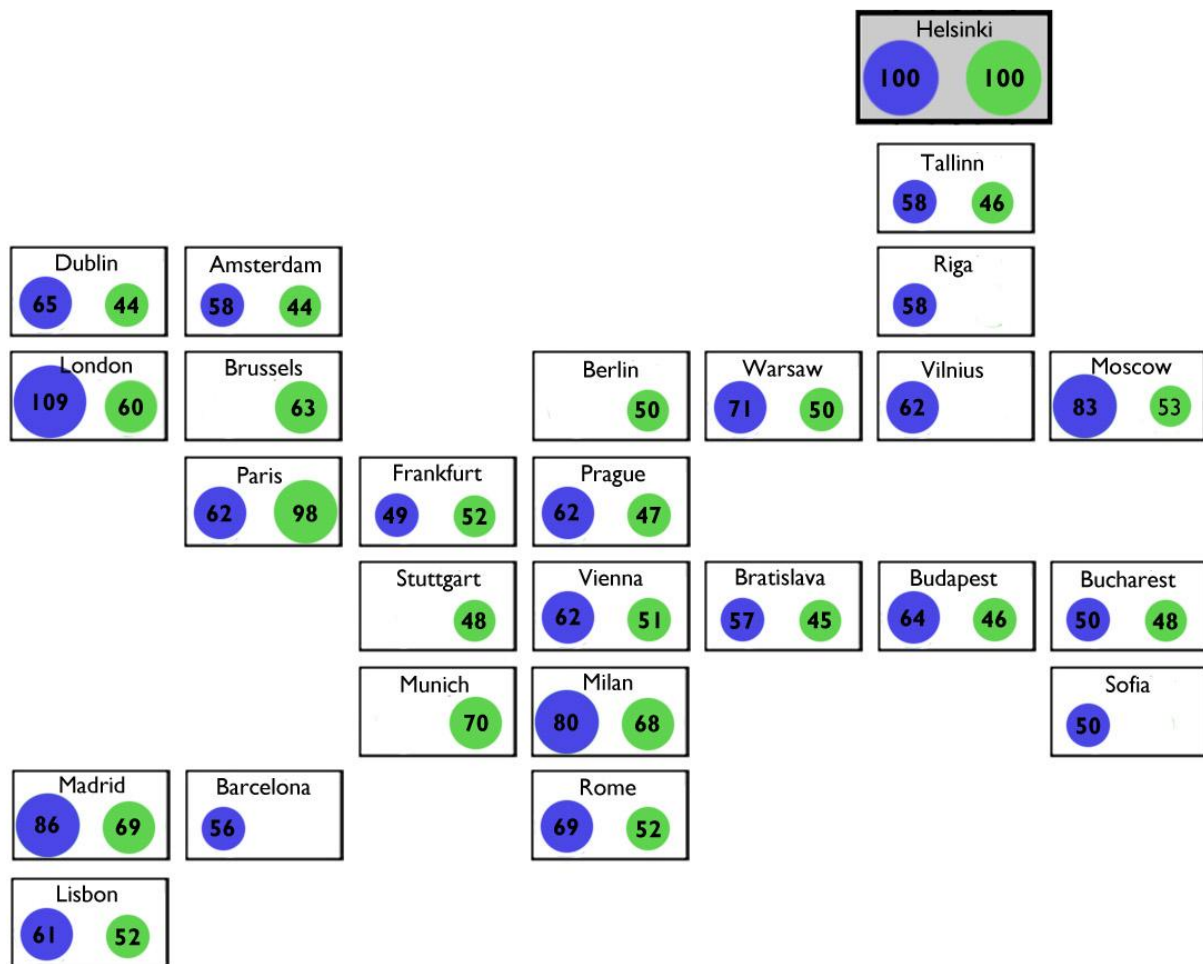
Connectivity through financial and market service firms (Index)



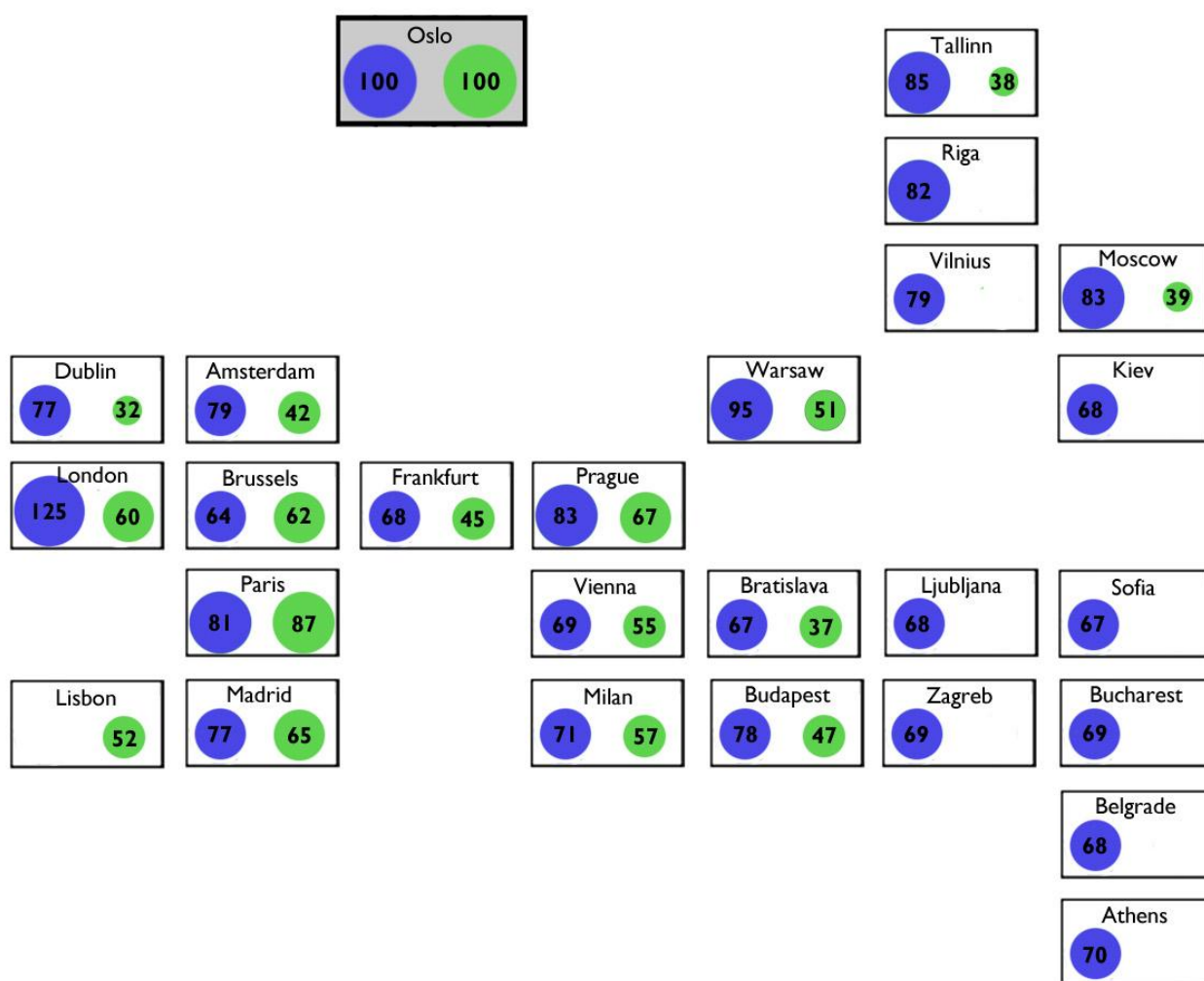
Connectivity through ICT firms (Index)



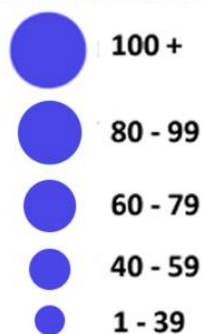
Map 13. Copenhagen's European intercity connectivity through financial and market service, and ICT service firms



Map 14. Helsinki's European intercity connectivity through financial and market service, and ICT service firms



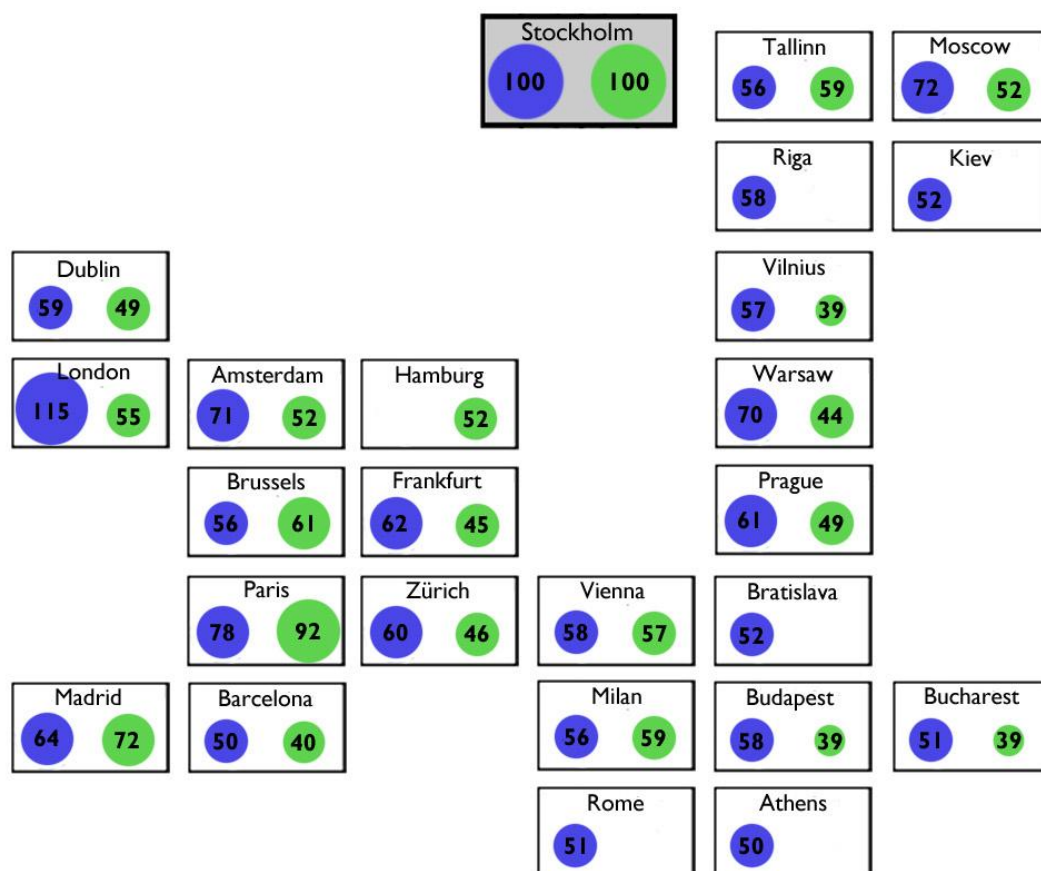
Connectivity through financial and market service firms (Index)



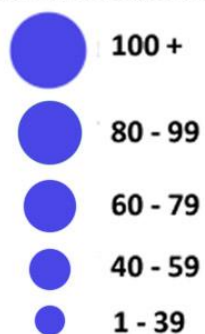
Connectivity through ICT firms (Index)



Map 15. Oslo's European intercity connectivity through financial and market service, and ICT service firms



Connectivity through financial and market service firms (Index)



Connectivity through ICT firms (Index)



Map 16. Stockholm's European intercity connectivity through financial and market service, and ICT service firms

2.4 Intercity connectivity at the global scale

Singapore and New York are the two cities that stand out on all of the global maps of intercity connectivity. American and East Asian cities dominate at the global scale but other important cities exist such as Dubai, Johannesburg and Sydney. New York is clearly a very important global city for the finance and market service firms located in the Nordic capital regions. It has a network connectivity value above index (i.e. 100) in all cases within the finance and market service sector. Singapore also stands out in the finance and market service sector as the second most important city but more importantly Singapore is the most important city for the global network of ICT service firms located in the Nordic capital regions. That Singapore and New York are the most interconnected cities is consistent with other research. It is notable that Hong Kong seems to be of lesser importance from a Nordic perspective, in contrast with other studies. Hong Kong does stand out as particularly important for finance and service market firms in Helsinki region however (see map 18).

