



Human resources and knowledge creation

An assessment of human resources and knowledge creation in the Stockholm, Helsinki and Copenhagen regions.

Metropolitan Inc.



IRISgroup



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Foreword



Metropolitan Inc. is a consortium of the three Nordic metro regions Stockholm, Helsinki and Copenhagen, represented by Stockholm County Council, Uusimaa Regional Council (Helsinki Metropolitan Region) and The Capital Region of Denmark (the Copenhagen region).

The partners carry out joint analyses on the future challenges of metro regions and exchanges ideas and new knowledge about good practices within regional economic policy.

The idea is to pool analytical resources from each of the three metro regions and jointly build a solid fact base that the participating metro regions can draw on in their regional strategy work.

The analytical activities are co-funded equally by the three Nordic metropolitan regions and the Danish Enterprise and Construction Authority.

The project has been led by a steering committee with representatives from the three metro regions (Stockholm County Council, Uusimaa Regional Council, Culminatium Innovation Oy, Capital Region of Denmark), while the analytical work has been carried out by FORA (The research unit of the Danish Enterprise and Construction Authority) and IRIS Group.

This paper is authored by Jens Bjerg from Iris Group, with valuable assistance from Kenni Jørgensen and Lasse Nielsen from FORA

Metro regions - strategic sites in the global economy

Metro regions have become central nodes in the global economy. Even the most globalised industries and the largest multinational companies has a production process that is at least partly placed bound because of the combination of resources it requires (...) increasingly, metro regions become strategic sites where much of the work of globalization actually gets done.

***Saskia Sassen
Professor, Columbia University***



Executive summary

This benchmark study of human resources and knowledge creation in Stockholm, Helsinki and Copenhagen shows that the three Nordic metro regions face almost identical challenges in a number of key areas.

In all three regions there is a high share of well-educated people, and the share of the workforce that holds a tertiary education has gone up in recent years. But all three regions continue to lag behind the top performing regions in Europe.

Another area where the three regions face a common challenge is the creation of a more efficient infrastructure for knowledge sharing between universities and businesses in the region.

Further, all three metro regions face a common challenge in attracting and retaining young and well-educated people to the region.

The study also points to a number of areas where each region faces its own distinct challenges. For instance, Helsinki's private expenditure in R&D are lower than in Stockholm and Copenhagen, only 1 in 5 of the region's PhD's are employed in the private sector, and the dialogue between universities and business community on research priorities and educational programmes seems weak.

In Stockholm, private expenditure in R&D has gone down in recent years. Another challenge for Stockholm is that the number of students enrolled in tertiary education per inhabitant is at a low level compared to Copenhagen and Helsinki.

This means that Stockholm has to be able to attract a significant number of highly educated people to the region each year.

One distinct challenge for Copenhagen is that the number of PhD's in the labour force is relatively low compared with Helsinki and Stockholm, and a relatively low share of the students in the region is doing a PhD.

Suggestions for future action of the Metropolitan InC

This might for example be joint analytical activities that address the question of how to create an efficient infrastructure for knowledge creation and knowledge sharing among the business community and the universities in the region, and how to establish incentives at universities that support knowledge sharing.

And it could be more in-depth analysis of how regional authorities could attract and retain the group of "young and restless", well-educated people, and how to ensure that more young people get a formal education.

Another focus area for the metro regions could be to identify regional policies that would cause a higher number of more highly educated people to find jobs in the private sector.

In these areas it would be obvious for the Nordic metro regions to do joint analysis in order to pool resources, learn from each other and share best practice.



Analytical framework

The analytical focus is on four key drivers of innovation – human capital, knowledge creation, entrepreneurship and competitive business clusters.

These four key drivers of innovation are pivotal for the economic growth and the future prosperity of metro regions.

This paper outlines benchmark results and insights regarding human resources and knowledge creation in the three metro regions: Helsinki, Stockholm and the Copenhagen region.

Where data has been readily available, we benchmark the three Nordic metro regions against all metro regions in Europe.

In areas where we ourselves have collected new data we only benchmark the three Nordic metro regions vis-à-vis each other.

The last part of this presentation on human resources and knowledge creation is dedicated to an in-depth analysis of how the universities in the three Nordic metro regions interact with the surrounding society.

The analyses builds on results from a survey that we conducted back in 2007 and again in 2009 among all universities in the three Nordic metro regions.

The Metropolitan InC benchmarking model



The remaining elements in the model above will be addressed in two additional papers under the consortia, entitled “Specialized Clusters - An assessment of specialized clusters in Stockholm, Helsinki, and Copenhagen” and “Human resources and knowledge creation - An assessment of human resources and knowledge creation in the Stockholm, Helsinki and Copenhagen region.”

Key indicators of human resources and knowledge creation in metro regions

Regional performance

The first part of the paper is devoted to an analysis of what we define as regional performance indicators. That is: Indicators that express to what extent the private businesses employ highly skilled workers, invest in knowledge creation and are capable of turning skills and new knowledge into innovations. Key indicators in this area are:

- Share of highly skilled employees in the workforce
- Changes in the share of highly skilled employees in the workforce
- Private vs. public employment of highly skilled employees
- Share of employees with a PhD.
- Private investments in R&D
- Changes in private R&D expenditures
- Number of patent applications to European Patents Organization

Regional framework conditions

The second half of the presentation focuses on indicators for the regional framework conditions. That is: Indicators that give information on the access that private businesses have to new knowledge and highly skilled young people in the region. Key indicators in this area are:

- Number of students enrolled in tertiary educations
- PhD students in percent of total tertiary students
- Number of exchange students - in- and outgoing
- Public R&D expenditures
- Quality of academic research
- Net migration of highly skilled young people

Universities as drivers of growth in metro regions

Regional embedded universities that are engaged in collaborative research with the private businesses and are capable of providing the skills that regional businesses need are important drivers of growth in metro regions.

In the last part of this paper we devote special attention to the role that different universities play in the three metro regions: Helsinki, Stockholm and Copenhagen.

Key indicators in this section are:

- Universities' strategies and focus on outreach activities
- Universities' focus on developing educational programs that meet the needs of the private business sector
- Universities' focus on collaborate research and other types of knowledge exchange with the private sector.

It is the second time this survey is conducted, which enables us to track changes over time at the universities and within the three regions.

Thoughts for inspiration

The survey results show how universities in all three regions are struggling to set up an infrastructure that facilitates knowledge transfer to the private sector. The paper concludes with a brief description of how the Alto university in Helsinki is working to create three interdisciplinary "factories" that bring together industry partners and researchers in the universities in order to facilitate knowledge transfer and new innovation.



Well-educated workforce in metro regions

Human resources is a key driver of economic growth. In a continuously changing global economy, companies need employees that are well-educated, creative, entrepreneurial, team-oriented and capable of sharing knowledge within and outside the organisation.

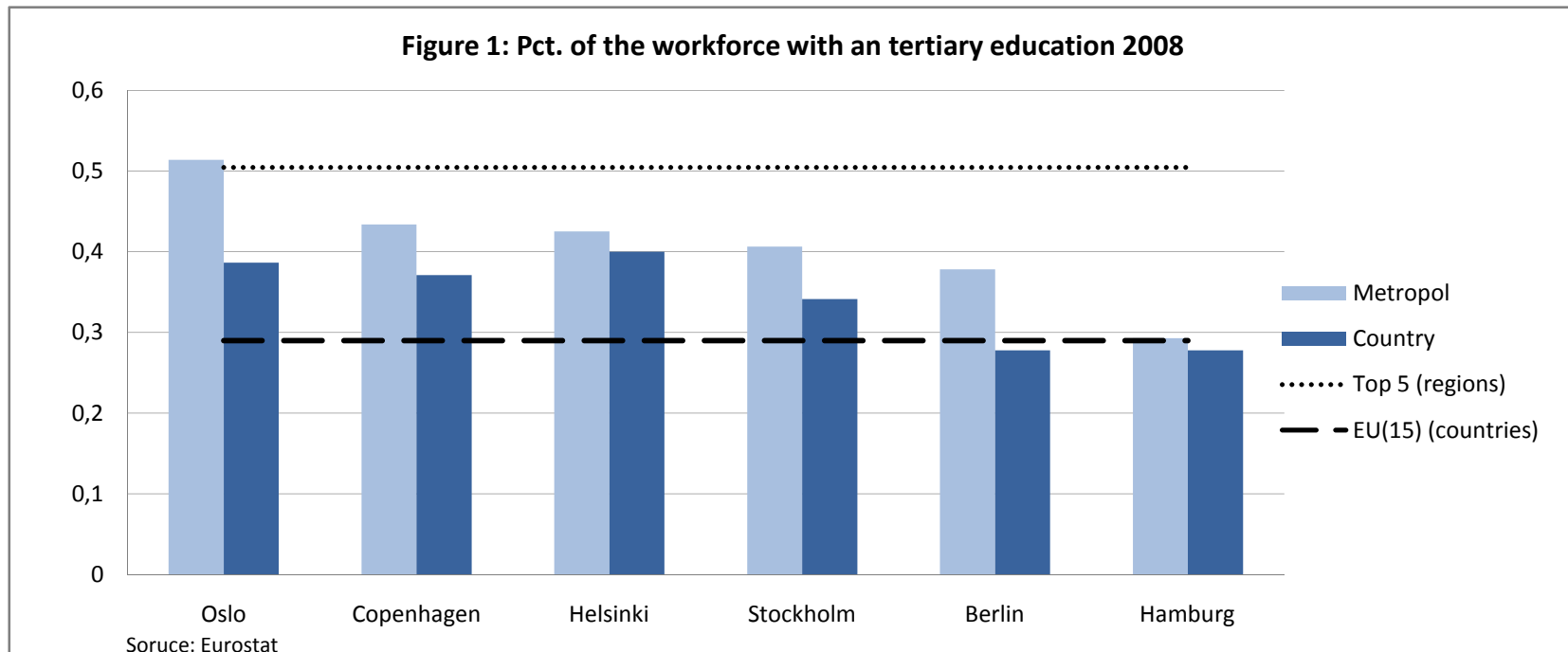
Access to highly educated, specialised labour plays a key role when global companies scan the world's metro regions considering where to locate new activities and new jobs.

Figure 1 shows that the workforce in metro regions in general is more well-educated than the national average.

However, there are some quite significant differences across the metro regions. For example: In Oslo almost half of the workforce has completed a tertiary education, while the same share in Hamburg is less than thirty percent.

