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## **Development of the Urban Form in Helsinki and Stockholm metropolitan regions**

### **Background**

In recent decades, the Helsinki and Stockholm city regions have been among the most rapidly growing areas in Europe. In addition to the peri-urban area surrounding a dense core area, the areas of impact of both cities include several smaller towns, various development corridors and extensive rural areas. How has the urban form of metropolitan areas been structured from the core to the fringes? How should their development be guided? Answering these questions requires international reference data so that solutions that have been successful elsewhere can be utilised in planning and decision-making, and detrimental effects can be prevented.

In order to succeed, the comparison of city regions requires comparable data, applicable methods and identifying the similarities and differences of the administrative and planning systems of the studied regions. In many ways, the Stockholm metropolitan area is an important point of comparison for Helsinki. In terms of its many dimensions, urbanisation in the Stockholm region has been found to be more advanced than in Helsinki, which is why the solutions implemented in Stockholm with regard to urban form should be evaluated in relation to the development of the Helsinki region.

A comparative study of the urban form in Helsinki and Stockholm was originally published in the form of a collection of articles in Finnish (ed. Söderström, Schulman & Ristimäki 2014). The publication explored the development of the city regions through GIS and statistical analyses, literature reviews and expert interviews conducted in the regions. The summarized report (ed. Söderström, Schulman & Ristimäki 2015) made available in English focuses particularly on the GIS-based comparison of the regions from the perspective of three urban fabrics (walking city, transit city and car city) and the urban zones that reflect them. Another key theme in the examination is the increasing polycentric structure of the regions and the related growth of a networked urban structure.

**This article focus on the recent developments of the polycentricity** - the network of centres in the core areas of the city regions. In addition to the traditional centre and sub-centres, business parks and other concentrations of jobs located throughout the regions have a significant impact on their polycentric structure.

Finnish city regions have widely been studied from the urban zone perspective within the framework of the Urban Zone project coordinated by the Finnish Environment Institute (Ristimäki et al. 2011; 2013), which analysed the development of 34 Finnish city regions. However, the Helsinki region, which is the only metropolitan area in Finland, does not have a comparative equivalent of the same scale among the Finnish city regions. This article expands the analyses to the Nordic scale, which enables correlating the development of Helsinki with another

Nordic capital. The study was conducted between 2012 and 2014.

A cooperative party in the project in Sweden was the Growth and Regional Planning Administration (TRF) of the Stockholm County Council (SCC) (Stockholms läns landsting – Tillväxt- och regionplaneförvaltningen, TRN). This also provided the research project with access to GIS data regarding population and employment developments in the Stockholm region. As regards Helsinki, the project had access to GIS data from the Finnish Monitoring System of Spatial Structure (YKR) with regard to regional development. In addition to this, the project utilised previous area and zone divisions that were prepared for Helsinki during the Urban Zone project.

## **Polycentricity in the city regions**

The central structures of both Helsinki and Stockholm are dominated by strong centres, which is why both cities have often been construed as fairly monocentric in terms of their structure (Silfverberg 2012; Ståhle 2012). However, an ever-increasing share of jobs and services in the city region has, in recent decades, been positioned outside the main centres – in sub-centres, various job concentrations or other areas.

In both regions, the sub-centres hold approximately 15% of the jobs in the core areas. In addition to the city centre and sub-centres, Figures 1 and 2 illustrate the most important job concentrations in the core areas. Their role in the job positioning is significant particularly in the Helsinki region (16% of the jobs in the core areas). Motorway junctions, areas along orbital roads and other locations that are pivotal in terms of traffic have increased their importance as commercial hubs and as areas where new jobs emerge.

In the Helsinki region, the most significant job concentrations outside the centre are scattered throughout the region, much like the sub-centres. Nearest to the centre, at a distance of approximately 6–8 km, are Otaniemi–Keilaniemi, Pitäjänmäki, the Käpylä station area and the Herttoniemi–Roihupelto industrial area. Karamalmi, Veromies and the airport, on the other hand, are situated further away, some 12–16 km from the centre, and are more reliant on the orbital roads in the region than their proximity to the core city.

In the Stockholm region, the strongest job concentrations outside the centres are, by their nature, more like extensions of the inner city area than separate clusters of offices. The concentrations are located 4–8 km from the centre, and many of them are gradually transforming into parts of the expanding central area of the city. In the core areas of the Stockholm region, five of the seven job concentrations covered here are situated along the orbital light rail line Tvärbanan. This new rail link has tied the focus areas into an even more unified structure than before; to a corridor that surrounds the inner city.