Nordic linkages to American cities

South American cities generally have higher network connectivity values than North American cities. This is clearly illustrated in the Copenhagen map (see map 17). It should, however, be noted that only ten US cities are included in the data roster. Cities like Boston, Miami, San Francisco, Seattle, and Washington are not included since they do not have a population of 1 million or more (see methodological notes above). This does not however account for the fact that Los Angeles and Chicago are the only cities (apart from New York) included in the maps and they are only included through Stockholm's finance and market service firms (see map 20). Chicago is usually considered to be a very important global city alongside Singapore, Dubai and Sydney, and Los Angeles an 'alpha' city together with for example Beijing and Sao Paulo.

New York does however stand out as crucial for the finance and service market firms based in the Nordic capital regions, but a number of South and Latin American cities also stand out. Sao Paulo, Buenos Aires and Mexico City are very important Latin American cities. New York and Sao Paulo are, for example, equally important for the global network connectivity of Copenhagen's ICT servicesector (see map 17). Toronto is also important, especially for finance and markets service firms, in the Nordic capital regions.

Nordic linkages to East Asian cities

East Asian cities generally occupy good positions in the network connectivities of Nordic capital regions. Singapore stands out as a city with very high connectivity values, with above index network connectivity values in Copenhagen and Stockholm through the ICT; and with Copenhagen (above New York), Helsinki and Oslo through financial and market service firms. The three Chinese cities Beijing, Hong Kong and Shanghai are also very important.

For Copenhagen's ICT service sector Singapore, followed by Tokyo, Beijing, Hong Kong and Seoul are also very important. For Stockholm's ICT service firms Singapore, Tokyo, Beijing and Bangalore are the most important cities.

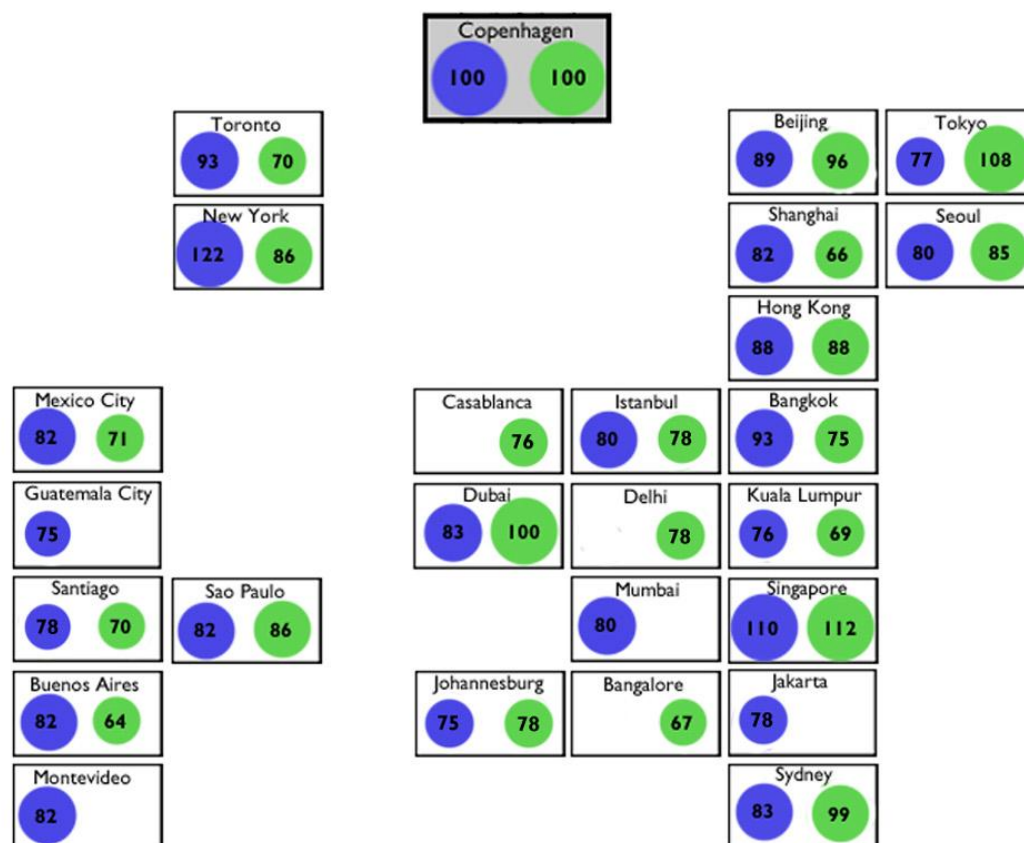
Nordic linkages to other cities

Dubai stands out as a very important city in the global network of ICT service firms based in Copenhagen and Oslo regions, and is also important for Stockholm-based firms. Oslo-based firms are somewhat oriented towards the Middle East (see map 19), where Istanbul stands out particularly for finance and service firms. Istanbul is also important for firms based in Copenhagen.

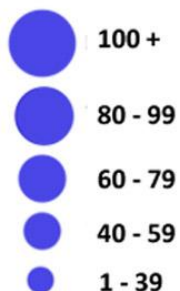
The Indian cities of Bangalore, Mumbai, and Delhi seem relatively important in the ICT service sector, since they have relatively high network connectivity values. Bangalore, for example has the second highest value in Stockholm's global connectivity through ICT service firms. India has however less significance for the Nordic capital regions' connectivities through financial and market service firms, although Mumbai is important for finance and market service firms based in Copenhagen. Furthermore, there are no Indian cities on Oslo's global intercity connectivity map (see map 19).

Johannesburg is the most important African city with strong connectivities to the Nordic capital regions and as such it is included in all four global connectivity maps. Moreover, it is included in all but one of the eight global top 25 tables (see appendix). In addition, Casablanca is also important, for example among the top 10 cities in the Stockholm and Helsinki connectivity indexes through ICT service firms.

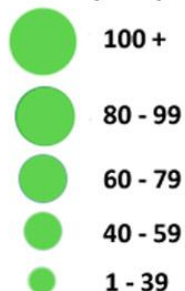
Last but not least, Sydney is an important city for finance and market service firms as well as for ICT service firms based in the Nordic capital regions.



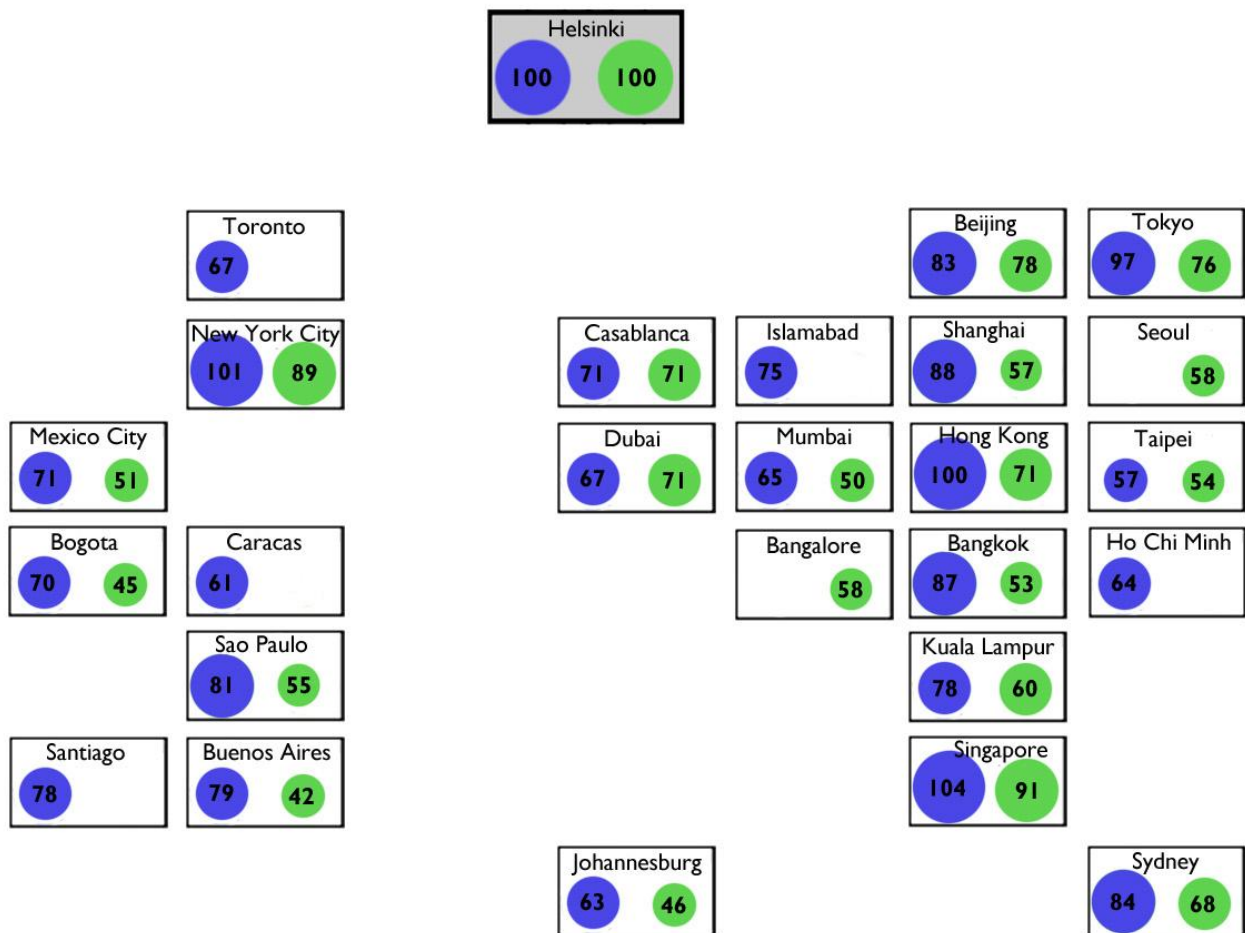
Connectivity through financial and market service firms (Index)



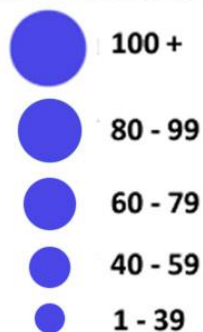
Connectivity through ICT firms (Index)



Map 17. *Copenhagen's global intercity connectivity through financial and market service, and ICT service firms*