In the three metro regions: Stockholm, Helsinki and Copenhagen, the share of highly educated is almost equal, being a little more than 40 percent.

Both the Helsinki, Copenhagen and Stockholm region are clearly lagging behind the best performing European regions, where the share of highly educated is close to 50 percent.





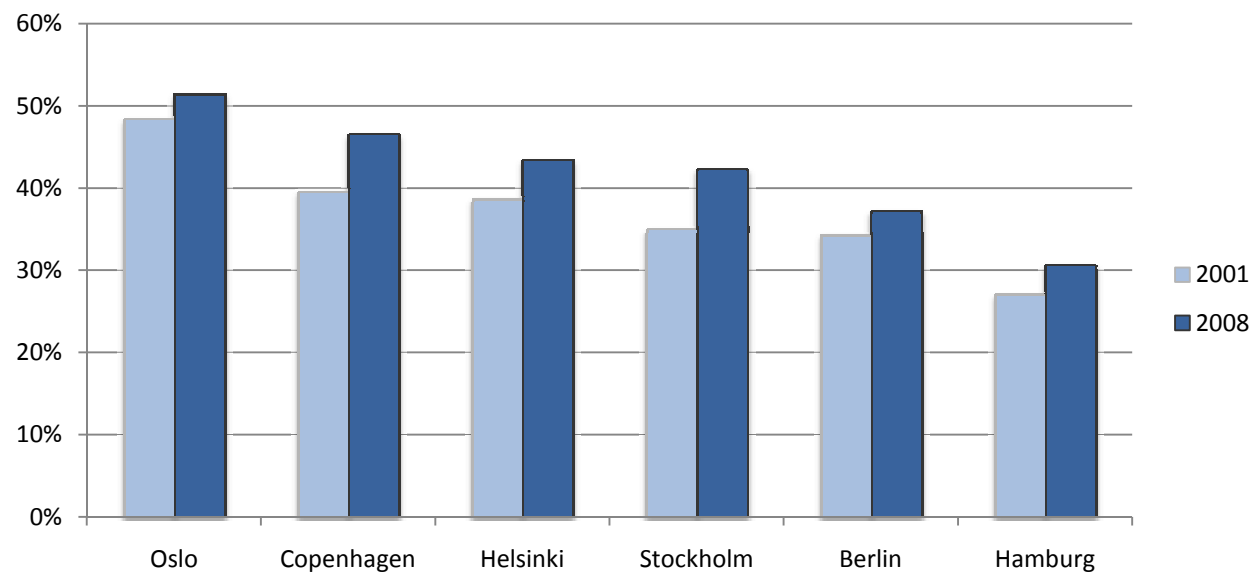
Changes in the share of highly educated 2001-2007

All the metro regions have experienced significant growth in the share of the workforce with a tertiary education since 2001.

In particular, Copenhagen and Stockholm have performed well, while progress in the Helsinki region has been slower.

Since 2001, the Stockholm region has narrowed in on Helsinki and today the two regions have almost the same share of highly educated in the workforce. Oslo is among the best performing metro regions in Europe in this area.

Figure 2: Development in pct. of the workforce with an tertiary education 2001-2008





Share of employees with a PhD

The marginal differences between the Nordic metro regions, when comparing the proportion of the workforce with tertiary education, mask a number of significant differences that become apparent when we apply a more narrow focus.

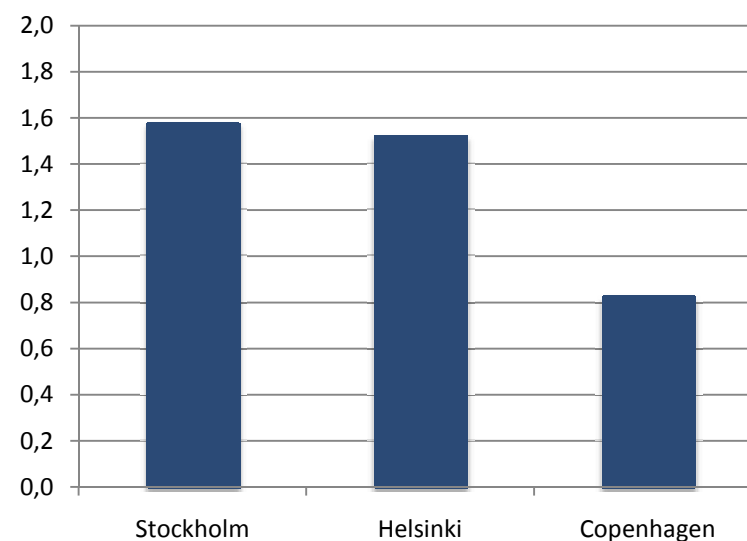
Thus, there are significant differences between the three metro regions when it comes to the share of employees who hold a PhD.

In Stockholm and Helsinki about 1.6 percent of the employees have a PhD. The share in the Copenhagen region is only 0.8 percent.

That the share of PhD's is twice as high in Stockholm and Helsinki as in Copenhagen is attributable to several factors. Firstly, rather few PhD's are trained each year in Denmark compared to the other Nordic metro regions.

Secondly, neither private companies and public organisations have a strong tradition for employing PhDs - except for a few knowledge-intensive business clusters like biopharmaceuticals.

Figure 3: Share of employment with a PhD, 2006



Source: National statistical bureaus in Sweden, Finland, Denmark.



Private and public employment of highly skilled workers

In Stockholm and Helsinki the private sector employs a significantly higher proportion of the highly skilled workers than in the Copenhagen region.

Where the private sector in both Helsinki and Stockholm employs over half of the highly skilled, the situation in the Copenhagen region is reverse - here the public sector accounts for more than 50 percent of the highly educated. Of course, the public sector needs highly skilled workers in order to be efficient and deliver the services that citizens demand. But it is a key challenge for the region to ensure that industries engaged in a fierce global competition have access to the specialised human resources they need and that competition on the labour market do not drive up wages to an extent where the regional businesses lose their competitive power.

If a more narrow focus only on PhDs is applied, the picture is different yet even more distinct. In Helsinki and Stockholm approximately 70 percent of the PhDs are employed in the public sector and in academia. In Copenhagen the share of publicly employed PhDs is a little more than 60 percent.

But the figures also reveals that the private sector in Copenhagen employs a higher share of the regions' PhDs than in Helsinki and Stockholm. This is partly due the relatively strong position that the life science industry holds in the Copenhagen region, but it should also be kept in mind that the total number of PhDs in the Copenhagen region is lower than in Helsinki and Stockholm.

Figure 4: Public and private employment of highly skilled workers

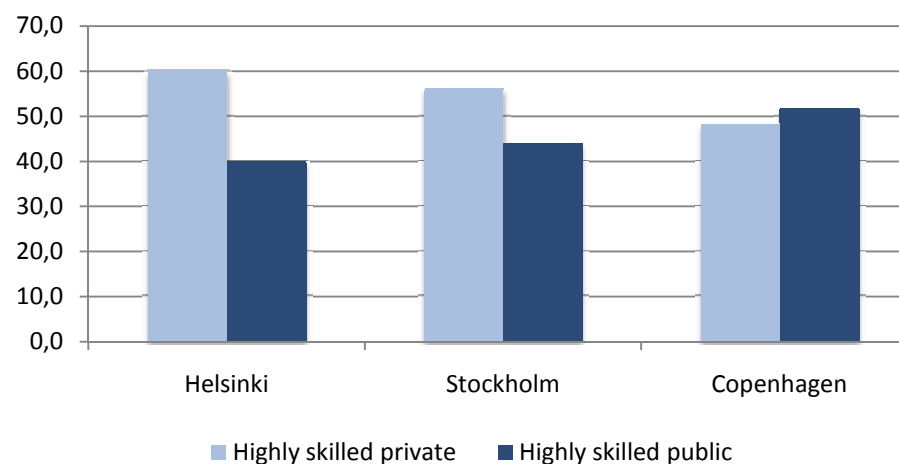
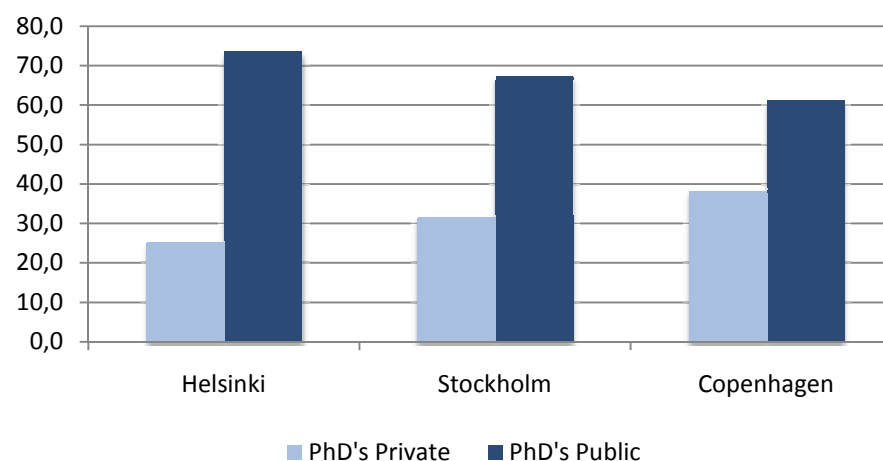


Figure 5: Public and private employment of PhDs





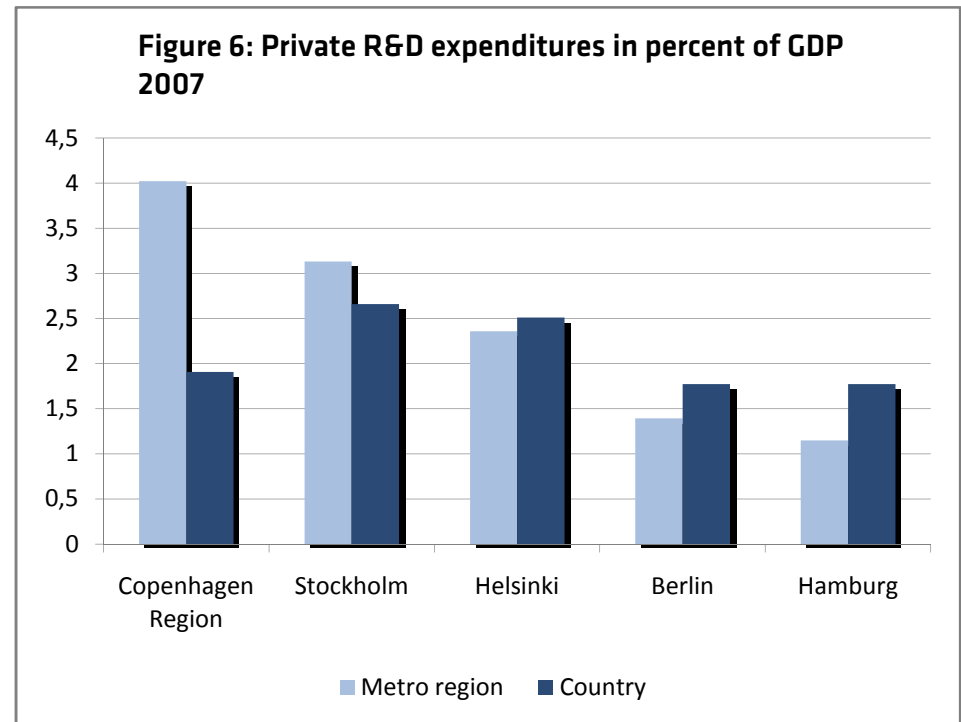
Regional knowledge creation – private R&D expenditures

Private expenditures on R&D is a key performance indicator for the knowledge creation that takes place in private companies in metro regions.

