

# POLYNET Action 1.2

## Quantitative analysis of service business connections



RhineRuhr

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## Quantitative Analysis of Service Business Connections

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### A. Introduction

The following gives an overview of the development of business services in the Mega-City-Region RhineRuhr, in the first part, and explains the selection of data sources as well as the data collection methods for creating the firm inventories, in the second part.

First of all it has to be pointed out that the cities and sub-regions of the Mega-City-Region RhineRuhr have no common history in economic terms, a topic which cannot be treated in greater detail here. For example, the famous “Ruhrgebiet”, in the northern part of the Mega-City-Region, which is made up of the former leading regional cluster of coal and steel works (cf. report Action 1.1, part 1), has followed a completely different economic development path from the cities of the “Rheinschiene”, namely Düsseldorf, Cologne, Bonn, Krefeld or Mönchengladbach. In spite of their different roots, however, all cities and sub-regions have experienced a deep structural change from the traditional manufacturing sector to a more service-orientated economy since the 1960s. Even though these structural changes are taking place in all the regions, their intensity and direction are relatively dissimilar. Because of this the current economic profile of the Mega-City-Region RhineRuhr demonstrates strong regional differences and related specialisations. This applies analogously for the distribution of business services.

As elucidated in the Action 1.1. report, the service sector in general and the knowledge-intensive business sectors in particular do have a higher share in the Mega-City Region RhineRuhr than in the rest of North Rhine-Westphalia (cf. Fig 9b, Action 1.1). Regarding the six selected economic cores, the spatial distribution of the knowledge intensive business sectors, represented here by the eight sectors which are crucial within the framework of POLYNET, varies from 24.7% (Düsseldorf), through 22.2% (Cologne), 17.0% (Bonn), 16.8 (Essen), 16.1% (Dortmund) to finally only 8.7% (Duisburg) in the year 2001 (cf. Fig. 9d, Action 1.1.).

Referring to Fig. 9e and 9f of Action 1.1, which illustrates the share of people working in these sectors for each FUR in 1991 and 2001, it becomes even more obvious that these differences apply similarly for the knowledge-intensive business service sector. The insurance sector, which is comparably strong in the FUR Cologne, is also distinctive to some extent for the FUR Dortmund. Furthermore the leading role of Düsseldorf in the advertising sector becomes apparent, whereas design and media have a comparably high share in the FURs Cologne and Essen. The sectors, which have to merged together due to data problems (see explanations Action 1.1, part 3), namely management consulting, law and accountancy, have a share of about 50% in almost each of the six FURs, an exception here being the FUR Cologne (cf. Fig. 9f, Action 1.1). The share of banking and finance is also relatively stable. In addition to this, both figures illustrate a huge increase in people working in these sectors from 1991 to 2001, which underlines the growing importance of the knowledge-intensive business sector for the economy of all six FURs representing the Mega-City-Region RhineRuhr.

For creating the firm inventories, the Hoppenstedt data base served as the main base. The advantages of this data base are that it is developed from the NACE Classification and it includes additional information about the firms, e.g. post and e-mail addresses, web-addresses, telephone numbers, statement of holdings and shareholders, capital, transaction volume as well as number of employees. In the first instance, this additional information have been very helpful identifying the firms, which were important for the analysis. As supplementary source, the Yellow Pages as well

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as other data bases (e.g. Chambers of Commerce, or Regional Development Agencies) have been consulted in order to check the results given by Hoppenstedt and to increase the sample size. During the preparation and implementation phases the professional support from experts of the chambers of commerce and the local development agencies has been of outstanding importance.

## B. Functional Geography of the Mega-City-Region

During the preparation and the implementation of Action 1.2 the exchange of ideas with regional economic experts has been essential. Discussion themes at round tables and also during the interviews included conceptual and substantial issues, such as the design of the survey, data collection methods and significance of the expected results as well as questions concerning the current and future distribution of business service in general and of knowledge-intensive business services in particular. In addition, the experience of the regional experts were very helpful in identifying the urban centres for detailed study.

The selection of urban centres for detailed studies was based on the distribution of business service sectors, the share of those sectors which are relevant for POLYNET in the several urban centres, and their significance in the business service economy of the Mega-City-Region RhineRuhr.