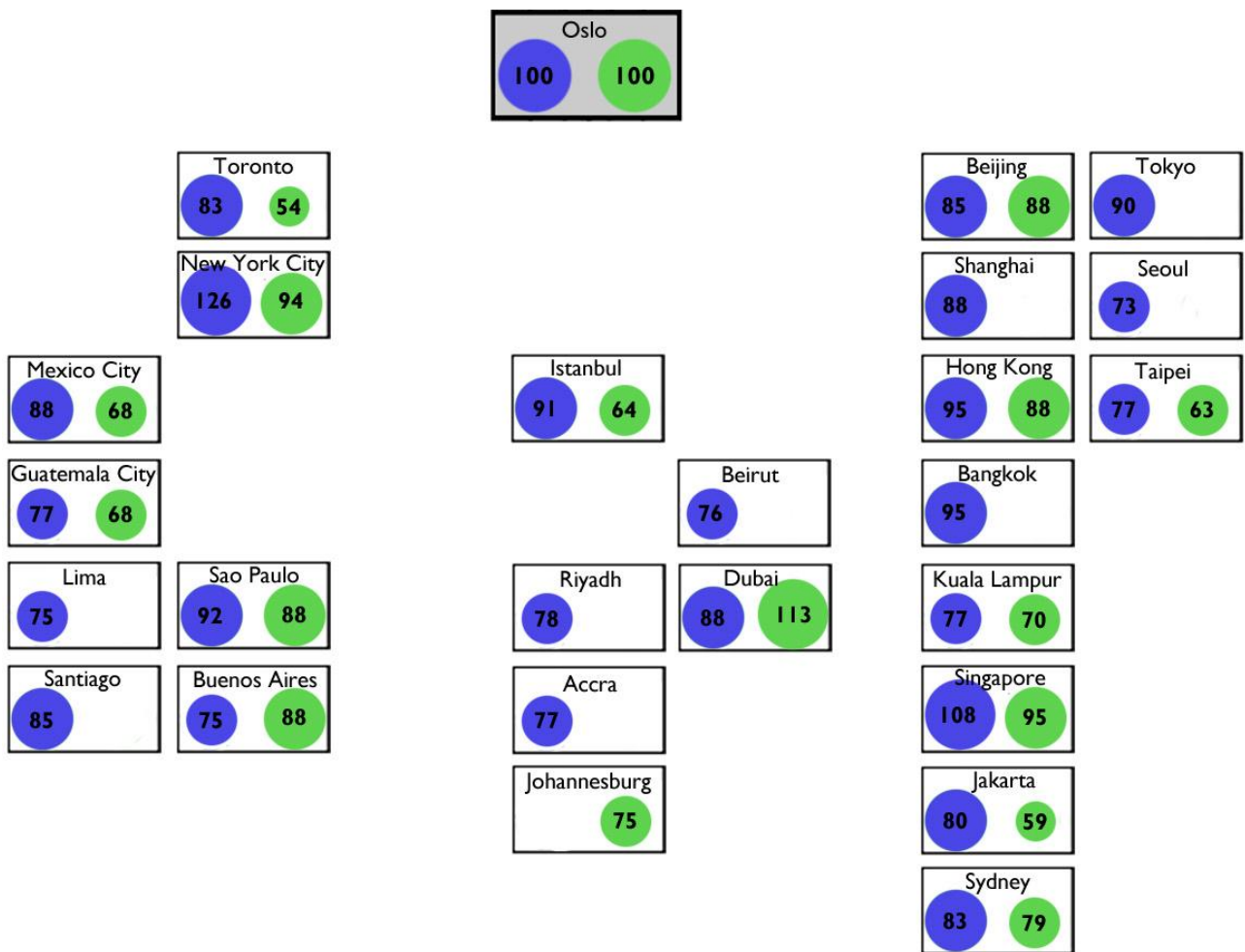
Connectivity through financial and market service firms (Index)



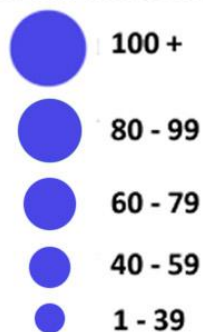
Connectivity through ICT firms (Index)



Map 18. Helsinki's global intercity connectivity through financial and market service, and ICT service firms



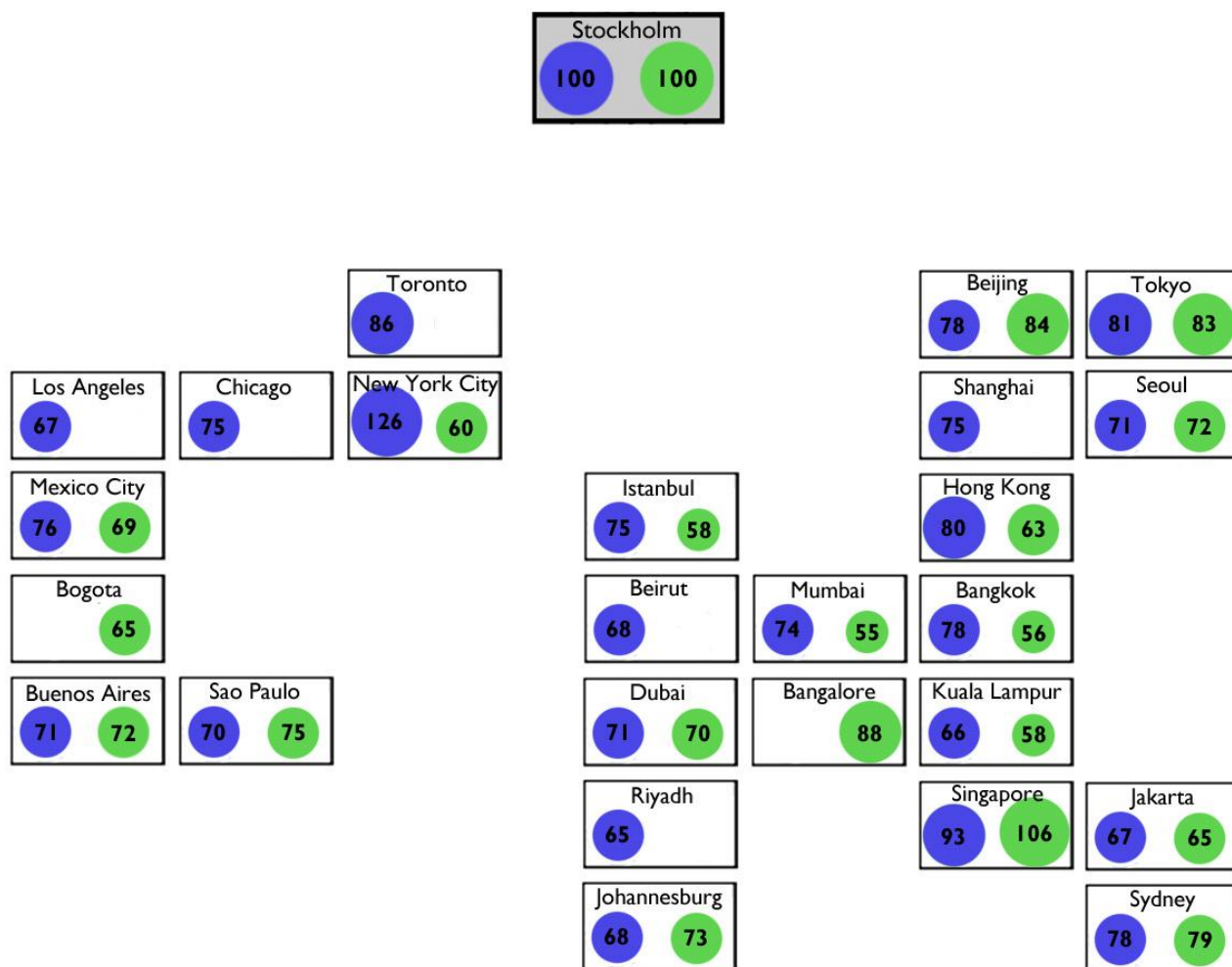
Connectivity through financial and market service firms (Index)



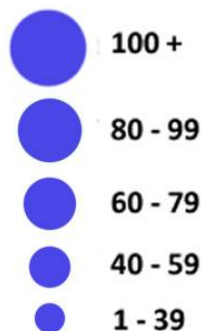
Connectivity through ICT firms (Index)



Map 19. Oslo's global intercity connectivity through financial and market service, and ICT service firms



Connectivity through financial and market service firms (Index)



Connectivity through ICT firms (Index)



Map 20. Stockholm's global intercity connectivity through financial and market service, and ICT service firms

3. Conclusions and Policy Implications

3.1 Concluding discussion

Using this ‘bottom-up’ approach (as discussed in chapter 1), which conceptualises the outside world of the four Nordic capital regions through the lenses of KIBS-firms, reveals a number of interesting results. Firstly, in relative terms, it confirms the latest results of the global ‘top-down’ approach (cf. table 1), namely the comparatively strong global significance of Stockholm, followed by Copenhagen and then Oslo and Helsinki (although the latter two seem to be much closer in terms of their factual inter-city connectivity in our ‘bottom-up’ approach). However, one can also conclude that our ‘scale-sensitive’ approach complements the aforementioned top-down study in many respects. It should also be noted here that we have defined our two sectors slightly differently as compared to the large GUCP/GaWC project (cf. Taylor *et al.* 2010).

Nevertheless, our results at the national scale indicate quite strongly the relative monocentricity of the Nordic national urban systems. One explanation for this is the unitary nature of the Nordic nation states compared, for instance, to Federal Systems which might have fortified this picture. In addition, perhaps related to this, the relatively small critical mass of the Nordic national cities here in terms of their city-regional market potentials for KIBS firms is another important aspect for consideration here. Moreover, it is clear that the four Nordic countries (Denmark, Finland, Norway and Sweden) themselves comprise small markets. In other words, many larger KIBS-firms (here selected by the size of their annual turnover) serve the national market with only a small number of offices (in many cases with only one office located in the capital region). However, there are some differences in location patterns between finance and market service firms and ICT service firms. The latter seems to be more concentrated, while the former display a more dispersed pattern of office locations.

In this context then it is perhaps not that surprising that, at the Nordic scale, Swedish cities

are more prominent, as they belong to a country with an overall market size that is double that of any of the other Nordic countries. In addition, Sweden’s relatively central geographic position in *Norden* undoubtedly provides a strong incentive for non-Nordic based companies to open an office there as opposed to one of the other less centrally situated Nordic capitals. Another potential factor here might be the comparatively high critical mass (in terms of market potentials, here other firms as clients) of the Stockholm region. The Copenhagen capital region has more or less the same weight in this respect and might also profit from its closeness to the European mainland and the higher significance of its international airport (as compared to Stockholm, but also to the other two Nordic capital regions). Nevertheless, these are rather speculative assumptions based on a highly rationalistic outlook in relation to market size (also in terms of population and jobs, see table 2), geographic position etc. Hermelin (2010, 301) for instance argues in her commentary on the global top-down approach of the GUCP/GaWC project (cf. Taylor *et al.* 2010) that the ‘integrated history’ of the Nordic Countries has resulted in relatively dense economic, social and cultural connections. This may then also support the perceptions held by strategic decision-makers, in Nordic as well as in non-Nordic KIBS firms, that only a small number of offices is required to service this (comparatively) well integrated market.