Though it is far from being a perfect indicator, since it only captures a small fraction of the total knowledge creation that takes place in private companies, it is, however, an important one, especially for metro regions, which typically host a relatively large proportion of research-based, knowledge-intensive businesses.

At the national level Sweden and Finland have the highest share of private expenditures as percent of GDP. But among the metro regions it is the Copenhagen region that stands out. Here, private investments in R&D account for as much as 4 percent of GDP.

The differences among the Nordic metro regions reflect that private R&D activities in Finland and Sweden are more evenly distributed among several locations across the countries, while in Denmark there is a pronounced concentration of private research activities in the Copenhagen region.



Source: Eurostat



Regional knowledge creation – private R&D expenditures

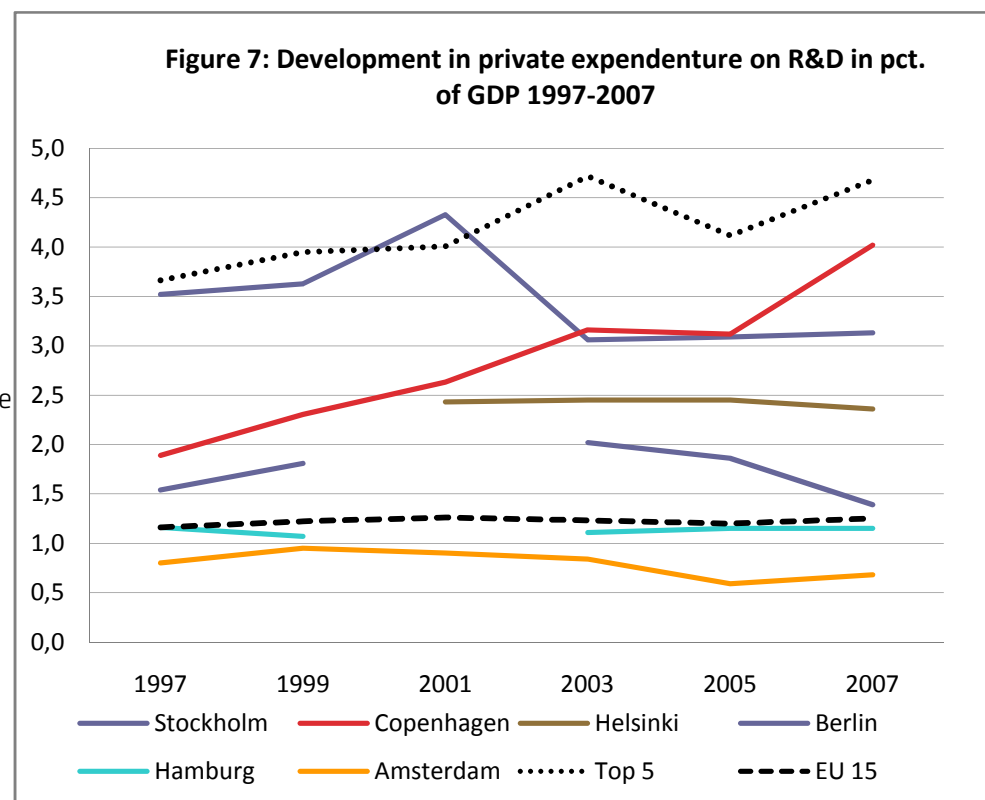
Viewed over a ten year period the trend in private R&D expenditures has evolved quite differently across the metro regions covered by this survey. In the Copenhagen region there has been a distinct positive trend and private R&D as percent of GDP has doubled.

In Helsinki private R&D expenditures as share of the regional GDP have remained almost constant at 2.5 percent in the period from 2001 to 2007.

Stockholm, on the contrary, has experienced a downward trend. In 1997 Stockholm was by far the highest ranking of the Nordic metro regions as private R&D expenditures accounted for more than 3.5 percent of the regional GDP.

In 2007 the share in Stockholm was reduced and accounted for a little more than 3 percent.

During the ten years period Copenhagen has surpassed Stockholm and is today the highest ranking of the Nordic metro regions.





Regional innovation – EPO patent applications

Measuring innovation at the regional level poses a huge challenge since innovation is hard to define, and the scarce (often survey) data that exists in this field is often fragmented and incomparable across regions.

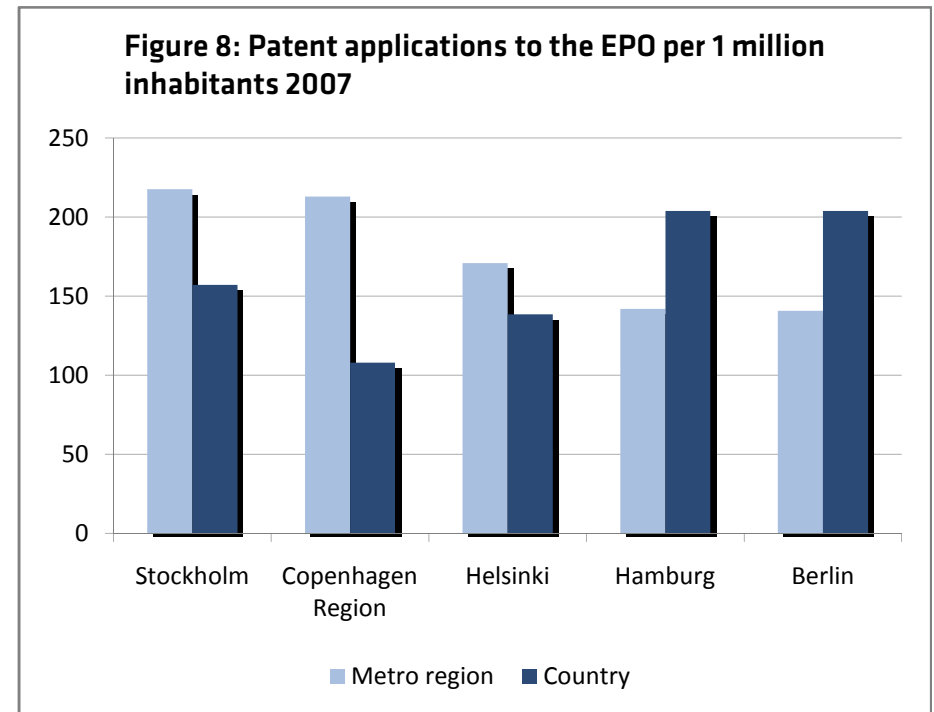
One of the few indicators that can be compared across regions is the number of patent applications to the European Patent Organisation (EPO).

Stockholm has the highest number of patents per million inhabitants - Copenhagen and Helsinki follow close behind.

The problem with this indicator is that it only captures a very small fraction of the total innovations in a region, and it is heavily biased towards certain high technology sectors.

Thus, patents are far from an adequate indicator of the extent to which investments in human resources and knowledge creation are translated into new, innovative ideas with commercial value.

It is important to keep this in mind when conclusions about regional innovation performances are drawn.



Source: Eurostat

Human resources and knowledge creation – key indicators of framework conditions

Human resources and knowledge creation – Key indicators of framework conditions in metro regions:

Human resources and knowledge creation:

- Students enrolled in tertiary education
- Number of PhD students
- In- and outgoing exchange students
- Net migration of “young and restless”
- Public sector R&D expenditure
- Public sector R&D personnel
- International ranking of universities

Universities as regional drivers of growth:

- Universities’ focus on outreach activities
- Universities’ interaction on education
- Universities’ interaction on research and development



Future access to highly skilled workers

The number of students in tertiary education is an important framework indicator as it expresses to what extent the regional business sector can expect to have access to highly skilled labour in the future.

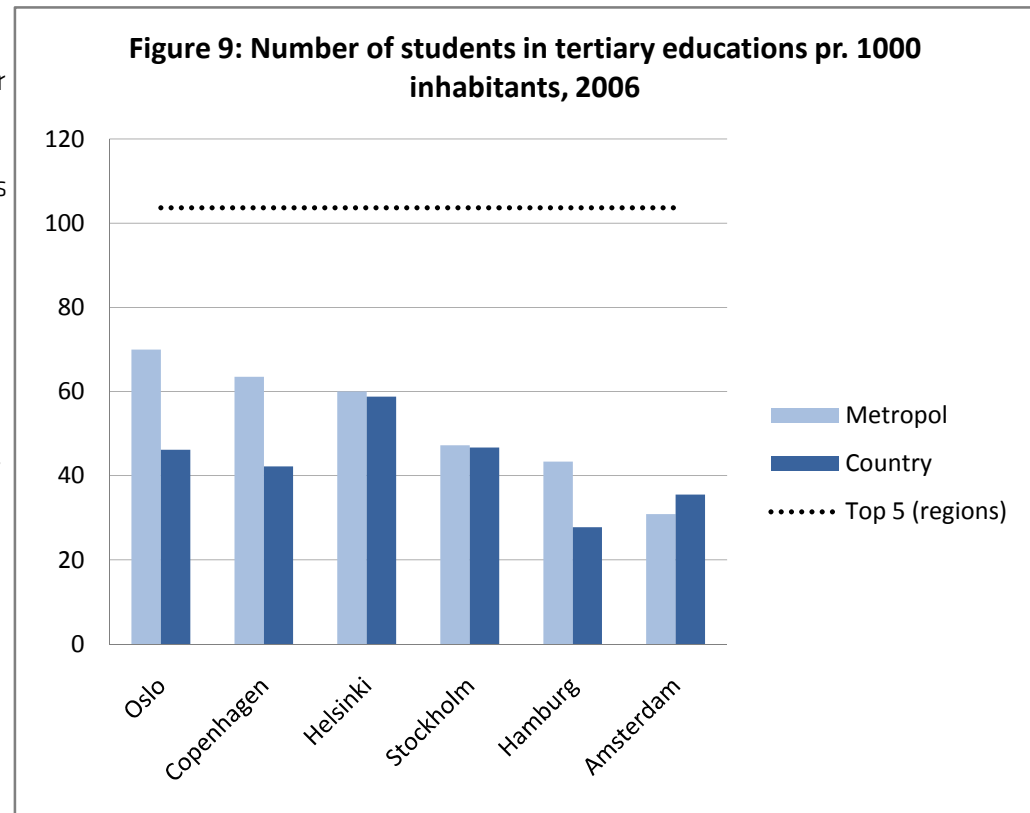
At the country level, Finland has the highest number of students enrolled in tertiary education per 1000 inhabitants.