Regarding the current spatial distribution of business services in general within the Mega-City-Region RhineRuhr, the selection of urban centres for study becomes obvious. Düsseldorf and Cologne rank highest among the economic cores (cf. Fig. 9c and 9d in Action 1.1). Düsseldorf, the capital city of the state of North-Rhine Westphalia, leads in public administration, legal advice, advertising and accountancy. Moreover Düsseldorf constitutes the most important wholesale centre due to the fact that the only stock exchange market of North Rhine-Westphalia is located there. In comparison with Düsseldorf, Cologne is the main centre for insurance in the Mega-City-Region RhineRuhr and is even specialised in household service, including the fast growing media sector. Other sectors such as trade, health and information technology are strongly represented in Essen. Duisburg was chosen because of its specialisation as a transport and logistics centre of the Mega-City-Region RhineRuhr, as the biggest inland port world-wide is located there. Insurance, transport and logistics are also represented to some extent in the city of Dortmund, which has also strongly developed the knowledge-intensive sector, in particular microelectronics and software engineering. Bonn can be regarded as a specially interesting case as it constituted the former capital of Germany. Despite all negative economic prognoses after the removal of the national ministries to Berlin at the end of the 1990s and with the help of a huge amount of subsidies Bonn could show a positive economic development. Today Bonn is still specialised in political transaction services and has still as many employees working in administrative occupation in general as the capital city of Berlin (Knapp and Schmitt 2002).

The future development of the service business sector in the selected urban centres, as predicted by the regional experts of the chambers of commerce and the local development agencies interviewed for the study, illustrates a very differentiated picture with regard to the main sectors. Whereas the experts from the chambers of commerce of Dortmund aim to enlarge the sector of health and information technology, their colleagues from Essen plan to expand the environment technology sector and to some extent even health and information technology. The experts of the FUR Duisburg pointed out that the first aim for the future is the extension of the transport and logistics sector as well as material and steel grade technology. According to the interviewees from Düsseldorf it is of most importance in the future to advance the knowledge-intensive business sectors. They see a backlog of need mainly in the logistics sector, which in comparison to other cities in RhineRuhr is less developed. Compared to this the experts of the FUR Cologne regard the expansion of the media sector as most important for the future. The outstanding case here is Bonn, which has a high share of business services in general (cf. Fig. 9f in Action 1.1) and a clear profile as UN-location and scientific city and location of two significant large-scale enterprises (Deutsche Post AG and Telekom).

Considering both the current and expected future distribution of the business services sector within the Mega-City-