At the non-Nordic (i.e. European scale) it appears that the Iron Curtain has to a large extent been overcome. Indeed London and Paris stand out due to their high-degree of world ‘cityness’ (cf. Taylor *et al.* 2010, 2011). But looking at the other 23 non-Nordic European cities we see a rather balanced west-east picture. It would be interesting to compare these results with other Western European cities (such as Frankfurt, Amsterdam etc.) to see if they are as well connected, or, using the language of the GaWC, ‘interlocked’ with Eastern

European cities. Nevertheless, it appears that the four Nordic capital regions are (in this context) well-connected with these relatively fast growing markets. Perhaps the most eye-catching result in this respect is that actual geographic proximity to the cities of the Baltic States (particularly the comparatively small markets in and around Tallinn, Riga and Vilnius) is mirrored by strong 'intra-firm proximity' (i.e. the intra-organisational linkages represented by the direct connectivity values, cf. appendix tables 17 to 24). But there are some differences between the two sectors, with the ICT service sector appearing to be more oriented towards Western Europe. It is also interesting to see that while London is the centre for finance and market service, Paris is the European hub for the ICT service sector.

From our perspective the most surprising results, in particularly compared to the most recent global top-down approaches (cf. Taylor *et al.* 2010 and 2011), are to be found at the non-European (i.e. global) scale. Here one needs to mention once again the selection of our roster of cities. For pragmatic reasons we had to pre-define the number of cities, specifically at the global scale, since not doing so would have resulted in an endless list of cities (our roster now comprises 374 cities). Compared to the aforementioned established global top-down approaches, we have defined these cities in a very systematic way, i.e. based on their critical mass in terms of population at the municipal level. We felt that this is a 'fair approach' to challenging established mental maps in so far as it is very sensitive towards the big cities in the many growing economies of the world, but, as a side-effect, it neglects the functional well-established, but in a global perspective, smaller cities of the capitalist world system of the 20th century. In consequence

our roster of cities for instance omitted many (comparatively) small US-cities (with less than one million inhabitants, such as Boston, Miami, San Francisco, Seattle, and Washington), which were included in the GUCP/GaWC study. Our results differ significantly from this study as they apportion comparatively more weight to cities in the BRIC countries and other rapidly growing countries in terms of their economic weight such as Thailand, Chile and South Africa. Most of the cities with the highest global network connectivities are nevertheless generally also to be found in our Top 25 lists (New York, Tokyo, Shanghai, Singapore etc., cf. Tables 25 to 32 in the appendix). Perhaps most interesting is the extent to which the pattern of cities (and their connectivity indices) belonging to global macro-regions (such as Central and South America or Asia) change between the four maps of the Nordic capital regions, and between the sectors. For example, the Oslo capital region has strong intercity connectivity with Dubai through ICT service firms, while Helsinki's connections with Hong Kong are very strong through finance and market service firms. Here further investigation is required in order, for instance, to discern historical path-dependencies. It does however appear that the Nordic capital regions seem to be well-connected with these emerging or fast growing macro-regions/countries or cities at the global scale. Still, one needs to bear in mind here that the KIBS firms that connect the Nordic capital regions with these markets in our sample are for the most part 'non-Nordic based firms'. In other words, we have to understand these maps and findings as representations of decision-makers that are based for instance in New York or London and thus consider the global market potentials of their firm not necessarily from a Nordic point of view.

3.2 Policy implications

Formulating policy implications on the basis of the results produced by this study is not an easy task. In so doing the first question that arises is who is the target of this intervention? Even this is not so easy to define as the Nordic Working Group's idea was to address the *Nordic policy level* as such; our study has, however, offered a rather more selective perspective by focussing in particular on the sample of four Nordic capital regions. We would also like to emphasise once again that this study presents a very narrow and specific view of 'KIBS firms' and their intra-office networks – and thus does not, for instance, entail an in-depth analysis of the specific functional and/or economic profiles of the four

Nordic capital regions. In addition it should be noted that neither 'high' nor 'low' indices of intercity connectivities provide a concrete indication of actual economic performance, social-economic well-being or future competitiveness.

One of the central lessons of this study is undoubtedly however the need to challenge established notions of the national, Nordic, European and even Global urban systems. This study has done this on the basis of strategic decisions to set up intra-office firm networks that connect several cities in *Norden* and the world outside *Norden*. Traditional studies on urban systems generally tend to use rather static approaches (size

of cities, functional profiles of cities e.g. based on available infrastructures etc.) from which some forms of 'relations' or 'intangible' labour divisions between cities are anticipated. Although critical mass aspects have also had a certain influence on our results (here regarding the selection of KIBS firms due to their annual turnover and the roster of cities, cf. chapter 1) our study is representative of the 'relational approach' to the consideration of current national and international urban systems. As such it challenges traditional mental maps of the relative position of the one or other city.

In this vein, we would argue that in light of the geo-economic shifts of the last two decades one of the primary policy implications of this is simply the need to take into fuller consideration such 'relational representations'. They challenge our traditional maps as well as our policy frameworks in so far as they focus on the networking agent (i.e. the firm) and the decisions/practices of specific key actors instead of a static *ensemble* of institutions and infrastructures which are qualified in terms of market sizes and/or the economic performance of spatial units within jurisdictional boundaries. This figure of thought still organises the spatial allocation of policies, programmes and projects – with the EU structural funds a particularly eye-catching example of this. Certainly such a relational perspective is less tangible and before formulating concrete 'place-based' policies, one needs to more vigorously interrogate the nature of such relations and what could be done in order to optimise them. This study represents then a first step in this direction!

As such, we consider this study to be something of an eye-opener inviting readers to re-think their established notions of, for instance, the Swedish, Danish, Finnish or Norwegian urban system and their integration in other urban systems; and thus the notions which ultimately still dominate our strategic policy approaches. In other words, with this study we want to stimulate the development of such complementary mental maps in respect of the Nordic urban systems. What is clear, however, is that such a re-thinking process cannot be based on either a solely national perspective, or indeed on a Nordic one. Careful

consideration here must be given to the multi-scalar scope of these 'interlocked urban systems'.

It is clear that a new and more extensive survey focusing on the rationalities and functioning of intra-firm networks and the role of the city is likely to produce interesting results enabling us to better inform policymakers and them perhaps to fine-tune urban policies: Why do firms choose to establish an office in one Nordic city rather than another? How many offices are actually needed to serve the specific market that the KIBS firm in question is operating in?

From a more Nordic perspective we would like to suggest a more complementary approach. Certain path-dependences and degrees of functional economic specialisation exist among the Nordic cities in general and the four Nordic capital regions in particular (cf. Schmitt/Dubois 2008, 39-63). Here one could try to optimise place-placed policies in order to strengthen the relative inter-city connectivity of the one or other city/capital region (e.g. in terms of ICT services). This should be done, however, in careful cooperation with other Nordic cities in order to avoid a situation where many Nordic cities simply follow similar strategies. This could lead to unhealthy competition and the less efficient application of the policy incentives, due to the small market sizes and the high level of integration across the Nordic economy. In any case, the prevailing 'governance capacity' of the Nordic capital regions in particular in terms of their interlocking with other urban systems is an important factor here. Are appropriate institutions available that are willing to organise such place-based policies based on somewhat different logics and rationales as illustrated in this report? As illustrated in another Working Paper also based on the work of this Nordic Working Group (cf. Schmitt *et al.* 2011), one can easily detect a number of governance actors in each Nordic capital region, which could potentially take-up such issues and set in motion a lively debate within each Nordic capital region, potentially also encouraging a strategic dialogue with other Nordic cities or metropolitan regions.

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Table 1. Copenhagen's *national* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Aarhus	23	Aarhus	54
Aalborg	13	Aalborg	50
Odense	11	Odense	46
Vejle	10	Esbjerg	45
Sønderborg	10	Sønderborg	45
Kolding	10	Kolding	42
Esbjerg	10	Herning	42
Viborg	9	Holstebro	42
Slagelse	9	Viborg	40
Holstebro	9	Vejle	39
Herning	9	Randers	38
Skive	8	Skive	38
Randers	8	Frederikshavn	37
Næstved	8	Hjørring	37
Horsens	8	Næstved	36
Hjørring	8	Horsens	35
Haderslev	8	Slagelse	34
Frederikshavn	8	Haderslev	34
Svendborg	6	Fredericia	33
Silkeborg	6	Silkeborg	33
Ringkøbing-Skjern	6	Ringkøbing-Skjern	32
Fredericia	6	Svendborg	31
Holbæk	5	Aabenraa	28
Aabenraa	5	Holbæk	28

Table 2. Copenhagen's *national* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Aarhus	27	Aarhus	55
Aalborg	12	Aalborg	40
Odense	8	Odense	30
Herning	6	Herning	28
Kolding	6	Kolding	27
Silkeborg	4	Silkeborg	24
Aabenraa	2	Aabenraa	20
Esbjerg	2	Esbjerg	20
Hjørring	2	Hjørring	20
Holbæk	2	Holbæk	20
Holstebro	2	Holstebro	20
Horsens	2	Horsens	20
Næstved	2	Næstved	20
Skanderborg	2	Slagelse	20
Slagelse	2	Thisted	20
Thisted	2	Varde	20
Varde	2	Vejle	20
Vejle	2	Skanderborg	2
Faaborg-Midtfyn	0	Faaborg-Midtfyn	0
Fredericia	0	Fredericia	0
Frederikshavn	0	Frederikshavn	0
Guldborgsund	0	Guldborgsund	0
Haderslev	0	Haderslev	0
Hedensted	0	Hedensted	0

Table 3. Helsinki's *national* connectivity through financial and market service firms

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Tampere	27	Tampere	57
Turku	21	Turku	53
Oulu	19	Oulu	50
Vaasa	14	Vaasa	41
Jyväskylä	13	Pori	41
Kuopio	13	Jyväskylä	38
Pori	13	Kuopio	37
Lahti	11	Seinäjoki	32
Joensuu	10	Lappeenranta	31
Seinäjoki	10	Lahti	30
Lappeenranta	8	Joensuu	28
Rovaniemi	6	Rovaniemi	25
Kokkola	5	Kouvola	22
Kouvola	5	Kokkola	21
Mikkeli	5	Mikkeli	18
Hämeenlinna	4	Kotka	17
Kotka	4	Salo	17
Porvoo	4	Porvoo	17
Salo	4	Hämeenlinna	16

Table 4. Helsinki's *national* connectivity through ICT service firms

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Tampere	24	Tampere	50
Jyväskylä	18	Turku	48
Turku	18	Jyväskylä	47
Oulu	17	Oulu	46
Kuopio	10	Kuopio	33
Joensuu	8	Joensuu	32
Lappeenranta	8	Lappeenranta	30
Lahti	8	Lahti	29
Vaasa	7	Vaasa	29
Hämeenlinna	5	Hämeenlinna	24
Pori	5	Pori	18
Seinäjoki	5	Kouvola	17
Kouvola	3	Mikkeli	17
Mikkeli	3	Seinäjoki	16
Salo	3	Salo	13
Kokkola	2	Kokkola	10
Kotka	2	Kotka	10
Porvoo	2	Porvoo	10
Rovaniemi	2	Rovaniemi	7

Table 5. Oslo's *national* connectivity through financial and market service firms

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
Bergen	19	Bergen	54
Trondheim	16	Trondheim	51
Stavanger	15	Stavanger	47
Kristiansand	9	Tønsberg	40
Tønsberg	9	Ålesund	39
Ålesund	8	Kristiansand	35
Tromsø	7	Tromsø	34
Bodø	6	Bodø	34
Fredrikstad	6	Haugesund	32
Haugesund	6	Arendal	30
Arendal	6	Fredrikstad	28
Sandefjord	6	Sandefjord	28
Sandnes	4	Sandnes	21
Sarpsborg	4	Sarpsborg	19
Skien	3	Skien	16