Helsinki and Stockholm are close to their national averages, while Copenhagen is well ahead of the average for Denmark.

The figures illustrate that the Copenhagen region is an important hub for education and training for the whole of Denmark, while tertiary educational institutions are more evenly distributed geographically in Sweden and Finland.

When looking at the relatively low number of students per inhabitant in Stockholm compared to Helsinki and Copenhagen, it should be kept in mind that one of Sweden's biggest universities are located in Uppsala, just next to the Stockholm region.

Nevertheless, the figures show that all the Nordic metro regions have a long way up to the best performing regions of Europe.





Future supply of PhD's

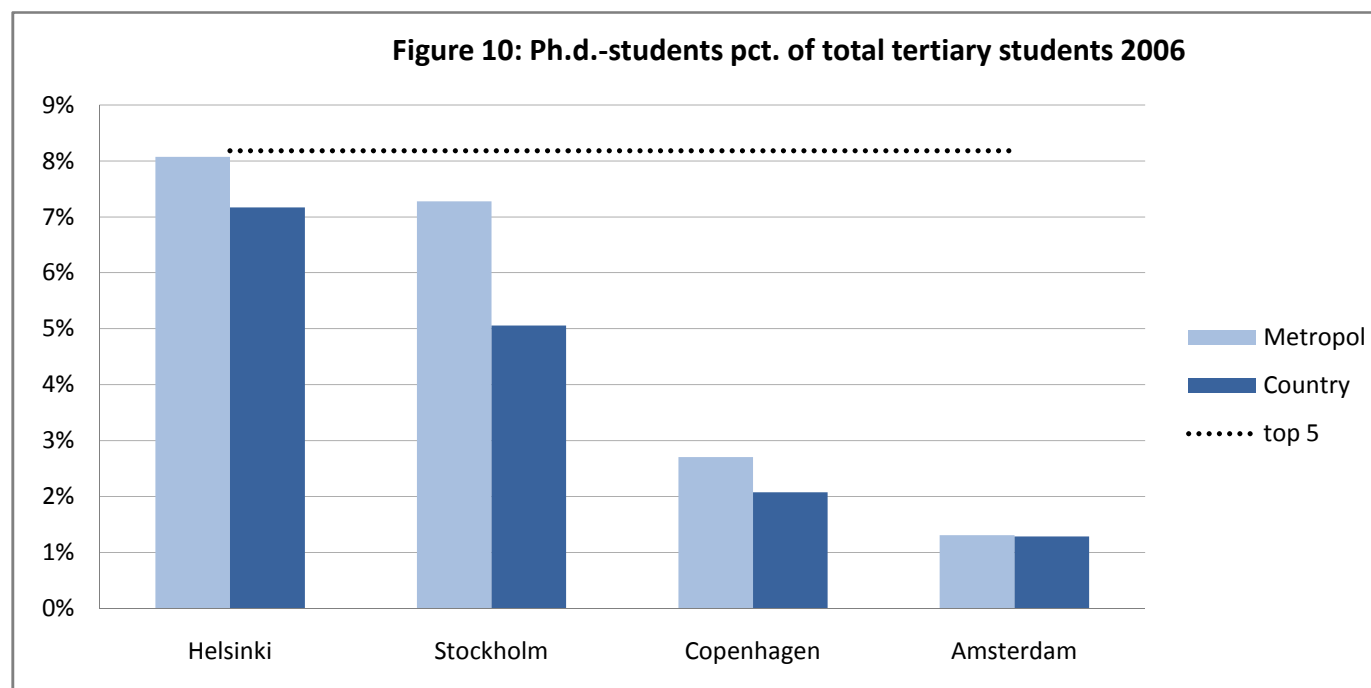
The share of PhDs gives an indication of the future supply of highly skilled researchers in the region.

It was previously shown (pages 6-7) that the relative share of PhDs in Copenhagen is significantly lower than in Stockholm and Helsinki.

There are no signs that this picture will change in the next many years.

Figures on the number of PhD students show that in Helsinki and Stockholm 7-8 percent of the students enrolled in tertiary education are PhD students. In Copenhagen, this share is just close to 3 percent.

Helsinki and Stockholm are among the top performing regions in Europe in this field, while Copenhagen is far behind at a level more comparable to Warsaw.

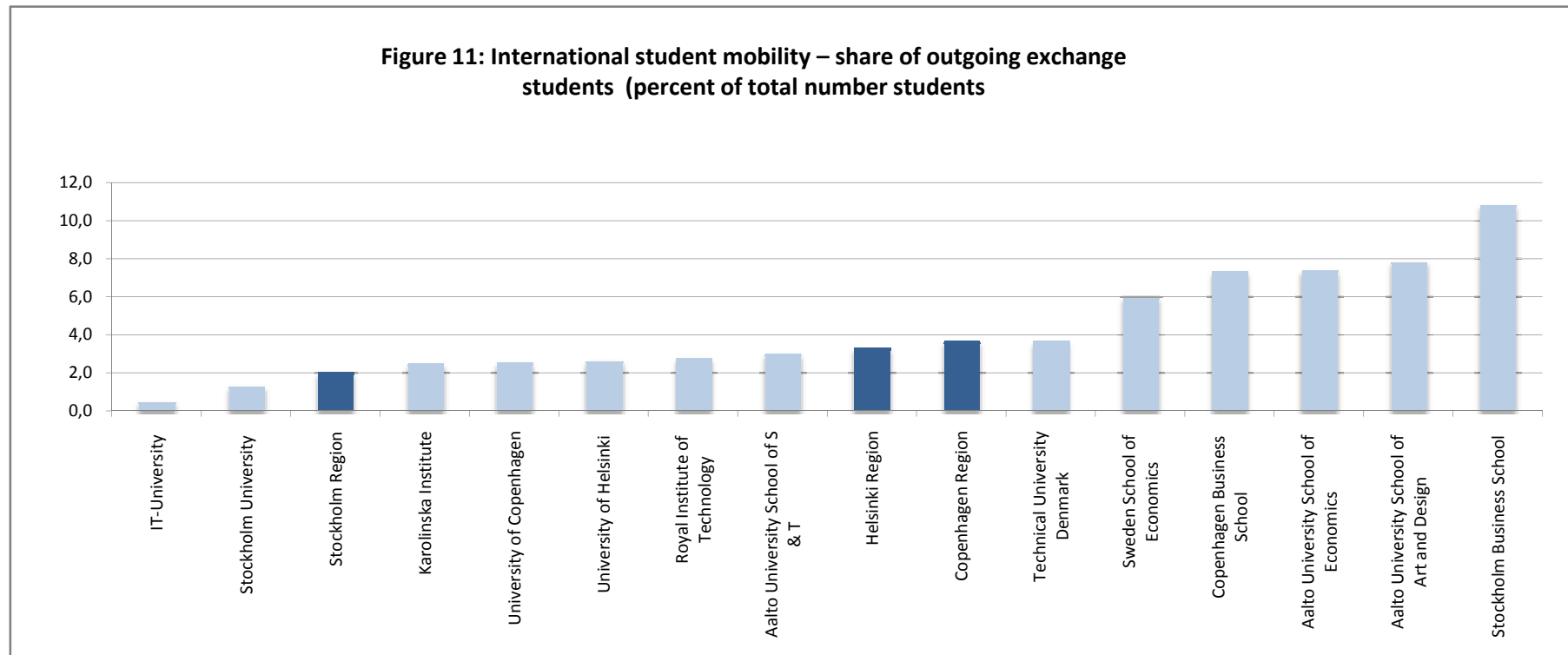




Exchange students – outgoing (percent per year)

Studying in another country as part of one's education can be a good investment – not just on a personal level, but also for the businesses in the region. People who have studied abroad can provide new knowledge, skills and competences that the innovative and internationally oriented companies hunger for.

There are quite substantial differences in the share of students that go abroad as part of their education. But the differences are more distinct between different types of institutions than across regions. Students at business schools are much more likely to go abroad as part of their education than students at the “traditional” universities in Stockholm, Helsinki and Copenhagen who typically spend all their student years in their home country.