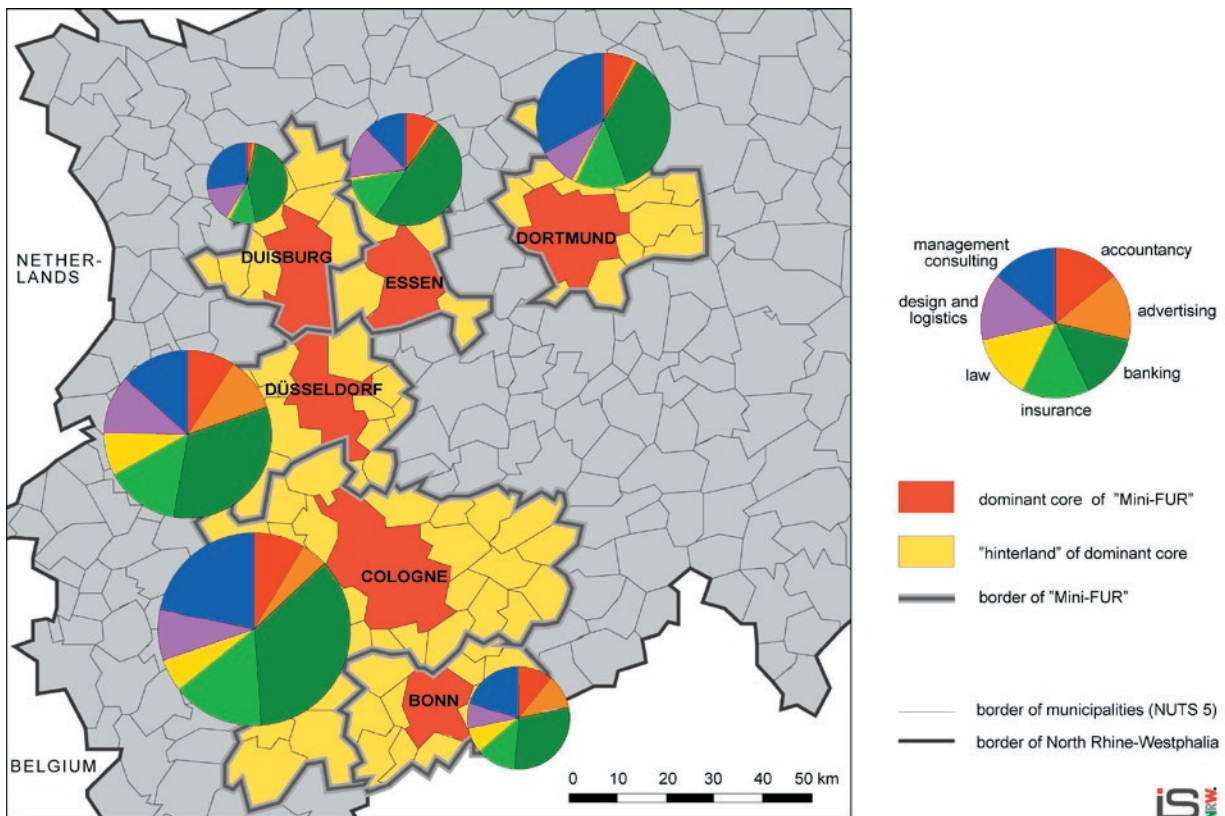


Figure 1: RhineRuhr Polynet sectors based on firms inventory

Region RhineRuhr, it becomes more obvious that different cities have different specialisations and perform to some extent different functions, which begins to suggest a developing functional polycentricity within the Mega-City-Region RhineRuhr. In spite of this, the economic climate as affirmed by the interviewees is marked by strong competition on different levels. Co-operation takes place only on certain projects for a given time, depending on the theme and the importance. The vast majority of the interviewees rejected the idea of a Mega-City-Region RhineRuhr in general. Co-operation takes place at the inter-municipal level at best, but not on the level of the entire Mega-City-Region (Fig. 1).

## C/D. Inventory of Firms/Classification of Firms & Data Matrix Creation

The purpose of this section is to confirm and describe the way firms were classified as well as the scoring practice used for the data matrix creation.

As mentioned in Section A, the Hoppenstedt firm-database served as the basis for a first data inquiry of existing firms in the Mega-City-Region RhineRuhr. In addition, Yellow Pages, other data bases as well as significant advice from regional experts and stakeholders were very helpful in identifying the firms for each urban centre, which were important for the analysis. This means also an exclusion of purely local firms. “Local” in the context of POLYNET means the immediate hinterland of the urban centre. A local firm that has only two offices, of which one is located in the urban centre and the other in the immediate hinterland of the urban centre, does not constitute a regional servicing function. This resulted in an inventory of service firms for each selected urban centre within the Mega-City-Region RhineRuhr, which defines the universe of firms in the study.

The selection of urban centres at the regional and national level, upon which the selection of the universe of firms is based, was carried out according to the following criteria. The regional centres first had to be located inside the Mega-City-Region RhineRuhr as defined in the study. Second, the economic cores must have a greater population

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than 100,000 inhabitants as well as 20,000 employees. The national centres are located outside the Mega-City-Region RhineRuhr and have met the criteria of more than 100,000 employees in 2000 (cf. Fig. 2). The urban centres at the European and non-European level were pre-determined by the Lead Partner. Starting from the universe of firms in a next step the web-pages of the selected firms were examined in order to find distinctive information about the importance of offices in a firms network. Additionally, if the website could not give clear results it was necessary to ask the firms (e.g. by telephone calls, e-mail requests) for further and more precise information about their firm network. All the given information from web-sites, firm brochures or firms internal directories are flown into the data matrix creation.

The scoring methodology pre-given by the Lead Partner allows four service values that indicate how important a city is within the operation of intra-firm network of offices. Thus the coding scheme, which is built up by these four service values, consists of 4 integers. 0 indicates that the firm has no presence in a city at all, 2 indicates a typical standard office for a given firm, 1 indicates a sub-office of a pre-given firm and 3 a superior office, which has some extra-location functions. Applying this methodology for RhineRuhr, the first step was to take each firm into turn and to indicate every city 0 (absence) or 2 (presence). After inspecting all the 2s, one have to decide if a presence warranted lowering to 1 or raising to 3. In most of the cases the websites and the additional material have given enough information to make these decisions, but in some cases it was rather difficult.