Table 6. Oslo's *national* connectivity through ICT service firms

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
Bergen	29	Bergen	51
Trondheim	26	Trondheim	47
Stavanger	24	Stavanger	43
Kristiansand	14	Kristiansand	33
Haugesund	9	Tromsø	27
Tromsø	9	Ålesund	25
Ålesund	9	Tønsberg	22
Arendal	7	Fredrikstad	21
Fredrikstad	7	Haugesund	21
Tønsberg	7	Arendal	20
Bodø	5	Bodø	17
Sandnes	5	Sandefjord	13
Sandefjord	3	Sandnes	9
Sarpsborg	3	Skien	7
Skien	2	Sarpsborg	5

Table 7. Stockholm's *national* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Gothenburg	33	Gothenburg	65
Malmö	27	Malmö	63
Sundsvall	15	Linköping	49
Umeå	15	Umeå	49
Linköping	13	Örebro	46
Örebro	13	Västerås	45
Karlstad	12	Jönköping	44
Jönköping	12	Karlstad	43
Helsingborg	12	Sundsvall	43
Västerås	12	Helsingborg	43
Växjö	11	Halmstad	42
Norrköping	11	Växjö	42
Eskilstuna	10	Norrköping	40
Gävle	10	Kalmar	40
Halmstad	10	Luleå	40
Luleå	10	Eskilstuna	39
Kalmar	10	Karlskrona	38
Östersund	10	Gävle	37
Karlskrona	9	Östersund	36
Borås	9	Borås	36
Falun	9	Falun	36
Nyköping	8	Nyköping	35
Kristianstad	8	Skellefteå	34
Skellefteå	8	Örnsköldsvik	34

Table 8. Stockholm's *national* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Gothenburg	33	Gothenburg	60
Malmö	26	Malmö	52
Linköping	18	Linköping	46
Sundsvall	17	Sundsvall	42
Västerås	13	Karlstad	41
Karlstad	12	Umeå	41
Umeå	12	Västerås	39
Örebro	12	Örebro	38
Gävle	10	Luleå	36
Helsingborg	10	Växjö	36
Jönköping	10	Gävle	36
Karlskrona	10	Helsingborg	36
Kristianstad	10	Jönköping	35
Luleå	10	Norrköping	32
Norrköping	10	Östersund	29
Växjö	10	Kristianstad	28
Falun	8	Örnsköldsvik	25
Östersund	8	Falun	22
Lund	7	Karlskrona	22
Skövde	7	Kalmar	21
Örnsköldsvik	7	Skellefteå	21
Borlänge	5	Skövde	20
Eskilstuna	5	Borlänge	17
Halmstad	5	Eskilstuna	17

Table 9. Copenhagen's *Nordic* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Stockholm region	58	Stockholm region	109
Oslo region	39	Helsinki region	87
Helsinki region	36	Oslo region	84
Gothenburg	23	Gothenburg	66
Jönköping	11	Jönköping	52
Linköping	11	Karlstad	50
Bergen	11	Sundsvall	50
Karlstad	10	Umeå	50
Sundsvall	10	Örebro	50
Umeå	10	Trondheim	49
Växjö	10	Linköping	48
Örebro	10	Växjö	48
Reykjavik region	10	Eskilstuna	46
Trondheim	9	Norrköping	46
Eskilstuna	9	Västerås	46
Halmstad	9	Tampere	45
Helsingborg	9	Turku	45
Kalmar	9	Bergen	43
Lund	9	Halmstad	43
Norrköping	9	Helsingborg	43
Västerås	9	Östersund	42
Östersund	9	Kristianstad	42
Stavanger	9	Nyköping	42
Tampere	9	Kristiansand	41

Table 10. Copenhagen's *Nordic* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Oslo region	52	Oslo region	93
Stockholm region	51	Stockholm region	91
Helsinki region	39	Helsinki region	76
Göteborg	20	Göteborg	54
Sundsvall	15	Sundsvall	49
Bergen	15	Bergen	46
Tampere	13	Linköping	42
Linköping	12	Turku	38
Helsingborg	9	Umeå	37
Växjö	9	Kuopio	36
Kuopio	9	Gävle	34
Oulu	9	Jyväskylä	34
Turku	9	Vaasa	34
Gävle	7	Växjö	34
Karlskrona	7	Tampere	34
Umeå	7	Helsingborg	34
Västerås	7	Västerås	31
Örebro	7	Skellefteå	30
Stavanger	7	Hämeenlinna	30
Trondheim	7	Joensuu	30
Jyväskylä	7	Lahti	30
Lappeenranta	7	Lappeenranta	29
Vaasa	7	Trondheim	28
Falun	6	Örebro	27

Table 11. Helsinki's *Nordic* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Stockholm region	49	Stockholm region	102
Oslo region	30	Copenhagen region	83
Copenhagen region	29	Oslo region	83
Gothenburg	14	Reykjavik region	52
Reykjavik region	9	Gothenburg	44
Trondheim	6	Bergen	44
Bergen	5	Trondheim	39
Växjö	5	Växjö	37
Aarhus	5	Aarhus	36
Stavanger	5	Stavanger	36
Jönköping	4	Jönköping	34
Luleå	4	Luleå	34
Sundsvall	4	Kristiansand	33
Kristiansand	3	Sundsvall	28
Halmstad	2	Halmstad	26
Helsingborg	2	Helsingborg	26
Kalmar	2	Kalmar	26
Karlskrona	2	Karlskrona	26
Linköping	2	Linköping	26
Lund	2	Lund	26
Norrköping	2	Nyköping	26
Nyköping	2	Umeå	26
Skellefteå	2	Västerås	26
Umeå	2	Vejle	26

Table 12. Helsinki's *Nordic* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Stockholm region	45	Stockholm region	99
Oslo region	40	Copenhagen region	94
Copenhagen region	35	Oslo region	94
Göteborg	17	Göteborg	56
Växjö	13	Växjö	51
Bergen	13	Bergen	50
Linköping	12	Sundsvall	48
Sundsvall	12	Linköping	45
Västerås	10	Umeå	41
Aarhus	10	Västerås	39
Gävle	8	Aarhus	38
Karlstad	8	Karlstad	36
Umeå	8	Luleå	33
Stavanger	8	Gävle	33
Falun	7	Stavanger	31
Helsingborg	7	Norrköping	31
Jönköping	7	Helsingborg	30
Luleå	7	Kolding	28
Norrköping	7	Falun	28
Skellefteå	7	Örebro	28
Trondheim	7	Östersund	28
Halmstad	5	Skellefteå	28
Karlskrona	5	Jönköping	27
Örebro	5	Kristiansand	24

Table 13. Oslo's *Nordic* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
Stockholm region	54	Stockholm region	114
Copenhagen region	45	Copenhagen region	104
Helsinki region	34	Helsinki region	85
Gothenburg	17	Gothenburg	60
Reykjavik region	8	Karlstad	49
Karlstad	7	Örebro	47
Umeå	6	Växjö	46
Västerås	6	Umeå	46
Växjö	6	Jönköping	45
Örebro	6	Sundsvall	45
Aarhus	6	Västerås	42
Linköping	6	Aarhus	42
Jönköping	6	Linköping	42
Sundsvall	6	Eskilstuna	40
Odense	6	Norrköping	40
Borås	5	Kalmar	40
Eskilstuna	5	Karlskrona	40
Helsingborg	5	Luleå	40
Kalmar	5	Tampere	39
Karlskrona	5	Turku	39
Luleå	5	Reykjavik region	39
Norrköping	5	Borås	36
Aalborg	5	Helsingborg	36
Oulu	5	Oulu	36

Table 14. Oslo's *Nordic* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
Stockholm region	53	Stockholm region	83
Copenhagen region	42	Copenhagen region	80
Helsinki region	35	Helsinki region	74
Göteborg	24	Göteborg	52
Linköping	15	Linköping	44
Aarhus	15	Sundsvall	42
Sundsvall	14	Växjö	42
Västerås	12	Aarhus	40
Växjö	12	Umeå	37
Örebro	12	Västerås	36
Umeå	10	Turku	35
Jyväskylä	10	Jyväskylä	35
Tampere	10	Örebro	34
Turku	10	Oulu	32
Karlstad	9	Joensuu	32
Joensuu	9	Karlstad	32
Oulu	9	Tampere	31
Falun	7	Norrköping	30
Gävle	7	Kolding	30
Halmstad	7	Gävle	29
Helsingborg	7	Helsingborg	29
Karlskrona	7	Skellefteå	29
Luleå	7	Kuopio	29
Norrköping	7	Lahti	29

Table 15. Stockholm's *Nordic* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Copenhagen region	32	Copenhagen region	80
Oslo region	29	Oslo region	71
Helsinki region	26	Helsinki region	69
Stavanger	8	Stavanger	44
Reykjavik region	8	Aarhus	42
Aarhus	8	Tampere	42
Trondheim	8	Turku	41
Tampere	7	Trondheim	40
Bergen	6	Aalborg	39
Aalborg	6	Vaasa	38
Turku	6	Haugesund	38
Haugesund	6	Kristiansand	38
Kristiansand	6	Ålesund	38
Ålesund	6	Bergen	37
Jyväskylä	6	Vejle	35
Vaasa	6	Oulu	35
Tromsø	5	Tromsø	34
Esbjerg	5	Jyväskylä	34
Odense	5	Esbjerg	33
Vejle	5	Odense	33
Bodø	5	Kuopio	33
Sandefjord	5	Lappeenranta	30
Tønsberg	5	Pori	30
Kuopio	5	Rovaniemi	30

Table 16. Stockholm's *Nordic* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Helsinki region	48	Oslo region	95
Oslo region	47	Helsinki region	93
Copenhagen region	46	Copenhagen region	87
Aarhus	17	Aarhus	46
Bergen	12	Bergen	38
Stavanger	10	Turku	34
Trondheim	10	Stavanger	32
Turku	10	Joensuu	30
Oulu	8	Jyväskylä	30
Tampere	8	Kuopio	30
Kolding	7	Lahti	30
Joensuu	7	Pori	30
Jyväskylä	7	Trondheim	28
Kuopio	7	Oulu	28
Lahti	7	Kolding	27
Pori	7	Tampere	27
Aalborg	5	Aalborg	25
Kristiansand	5	Vaasa	24
Hämeenlinna	5	Hämeenlinna	21
Vaasa	5	Kristiansand	19
Esbjerg	3	Haugesund	17
Herning	3	Tønsberg	17
Vejle	3	Esbjerg	17
Arendal	3	Arendal	17

