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The Mega-City-Region of Munich: A Kingdom of Its Own Or a Space of Inter-Connected Flows?

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The Mega-City-Region of Munich: A kingdom of its own or a space of inter-connected flows?

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Abstract:

In a globalized world mega-city regions (MCR) are of increasing importance. MCR are defined by a high concentration of regulation, innovation and gateway functions. Planners and politicians alike recognise that competition on this new spatial scale is becoming a strategic tool to develop the whole country. So they are looking for spatial strategies to ensure economic success and sustainable development (social and spatial cohesion) simultaneously. However, only little is known about the factors, which constitute MCRs: Their size, the inter-relationships within and between MCRs, the primacy of individual functional urban areas within MCRs and the potential methods to communicate these complex structures to politicians and stakeholders. The paper will deal with the following questions that will be tested with a case-study in the Munich metropolitan region: (1) What spatial extent and structure has the Mega-City-Region Munich? (2) Which flows and inter-relationships of knowledge based economic activities define the MCR? How is the MCR itself embedded in the global network of mega-city regions? (3) What kind of functional polycentricity do firms in the Advanced Producer Services and in the High-Tech sectors produce when looking at their office location strategies? (4) What policy recommendations follow for sustainable spatial development?

Our hypothesis is that the current perception of MCRs by local and regional stakeholders is quite inhomogeneous. There is an obvious gap between the functional logic of the competitive world and the territorial logic of the planning administrations. So we propose to look at the individual logics and the spatial reach of the stakeholders' activities.

The study uses an empirical survey for the Greater Munich Area that is mainly based on commuter data, location data of firms, business communication data and interviews with firms and a selection of key stakeholders.

1 Introduction - What is a Mega-City-Region? Why are they important?

Mega-City-Regions (MCR) and their impact appeared recently in the focus of planners and politicians. At European level the European Spatial Planning Perspective (ESDP) states that "The regions of the EU can only be competitive and hence contribute to the reduction of unemployment if towns and cities"[...] "have enough economic potential" (CEC 1999: 22). A

following policy option is the “Expansion of the strategic role of metropolitan regions and gateway cities” (CEC 1999: 23).

Mega-City-Regions are a result of globalization. These hot spots in the global surface in the view of German planners are hopeful cores to develop the whole nation (Sinz 2005: 1). The German Ministerial Conference on Spatial Planning (MKRO) outlined the relevance of these spatial structures as engines of social, economic and cultural development (MKRO 1995) and started defining six MCRs (“Metropolregionen”), ending up identifying now eleven MCRs for the entire of Germany.

There are maps in the current German report of spatial development, where all areas of Germany are assigned to one of these eleven MCRs (BBR 2005: 186). As no blind spots are left politicians might hope that all people are satisfied. But regional disparities still exist, and the debate is now dealing with the question: Should the strong or the weak areas be strengthened inside the MCRs? A good idea might be to do both, but there is a restriction: The limited budgets of the public authorities.

The reasons for the attention of politicians and planners to MCRs can be seen in the current spatial and economic development. The sector of the knowledge based economy is gaining importance within the whole economy. Technological progress and ongoing division of labour lead to a concentration of economic activities with a high degree of value-added in MCRs. Firms of the knowledge based economy are dependent on attractive location factors and their density in these areas because they are dealing with information. Several studies showed that face to face contacts are not substitutable in this sector (e.g. Wolke & Schmidt 2004). A further indicator for reconcentration of information is the density of Internet-Domains (located by the address of the responsible enterprise) as a proxy for transformation of information. This attribute has high values only in agglomerations and important cities (Sternberg 2004).

What is a Mega-City-Region? How can we define it? Meanwhile there are a lot of papers attempting to describe or define these structures regarding both, their specific functions and their spatial extent.

There are two approaches to define MCRs: A territorial and a functional logic. Politicians above all tend to think within the limitations of their territory because their electoral constituency represents their relevant market area. So there are a lot of examples in Europe where planning areas correspond to regional authorities. But: Location strategies of firms ignore the often overaged frontiers of politicians and organise their own networks due to different rules as we will see in our study. This leads us to the central hypothesis in this paper:

The authorities and structures responsible for planning in the MCR of Munich are not in line with current spatial development.

Blotevogel characterises MCRs using three functions: 346):

Metropolitan Functions	Examples
Regulation Function	Headquarters of big firms, Powerhouses of political decisions (Parliament, Ministries)
Innovation Function	Universities, research units of firms
Gateway Function	Airports, Congress Centres

Adam et. al. (2005) took these functions as a basis for an indicator set, which enables to assess the relevance of a MCR. They produced a map that shows the worldwide spatial

distribution of MCRs classified via these functions. However, an approach like this neglects an important aspect: The relations and flows between the mega-city-regions.