Office locations were rated with three points where they play a superior role in the hierarchy of the firm's strategy networks. Those with an international headquarters of a worldwide operating firm (e.g. Ernst & Young) received three points. National headquarters or headquarters with a regional importance and responsibility in the firm's network have received three points, whether or not some special responsibility could be analysed. To clarify this method an example will be given: An office in London which has overall importance and competence in the firm's network on the European market received three points as the headquarters in the case of the international operation is based in New York. Three points have been also given for those office locations which had overall competence in a country as the national agency of an enterprise.

Obviously this classificatory procedure was based on subjective decision making processes, which were analysed and discussed intensively. One consideration is subjectivity during the scoring process, which may lead to selection of a poor sample. Another difficult issue has been the pre-assigned list of European and non-European urban centres. In our view this lacks some important European and non-European urban centres, such as Rotterdam and Helsinki as well as middle-and east-European urban centres such as Bratislava, Bucharest or Riga. The latter would be particularly interesting, considering their emerging markets in general and their developments especially in the logistics sector. Moreover, according to our interviewees a number of firms located in RhineRuhr have strong relations to these urban centres. These urban centres have been named by our interviewees (cf. section B) as contact points of firms in RhineRuhr. Also, there is a lack of some powerful Asian and even African centres like Shanghai, Bangkok, Seoul, Kuala Lumpur, Cape Town, Johannesburg, Cairo, Nairobi and finally the economic centres situated on the Arabian Peninsula like Doha and Dubai. This means that our potential gathering of new knowledge about polycentricity is unfortunately constrained at the European and global scale (Fig 2).

## E. Geographical Scopes of Firms & Connectivities of Urban Centres

The FUR Cologne is by far the biggest in terms of population and employees, the FURs Düsseldorf, Essen, Dortmund and Duisburg are almost equal in size in terms of population (between 1.36 and 1.03 Million in 2001), whereas the FUR Bonn is small in comparison, including only slightly over 600,000 inhabitants. Regarding the numbers of employees contributing to the social insurance system, the differences are somewhat stronger: the FUR Cologne (almost 805,000 of such employees) followed by the FURs Düsseldorf (somewhat more than 600,000), Essen (411,000), Dortmund (almost 317,000), Duisburg (almost 285,000) and finally Bonn (almost 220,000) in 2001. The latter ranking is however not confirmed by our sample of all in all 297 scored business service firms. Here, the FUR Duisburg has

Figure 2 Regional & National Urban Centres

| Regional Urban Centres | National Urban Centres: |
|------------------------|-------------------------|
| Dortmund               | Aachen                  |
| Essen                  | Augsburg                |
| Duisburg               | Berlin                  |
| Duesseldorf            | Bielefeld               |
| Cologne                | Braunschweig            |
| Bonn                   | Bremen                  |
| Krefeld                | Chemnitz                |
| Mönchengladbach        | Dresden                 |
| Remscheid              | Erfurt                  |
| Solingen               | Frankfurt a. M.         |
| Wuppertal              | Halle                   |
| Velbert                | Hamburg                 |
| Viersen                | Hannover                |
| Wesel                  | Karlsruhe               |
| Dorsten                | Kiel                    |
| Herten                 | Leipzig                 |
| Marl                   | Magdeburg               |
| Recklinghausen         | Mainz                   |
| Bochum                 | Mannheim                |
| Hagen                  | München                 |
| Hamm                   | Münster                 |
| Herne                  | Nürnberg                |
| Witten                 | Saarbrücken             |
| Iserlohn               | Stuttgart               |
| Lüdenscheid            | Wiesbaden               |
| Menden                 | Aschaffenburg           |
|                        | Darmstadt               |

slipped a notch, as we could identify more business service firms in the FUR Bonn which have met our criteria (cf. Fig. 1). Another comment concerning this ranking can be seen between the FURs Essen and Dortmund. This is not necessarily a suggestion that in the FUR Dortmund the number of firms of interest is higher than in the FUR Essen; we had relatively good support with relevant firm data by the chambers of commerce in Dortmund (cf. section A and B).

Moreover, our sample represents a relatively balanced selection of the several sectors, which are crucial for our study. However, there are considerably more management consultancies and rather more banking and finance firms in comparison to the other sectors, so that the design and logistics sector is least well represented. Fig. 1 also confirms the different size of the representative six FURs.