Table 17. Copenhagen's *European* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
London (UK)	49	London (UK)	135
Warsaw (Poland)	31	Warsaw (Poland)	92
Prague (Czech Republic)	25	Moscow (Russia)	79
Tallinn (Estonia)	24	Paris (France)	78
Moscow (Russia)	24	Tallinn (Estonia)	78
Dublin (Ireland)	23	Prague (Czech Republic)	77
Paris (France)	23	Riga (Latvia)	77
Riga (Latvia)	23	Amsterdam (Netherlands)	75
Madrid (Spain)	22	Vilnius (Lithuania)	74
Vilnius (Lithuania)	21	Dublin (Ireland)	73
Frankfurt am Main (Germany)	21	Vienna (Austria)	72
Milan (Italy)	21	Budapest (Hungary)	70
Amsterdam (Netherlands)	20	Frankfurt am Main (Germany)	69
Athens (Greece)	19	Madrid (Spain)	69
Vienna (Austria)	19	Athens (Greece)	68
Bratislava (Slovakia)	19	Bratislava (Slovakia)	68
Budapest (Hungary)	19	Milan (Italy)	64
Kiev (Ukraine)	19	Sofia (Bulgaria)	62
Hamburg (Germany)	18	Kiev (Ukraine)	62
Zürich (Switzerland)	18	Ljubljana (Slovenia)	61
Lisbon (Portugal)	17	Belgrade (Serbia)	61
Brussels (Belgium)	16	Bucharest (Romania)	61
Düsseldorf (Germany)	16	Lisbon (Portugal)	58
Barcelona (Spain)	15	Zürich (Switzerland)	58

Table 18. Copenhagen's *European* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Paris (France)	43	Paris (France)	133
Milano (Italy)	29	Milano (Italy)	92
Madrid (Spain)	28	Madrid (Spain)	91
Brussels (Belgium)	28	Munich (Germany)	90
Warsaw (Poland)	28	Brussels (Belgium)	82
Munich (Germany)	27	Vienna (Austria)	77
Moscow (Russia)	26	Moscow (Russia)	76
Vienna(Austria)	25	Lisbon (Portugal)	73
Zürich (Switzerland)	24	London (UK)	72
Lisbon (Portugal)	23	Warsaw (Poland)	71
Prague (Czech Republic)	23	Prague (Czech Republic)	71
Budapest (Hungary)	22	Budapest (Hungary)	69
Dublin (Ireland)	22	Dublin (Ireland)	69
Bratislava (Slovakia)	21	Bratislava (Slovakia)	68
Bucharest (Romania)	21	Bucharest (Romania)	67
London (UK)	21	Zürich (Switzerland)	66
Rome (Italy)	19	Rome (Italy)	65
Tallinn (Estonia)	19	Hamburg (Germany)	61
Vilnius (Lithuania)	19	Tallinn (Estonia)	59
Frankfurt am Main (Germany)	18	Kiev (Ukraine)	59
Kiev (Ukraine)	18	Berlin (Germany)	58
Belgrade (Serbia)	17	Vilnius (Lithuania)	58
Berlin (Germany)	17	Zagreb (Croatia)	57
Hamburg (Germany)	17	Belgrade (Serbia)	57

Table 19. Helsinki's *European* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
London (UK)	22	London (UK)	109
Tallinn (Estonia)	22	Madrid (Spain)	86
Moscow (Russia)	20	Moscow (Russia)	83
Vilnius (Lithuania)	20	Milano(Italy)	80
Milan (Italy)	18	Warsaw (Poland)	71
Riga (Latvia)	17	Rome (Italy)	69
Warsaw (Poland)	17	Dublin (Ireland)	65
Madrid (Spain)	17	Budapest (Hungary)	64
Saint Petersburg (Russia)	16	Paris (France)	62
Vienna (Austria)	16	Vienna (Austria)	62
Budapest (Hungary)	14	Vilnius (Lithuania)	62
Dublin (Ireland)	14	Prague (Czech Republic)	62
Lisbon (Portugal)	13	Lisbon (Portugal)	61
Prague (Czech Republic)	13	Riga (Latvia)	58
Bratislava (Slovakia)	11	Amsterdam (Netherlands)	58
Amsterdam (Netherlands)	10	Tallinn (Estonia)	58
Bucharest (Romania)	10	Bratislava (Slovakia)	57
Sofia (Bulgaria)	10	Barcelona (Spain)	56
Barcelona (Spain)	10	Sofia (Bulgaria)	50
Frankfurt am Main (Germany)	10	Bucharest (Romania)	50
Ljubljana (Slovenia)	10	Frankfurt am Main (Germany)	49
Rome (Italy)	10	Ljubljana (Slovenia)	47
Paris (France)	9	Saint Petersburg (Russia)	47
Athens (Greece)	8	Athens (Greece)	45

Table 20. Helsinki's *European* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Paris (France)	29	Paris (France)	98
Milan (Italy)	20	Munich (Germany)	70
Munich (Germany)	20	Madrid (Spain)	69
Tallinn (Estonia)	20	Milan (Italy)	68
London (UK)	19	Brussels (Belgium)	63
Madrid (Spain)	18	London (UK)	60
Brussels (Belgium)	18	Moscow (Russia)	53
Moscow (Russia)	18	Frankfurt am Main (Germany)	52
Frankfurt am Main (Germany)	16	Rome (Italy)	52
Warsaw (Poland)	15	Lisbon (Portugal)	52
Lisbon (Portugal)	13	Vienna (Austria)	51
Prague (Czech Republic)	13	Warsaw (Poland)	50
Vienna (Austria)	13	Berlin (Germany)	50
Berlin (Germany)	11	Bucharest (Romania)	48
Budapest (Hungary)	11	Stuttgart (Germany)	48
Dublin (Ireland)	11	Prague (Czech Republic)	47
Rome (Italy)	11	Tallinn (Estonia)	46
Amsterdam (Netherlands)	10	Budapest (Hungary)	46
Bratislava (Slovakia)	10	Bratislava (Slovakia)	45
Bucharest (Romania)	10	Hamburg (Germany)	45
Vilnius (Lithuania)	10	Dublin (Ireland)	44
Düsseldorf (Germany)	9	Amsterdam (Netherlands)	44
Riga (Latvia)	9	Utrecht (Netherlands)	44
Stuttgart (Germany)	9	Birmingham (UK)	41

Table 21. Oslo's *European* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
London (UK)	45	London (UK)	125
Warsaw (Poland)	30	Warsaw (Poland)	95
Riga (Latvia)	25	Tallinn (Estonia)	85
Tallinn (Estonia)	25	Moscow (Russia)	83
Paris (France)	24	Prague (Czech Republic)	83
Vilnius (Lithuania)	24	Riga (Latvia)	82
Madrid (Spain)	23	Paris (France)	81
Moscow (Russia)	23	Vilnius (Lithuania)	79
Brussels (Belgium)	22	Amsterdam (Netherlands)	79
Prague (Czech Republic)	21	Budapest (Hungary)	78
Milan (Italy)	20	Madrid (Spain)	77
Frankfurt am Main (Germany)	20	Dublin (Ireland)	77
Dublin (Ireland)	19	Milan (Italy)	71
Amsterdam (Netherlands)	19	Athens (Greece)	70
Budapest (Hungary)	19	Zagreb (Croatia)	69
Athens (Greece)	17	Vienna (Austria)	69
Bucharest (Romania)	17	Bucharest (Romania)	69
Lisbon (Portugal)	17	Belgrade (Serbia)	68
Vienna (Austria)	17	Frankfurt am Main (Germany)	68
Kiev (Ukraine)	17	Kiev (Ukraine)	68
Barcelona (Spain)	16	Ljubljana (Slovenia)	68
Bratislava (Slovakia)	15	Sofia (Bulgaria)	67
Zagreb (Croatia)	15	Bratislava (Slovakia)	67
Sofia (Bulgaria)	14	Brussels (Belgium)	64

Table 22. Oslo's *European* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
London (UK)	16	Paris (France)	87
Amsterdam (Netherlands)	14	Prague (Czech Republic)	67
Paris (France)	14	Madrid (Spain)	65
Prague (Czech Republic)	14	Brussels (Belgium)	62
Madrid (Spain)	13	London (UK)	60
Warsaw (Poland)	13	Milan (Italy)	57
Brussels (Belgium)	12	Vienna (Austria)	55
Tallinn (Estonia)	12	Lisbon (Portugal)	52
Vilnius (Lithuania)	11	Warszawa (Poland)	51
Riga (Latvia)	10	Munich (Germany)	51
Vienna (Austria)	10	Stuttgart (Germany)	50
Hamburg (Germany)	9	Hamburg (Germany)	47
Milan (Italy)	9	Budapest (Hungary)	47
Munich (Germany)	9	Berlin (Germany)	45
Lisbon (Portugal)	9	Rome (Italy)	45
Moscow (Russia)	9	Frankfurt am Main (Germany)	45
Budapest (Hungary)	8	Amsterdam (Netherlands)	42
Frankfurt am Main (Germany)	8	Moscow (Russia)	39
Stuttgart (Germany)	8	Tallinn (Estonia)	38
Berlin (Germany)	7	Wroclaw (Poland)	37
Bratislava (Slovakia)	7	Bratislava (Slovakia)	37
Rome (Italy)	7	Toulouse (France)	35
Wroclaw (Poland)	7	Dublin (Ireland)	32
Bucharest (Romania)	6	Birmingham (UK)	30

Table 23. Stockholm's *European* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
London (UK)	41	London (UK)	115
Paris (France)	27	Paris (France)	78
Moscow (Russia)	25	Moscow (Russia)	72
Warsaw (Poland)	24	Amsterdam (Netherlands)	71
Amsterdam (Netherlands)	23	Warsaw (Poland)	70
Frankfurt am Main (Germany)	22	Madrid (Spain)	64
Brussels (Belgium)	22	Frankfurt am Main (Germany)	62
Madrid (Spain)	22	Prague (Czech Republic)	61
Zürich (Switzerland)	20	Zürich (Switzerland)	60
Milano (Italy)	19	Dublin (Ireland)	59
Prague (Czech Republic)	19	Budapest (Hungary)	58
Wien (Austria)	17	Riga (Latvia)	58
Budapest (Hungary)	17	Vienna (Austria)	58
Rome (Italy)	17	Vilnius (Lithuania)	57
Dublin (Ireland)	16	Brussels (Belgium)	56
Riga (Latvia)	16	Milan (Italy)	56
Kiev (Ukraine)	15	Tallinn (Estonia)	56
Lisbon (Portugal)	15	Kiev (Ukraine)	52
Vilnius (Lithuania)	15	Bratislava (Slovakia)	52
Barcelona (Spain)	15	Bucharest (Romania)	51
Bratislava (Slovakia)	15	Rome (Italy)	51
Bucharest (Romania)	15	Athens (Greece)	50
Tallinn (Estonia)	15	Barcelona (Spain)	50
Hamburg (Germany)	14	Zagreb (Croatia)	48

Table 24. Stockholm's *European* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Paris (France)	29	Paris (France)	92
Madrid (Spain)	20	Madrid (Spain)	72
Brussels (Belgium)	18	Brussels (Belgium)	61
Milan (Italy)	17	Milan (Italy)	59
Warsaw (Poland)	17	Vienna (Austria)	57
Hamburg (Germany)	16	London (UK)	55
London (UK)	16	Moscow (Russia)	52
Frankfurt am Main (Germany)	15	Hamburg (Germany)	52
Prague (Czech Republic)	15	Amsterdam (Netherlands)	52
Tallinn (Estonia)	15	Prague (Czech Republic)	49
Amsterdam (Netherlands)	14	Dublin (Ireland)	49
Moscow (Russia)	14	Zürich (Switzerland)	46
Vienna (Austria)	14	Stuttgart (Germany)	46
Munich (Germany)	13	Frankfurt am Main (Germany)	45
Vilnius (Lithuania)	13	Warsaw (Poland)	44
Bucharest (Romania)	12	Berlin (Germany)	44
Barcelona (Spain)	11	Tallinn (Estonia)	43
Düsseldorf (Germany)	11	Toulouse (France)	41
Riga (Latvia)	11	Barcelona (Spain)	40
Zürich (Switzerland)	11	Budapest (Hungary)	39
Berlin (Germany)	10	Bucharest (Romania)	39
Budapest (Hungary)	10	Vilnius (Lithuania)	39
Dublin (Ireland)	10	Lisbon (Portugal)	39
Stuttgart (Germany)	10	Strasbourg (France)	39