In terms of orbital roads and development corridors that adhere to them, the city regions of Helsinki and Stockholm are vastly different. The Helsinki region features three orbital roads, which are located in a clearly suburban environment. Particularly around Ring Road III, a vast string-like car city corridor has formed, which has a significant impact on the total structure of the region and service access within it. Stockholm has only one orbital road that circles the city, and it is located very close to the centre. For this reason, a corresponding string-like car city zone, supported by orbital roads, has not taken shape in the Stockholm region.

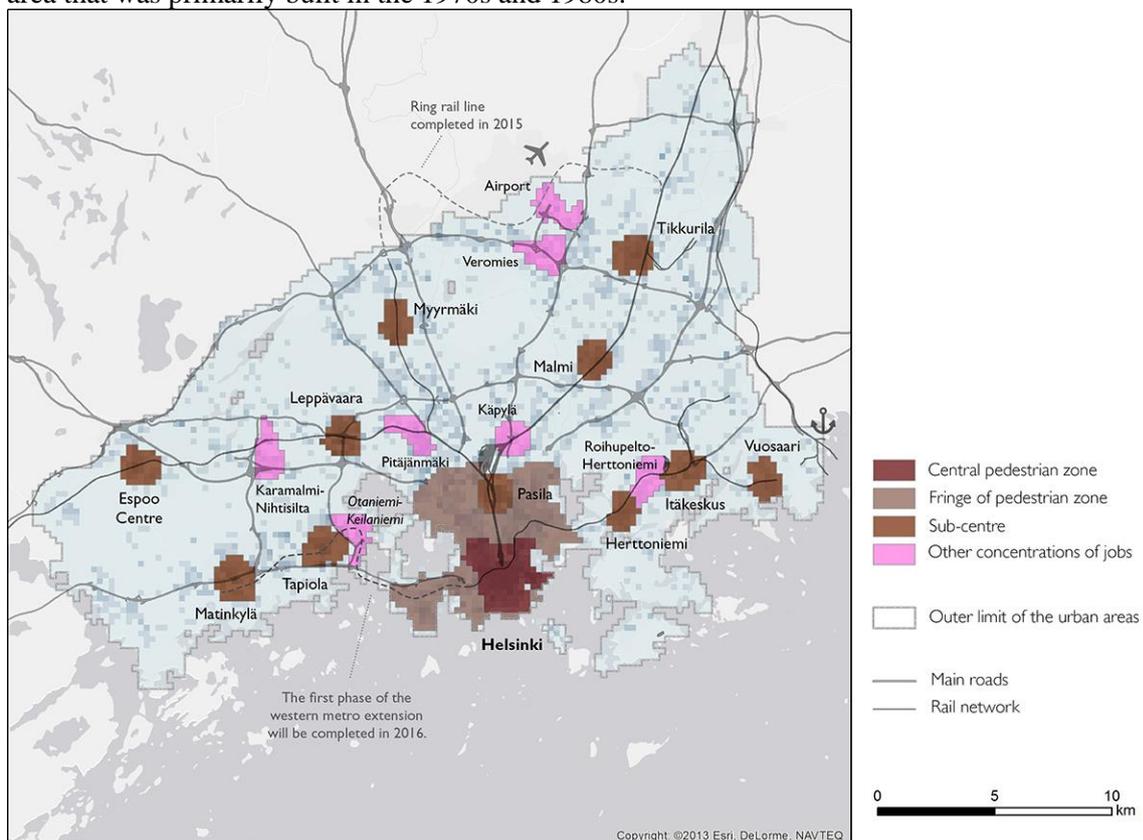
## **Sub-centres in the city regions**

The service offering of many sub-centres that are accessible via public transport and the road network has expanded with the establishment of new shopping centres. Some of the centres also serve as important concentrations of offices. On average, the sub-centres of Stockholm and Helsinki hold