To define sectoral specialisation between the six FURs is rather difficult by means of the sample of scored firms, as the number is very restricted and these firms had to meet certain criteria (cf. section C). However, it seems that service firms which deal with law consulting do have a setting rather in one of the FURs along the Rhine, namely Bonn, Cologne or Düsseldorf, than along the Ruhr, namely Duisburg, Essen or Dortmund. The same spatial distribution can be seen regarding the advertising sector, which, according to our sample of firms, is almost completely lacking in the FURs Duisburg, Essen and Dortmund.

The share of firms scored in the banking and finance, management consulting and in this case even the insurance sector, is relatively balanced in all of our FURs. The same can be identified for the design and logistics sector, even though we would have expected that the latter would be represented relatively strongly in the FUR Duisburg. Unfortunately we could not identify

many firms that meet our specific criteria for this survey.

The following figures illustrate the output of our scoring of all in all 297 business service firms at different scales. Through their intra-firm networks that is made up by their office locational strategies, these business service firms do connect one of our six FURs with at least one other FUR within RhineRuhr and/or another important economic core, and/or another important national, European or even Global City (cf. Fig. 2). In other words, these figures illustrate the geographical patterns of aggregated firms office networks across cities based on intra-firm relations. The different values of scoring (cf. section C) as well as the presence of a firms office in these FURs within the Mega-City-Region RhineRuhr and/or other cities give us an idea about the potential importance of a “city” based upon its sharing of firm’s offices with other cities (it is assumed that the flow between any pair of offices is approximately proportional to the product of office sizes/importance). Thus these aggregations produce inter-locking connectivities at different scales and answer the question as to how well connected is this city to other cities in terms of intra-firm service flows. Particularly in view of one of our key question within POLYNET, namely to learn more about polycentricity within an urban configuration at the regional level, the results of this survey may give us a better understanding of the likely geography of information flows, which are constituted by the physical presence and strategic importance of business service firms locations. Due to this, the more balanced oriented such flows of information are (knowledge, plans, advice, strategies, key personnel, instruction etc.) or the more balanced the relative importance of a set of cities is, respectively, the higher is the degree of polycentricity at the regional level in this respect (cf. Fig. 3a).

The following figures (3a and 3b) illustrate which FUR or important economic core is more or less embedded in service firms’ communication networks at the regional and national level.

It is very noticeable that all FURs have extremely high levels of connectivity at the regional and even national scales, which are all over 0.5. Even other economic cores such as Wuppertal, Bochum or Mönchengladbach (without

| Regional Connect | part 1 | part 2 | Total | relcunct |
|------------------|--------|--------|-------|----------|
| FUR Duesseldorf  | 2007   | 56     | 2063  | 1.00     |
| FUR Cologne      | 1949   | 84     | 2033  | 0.99     |
| FUR Dortmund     | 1820   | 42     | 1862  | 0.90     |
| FUR Essen        | 1793   | 50     | 1843  | 0.89     |
| FUR Bonn         | 1580   | 56     | 1636  | 0.79     |
| FUR Duisburg     | 1547   | 42     | 1589  | 0.77     |
| Bochum           | 1223   | 12     | 1235  | 0.60     |
| Wuppertal        | 1213   | 0      | 1213  | 0.59     |
| Mönchengladbach  | 1091   | 0      | 1091  | 0.53     |
| Krefeld          | 957    | 26     | 983   | 0.48     |
| Hagen            | 900    | 0      | 900   | 0.44     |
| Hamm             | 758    | 0      | 758   | 0.37     |
| Remscheid        | 748    | 0      | 748   | 0.36     |
| Solingen         | 748    | 0      | 748   | 0.36     |
| Recklinghausen   | 726    | 0      | 726   | 0.35     |
| Velbert          | 687    | 0      | 687   | 0.33     |
| Viersen          | 684    | 0      | 684   | 0.33     |
| Herne            | 682    | 0      | 682   | 0.33     |
| Wesel            | 664    | 0      | 664   | 0.32     |
| Witten           | 649    | 0      | 649   | 0.31     |
| Herten           | 646    | 0      | 646   | 0.31     |
| Lündenscheid     | 642    | 0      | 642   | 0.31     |
| Marl             | 563    | 0      | 563   | 0.27     |
| Menden           | 556    | 0      | 556   | 0.27     |
| Dorsten          | 486    | 0      | 486   | 0.24     |
| Iserlohn         | 431    | 0      | 431   | 0.21     |