Friedmann (1995) and Taylor (2004) put emphasis on the aspect that the importance of a city – or mega-city-region – is substantially determined by its position in the world city network. It is worth to regard the nodes and their linkages within the network rather than regarding only attributes of the cities. The better connected a city is the more economic activities are virulent. But the question is: How to measure these flows?

A common approach to analyse functional inter-relationships of a city and its hinterland is using commuter data of the workforce. Commuters create physical and thus recognisable, visible flows. But beyond mere physical inter-connectivities there are other important relations that are much less detectable and visible and for which it is much harder to get data for. For example: Economic linkages such as communication between two office locations or business relations with customers, suppliers or technology producers.

This paper introduces a case study in the mega-city-region of Munich analysing the intra- and extra-firm relations in different spatial scales. The methodology draws from the Interreg III B Study Project POLYNET “Sustainable Management of European polycentric Mega-City-Regions” (Hall & Pain 2006: 3). The Globalization and World City Study Group (GaWC) at Loughborough University (UK) developed a method enabling a rough quantitative estimate regarding the flows created through intra-firm networks (Taylor 2004: 64). For the Munich study, some additions and modifications have been made. First, inter-firm relationships along the corporate value chain will be incorporated. Second, the High-Tech-Sector has now been included in the study and its location patterns will be compared with those of APS firms.

This paper has the character of an interim-report as the study is still running. After a short description of the local area it will show the first findings and its possible implications. The study aims to deal with the following questions. As the study is not yet completed the paper focuses on the following issues:

- (1) What spatial extent and structure has the Mega-City-Region Munich?
- (2) Which flows and inter-relationships of the knowledge based economic activities define the MCR? How is the MCR embedded in the global network of MCRs?
- (3) What functional polycentricity do firms in the Advanced Producer Services and in the High-Tech sectors produce when looking at their office location strategies?
- (4) What policy recommendations follow for sustainable spatial development?

2 The Mega-City-Region Munich

2.1 Basic socio-economic characteristics of the region and current challenges

Munich is one of the most competitive metropolitan areas in Germany. It is a monocentric region (figure 1) with Munich doubtless being the primary centre.

In the core city and its adjacent region a lot of metropolitan infrastructure can be found: Several companies operating at the global scale like Siemens, BMW, DASA, Allianz etc. have headquarters or major offices. Universities provide qualified workforce for the research & development units of firms. The figures of unemployment are low and the quality of leisure

opportunities, environment and living are ranked high as the percentage of knowledge-based economic activities.

In many rankings based on economic indicators and soft location factors Munich is the leading city in Germany (e.g. IFW Consult 2005).

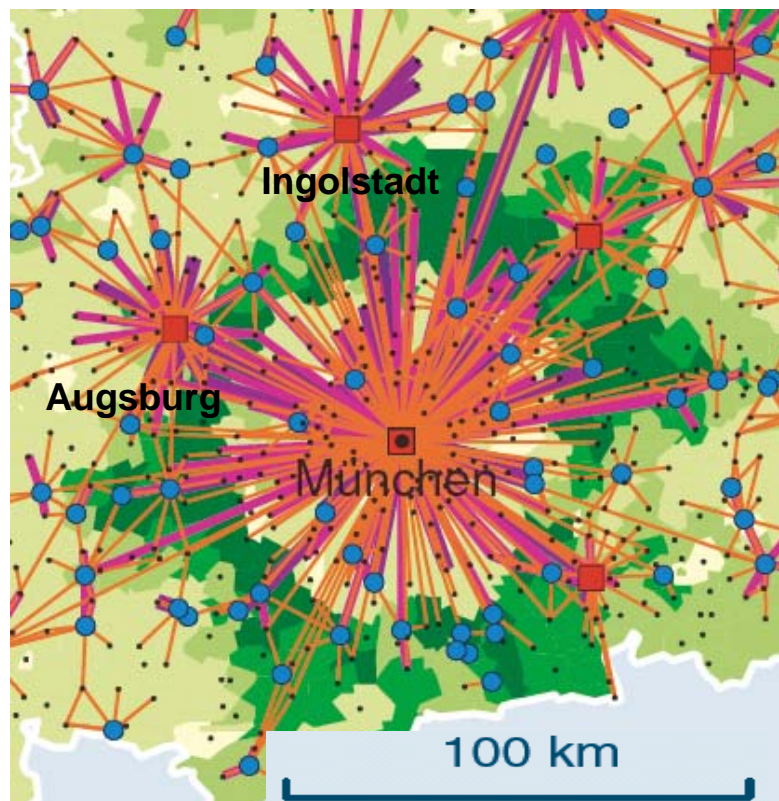


Figure 1: Commuter patterns in the monocentric Mega-City Region Munich
Source: BBR 2005: 79