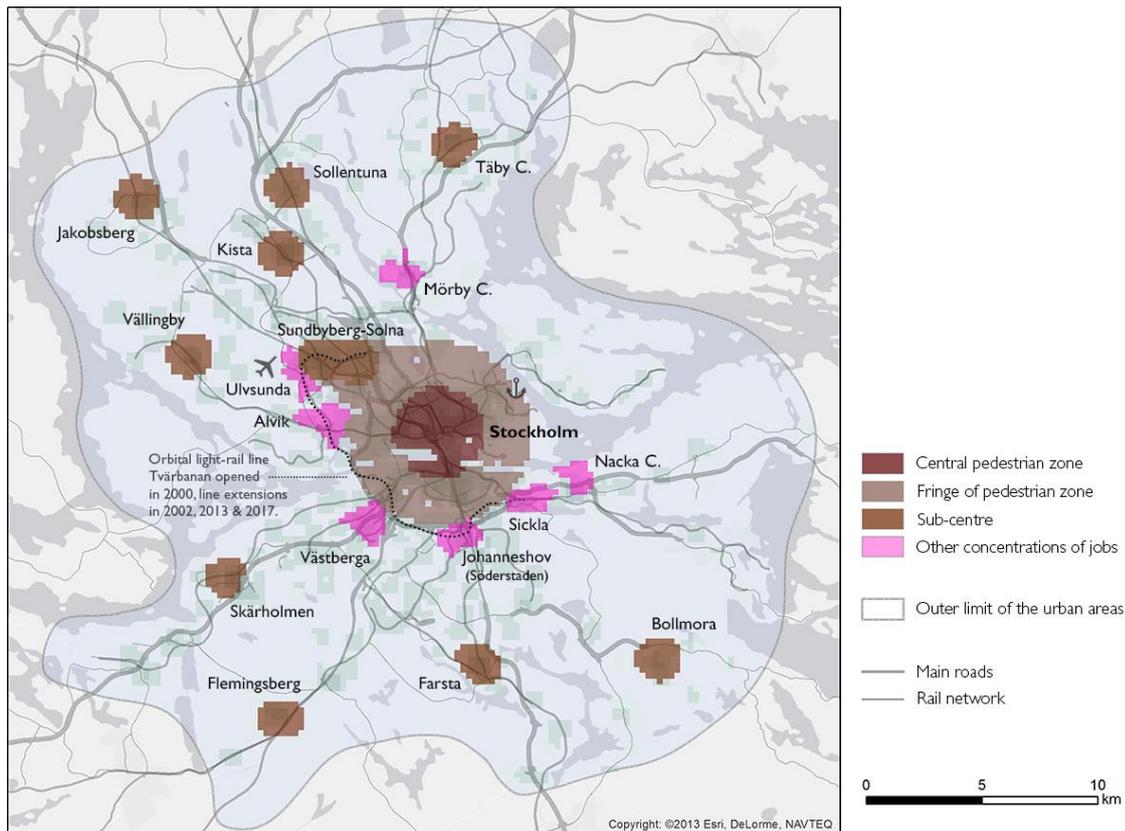
40 and 30 jobs per hectare, respectively. In the Helsinki metropolitan area, there are 11 diverse subcentres where housing, services and jobs intermingle, whereas zone analyses revealed 10 such subcentres in the core areas of the Stockholm region (Figures 1 and 2).

Sundbyberg–Solna and Kista, the largest sub-centres in Stockholm with regard to job quantities and densities, are significantly more prominent than the strongest sub-centres in Helsinki. Among the Stockholm sub-centres, the pedestrian zone formed by Sundbyberg and Solna together is the largest of the region’s sub-centres in terms of its population, job number and area density. Both centres are independent and old towns within the urban structure of Stockholm. The distance between the centres of the municipalities is less than two kilometres, and they form a contiguous and dense concentration of jobs, services and housing. The area holds the head offices of many Swedish companies as well as state agencies. The central area is served by numerous metro and commuter train stations.

In Helsinki, too, the most dominant sub-centre in the region, Pasila, is located near the centre, at the edge of the inner city. Pasila is situated only about 3 km from the centre of Helsinki, by excellent rail and road links. The region is developing into a second centre for the metropolitan area, which can be compared with the largest sub-centres in Stockholm. A substantial portion of the new construction is concentrated in the area of a decommissioned railway yard, in the middle of a central area that was primarily built in the 1970s and 1980s.



**Figure 1:** Centres and most important job concentrations in the core areas of the Helsinki region.



**Figure 2:** Centres and most important job concentrations in the core areas of the Stockholm region.

Kista in Stockholm distinguishes itself from the other sub-centres as both a nationally and internationally prominent hub of technology, education and services. The area holds the head office of the mobile phone company Ericsson, facilities of the Royal Institute of Technology and Stockholm University, as well as operations of IBM, Tele2, Fujitsu and Nokia. The area has been erected in a dense pattern around the metro station and large shopping centre, and the urban environment has, in recent times, been developed to be more pedestrian-friendly. It also bears noting that Kista, which is one of the strongest concentrations of competence in Sweden, is located in northwest Stockholm, an area where a large part of the population has an immigrant background.

Leppävaara, which is located in Espoo slightly outside the borders of Helsinki, partially resembles Stockholm's Kista. In terms of the fields represented in the area, jobs in education and IT stand out alongside commerce, but the total number of jobs is less than a third of that in Kista. The public transport solution in Leppävaara is based on a commuter train link, and like in Kista, a regionally important shopping centre that forms the functional core of the centre is situated by the station. However, the majority of office jobs are located relatively far from the core of the area.