Table 25. Copenhagen's *global* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
New York (USA)	39	New York (USA)	122
Singapore (Singapore)	36	Singapore (Singapore)	110
Shanghai (China)	27	Bangkok (Thailand)	93
Hong Kong (China)	25	Toronto (Canada)	93
Beijing (China)	23	Beijing (China)	89
Dubai (UAE)	22	Hong Kong (China)	88
Sydney (Australia)	22	Sydney (Australia)	83
Bangkok (Thailand)	21	Dubai (UAE)	83
Toronto (Canada)	21	Shanghai (China)	82
Mexico City (Mexico)	20	Sao Paulo (Brazil)	82
Buenos Aires (Argentina)	19	Montevideo (Uruguay)	82
Mumbai (India)	19	Buenos Aires (Argentina)	82
Santiago (Chile)	19	Mexico City (Mexico)	82
Tokyo (Japan)	18	Istanbul (Turkey)	80
Ho Chi Minh City (Vietnam)	18	Seoul (South Korea)	80
Istanbul (Turkey)	18	Mumbai (India)	80
Kuala Lumpur (Malaysia)	18	Santiago (Chile)	78
Montevideo (Uruguay)	18	Jakarta (Indonesia)	78
Johannesburg (South Africa)	17	Tokyo (Japan)	77
Chicago (USA)	16	Kuala Lumpur (Malaysia)	76
Delhi (India)	16	Guatemala City (Guatemala)	75
Jakarta (Indonesia)	16	Johannesburg (South Africa)	75
Melbourne (Australia)	16	Accra (Ghana)	75
Sao Paulo (Brazil)	16	Riyadh (Saudi Arabia)	74

Table 26. Copenhagen's *global* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Copenhagen region	100	Copenhagen region	100
Singapore (Singapore)	32	Singapore (Singapore)	112
Sydney (Australia)	29	Tokyo (Japan)	108
Beijing (China)	28	Dubai (UAE)	100
Dubai (UAE)	28	Sydney (Australia)	99
Tokyo (Japan)	28	Beijing (China)	96
Hong Kong (China)	25	Hong Kong (China)	88
New York (USA)	25	Sao Paulo (Brazil)	86
Sao Paulo (Brazil)	24	New York (USA)	86
Bangalore (India)	23	Seoul (South Korea)	85
Delhi (India)	23	Istanbul (Turkey)	79
Seoul (South Korea)	22	Delhi (India)	78
Johannesburg (South Africa)	20	Johannesburg (South Africa)	78
Santiago (Chile)	20	Casablanca (Morocco)	76
Bogota (Colombia)	19	Bangkok (Thailand)	75
Casablanca (Morocco)	19	Taipei (Taiwan)	73
Istanbul (Turkey)	19	Mexico City (Mexico)	71
Kuala Lumpur (Malaysia)	19	Santiago (Chile)	70
Melbourne (Australia)	19	Bogota (Colombia)	70
Bangkok (Thailand)	18	Toronto (Canada)	70
Jakarta (Indonesia)	18	Kuala Lumpur (Malaysia)	69
Toronto (Canada)	18	Hanoi (Vietnam)	67
Buenos Aires (Argentina)	17	Bangalore (India)	67
Mexico City (Mexico)	17	Shanghai (China)	66
Shanghai (China)	17	Buenos Aires (Argentina)	64

Table 27. Helsinki's *global* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Singapore (Singapore)	20	Singapore (Singapore)	104
New York (USA)	18	New York (USA)	101
Hong Kong (China)	16	Hong Kong (China)	100
Shanghai (China)	16	Tokyo (Japan)	97
Tokyo (Japan)	16	Shanghai (China)	88
Bangkok (Thailand)	16	Bangkok (Thailand)	87
Sydney (Australia)	16	Sydney (Australia)	84
Beijing (China)	14	Beijing (China)	83
Buenos Aires (Argentina)	14	Sao Paulo (Brazil)	81
Sao Paulo (Brazil)	14	Buenos Aires (Argentina)	79
Toronto (Canada)	13	Kuala Lumpur (Malaysia)	78
Santiago (Chile)	13	Santiago (Chile)	78
Dubai (UAE)	11	Islamabad (Pakistan)	75
Mexico City (Mexico)	11	Mexico City (Mexico)	71
Kuala Lumpur (Malaysia)	10	Casablanca (Morocco)	71
Mumbai (India)	10	Bogota (Colombia)	70
Casablanca (Morocco)	10	Toronto (Canada)	67
Johannesburg (South Africa)	10	Dubai (UAE)	67
Bogota (Colombia)	9	Mumbai (India)	65
Caracas (Venezuela)	9	Ho Chi Minh City (Vietnam)	64
Islamabad (Pakistan)	9	Johannesburg (South Africa)	63
Taipei (Taiwan)	9	Caracas (Venezuela)	61
Chicago (USA)	8	Riyadh (Saudi Arabia)	59
Jakarta (Indonesia)	8	Taipei (Taiwan)	57

Table 28. Helsinki's *global* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Helsinki region	100	Helsinki region	100
Singapore (Singapore)	29	Singapore (Singapore)	91
Beijing (China)	23	New York (USA)	89
Dubai (UAE)	23	Beijing (China)	78
New York (USA)	22	Tokyo (Japan)	76
Sydney (Australia)	20	Dubai (UAE)	71
Hong Kong (China)	18	Hong Kong (China)	71
Kuala Lumpur (Malaysia)	18	Casablanca (Morocco)	71
Tokyo (Japan)	16	Sydney (Australia)	68
Mexico City (Mexico)	15	Kuala Lumpur (Malaysia)	60
Bangalore (India)	14	Seoul (South Korea)	58
Shanghai (China)	14	Bangalore (India)	58
Mumbai (India)	13	Shanghai (China)	57
Sao Paulo (Brazil)	13	Mexico City (Mexico)	55
Casablanca (Morocco)	13	Sao Paulo (Brazil)	55
Buenos Aires (Argentina)	12	Hanoi (Vietnam)	54
Seoul (South Korea)	12	Taipei (Taiwan)	54
Bangkok (Thailand)	11	Bangkok (Thailand)	53
Jakarta (Indonesia)	11	Delhi (India)	51
Chengdu (China)	10	Mumbai (India)	50
Delhi (India)	10	Istanbul (Turkey)	50
Melbourne (Australia)	10	Johannesburg (South Africa)	46
Houston (USA)	9	Bogota (Colombia)	45
Istanbul (Turkey)	9	Jakarta (Indonesia)	43
Santiago (Chile)	9	Buenos Aires (Argentina)	42

Table 29. Oslo's *global* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
New York (USA)	38	New York (USA)	126
Singapore (Singapore)	34	Singapore (Singapore)	108
Hong Kong (China)	25	Bangkok (Thailand)	95
Shanghai (China)	25	Hong Kong (China)	95
Sao Paulo (Brazil)	24	Sao Paulo (Brazil)	92
Istanbul (Turkey)	22	Istanbul (Turkey)	91
Dubai (UAE)	21	Tokyo (Japan)	90
Bangkok (Thailand)	21	Mexico City (Mexico)	88
Beijing (China)	21	Shanghai (China)	88
Mexico City (Mexico)	21	Dubai (UAE)	88
Santiago (Chile)	21	Beijing (China)	85
Toronto (Canada)	20	Santiago (Chile)	85
Sydney (Australia)	19	Sydney (Australia)	83
Tokyo (Japan)	19	Toronto (Canada)	83
Riyadh (Saudi Arabia)	18	Jakarta (Indonesia)	80
Buenos Aires (Argentina)	17	Riyadh (Saudi Arabia)	78
Johannesburg (South Africa)	17	Guatemala City (Guatemala)	77
Jakarta (Indonesia)	16	Kuala Lumpur (Malaysia)	77
Mumbai (India)	16	Accra (Ghana)	77
Taipei (Taiwan)	16	Taipei (Taiwan)	77
Nairobi (Kenya)	16	Beirut (Lebanon)	76
Cairo (Egypt)	15	Lima (Peru)	75
Caracas (Venezuela)	15	Buenos Aires (Argentina)	75
Kuala Lumpur (Malaysia)	15	Seoul (South Korea)	73

Table 30. Oslo's *global* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Oslo region	100	Oslo region	100
Dubai (UAE)	12	Dubai (UAE)	113
Beijing (China)	11	Singapore (Singapore)	95
Singapore (Singapore)	11	New York (USA)	94
Bangalore (India)	10	Beijing (China)	88
Taipei (Taiwan)	10	Buenos Aires (Argentina)	88
Melbourne (Australia)	9	Hong Kong (China)	88
New York (USA)	9	Sao Paulo (Brazil)	88
Sydney (Australia)	9	Sydney (Australia)	79
Buenos Aires (Argentina)	9	Johannesburg (South Africa)	75
Hong Kong (China)	9	Kuala Lumpur (Malaysia)	70
Sao Paulo (Brazil)	9	Guatemala City (Guatemala)	68
Houston (USA)	8	Mexico City (Mexico)	68
Kuala Lumpur (Malaysia)	8	Tegucigalpa (Honduras)	66
Jakarta (Indonesia)	7	Bangalore (India)	65
Tokyo (Japan)	7	Bogota (Colombia)	64
Bogota (Colombia)	6	Caracas (Venezuela)	64
Caracas (Venezuela)	6	Istanbul (Turkey)	64
Guatemala City (Guatemala)	6	Taipei (Taiwan)	63
Johannesburg (South Africa)	6	Jakarta (Indonesia)	59
Mexico City (Mexico)	6	Ho Chi Minh City (Vietnam)	56
Mumbai (India)	6	Toronto (Canada)	54
Shanghai (China)	6	Managua (Nicaragua)	54
Toronto (Canada)	6	Melbourne (Australia)	53
Casablanca (Morocco)	5	Mumbai (India)	51

Table 31. Stockholm's *global* connectivity through financial and market service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
New York (USA)	42	New York (USA)	126
Singapore (Singapore)	26	Singapore (Singapore)	93
Hong Kong (China)	26	Toronto (Canada)	86
Shanghai (China)	23	Tokyo (Japan)	81
Beijing (China)	21	Hong Kong (China)	80
Toronto (Canada)	21	Sydney (Australia)	78
Tokyo (Japan)	20	Bangkok (Thailand)	78
Sydney (Australia)	19	Beijing (China)	78
Chicago (USA)	19	Mexico City (Mexico)	76
Mexico City (Mexico)	19	Shanghai (China)	75
Mumbai (India)	17	Istanbul (Turkey)	75
Bangkok (Thailand)	17	Chicago (USA)	75
Buenos Aires (Argentina)	17	Mumbai (India)	74
Istanbul (Turkey)	17	Dubai (UAE)	71
Dubai (UAE)	16	Seoul (South Korea)	71
Los Angeles (USA)	16	Buenos Aires (Argentina)	71
Sao Paulo (Brazil)	16	Sao Paulo (Brazil)	70
Taipei (Taiwan)	15	Johannesburg (South Africa)	68
Johannesburg (South Africa)	15	Beirut (Lebanon)	68
Kuala Lumpur (Malaysia)	15	Los Angeles (USA)	67
Seoul (South Korea)	15	Jakarta (Indonesia)	67
Melbourne (Australia)	15	Kuala Lumpur (Malaysia)	66
Jakarta (Indonesia)	14	Riyadh (Saudi Arabia)	65
Delhi (India)	14	Taipei (Taiwan)	65