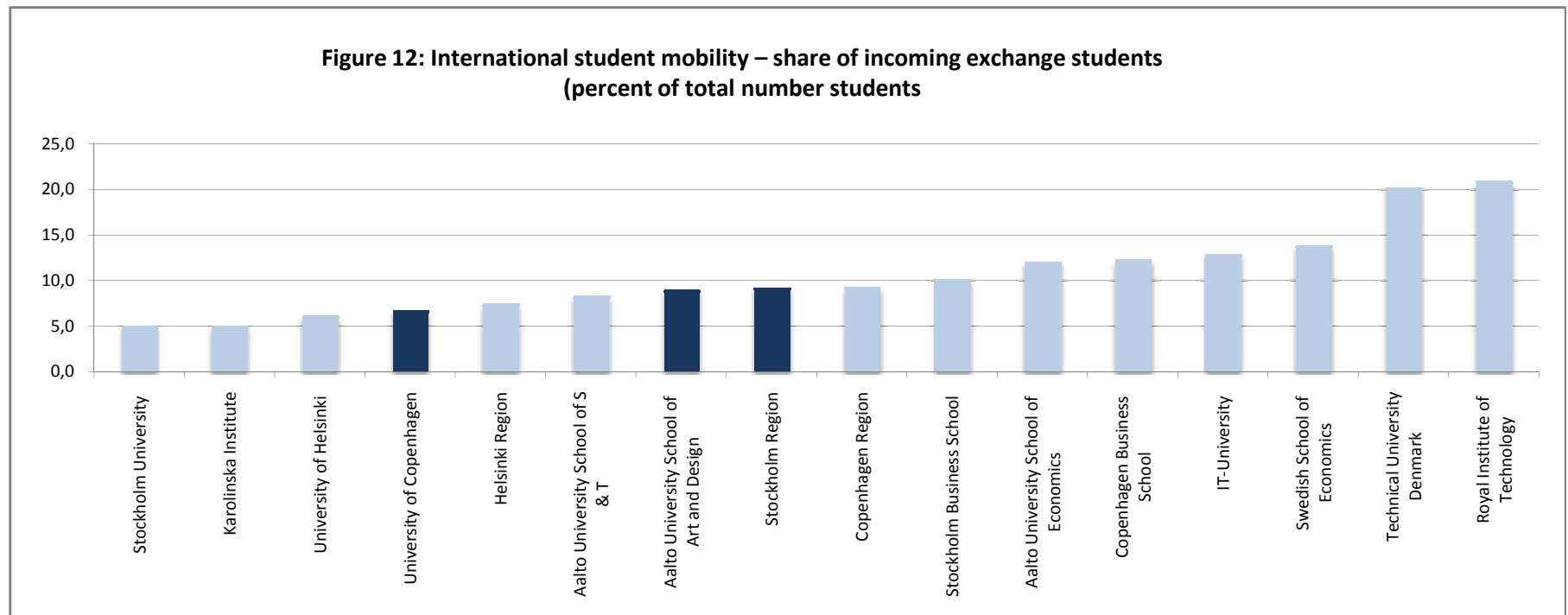
Source: Högskoleverket (SWE), CIRIUS (DEN), KOTA/Ministry of Education (FIN)



Exchange students – in-coming (percent per year)

The share of in-coming exchange students gives an indication of how attractive the regional universities are to foreign students. Attracting a high share of exchange students to the region might help give the regional businesses access to highly trained workers in times when competition on the labour market is intensifying. This is especially relevant when it comes to the so-called free-movers – young people who move to another country with the purpose of completing an entire education in the region.

There is quite a substantial variation among the universities when we compare their relative share of foreign students. The technical universities of Stockholm and Copenhagen attract the highest share of foreign students. More than 20 percent are in-coming exchange students. At the other end of the spectrum one finds the “classic” universities, Stockholm University, University of Helsinki and University of Copenhagen, where exchange students only make up a little more than 5 percent of the total student body.



Source: Högskoleverket (SWE), CIRIUS (DEN), KOTA/Ministry of Education (FIN)



Regional knowledge creation – public R&D expenditures

Public expenditures on R&D is an important regional framework condition for knowledge creation and innovation in regional businesses – especially within high-tech sectors like biopharmaceuticals, ICT etc.

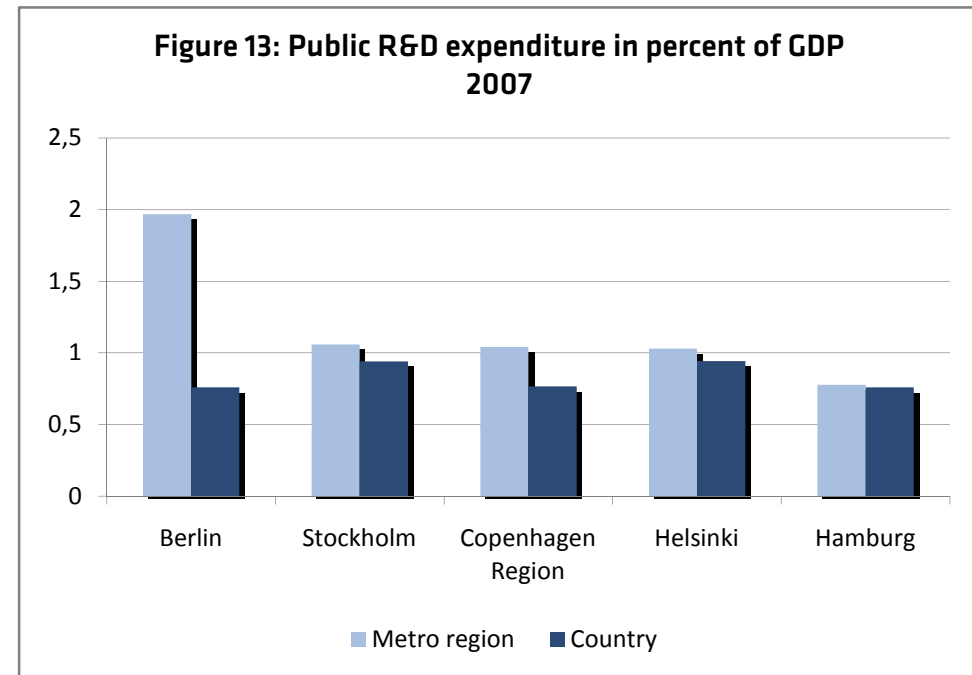
Publicly funded research institutes, universities etc. help to attract and retain highly skilled people to the region and often serve as valuable collaborators for innovative businesses in the region.

At the country level Sweden and Finland are ranked in the top with close to one percent of GDP spent on public R&D activities.

At the metro region level, Berlin is extreme with public R&D expenditures accounting for as much as 2 percent of GDP.

Despite the fact that Denmark spends less on public R&D than Sweden and Finland, there are only marginal differences among the three Nordic metro regions, where public R&D expenditures account for close to one percent.

This reflects that Copenhagen accounts for a relatively large share of the country's public sector R&D compared to Stockholm and Helsinki.



Source: Eurostat



Academic ranking of universities

Top performing research universities play an important role for innovation and growth in metro regions.

Top universities serve as hubs for knowledge creation and enable the regions to gain access to global flows of new knowledge and research.

The three Nordic metro regions all have universities that are ranked among the top 100 in the world.

Impressively, Stockholm hosts two Top 100 universities and four of the universities in Stockholm are on the global top 500.

The highest ranked university in each of the Nordic metro regions – University of Copenhagen, University of Helsinki and Karolinska in Stockholm, have all recently experienced a positive trend and climbed up the list from 2007 to 2009.

Figure 14: Top performing universities

Region	University	2005	2007	2009	Trend
Copenhagen Region	Tech Univ Denmark	153-202	151-202	152-200	●
	Univ Copenhagen	57	46	43	●
Helsinki	Tech Univ Helsinki	401-500	403-510	-	●
	Univ Helsinki	76	73	72	●
Stockholm	Karolinska Inst Stockholm	45	53	50	●
	Royal Inst Tech	203-300	203-304	201-302	●
	Stockholm Sch Economics	301-400	305-402	402-501	●
	Stockholm Univ	93	86	88	●
Hamburg	Univ Hamburg	101-152	102-150	152-200	●
Amsterdam	Free Univ Amsterdam	153-202	151-202	101-151	●
	Univ Amsterdam	101-152	102-150	101-151	●

Source: Academic ranking of world universities 2009 (Shanghai University)

Note: The Shanghai Ranking of World Universities is only one among a number of different international rankings. Examples of other relevant rankings are: Times Higher Education <http://www.timeshighereducation.co.uk/Rankings2009-Top200.html>, Leiden Ranking http://www.cwts.nl/ranking/world_250_green.html



Metro region attractiveness to the “young and restless”?

The group of highly skilled, 25 to 34 year-old workers are among the most flexible but also the most mobile group of workers. And they will be fewer in numbers in the coming decades.

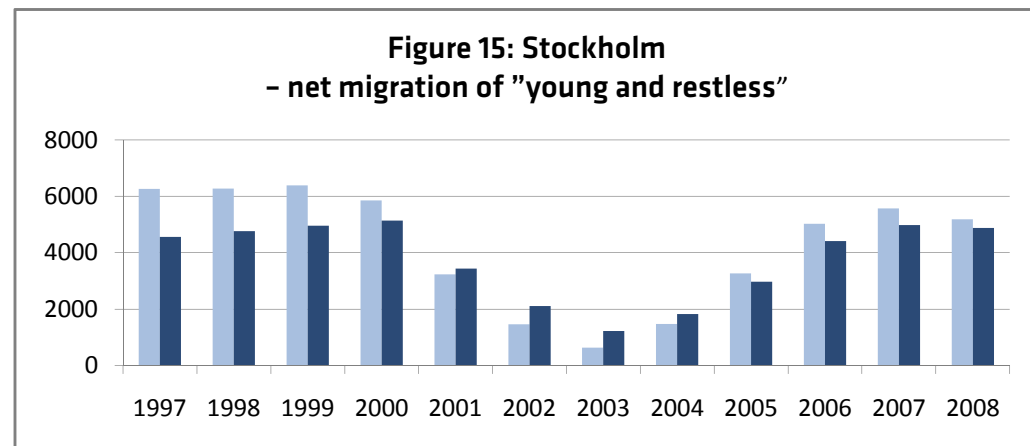
The future economic growth of metro regions are dependent on the regions ability to attract and retain a high share of the group of “young and restless” workers.

The figures shows that Stockholm have had a positive net-migration of young and restless each year since 1997.