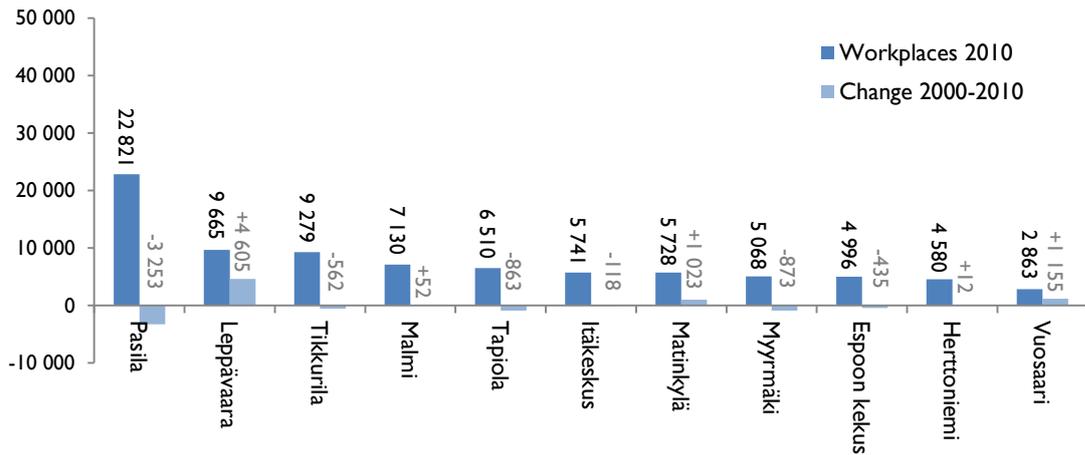
Stockholm's Vällingby and Farsta, in turn, represent the Swedish 1950s urban planning principle centring around ABC cities (Arbete, Bostad, Centrum) built on a foundation formed by the metro network. The idea was to position housing, jobs and various services as close together as possible. However, not as many jobs emerged in the centres as was originally planned (Kallstenius 2010, 167). In the Helsinki region, the model of urban planning from the same period has been Tapiola, which is currently implementing extensive reformations to prepare for the opening of the new metro line in 2016. Once this Western Metro Extension is complete, all sub-centres in the region will be located in proximity to railway lines. In Stockholm, the only exception with regard to the rail link is Bollmora, which is supported by bus lines. In addition to metro and commuter train

lines, Solna and Sundbyberg are served by the extension of an orbital light rail line.

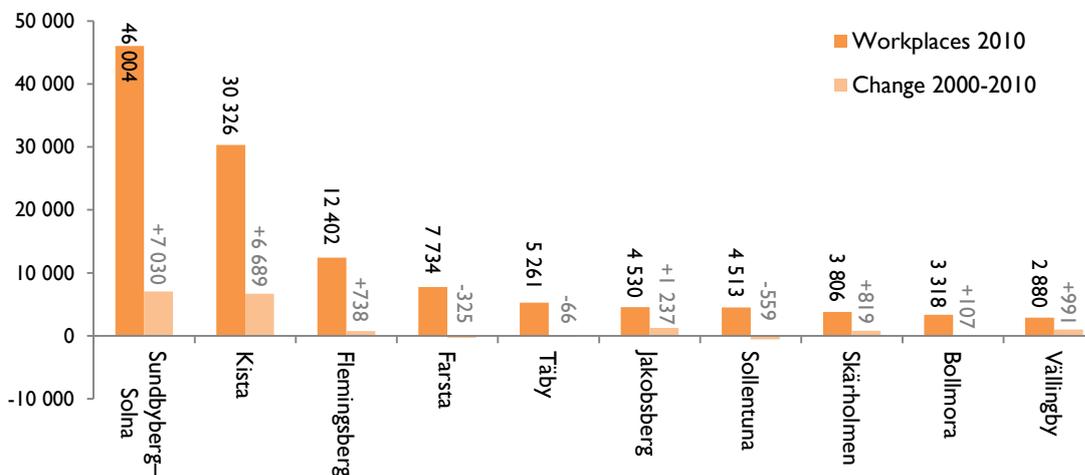
The job increase in the sub-centres between 2000 and 2010 has been substantially stronger in Stockholm than in the Helsinki metropolitan area (Figures 3 and 4). During the study period, the Stockholm sub-centres grew by almost 17,000 jobs, whereas the job numbers in the sub-centres of the Helsinki region climbed only slightly to the positive (+743 jobs). The growth numbers of the Helsinki sub-centres are diminished by the negative development of Pasila – during the study period over 3,000 jobs left the area. Leppävaara increased its job numbers most notably, with approximately 4,600 new jobs. Furthermore, the new sub-centre Vuosaari and Matinkylä, which has been improved in terms of services, have increased their job numbers in the first decade of the 2000s. In other sub-centres, the job numbers have remained the same or decreased.