Photo 1: Soft location factor - View at the lake of Starnberg, about 25 min km from the City-Centre Munich (W. Kufeld)

However, like in most other European MCRs there are challenges to consider:

- Urban sprawl continues. From 1988 to 2004 the surface area used for settlement and traffic rose by approximately 24%. The population figures rose as well, but only by 8% in the same period. A good portion of this growth occurred at places like small communities between the axes with poor quality of public transport (Data: BayLfST). This development is against the objectives of the current regional plan. As a result it is no surprise that traffic in the region is generally increasing. Thus the quality of air does not qualify the minimum EU-Standards, already affecting the health of the people now. More Traffic is to be expected.
- Open spaces in the hinterland of the core city are dissected by infrastructure, losing its potential quality. Moreover a lot of workplaces emerge in the hinterland of the region weakening its monocentricity. This leads to a criss-cross commuter pattern (Goebel 2005: 111), difficult to handle by public transport.
- The described positive qualities of the region lead to immigration and a high demand in the residential market. High rents for dwelling and real estate has to be paid causing problems for a significant part of the population. Social disparities have increased in the last years and the gap between poor and rich is projected to widen even more, especially in the core of the agglomeration (LH München 2006: 19).
- MCRs compete in a global market. The worth of new technologies and innovation has a shortening half-life period. Therefore constant adoption to the global trends, permanent knowledge transfer and efficient respectively flexible organisation structures become more and more indispensable to succeed under these circumstances.

2.2 Institutional characteristics of the region

Official regional planning in the State of Bavaria is regulated by law. The communities in a circle of about 50 km from the city centre are grouped together in a "Regional planning association – Regionaler Planungsverband München" (for circumference see Figure 2) where mainly the local mayors control the planning process and adopt the binding regional plan ("Regionalplan"). The local authorities have the power to set up their own development plans in their territory as long as this fits into the framework of the regional plan and does not affect other communities in a negative way. The idea of the regional plan is to create coordination in the planning process at regional level and therefore achieve better results or to avoid aberrations.

There is a lot of criticism about the regional plan. Representatives of the Chamber of Commerce criticise that fast adequate decisions of firms are blocked because of this inflexible instrument. Representatives of organisations complain about the ineffectiveness of the plan.

The personal and financial capacity of the local planning authority in Munich is quite low compared to other regions in Germany (e.g. Stuttgart or Hannover). There are some voluntary initiatives and alliances like the "Greater Munich Area e.V.". This is an association aiming to improve co-ordination of development strategies of its members (regional planning associations, counties, single communities and cities, companies etc.) by bringing together local stakeholders and concentrate forces. The association organises joint marketing efforts, for example at the international real estate exhibition EXPO Real. Greater Munich Area offers a platform for advertising in the internet. Smaller in size, the Alliance of Northern Municipalities ("Nord Allianz") tries to better co-ordinate their interests and spatial development plans.

3 Project: “Spatial Development in the Mega-City-Region Munich

3.1. Study design

To understand the structures of the knowledge-based economy it is necessary to investigate their functional logic and the networks in which the firms interact. The project, funded by the City of Munich and the Munich International Airport Ltd., is analysing the networks of multiple-location firms and will measure the flows of information between business partners.

The results will generate knowledge about the degree of polycentricity in the MCR and the specific location pattern of firms in the advanced producer services (APS) and in the High-Tech-Sector. For the purpose of this study these sectors are subdivided via the international NACE-Classification into the following branches:

Table 1: Studied sectors, NACE-Code in brackets

Advanced Producer Services (APS) - Sectors	B. High-Tech-Sectors
1. Finance (65, 67.1)	1. Manufacture of pharmaceuticals (24.4)
2. Management Consulting (72, 74.13, 74.14, 74.15, 70, 92.4)	2. Manufacture of electrical and optical equipment (30)
3. Accountancy (74.12)	3. Manufacture of electrical machinery and apparatus (31)
4. Insurance (66, 67.2)	4. Manufacture of radio, television and communication equipment and apparatus (32)
5. Law (74.11)	5. Manufacture of medical, precision and optical instruments, watches and clocks (33)
6. Logistics (60.24, 61, 62.1, 62.2, 63.2, 63.4, 64.1)	6. Manufacture of aircraft and spacecraft (35.3)
7. Advertising (74.4)	--
8. Design (74.2)	--