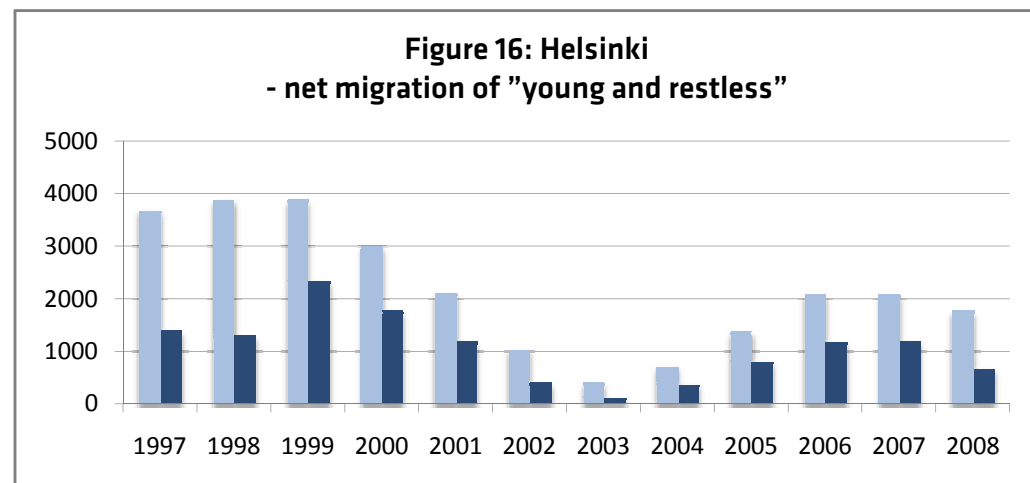
The picture for Helsinki is almost similar. In periods of high economic growth both Stockholm and Helsinki had a high positive net-migration. Even during the economic downturn after the dotcom-crisis in 2001 Helsinki and Stockholm was able to keep a positive net-inflow of young and restless.

The figures indicate that both Stockholm and Helsinki is very attractive to the group of young and restless. The other side of the coin is that the future growth in the two metro regions are dependent on the regions ability to safeguard and enhance their attractiveness in the future.

The challenges is to stay an attractive choice of location for newly graduated young people who are about to have their first job and start a family.



Source : Statistics Sweden



Source: Statistics Finland

■ Net-migration 25-34 years old
■ Net-migration 25-34 years old with ISCED 5-7



Metro region attractiveness to the “young and restless”?

The picture for Copenhagen looks quite different. Every year since 2002 there has been a negative net migration of “young and restless”.

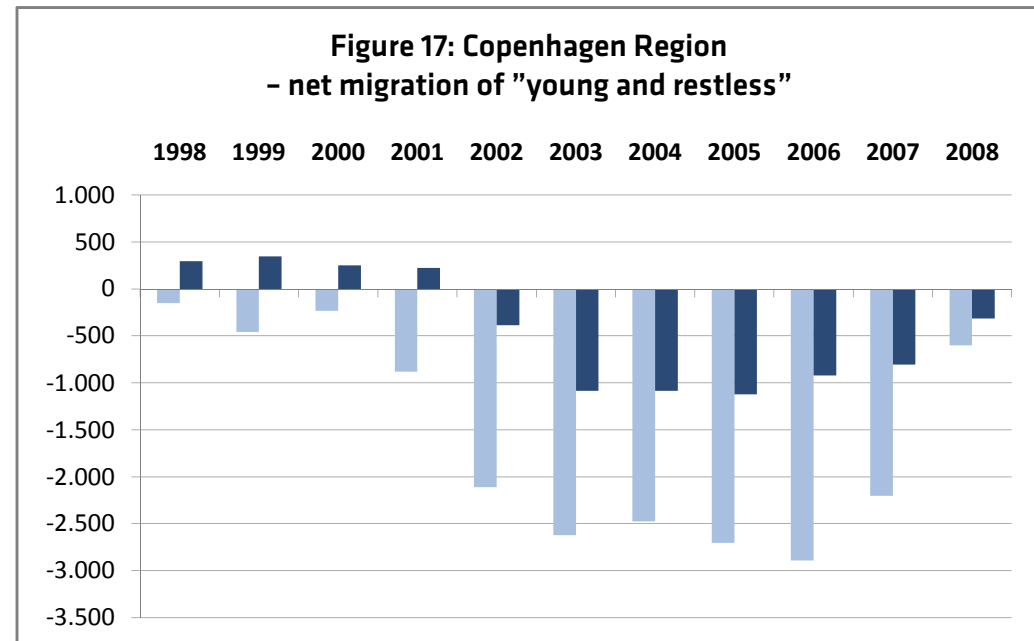
This is a result of two different phenomena. First, Copenhagen is a national hub for higher education. This means that every year young people move to the region to get an education. When they graduate, some of them move to other parts of the country for their first job.

Secondly, the rising prices on the housing market have forced many of the young and restless to find a home in a neighboring region and commute to the Copenhagen region for work.

The future challenge for the Copenhagen region is similar to the one for Stockholm and Helsinki: to remain and become even more attractive to the group of “young and restless”.

But the task facing the Copenhagen region might be a little different, as a large number of young people already move to the region from other parts of the country to get enrolled at the region’s higher educational institutions.

The challenge for the Copenhagen region is to make it attractive for them to stay in the region after graduation, when they are about to get their first job and start a family.



Source: Statistics Denmark

■ Net-migration 25-34 years old
■ Net-migration 25-34 years old with ISCED 5-7

Universities as drivers of innovation and growth

Universities and other higher educational institutions play a crucial role for the innovation capacity in metro regions. Higher education institutions are providers of a educated labour and serves as regional hubs for knowledge creation and innovation.

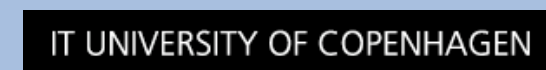
Higher education institutions are becoming increasingly aware of the impact on innovation and economic progress they can have on the regions where they are located.

This part of the paper presents the results of a survey covering the universities of Helsinki, Stockholm and Copenhagen, where we have asked questions about the institutions' strategy and the extent of their outreach activities.

The survey focuses on three main areas:

- Universities' strategic focus on outreach activities
- Universities' interaction with the business community on education
- Universities' interaction with the business community on knowledge creation

The survey has been carried out twice - in 2007 and again in 2009 - which has enabled us to uncover areas where there have been progress and reveal areas where progress has been slow and there continues to be room for improvements.





Universities' strategic focus on outreach activities

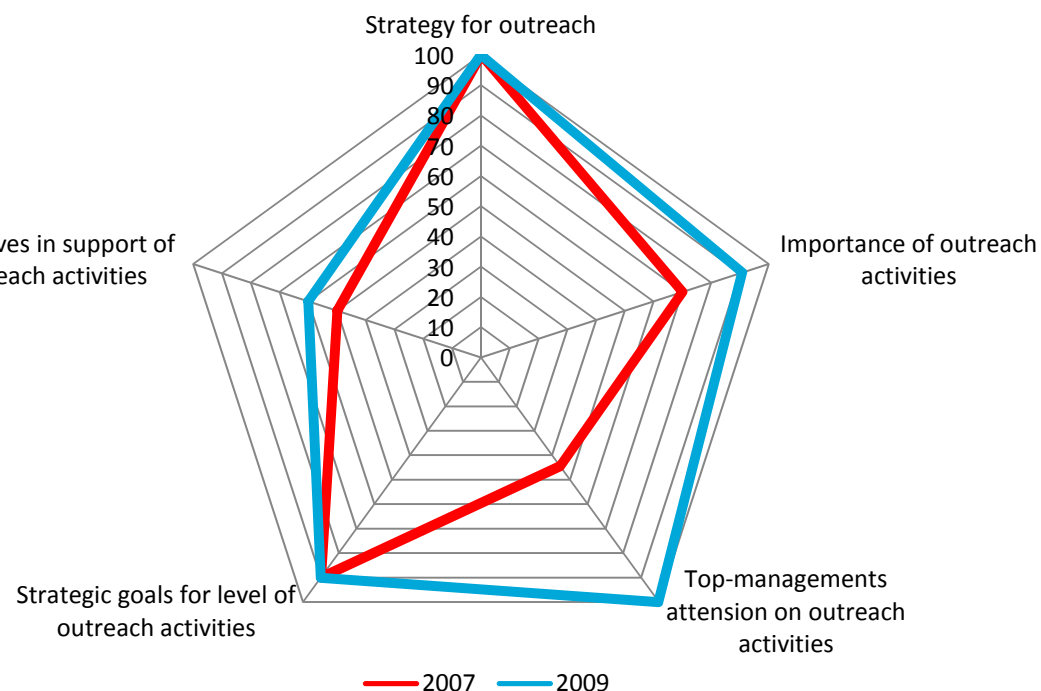
In both 2007 and 2009 we asked the universities in the three Nordic metro regions a series of questions about their strategic focus on outreach activities: If they had a strategy for outreach activities? How important their outreach activities are compared to education and research? If outreach is an area that has the attention of the top management at the university? If they have incentives in place that support outreach activities?

There has been significant progress from 2007 to 2009 when it comes to the question of top management attention towards outreach and the importance of outreach activities. Outreach activities have become an important area, and at all universities it has become a high priority area for the top management.

But there continues to be a challenge when it comes to the question of putting up incentives that support outreach activities at the universities. In this field progress has been slow.

This might be one of the most important focus areas if universities are to play a stronger role as engines of innovation and enhancers of regional growth.

Figure 18: Changes in universities' strategic focus on outreach activities



Note: A score of index 100 indicates that all universities obtained the highest possible score. See appendix 1 for a detailed description of the ranking.

Universities' interaction with the business community in the area of human resources



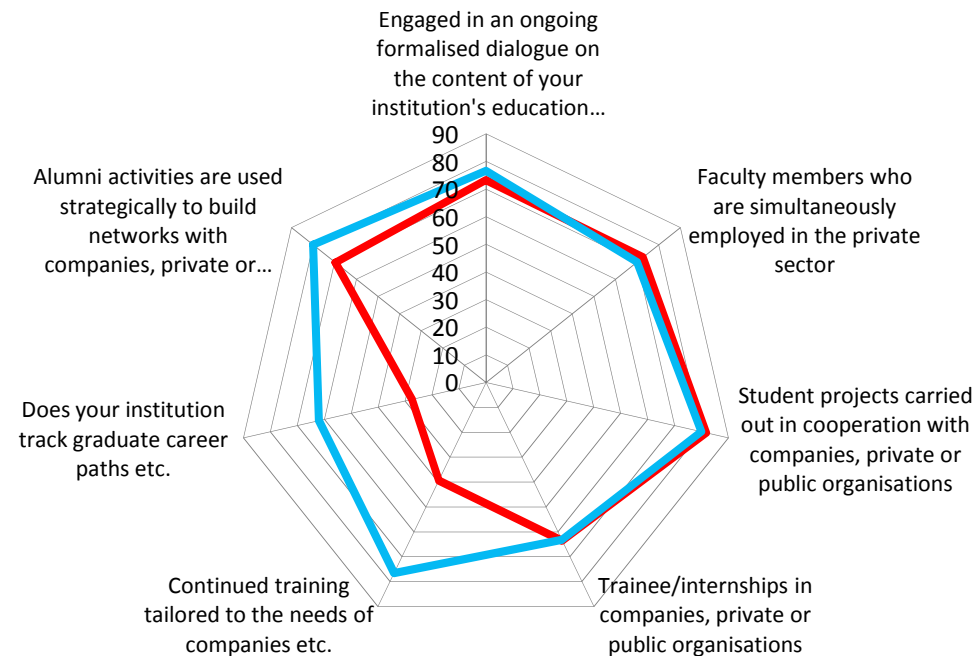
The universities are increasingly engaged in activities that help improve the relevance of their educational programs and develop new types of programs that suit the needs of both private and public sector.