In Stockholm, the clear majority of growth in the sub-centres has taken place in the two most prominent sub-centres, Sundbyberg–Solna and Kista. The number of jobs in Jakobsberg, Vällingby, Skärholmen and Flemingsberg has also increased. In Sollentuna and Farsta, on the other hand, jobs have decreased slightly. Increases in population were seen particularly in Solna, where the new Frösunda residential and employment area was constructed on land freed up from the Swedish Armed Forces. The area holds the Swedish or Nordic head offices of numerous companies (e.g. Canon, HP and Eniro).

The population in all sub-centres in Stockholm and Helsinki stands between 10,000 and 15,000. Due to its nature as a twin centre, the Sundbyberg–Solna central area is more expansive than other sub-centres, which partially explains the population exceeding 50,000. Yet, population density in the area (92 residents/ha) is double that of the other sub-centres of the cities. The only one to come close to this density is Vuosaari in Helsinki (83 residents/ha), whose structure is strongly residentially oriented. The average population density in the sub-centres of both cities is approximately 50 residents/ha. Between 2000 and 2010, the population growth in the sub-centres of Helsinki (+15,000) has been slightly higher than in the sub-centres of Stockholm (+12,000).



**Figure 3:** Workplaces and changes in them in the sub-centres of Helsinki, 2000-2010



**Figure 4:** Workplaces and changes in them in the sub-centres of Stockholm, 2000-2010

### Other concentrations of jobs and commerce

The core areas of both cities hold concentrations of jobs and services in varying sizes, even outside the centre and sub-centres. The diagrams in Figure 5 present the job numbers of a few of the most important concentrations and changes in them during the first decade of the 2000s. The job concentrations have been viewed as areas of approximately 200–250 hectares that are comparable to subcentres.

In the Helsinki metropolitan area, the concentrations outside the diverse central areas form a level of polycentricity that is even more important than the sub-centres, at least when measured based on job numbers. Many of these concentrations hold more jobs than the strongest sub-centres in the entire metropolitan area. In terms of their functional structure, however, these concentrations have not developed into diverse central areas that contain a wealth of housing, services and jobs. In most of these concentrations the pedestrian environment is also poor.

Over the course of the 2000s in the Helsinki region, especially Keilaniemi–Otaniemi and

Karamalmi–Nihtisilta in Espoo and the airport and Veromies areas in Vantaa have increased their job numbers. Currently, these areas are primarily inaccessible by rail, and the public environment is dominated by car traffic. However, with the completion of the Western Metro Extension and the Ring Rail Line that will connect Helsinki Airport to the railway network, some of the areas will have rail links within 2015 and 2016.

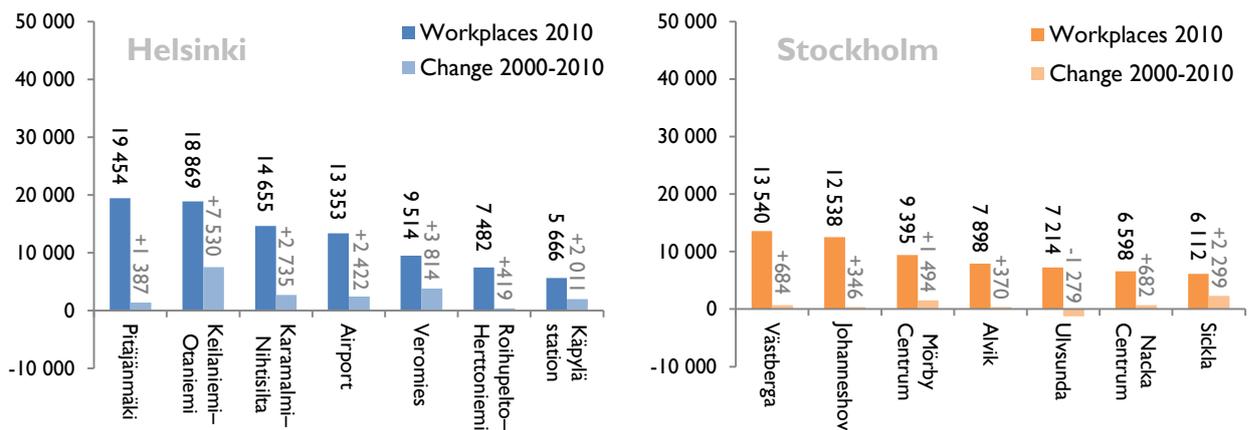
The significance of the area surrounding the airport in terms of employment is significantly lower in the Stockholm region than in Helsinki. In Stockholm the main airport Arlanda is located outside the core areas of the city region, at over twice the distance from the centre compared to Helsinki Airport. There are approximately 12,000 jobs in the immediate vicinity of the airport, but in contrast to Helsinki, the area is not surrounded by a wider business area. The situation may be changing, however. In the regional development plan, the zone between the airport and the nearby Märsta densely populated area has been indicated as one of the regional urban cores. The development of the area is about to begin.