3.2. Setting up the study area

What spatial extent does the MCR of Munich have? This question cannot to be answered seriously in just drawing a line on a map. It is always dependent on the purpose of the analysis. However, analyzing flows in MCR always implicates the question of its extent (Thierstein et. al. 2003). A classic approach to define the hinterland of a city is regarding the daily commuter flows of the workforce into the centre. If more than a certain percentage of the working population of a community is commuting to a bigger centre or the primate city of the MCR we can assign the community to this centre because of its functional relation. However it is not easy to decide which limit to use for the decision. Nevertheless the German Federal Office for Building and Regional Planning (BBR) assigns areas/municipalities to a city if at least 25% of the workforce is commuting to the centre (BBR 2004).

A previous research project about the Greater Munich Area analysed commuter data. The resulting map indicates that the territory of the regional planning association does not correspond well to these functional commuter relations (Goebel 2005).

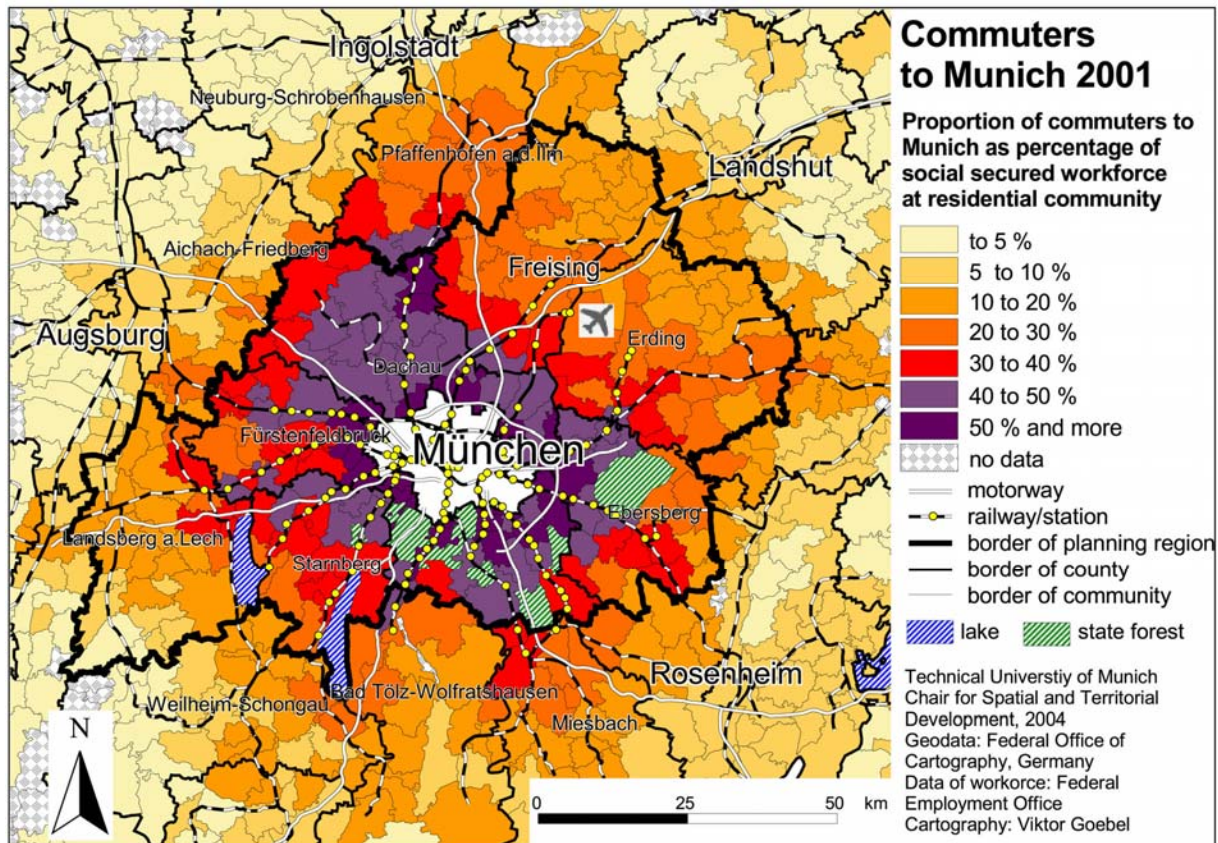


Figure 2: Commuters to Munich 2001. Thick black line: Circumference of the regional planning association

This approach gives an idea of the scope of functional commuter relations to Munich but it is not suited well enough for describing the entire MCR. Other important centres with metropolitan functions, connected to Munich or neighbouring centres should be included in the study.