In particular, a growing number of universities are providing further education tailored to the needs of the business community.

A growing number of universities make an extensive effort to track the career paths of their graduates. Which are the key sectors that employ newly graduated? What is their average salary compared to their peers from other institutions and departments? How many become entrepreneurs and start their own business?

This kind of information is important if one is to develop educational programs that meet the needs of private and public sector. And even though there has been progress, the figures also indicate that some universities can do more in this field.

Figure 19: Universities' interaction with the business community in the area of human resources



Note: Index indicates that all universities obtained the highest possible 100 score. See appendix 1 for a detailed description of the ranking.

Universities' interaction with the business community in the area of human resources – Stockholm, Helsinki, Copenhagen



There are similarities as well as some distinct differences across the three Nordic metro regions when it comes to the universities' interaction with the surrounding society within the field of human resources and education.

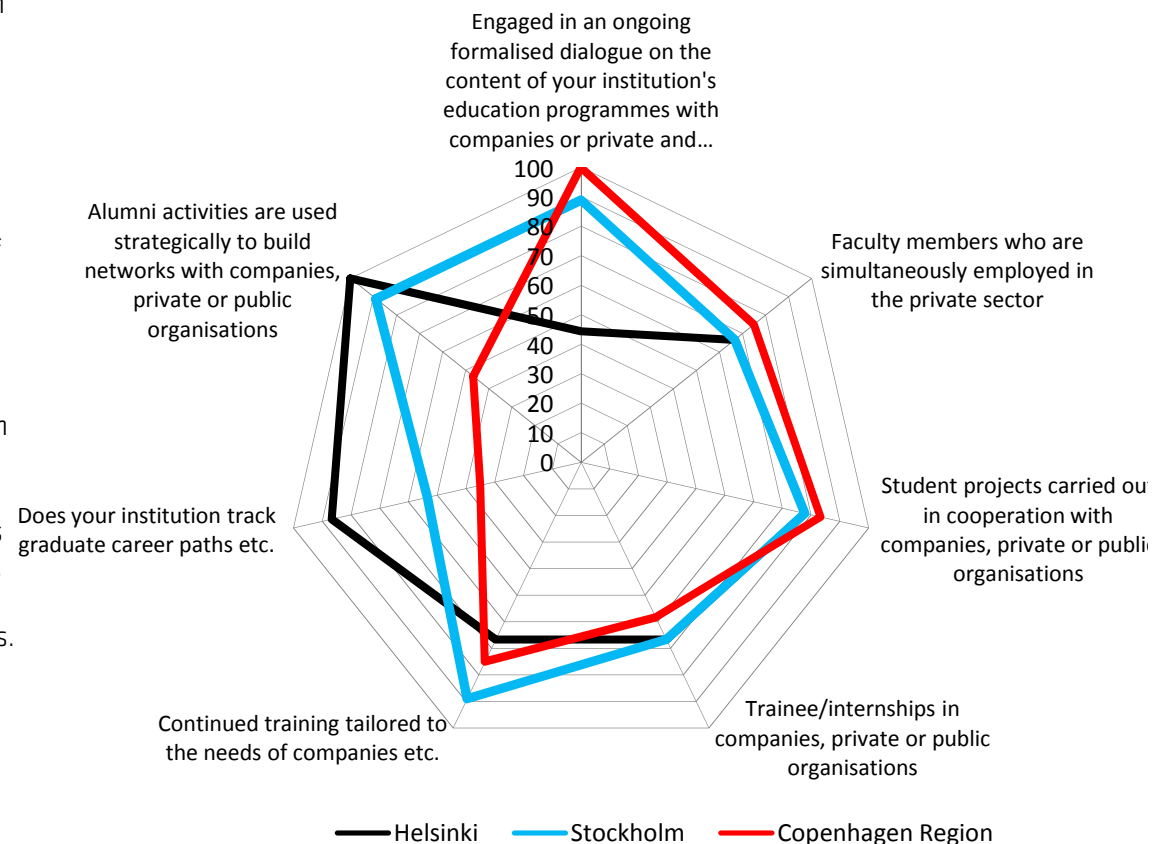
There are few differences among the three regions when it comes to how many faculties are simultaneously employed in the private sector and the extent to which students carry out projects in collaboration with companies etc.

The survey indicates that the universities in the Copenhagen region could do more to track the careers of their graduates and use alumni activities much more strategically in order to build strong relations with companies and public organisations.

In Helsinki, the survey indicates that more can be done in order to establish a closer dialogue with companies and public organisations – through advisory boards, for example, that can ensure that the educational programs reflect the needs of companies and public organisations.

Stockholm performs quite good within most of the areas. But, as with Copenhagen, more can be done in order to track the career path of graduates.

Figure 20: Universities' interaction with the business community in the area of human resources – Stockholm, Helsinki, Copenhagen



Note: Index 100 indicates that all universities obtained the highest possible score. See appendix 1 for a detailed description of the ranking.

Universities' interaction with the business community in the area of knowledge sharing 2007 and 2009



The survey results show that universities increasingly collaborate with companies and public organisations on knowledge creation - through joint research activities and commissioned research.

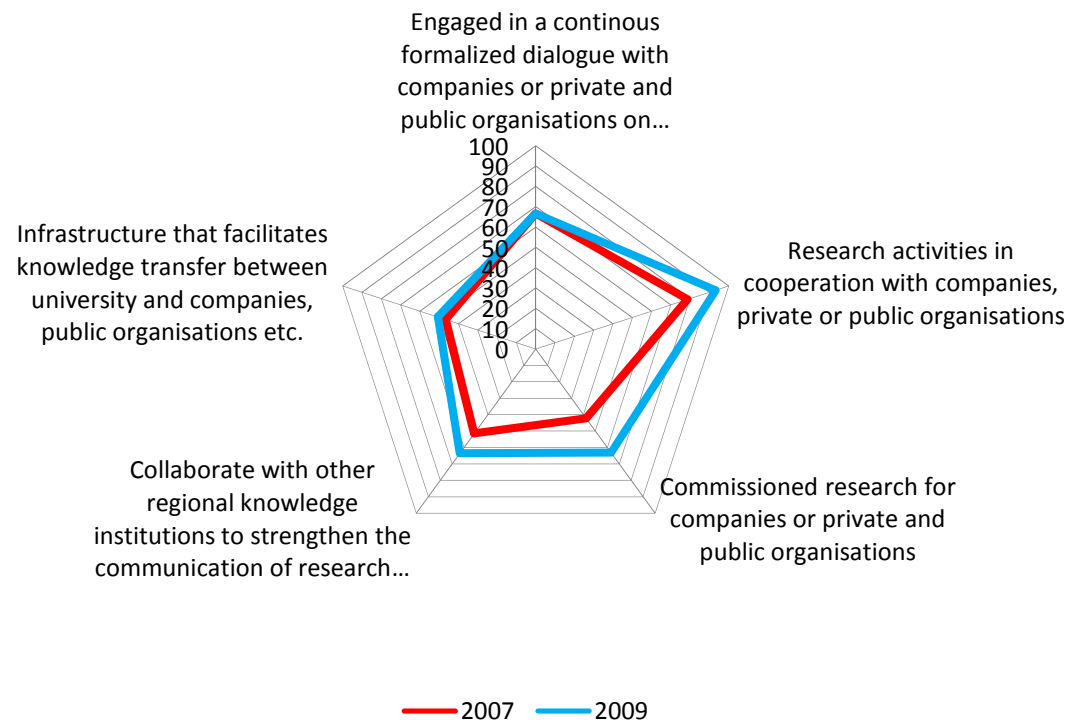
And it has become more common to collaborate with other knowledge institutions in the region in order to strengthen the transfer of new knowledge to the surrounding society.

But there continues to be considerable room for improvements within most of the areas we focus on.

Setting up an infrastructure that facilitates knowledge transfer between universities and businesses is one of the areas that has the biggest potential for improvements.

In many regions, the regional business policy involves a focus on supporting and co-investing in the development of this kind of infrastructure through network activities, matchmaking services and facilities for joint R&D, prototyping etc.

Figure 21: Universities' interaction with the business community in the area of knowledge sharing 2007 and 2009



Note: Index 100 indicates that all universities obtained the highest possible score. See appendix 1 for a detailed description of the ranking.

Universities' interaction with the business community on knowledge creation and sharing – Stockholm, Helsinki, Copenhagen



A more detailed analysis of each of the three Nordic metro regions shows that Stockholm is the best performing region in all five focus areas.