In the Stockholm region, clusters of offices similar to those in the Helsinki metropolitan area have not formed outside the centres in the core areas. The most important concentrations of jobs circle the inner city, and many of the areas are functionally quite diverse. Västberga, which has the highest number of jobs, is partially an old industrial area, in the vicinity of which housing, offices and trade has emerged. The western part of the area around the Telefonplan metro station has developed into a dense urban environment.

Another strong concentration of jobs is located in Johanneshov, near the Stockholm Globe arena. The district is located along excellent public transport links, and it is developing into a diverse centre in the southern part of the core city. It also holds an old slaughterhouse and wholesale area, which is being developed into a district of restaurants, housing and small businesses, taking advantage of the historical environment. The aim of the city is to implement broader efforts to expand the central structure to the vicinity of the Stockholm Globe arena as part of the South City (*Söderstaden*) project.

The Nacka corridor leading east of Stockholm is problematic from the perspective of sustainable urban form. Sickla, which is located immediately outside the border of Stockholm, is a commercial area that has grown rapidly and is strongly reliant on car traffic. With the exception of the Saltsjöbaden sub-urban rail line that passes near the early part of the corridor, the public transport links in the direction of Nacka are based on bus lines. In 2013, however, the municipalities in the area and the Stockholm County Council reached an agreement on new housing production and expansions of the metro network, as a result of which the Nacka area is likely to gain its own metro line in the 2020s.

In addition to the larger job concentrations, numerous smaller service concentrations and various job areas are located outside the central areas in both city regions. Particularly the areas surrounding metro and commuter train stations are important local centres. In many places new retail parks have also taken shape in the vicinity of the sub-centres, but they are, at least currently, fairly disconnected from the pedestrian zones of the sub-centres.



**Figure 5:** The development of the other workplace concentrations in the core areas between 2000-2010.

## Results

In both regions, the role of the main centre as an area where jobs are concentrated is notably strong. The proportion of core area jobs located in the city centre or its fringe zone is 50% in Stockholm and 40% in Helsinki. The sub-centres hold approximately 15% of the core area jobs in both regions. In Helsinki, Pasila (23,000 jobs) is clearly more significant than the other sub-centres, with Leppävaara coming in second (10,000 jobs). In Stockholm, the urban Sundbyberg–Solna (46,000 jobs) and the IT concentration Kista (30,000 jobs) are substantially larger job concentrations than the other sub-centres.

The essential difference in the polycentricity of Stockholm and Helsinki is related to job concentrations outside the centres. The top seven office and job concentrations in the Helsinki metropolitan area hold more jobs than the 11 sub-centres of the region combined, although the areas have not been developed as actual central locations. In Stockholm, no equivalent clusters of offices have developed outside the central areas. The most significant job concentrations outside the centres in Stockholm border the inner city, with many areas situated along the orbital light rail line Tvärbanan.

Substantial differences were revealed in the positioning of job increases in the sub-urban areas. In the Helsinki metropolitan area, the sub-centres grew by slightly over 700 jobs between 2000 and 2010, while in Stockholm the growth stood at almost 17,000 jobs. The increases in job numbers in the Helsinki region were highest in office and job concentrations outside centres, which gained over 20,000 jobs. In Stockholm, growth was strongest in sub-centres, with increases in other job concentrations remaining under 5,000 jobs.

## Conclusions

The core questions in the development of metropolitan areas are regional in nature. The increase in mobility, particularly changes in logistic and the increase in car ownership along with efficient public transport systems, has expanded the functional areas of cities into vast city regions. In the regions, an increasing share of trips is directed to locations other than the traditional city centre. At the same time, the hierarchical structures of governance and planning have been forced to give way to new forms of cooperation that focus on negotiations between different actors in the city regions.