Table 32. Stockholm's *global* connectivity through ICT service firms (TOP 25)

	Direct connectivity		Network Connectivity
Stockholm region	100	Stockholm region	100
Singapore (Singapore)	24	Singapore (Singapore)	106
Bangalore (India)	19	Bangalore (India)	88
Sydney (Australia)	18	Beijing (China)	84
Beijing (China)	16	Tokyo (Japan)	83
Mumbai (India)	15	Sydney (Australia)	79
Sao Paulo (Brazil)	14	Sao Paulo (Brazil)	75
Hong Kong (China)	13	Johannesburg (South Africa)	73
Tokyo (Japan)	13	Seoul (South Korea)	72
Dubai (UAE)	11	Dubai (UAE)	70
Jakarta (Indonesia)	11	Mexico City (Mexico)	69
Kuala Lumpur (Malaysia)	11	Jakarta (Indonesia)	65
Houston (USA)	10	Bogota (Colombia)	65
Melbourne (Australia)	10	Hong Kong (China)	63
Mexico City (Mexico)	10	Ho Chi Minh City (Vietnam)	62
New York (USA)	10	New York (USA)	60
Seoul (South Korea)	10	Istanbul (Turkey)	58
Bogota (Colombia)	9	Kuala Lumpur (Malaysia)	58
Chennai (India)	9	Almaty (Kazakhstan)	56
Johannesburg (South Africa)	9	Hanoi (Vietnam)	56
Bangkok (Thailand)	8	Melbourne (Australia)	56
Buenos Aires (Argentina)	8	Bangkok (Thailand)	56
Ho Chi Minh City (Vietnam)	8	Buenos Aires (Argentina)	56
Santiago (Chile)	8	Mumbai (India)	55
Almaty (Kazakhstan)	8	Santiago (Chile)	54

Table 33. Firms located in Copenhagen capital region

Finance and market service firms	ICT service firms
NKT HOLDING	TDC
NETS	IBM
BANKINVEST	SAS INSTITUTE
DEFAP ENTERPRISES	KMD
AXCEL	CSC
BEIERHOLM	NNIT
CARNEGIE ASSET MANAGEMENT	SAP
DANSKE BANK	COLUMBUS IT PARTNER
NYKREDIT REALKREDIT	LOGICA DANMARK
NORDEA GROUP	MICROSOFT
BANK DNB	MULTIDATA-BLUEGARDEN
ALM. BRAND	SIRIUS IT
BANKNORDIK	CAPGEMINI
ARBEJDERNAS LANDSBANK	ASPIRO
SAXO BANK	7N
TRYG	FORSIKRINGENS DATACENTER
SEB DENMARK	ORACLE
PFA PENSION	CA SOFTWARE
DET ØSTASIATISKE KOMPAGNI	ADDPRO
DELOITTE	FUJITSU
PRICEWATERHOUSECOOPERS	TIETO
KPMG	CREUNA
ACCENTURE	NETCOMPANY
OMD	MACONOMY
MEDIACOM	STERIA
INITIATIVE UNIVERSAL MEDIA (IUM Nordic)	NOKIA SIEMENS NETWORKS
PHD COPENHAGEN	PLATON
AWAPATENT	TELECA
ASSISTERA I SVERIGE	PRODATA CONSULT
MINDSHARE	
RAMBØLL MANAGEMENT CONSULTING	
KUNDE & CO	
GRANT THORNTON,	
GUAVA	
TNS	
VALCON	
THE NIELSEN COMPANY	
ERNEST & YOUNG	
NORTH MEDIA	
PA CONSULTING	
MAXUS COMMUNICATION	

Table 34. Firms located in Helsinki capital region

Finance and market service firms	ICT service firms
TOYOTA FINANCE	TIETO
OSUUSKUNTA TRADEKA-YHTYMÄ	ELISA
NASDAQ OMX NORDIC	DNA
THOMINVEST	IBM
TROLL CAPITAL	LOGICA
CAPMAN	FUJITSU SERVICES
SUOMEN PANKKI - BANK OF FINLAND	3STEP IT
SAMPO BANK PLC	F-SECURE
NORDEA BANK FINLAND PLC	DIGIA
OP-POHJOLA GROUP	AFFECTO
AKTIA PLC	CAPGEMINI
EVLI BANK PLC	BASWARE
NORDIC INVESTMENT BANK	TDC
FENNIA MUTUAL PENSION INSURANCE COMPANY	NICE-BUSINESS SOLUTIONS
IF INDUSTRIAL INSURANCE LIMITED	COMPTTEL
ZURICH FINANCIAL SERVICES	OY SAMLINK
HARTWALL CAPITAL	IXONOS
ACCENTURE	DOVRE GROUP
DAGMAR	TECNOTREE
PRETAX	TEKLA
CARAT	ORACLE
PRICEWATERHOUSECOOPERS	STONESOFT
KPMG	ADITRO
ENIRO	COMPUTERLINKS
ROSCHIER ASIANAJOTOIMISTO	TIETURI
DELOITTE & TOUCHE	VISMA SOFTWARE
ERNST & YOUNG	WINCOR NIXDORF
HANNES SNELLMAN ADVOKATBYRÅ	REAKTOR INNOVATIONS
ADITRO HRM	ADP DEALER SERVICES
JCDECAUX FINLAND	KNOW IT
FCG INTERNATIONAL	
VIZEUM	
ASIANAJOTOIMISTO BORENIUS & KEMPPINEN	
KOLSTER	
TNS GALLUP	
CARROT PALVELUT	
BERGGREN	
TALOUSTUTKIMUS	
MANPOWER BUSINESS SOLUTIONS	
PHD FINLAND	
ASIANAJOTOIMISTO KROGERUS	
MPS-YHTIÖT	

Table 35. Firms located in Oslo capital region

Finance and market service firms	ICT service firms
NETS	EDB BUSINESS PARTNER
PARETO SECURITIES	ERGOGROUP
ABG SUNDAL COLLIER NORGE	VISMA
DNB NOR KAPITALFORVALTNING	IBM
FIRST SECURITIES	NETWORK NORWAY
JOTUNFJELL PARTNERS	ATEA
NOKAS KONTANTHÅNDBTERING	TDC
SEB GROUP	LOGICA
FORMUESFORVALTNING	TIETO
NORFUND	CAPGEMINI
WILLIS	VENTELO NETWORKS
PRE EIEDNDOMSINVEST TYSKLAND	DATA RESPONS
MARSH	ELTEL NETWORKS
CARNEGIE	DATAMETRIX
GJENSIDIGE PENSION OG SPARING HOLDING	MARLINK NETWORKS
NORD POOL	TELIO HOLDING
NORGESINVESTOR PRO	INTELECOM
FSN CAPITAL PARTNERS	LOGITALL
NORGES BANK	BEKK CONSULTING
NORDEA BANK NORGE	BASEFARM
SPAREBANK 1 GRUPPEN	MULTIDATA BLUEGARDEN
JERNBANEPERSONALETS SPAREBANK	PROACT IT NORGE
ZURICH PROTECTOR FÖRSÄKRING	NORSK EIENDOMSINFORMASJON
KPL SKADEFORSIKRING	MNEMONIC
ERNST & YOUNG	IPNETT
INFOPAQ MEDIA	AFFECTO
PRICEWATERHOUSECOOPERS	BT SOLUTION
KPMG	CRAYON
DELOITTE	CIBER
ADVOKATFIRMAET THOMMESSEN	OPERA SOFTWARE INTERNATIONAL
MINDSHARE	
ADVOKATFIRMAET SCHJØDT	
AFFECTO	
ADVOKATFIRMAET SELMER	
JCDECAUX	
TNS GALLUP	
CLEAR CHANNEL	
ADVOKATFIRMAET STEENSTRUP STORDRANGE	
ARNTZEN DE BESCHE ADVOKATFIRMA	
ZALARIS HR SERVICES	
NORSTAT	
SIMONSEN ADVOKATFIRMA	
ACNIELSEN	
ADVOKATFIRMA DLA PIPER	
DDB	
MIRROR ACCOUNTING	
ADVOKATFIRMAET VOGT & WIIG	
DEVOTEAM	
CELERANT CONSULTING	
NORDISK SKIBSREDERFORENINGEN	

UNICONSULT	
HORWATH REVISJON	
GAMBIT H&K	
KETCHUM	
ACCENTURE	

Table 36. Firms located in Stockholm capital region

Finance and market service firms	ICT service firms
INVESTOR	TIETO
RATOS	CYBERCOM
INDUSTRIVÄRDEN	LOGICA
INVESTMENT AB KINNEVIK	SOGETI
GE MONEY	CONNECTA
OMX	ACANDO CONSULTING
INVESTMENT AB ÖRESUND	HIQ STOCKHOLM
ENTERCARD	SOFTRONIC
SIRIUS	KNOW IT
AMERICAN	HEWLETT-PACKARD
NORDEA	IBM
SEB	TDC
PAN CAPITAL	RELACOM AB
BURE EQUITY	ATEA
SVENSKA HANDELSBANKEN	EDB BUSINESS PARTNER
SWEDBANK	F-SECURE
SVENSK EXPORTKREDIT	KERFI
SBAB	STREAMSERVE
LÄNSFÖRSÄKRINGAR	ITELLA INFORMATION
SKANDIA BANKEN	IP-ONLY TELECOMMUNICATION
TRYGG HANSA	QBRANCH STOCKHOLM
SPP	IBS
KPA PENSIONS FÖRSÄKRING	IBX GROUP
KÅPAN PENSIONER	NET ENTERTAINMENT
IF SKADEFÖRSÄKRING	CSC
ALECTA PENSIONS FÖRSÄKRING	STERIA
ERNST & YOUNG	TERACOM
DELOITTE	ELTEL NETWORKS INFRANET
KPMG	CYGATE
ACCENTURE	CISCO SYSTEMS
PRICEWATERHOUSECOOPERS	GEMALTO
MORGAN STANLEY	
BAKER & MCKENZIE	
WHITE & CASE	
MANNHEIMER SWARTLING ADVOKATBYRÅ	
LINKLATERS ADVOKATBYRÅ	
ADVOKATFIRMAN VINGE	
ALBIHNS ZACCO	
LRF KONSULT	
PATRAFEE	
SETTERWALLS ADVOKATBYRÅ	
MCKINSEY & COMPANY SERVICE	
CONNECTA	

GRANT THORNTON	
INTRUM JUSTITIA SVERIGE	
THE BOSTON CONSULTING	
MADEO SOURCING GROUP	
CARAT	
ENIRO	
FORSMAN & BODENFORS	
MEDIACOM	
MINDSHARE	
OMNICOM MEDIA GROUP	
SCREAM MEDIABYRÅ	
PAR	
VIZEUM	
LOWE BRINDFORS	
PMI INITIATIVE/IUM	
SDR SVENSK DIREKTREKLAM	
STARCOM SWEDEN	
TNS	
TELEPERFORMANCE NORDIC AB	



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