But how to define a centre? Administrative city borders do not serve because they over- or underbound cities (Hall et al. 2006: 20). This means: The borders of the core city do often fail to include suburbs which are in many cases clearly connected and dependent to the core city. In this case they are from an analytical point of view more part of the city than an independent municipality. It is often difficult to distinguish suburbs from the city by morphological or socio-economic criteria as one wouldn't notice the border walking over it, unless there is a sign. In some cases suburbs have been assigned to their core city by a reform restructuring administrative borders (e.g. Leipzig in 1994 and 2000), in other cases not. Therefore the POLYNET study utilised the following more objective criteria, which were derived from the European Metropolitan Areas Comparative Analysis – GEMACA, to define MCRs. The first step is to define an Functional Urban Area (FUA):

1. Cores: using the NUTS 5 – Units of the EU – defining cores on the criteria seven or more workers per hectare and minimum 20,000 workers in either single or in contiguous NUTS-Units.
2. Rings: defined on the basis of 10% or more of the residentially based workforce commuting daily to the core. Overlapping rings: The municipality with the bigger share to a centre is assigned there.

The second step is to define the MCR. The main criteria is the contiguity of FUAs connected to the MCR (Hall et al 2006: 20). As no other real important metropolitan area is nearby and most of the neighbouring FUAs are clearly connected to Munich we decided to include all FUAs identified by the ESPON 1.1.1 final report (ESPON 2004) in a circumference of approximately 80 km and adding the FUA of Regensburg (Figure 3). The delimitation between the FUAs is in most cases congruent with borders of the counties ("Landkreise"). Some checks in parts of the study area show that the result does not differ substantially from the original GEMACA method.

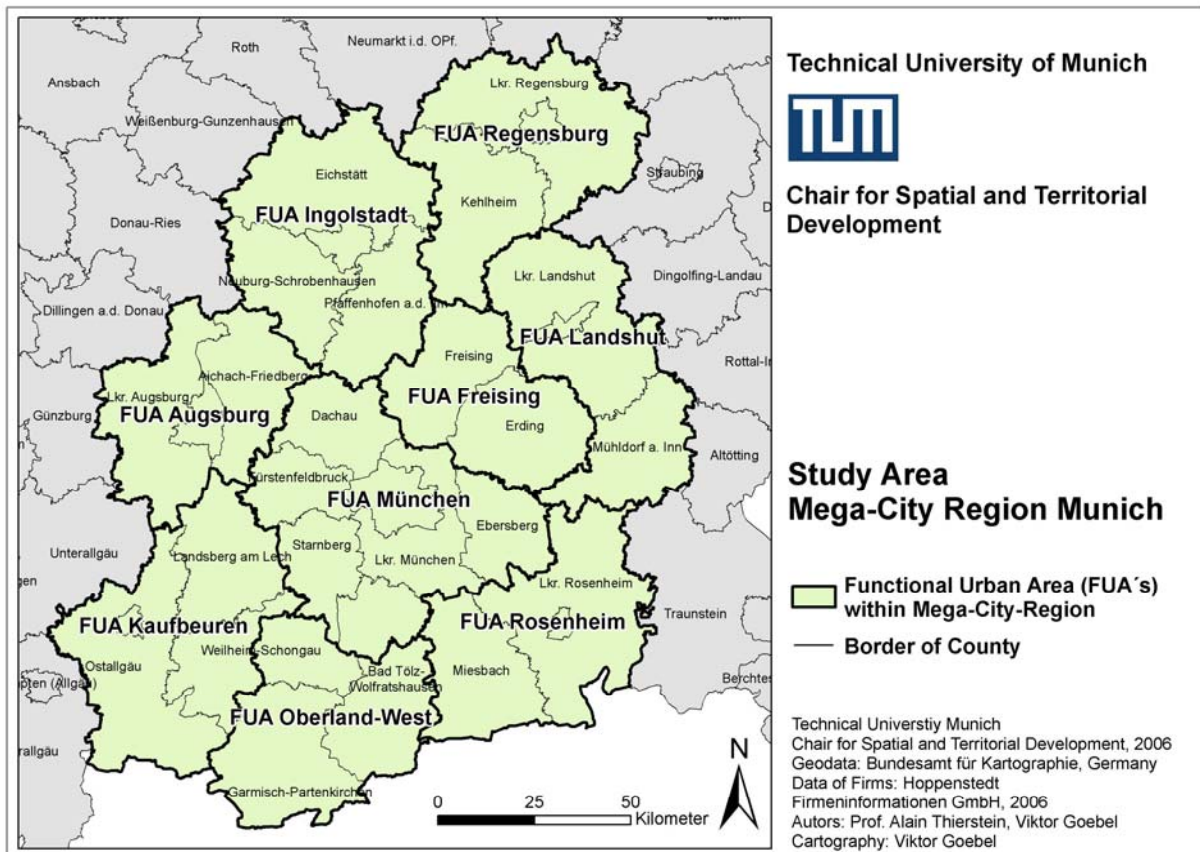


Figure 3: Study Area of the Project: Spatial development in the Mega-City-Region of Munich