### *Stockholm ahead of Helsinki in the development of the core city*

In Stockholm, population and jobs were more concentrated in areas near the centre than in Helsinki. Almost 300,000 more people lived in the inner core area, less than 8 km from the centre, than in the corresponding area of Helsinki. In the positioning of jobs, the city centre pedestrian zones were even more prevalent in Stockholm. The pedestrian and fringe zones of the city centre hold 50% of the jobs in the entire city region, whereas in Helsinki, the proportion of jobs in the central area of the city is less than 40%. The dominance of core areas in Stockholm is, in part, explained by the wider land area: There is less land for building in the vicinity of the centre of Helsinki, which is surrounded by sea. Despite the scarcity of land, the population and job densities in the core areas of Helsinki are still clearly lower than in the corresponding areas of Stockholm.

Similar developments can be seen in the core areas of both city regions, with port and industrial operations making way for more active use of the shore areas in the form of urban housing, employment and recreation. Stockholm has a significant lead over Helsinki with regard to the development of new areas. Of the regional population increase in the 2000s, as much as 40% has occurred in the inner core area, while only 15% of the growth in Helsinki has taken place in the corresponding area. The growth of the inner city in the fringe of the pedestrian zone has been a notable part of the development in Stockholm. This area holds the new districts of Hammarby Sjöstad, Liljeholmen and Lindhagen. In Helsinki, the new phase of expansion in the inner city did not properly take off until the opening of Vuosaari Harbour in 2008. The new harbour released the old inner city harbour areas for new land-uses. Also the financial downturn, which began in the same year, has turned the focus of the growth in the city region towards the core areas.

Many areas of supplementary and new construction in Stockholm have been located along the Tvärbanan light rail line that circles the central area of the city. Especially the junction points of the radial metro lines and new orbital rail links have risen to the fore as peak areas of public transport accessibility. With the expansion completed in the autumn of 2013, Tvärbanan now also reaches Sundbyberg–Solna, the most important sub-centre in terms of population and job numbers, which in this way is even more clearly integrated into the expanding central area of the city. The light rail connects the inner sub-urban areas tightly together. This improves the opportunities for expanding the mixed inner city structure, which is already under way in some areas. In Helsinki, corresponding quality corridors of orbital public transport and land use have so far not been developed.

### *Diverse sub-centres key to sustainable suburban development*

The development of a polycentric and networked urban structure is a topical subject for both research and planning (Oswald & Baccini 2003; Sieverts 2003; Alppi & Ylä-Anttila 2007; Joutsiniemi 2010). Even though the urban network in the Helsinki and Stockholm regions is still dominated by the traditional centres of cities and towns, the proportion of jobs and services located outside the main centres has been increasing in the past decades. The polycentric structure of the city regions is based on the sub-centres covered in the zone division, but also on a network of varying concentrations of jobs and services that have emerged in the public transport and car zones. The role of these concentrations was found to be prominent particularly in the Helsinki region.

The aim of developing diverse sub-centres outside the old central area of the city has been to structure the fragmented sub-urban zone and shorten the distances travelled to access services. The strengthening of regional and local urban cores is a pivotal element in the RUFSS development plan of Stockholm County and the city's new master plan (RUFSS 2010). The Helsinki master plan is also aiming to develop a "rail-oriented network city" and bolster the polycentric structure rooted in node points in the network. The idea of a polycentric network city can also be identified in the wider MAL cooperation between the Helsinki region municipalities and in regional planning, although the area delineations are less detailed than in the Stockholm region.

The largest sub-centres in the city regions – Pasila in Helsinki, and the traditionally urban

Sundbyberg–Solna and IT hub Kista in Stockholm – have developed into concentrations of tens of thousands of jobs with a significant role in the polycentric structure of the regions. As long as sufficient attention is paid to the quality of the urban environment, these areas have what it takes to develop into diverse environments for employment, housing, service access and recreation that are comparable with city centres. In the Helsinki region, however, Leppävaara has been the only subcentre in the 2000s to show substantial growth as an employment area and, in contrast to Stockholm, the numbers of jobs in many sub-centres in the Helsinki metropolitan area have even declined.

Based on these results, non-hierarchical development towards the network city structure has been more prevalent in Helsinki than in Stockholm. Instead of sub-centres, growth in the Helsinki metropolitan area has focused on job concentrations, many of which are clusters of particular fields (Norppa & Schulman 2011). Among these job concentrations, the ones to show strongest growth in the 2000s have been Keilaniemi and Karamalmi (ICT) in Espoo and the areas of Vantaa located near the airport (logistics) and Ring Road III (wholesale and retail trade). The structure that has formed in these areas leans more heavily on the use of cars than in the sub-centres. In Stockholm, the growth of employment areas outside city centres has not been as strong; instead, the growth of the polycentric structure has occurred in sub-centres that have been developed in a more systematic manner. The biggest out of centre concentrations of jobs are also located closer to the central city than in the Helsinki region.