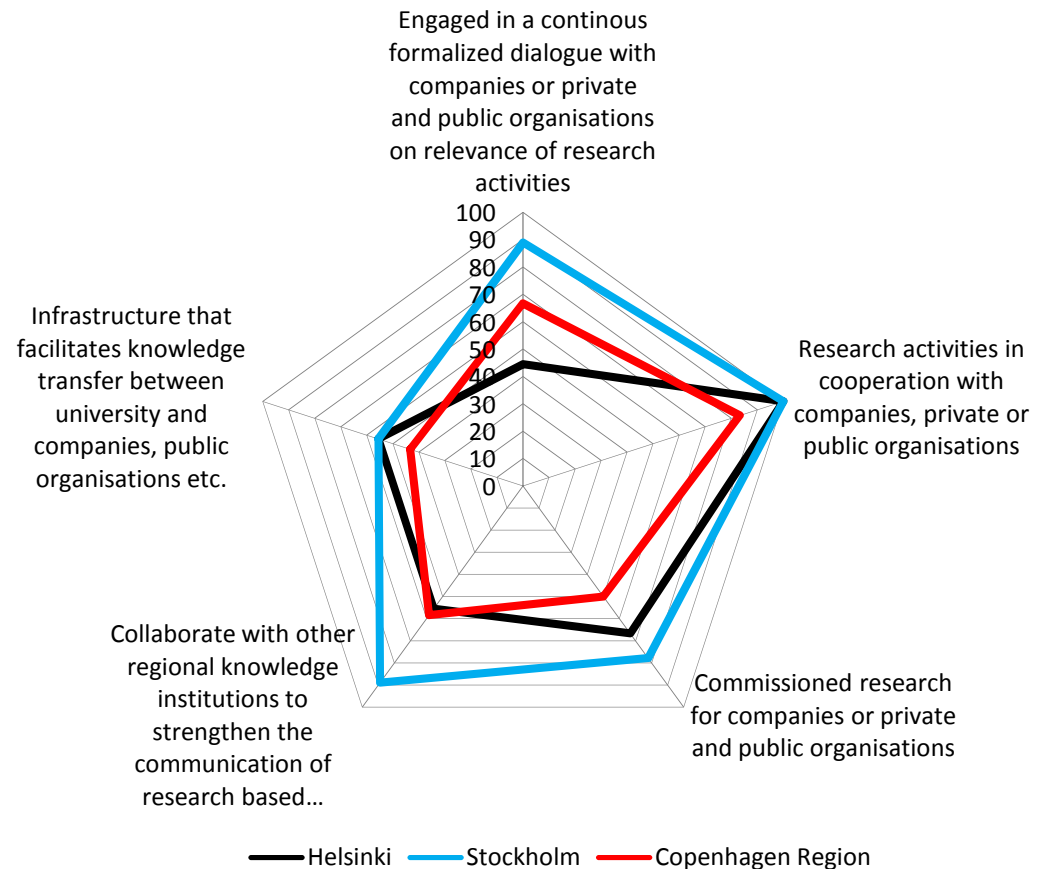
But the survey also shows that all three regions face a challenge in establishing an infrastructure that facilitates knowledge transfer between universities and companies.

This is a huge challenge for universities and regions all over the world. And it seems to be an obvious area for the three Nordic metro regions to do a joint analysis of best practise in order to develop recommendations for new policies and new initiatives.

Furthermore, the survey shows that Helsinki and Copenhagen might have a common challenge in facilitating stronger regional collaboration between knowledge institutions when it comes to knowledge transfer to the private and public sector. Perhaps inspiration and good practise can be found in Stockholm which seems to be performing very well in this area.

This could be another focus area for future joint analysis in the Metropolitan Inc. consortium.

Figure 22: Universities' interaction with the business community on knowledge creation and sharing – Stockholm, Helsinki, Copenhagen



Note: Index 100 indicates that all universities obtained the highest possible score. See appendix 1 for a detailed description of the ranking.

Directions for future work: Infrastructure for facilitating knowledge transfer



All over the world metro regions and universities struggle with the challenge of building a strong infrastructure for knowledge transfer between publicly funded research organisations and the private sector.

An efficient infrastructure contains a range of different elements: having incentives in place at the universities that support researchers who want to collaborate more with industry; support services at the universities where researchers can get help for project development; fundraising and project management, and different types of networks activities at the universities where researchers and company representatives can meet and exchange knowledge and new ideas etc.

There is an urgent need of a much more fact-based knowledge on how to set up an efficient infrastructure for knowledge sharing. And it would be an obvious task for the partners in Metropolitan Inc to initiate joint analytical activities in this field.

A first step could be an analysis of some of the recent initiatives that have been initiated at the universities in the Nordic Metro regions, for example at the Aalto University in Helsinki:



Interdisciplinary factories at Aalto University

Aalto University was established on January 1, 2010, through a merger of Helsinki University of Technology, Helsinki School of Economics and University of Arts and Design Helsinki.

The aim of the new Aalto University is to create an interdisciplinary science and arts community by bringing together technology, economics and art. The ambition is to open up new possibilities for strong multidisciplinary education and research.

Aalto University has founded three so-called "factories" that bring in together the industry partners and researchers. The three interdisciplinary factories, Design Factory, Media Factory, and Service Factory, are part of the Aalto University organization.

For businesses, the three factories are an innovative environment for finding, incubating, and implementing new ideas together with leading scholars, top future talent, and a mixture of other companies.

Directions for future work: Infrastructure to facilitate knowledge transfer



For the researchers the three factories offer unique opportunities for forming and participating in open-ended research initiatives challenging the industry status quo.

The three factories are supported financially by the Aalto University and the Finnish Ministry of Education, plus a number of big Finnish corporations, such as Nokia and Kone Oyj.

The Design Factory also offers incubation facilities for researchers and students who want to start their own company.

At the other universities in Helsinki and at universities in the Copenhagen region and in Stockholm, we see a broad range of similar initiatives focusing on creating learning and innovation environments where researchers, students and businesses can carry out collaborative R&D-activities and innovations.

Regional authorities often actively support these initiatives. There is a huge potential for the Nordic regions to learn from each other and share best practises with other metro regions in this field.

This might be one of several potential directions for the future work in the Metropolitan Inc.





Appendix 1

Metropolitan Inc.'s university survey

The university survey has been carried out in 2007 and in 2009 among all universities in the metro regions.

Only universities who completed the survey in both years are included. The following universities completed the survey in both 2007 and 2009:

- University of Copenhagen
- Danish University of Technology
- IT University
- Copenhagen Business School
- KTH – University of Technology
- Karolinska Institutet
- Stockholm School of Economics
- Helsinki University
- Swedish School of Economics
- Aalto University*

* 2007 figures for Aalto University are based on survey results from Helsinki University of Technology and Helsinki School of Economics.

Methodology

The universities was asked a series of questions related to the following three key areas:

- Overall strategy for outreach activities
- Interaction with surrounding society on education
- Interaction with surrounding society on R&D.

Under the theme "Strategy for outreach" the universities were asked the following questions:

1.1. Is interaction with companies or other private or public organisations an integrated part of your institution's strategy?

- Yes
- No

If "yes" to question 1.1.

1.1.1. Compared to other of your institution's activities how important is interaction with companies or other private or public organisations?

- Of limited importance
- Of some importance
- Of significant importance

1.2. Is interaction with the surrounding society the primary management function for one or more individuals in the organisation's management team?

- Yes
- No

1.3. Are leaders from companies or public organisations represented in the organisation's board?

- Yes
- No

1.4. Has your institution established a set of specific goals for the level of interaction with companies or other private or public organisations?

1.5. Does your institution offer an incentive structure that rewards researchers working with companies or other private or public organisations?

- Yes
- No



Appendix 1

Interaction on education

This section focuses on universities' interaction with key stakeholders - companies, regional authorities etc. – about education and training programs.

2.1 Is your institution engaged in an ongoing formalised dialogue on the content of your institution's education programmes with companies or other private and public organisations – in the form of advisory boards or similar forums?

- Yes, a limited number of departments are
- Yes, some departments are
- Yes, most departments are
- No

2.2. Does your institution employ faculties who are simultaneously employed in the private sector?

- Yes, a limited number of faculties
- Yes, some faculties
- Yes, a considerable number of faculties
- No

2.3. Are student projects carried out in cooperation with companies or other private or public organisations an integrated part of the education programmes?

- Yes, a few education programmes
- Yes, some education programmes
- Yes, a considerable number of programmes
- No

2.4. Do your institution's programmes offer trainee/internships in companies or other private or public organisations?

- Yes, a few education programmes
- Yes, some education programmes
- Yes, a considerable number of programmes
- No

2.5. Does your institution offer continued training tailored to the needs of companies?

- Yes, a limited number of departments do
- Yes, some departments do
- Yes, a considerable number of departments do
- No

2.6. Does your institution track graduate career paths?

It is possible to tick off more than one answer

- Yes, graduate unemployment rate
- Yes, graduate salaries

Interaction on research and development

This section focuses on universities' interaction with key stakeholders - companies, regional authorities etc. – on research and development activities

3.1. Is your institution engaged in a continuous formalized dialogue with companies or other private and public organisations regarding the relevance of your institution's research activities?

- Yes, but the dialogue is of limited importance of how the research activities is prioritised
- Yes, and the dialogue is of some importance of how the research activities is prioritised
- Yes, and the dialogue is very important of how the research activities is prioritised
- No

3.2. Does your institution carry out research activities in cooperation with companies or other private or public organisations?

- Yes, to a limited extent
- Yes, to some extent
- Yes, to a significant extent
- No

3.3. Does your institution carry out commissioned research for companies or other private and public organisations?

- Yes, to a limited extent
- Yes, to some extent
- Yes, to a significant extent
- No

3.4. Is your institution engaged in other activities related to interaction with companies or other private or public organisations in the area of research and development?

- Yes, please specify
- No

Continued on next page.....



Appendix 1

Interaction - research and development

4.2. Does your institution collaborate with other regional knowledge institutions (universities, institution colleges, technical schools etc.) to strengthen the communication of research based knowledge to companies or other private or public organisations?

- Yes, to a limited extent
- Yes, some extent
- Yes, a significant extent
- No

4.3. Does your institution host dedicated centres where companies or other private or public organisations may commission advisory and consulting services?

- Yes
- No

If yes to 4.3. then

4.3.1. Is the centre responsible for one or more of the following activities?

It is possible to tick off more than one answer

	Yes
To oversee the lending of lab and test facilities to companies or other private or public companies	<input type="checkbox"/>
Project management/project administration	<input type="checkbox"/>
To locate and raise funding for project development	<input type="checkbox"/>
To initiate projects	<input type="checkbox"/>
To market advisory and consulting services to companies or other private or public organisations	<input type="checkbox"/>
Other, please specify (space for text)	<input type="checkbox"/>

Ranking of the regions

The universities' responses to the questionnaire form the basis of ranking each region in a number of key areas. On questions where universities can only answer yes or no, the university gets a score of either 1 or 0. If all universities in a region answer yes, the region gets a score of 100.

On questions where the university can choose among several response categories, for example, to a limited extent / to some extent / to a significant extent, the university gets a score of 1, 2 and 3 respectively.

The score for the region is the sum of each university divided by the maximum score (number of universities x 3) times 100.

Regional score = $(\text{Sum}(\text{university score}) / (\text{Scoremax} \times \text{number of universities})) \times 100$

Likewise, with questions where it is possible to tick more answers, as in question 4.3.1. (see left side), the university gets a score based on how many of the listed services are provided. University Scoremax in this case is 6.