3.3 Quantitative Analysis of intra-firm networks

The analysis of intra-firm networks is based on the methodology of the Globalisation and World Cities Study Group (GaWC). The assumption underlying this methodology is that firms of the knowledge-intensive economy create a network with their location of offices which reproduces the economy (Taylor 2004). The accumulated flows of information and goods in this network are a good indicator to measure the importance of the nodes – the cities.

The model is constructed with a matrix of firms and cities (Table 2). All Office locations are rated at a scale from 0 to 3. The standard value (v) for a cell in the matrix is 0 (no presence) or 2 (presence). If there is clear indication that a location has a special relevance within the firm network (headquarter, supra-office functions) its value is upgraded to 3. If the overall importance of a location in the firm-network is very low (e.g. small agency in a small town) the value is lowered to 1.

The assumption is that the degree of information flows can be modelled by this table. A headquarter creates a higher number of interactions than a smaller location. More interaction means more potential new information and innovation.

In the next step the basic relational element is regarded for each pair of cities (a and b) of a certain firm j:

$$r_{abj} = v_{aj} * v_{bj} \text{ (elemental interlock)}$$

The two values are multiplied. The aggregate city interlock is then produced as the sum of all other firms (sum of all elemental interlocks) which have a connection between these two cities (a and b) as well.

$$r_{ab} = \sum r_{abj} \text{ (city interlock)}$$

The sum of all city interlocks with the other (i) cities is the interlock connectivity.

$$C_a = \sum r_{ai} \quad (a \neq i)$$

If we relate that value C_a to the primate city in the FUA C_p we get an idea about their relative relevance in the network and an idea about polycentricity. So the resulting values of relative connectivity (C_a/C_p) are between 0 and 1. This method is good for use in a regional, national, European or global scale. We are doing this in the study.

Table 2: Matrix with values of relevance of an office location from 0 to 3 for m Firms in n cities

	Siemens AG	Firm2	Firm3	...	Firm m
Munich	3	0	1	...	2
Amsterdam	2	2	3	...	2
....	
City n	2	1	1	...	2

The GaWC-Method is only an approximation to get to grips with the complex interrelationships and connectivity of intra-firm networks and decisions on office locations. But it's results in previous studies are quite impressive and convincing (e.g Taylor 2004, Hall & Pain 2006).

The list of the firms to be under examination is derived from the Hoppenstedt database, a commercial data provider. Additionally the list is improved by checking websites of associations for the several economic sectors and information from the Chamber of Commerce of Upper Bavaria. The information about their locations and their relevance is obtained mainly through the websites of the firms.

The process implies subjective decisions while evaluating the locations. However this work is done by the same person for all the branches in order to secure similar assessment.

3.4 Qualitative analysis of flows

A further module in the project will be the qualitative analysis of business connectivities and interrelationships in the High-Tech- and APS-Sector. We want to gather direct information about the flows by intensive face-face interviews with managers of the analysed sectors, a web-survey looking at the value chains of firms and the use of travel diaries

The semi-structured interviews will ask about the location strategy of the firm, the scale (regional, national, European, global) of their labour market, personal perceptions of the MCR

Munich, character of communication structures, the role of face-to-face contacts and furthermore related topics.

These semi-structured interviews will be supplemented by a standardized Web-Survey aiming to analyse more systematically the quantitative and qualitative flows like destinations of telephone calls, e-mails, video conferencing and business travels. This information shall be gathered by a web-based travel diary to be completed by the management.