In Helsinki, the central location of the main airport has affected the regional land use. Since it has not been possible to construct much housing in the area affected by aircraft noise, vast employment areas have been included in the plans, supplemented with some commercial services. The current structure of the area is strongly car-reliant. The completion of the Ring Rail Line will improve the competitiveness of public transport in the vicinity of the airport and the northern parts of the employment areas by Ring Road III, but the shopping centre Jumbo, for example, which is one of the largest ones of its kind in the region, will still remain outside the railway network. In Stockholm, the main airport is significantly further away, and the areas affected by aircraft noise have no impact on the development of the core areas.

The differences in orbital traffic links have resulted in the development of different service structures in the Helsinki and Stockholm regions. At present, only one orbital road connecting the northern and southern parts of the region has been completed in Stockholm, and even this runs in the immediate vicinity of the city centre. A corridor of car city services and logistics, akin to the areas along Ring Road III in the Helsinki metropolitan area, has not emerged in Stockholm. Instead, the corresponding operations have been scattered throughout the region in the form of smaller clusters. The new bypass *Förbifart Stockholm*, which has generated much discussion, will not change the situation to any great degree upon its completion in the 2020s, since the road runs mainly in a tunnel.

### *Regional land use must be decided at the metropolitan level*

In large urban regions, issues concerning land use, traffic, housing and general economic development policies are largely regional, which is why regional decision-making is required to solve them. Currently, the governance of both Greater Helsinki and Greater Stockholm is largely based on guidance through negotiation, but the governance models are different. Decision-making regarding the control of metropolitan-level urban form has been slow and ambiguous in the Helsinki region. This creates uncertainty and makes it harder to predict the development of the area.

The County Council forms a strong regional administration for the Stockholm region. The elected Council has the right to levy taxes. Together with the County Administrative Board, which is part of state administration, it is also responsible for regional development planning. The County Council coordinates community and traffic planning, and is responsible for publically funded health care. The municipalities of Stockholm County, in turn, are responsible for basic public services

and land use planning at the level of local master plans and local detailed plans, among other things. The RUFSS development plan prepared under the leadership of the Stockholm County Council presents a shared mindset regarding regional development in the future – particularly with regard to a regional network of centres that forms the core of the urban form. The development plan approved by all parties forms a basis for local level planning.

The regional administration in Helsinki is largely based on various consortiums of municipalities. The seven member municipalities of the Helsinki Region Transport (HSL) joint municipal authority handle the planning and organisation of public transport in the area. Helsinki Region Environmental Services (HSY), on the other hand, is responsible for water and waste management in the metropolitan area as well as production of environmental data regarding the region. As regards health care, the 24-municipality Hospital District of Helsinki and Uusimaa (HUS) serves as the joint municipal authority for special health care. The Helsinki Metropolitan Area Advisory Board and the wider 14-municipality Helsinki Region Cooperation Assembly, in turn, are pivotal for the strategic cooperation regarding land use, housing and traffic in the region. The Helsinki-Uusimaa Regional Council works to coordinate the regional development of a wider area, 28 municipalities, with regard to strategic planning, regional planning and cooperation between various operators. In order to enhance the collaboration between the state and the Helsinki region municipalities, a letter of intent procedure has also been developed, which includes a joint land use plan prepared for the Helsinki region (MAL 2014).

In Helsinki, there is no shortage of administrative structures and visions – on the contrary, there would seem to be an oversupply of both (e.g. Acher 2010, 118–120). Efforts have been made in recent years to unify the fragmented administration of the metropolitan area, but the results have been slim. The metropolitan administration, which was planned to be instituted in 2017, would have been tasked with making decisions on land use, housing and traffic in the region, but the project gave rise to strong opposition in some municipalities in the region. In addition to this, the extensive municipal consolidations suggested for the region, which included a proposal for organising local governance for parts of municipalities, will not be implemented, at least for now.

Based on this study, the metropolitan areas present themselves as polycentric and functionally networked systems whose governance requires both cooperation between the various actors involved and regional decision-making. The county-level decision-making in the Stockholm region is one example of organising metropolitan administration, and the experiences gained in Stockholm can also fuel considerations regarding the administrative model of the Helsinki region. Naturally the governance in Stockholm is not free of problems, but there the metropolis seems to better identify itself as a regional strategic actor, which also leaves room for the self-governance of municipalities and local democracy.

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