3.5 First findings

Since the analysis of the office locations is not finished yet, findings have only preliminary status:

- A first check of all the firms with more than 20 employees (including firms with only one location and therefore without a network) produce a monocentric location pattern in the MCR. This is true for the APS-Sector as well as for the High-Tech Sector (Figure 4 and 5), but the APS-Sectors shows a stronger monocentricity than the High-Tech-Sectors or all sectors together – if we just compare the pure numbers. However, in order to calculate the degree of polycentricity the GaWC-Analysis needs to be completed.
- The (sub-)sector matters! So for example the location pattern of the branches management consulting and design are much more concentrated in Munich than other APS- or the High-Tech-Branches. In some branches like pharmacy we recognize patterns for nearly all leading firms to cover the world market via their network. In other branches – e.g. design – a dominant proportion of regional-oriented firms were identified. In the branch of air- and spacecraft-industry cooperation and consortia meet the demand of complex orders in times with a high division of labour.
- Especially the large international oriented firms tend to locate in the FUA Munich and have in most cases no other location in the MCR of Munich. Again this is true for the APS-Sectors more than the High-Tech-Sectors.
- Firms with main locations in the remaining FUAs of the MCR of Munich often have only nationwide networks. This is true for both sectors and underlines the hypothesis of a functional division of labour in the Mega-City-Region.

It has to be stressed that these findings about spatial distribution of firm locations are not representative in a statistical sense; they represent the location patterns of firms with more than 20 employees.

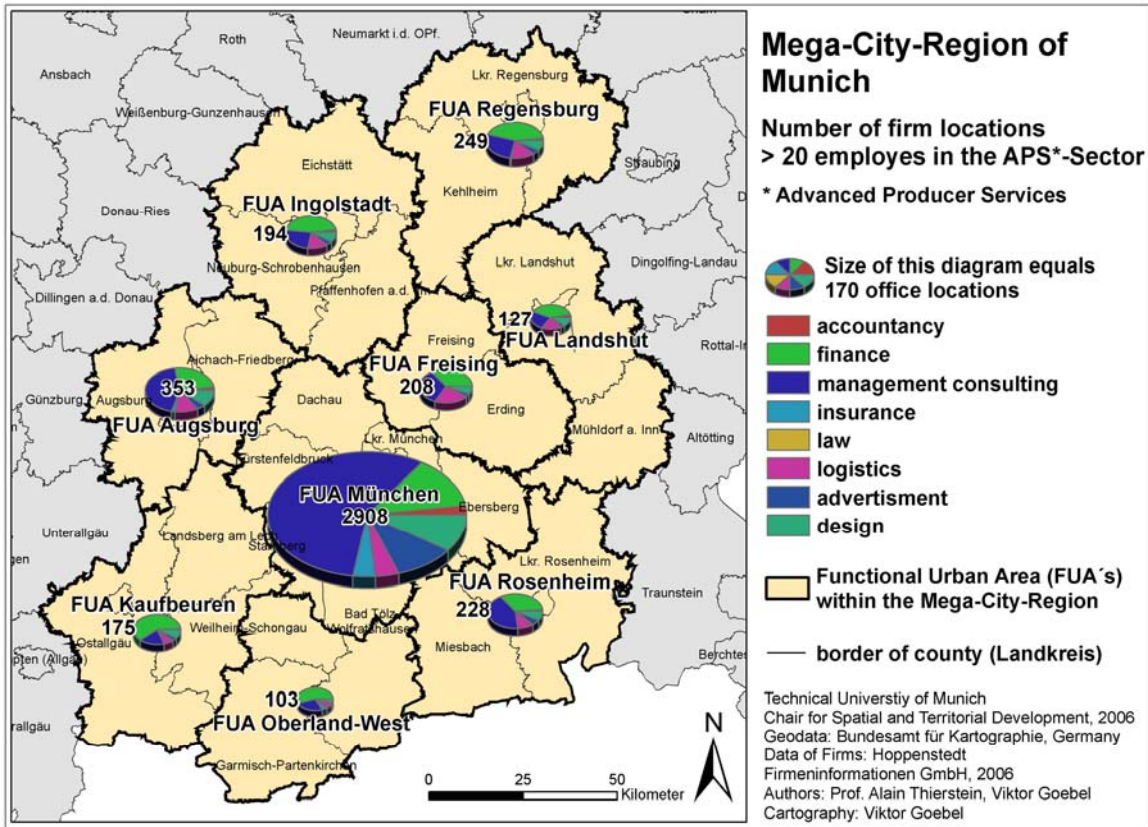


Figure 4: Spatial distribution of office locations of the APS (Advanced-Producer-Services)-Sector in the Mega-City-Region of Munich

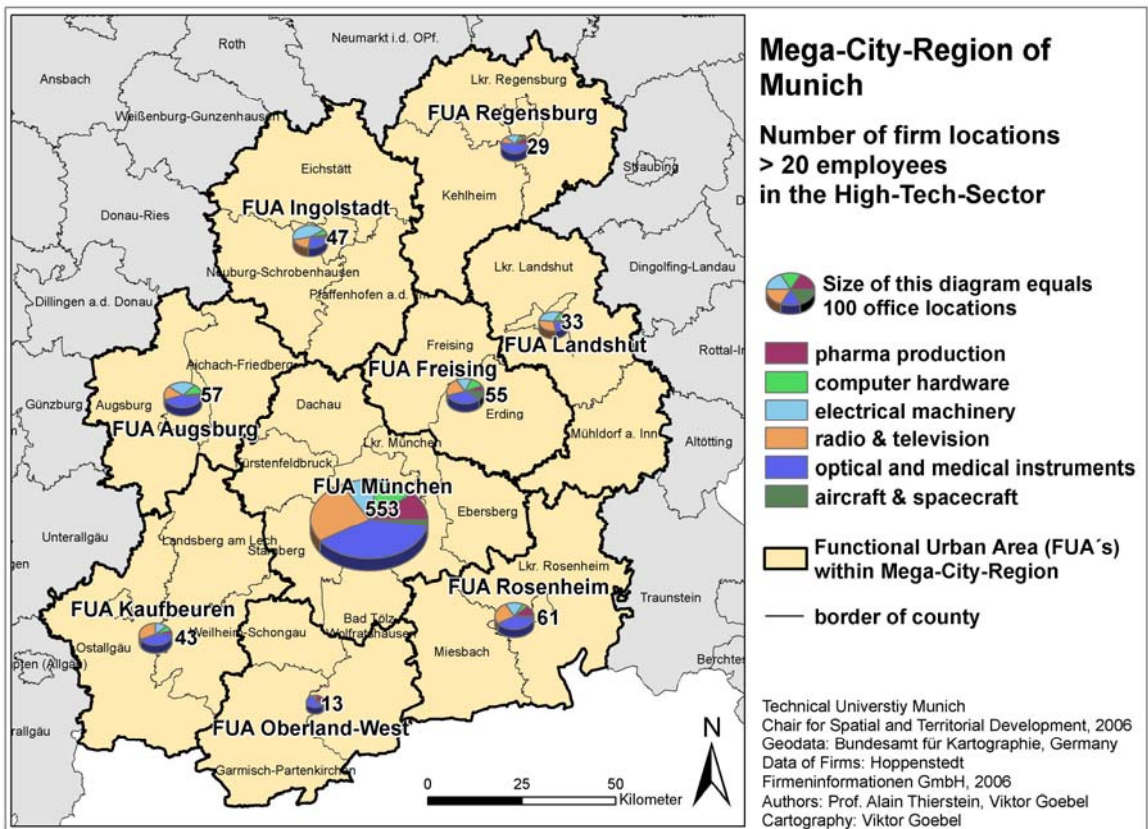


Figure 5: Spatial distribution of office locations of the High-Tech-Sector in the Mega-City-Region of Munich

4 Preliminary conclusions

The first results show doubtless that the Mega-City-Region of Munich is a location of international relevance. Numerous firm networks operating at global scale could be identified. A lot of firms of the GaWC-100 dataset (Taylor 2002) – the most important firms in the world – are present in this region with at least one location. The City of Munich seems to keep the role as a vital urban core with important location factors for the firms of the APS-Sector within the MCR of Munich. From a global point of view: Munich is an important international location for business services and a node in the space of flows (Castells 1996).

The location pattern of firms in the High-Tech-Sector seems to differ from the pattern of the APS-Sector. This is not surprising when we take into account the high land-rents in the centre and the requirements in floor space of High-Tech production.

The physical commuter patterns show a wide extents. The inter-regional non-physical flows identified by GaWC-method reach even farer. And the national, European and global flows influence the development of the MCR of Munich too. The degree of interconnectivity of the FUAs in the region still has to be calculated and mapped.

What does these findings and conclusions mean in regard to our hypothesis?

The authorities and structures responsible for spatial planning in the MCR of Munich are not in line with current spatial development.

The territorial organisation of the MCR of Munich does not correspond to the analysed internal and external flows of the knowledge economy. Physical flows like commuter relations surpass significantly the circumference of the regional planning association as do the non-physical flows. So there is existing a gap between the territorial and the functional logic (Thierstein et. al. 2006). This mismatch is a challenge for policy. In a competitive world optimized organisational structures are of relevance to succeed as a MCR in the long run.

Non-physical flows like information and knowledge transfer can become physically recognizable. On the one hand they lead to economic growth, provide the population with jobs and therefore grant indirectly a certain standard of living. On the other hand they are thus indirectly responsible for urban sprawl and ecological threats. To achieve the goal of a sustainable spatial development it is important to pursue in studying the economic flows of firms and improve the perception of the networked MCRs at the local stakeholders.

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