| National Connectivity |      |     |      |      |
|-----------------------|------|-----|------|------|
| FUR Cologne           | 5394 | 371 | 5765 | 1.00 |
| FUR Duesseldorf       | 5328 | 276 | 5604 | 0.97 |
| FUR Essen             | 4263 | 186 | 4449 | 0.77 |
| FUR Dortmund          | 4262 | 82  | 4344 | 0.75 |
| FUR Bonn              | 3608 | 146 | 3754 | 0.65 |
| FUR Duisburg          | 3243 | 238 | 3481 | 0.60 |
| Wuppertal             | 2460 | 0   | 2460 | 0.43 |
| Bochum                | 2361 | 46  | 2407 | 0.42 |
| Mönchengladbach       | 2079 | 0   | 2079 | 0.36 |
| Krefeld               | 1689 | 70  | 1759 | 0.31 |
| Hagen                 | 1626 | 0   | 1626 | 0.28 |
| Hamm                  | 1251 | 0   | 1251 | 0.22 |
| Remscheid             | 1229 | 0   | 1229 | 0.21 |
| Solingen              | 1199 | 0   | 1199 | 0.21 |
| Recklinghausen        | 1094 | 0   | 1094 | 0.19 |
| Herne                 | 1016 | 0   | 1016 | 0.18 |
| Velbert               | 999  | 0   | 999  | 0.17 |
| Viersen               | 993  | 0   | 993  | 0.17 |
| Wesel                 | 973  | 0   | 973  | 0.17 |
| Witten                | 944  | 0   | 944  | 0.16 |
| Herten                | 936  | 0   | 936  | 0.16 |
| Lündenscheid          | 931  | 0   | 931  | 0.16 |
| Marl                  | 882  | 0   | 882  | 0.15 |
| Menden                | 869  | 0   | 869  | 0.15 |
| Dorsten               | 849  | 0   | 849  | 0.15 |
| Iserlohn              | 742  | 0   | 742  | 0.13 |

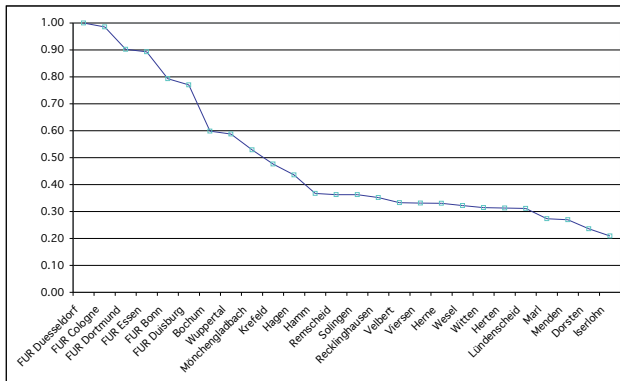


Figure 3a: Regional Connectivities

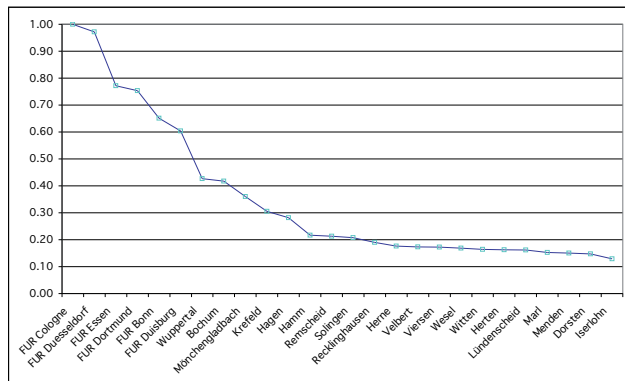


Figure 3b: National Connectivities

their respective rings!), score over 0.2, which can be considered as extremely balanced in comparison to other Mega-City-Regions studied in our project. Considering the connectivities at the regional and national scale, we can find out three pairs of FURs of almost the same values: Düsseldorf - Cologne, Dortmund – Essen and Bonn – Duisburg. Comparing to other Mega-City-Regions in our study, these values, which are standardised to the highest connected FUR, are on an extremely high level. One also needs to mention that the first named two pairs do change their ranks between the regional and the national scales.

By considering only the intra-regional linkages, it becomes obvious that these flows are however not as well balanced as the potential importance of Fig. 3a and 3b suggest. These linkages are only influenced by the locational strategy of those business service firms, which have at least two offices in the Mega-City-Region RhineRuhr and provide us with an impression of potential intraregional communication flows. Strong flows can be found between the following FURs: Essen - Cologne, Düsseldorf - Cologne and Düsseldorf - Dortmund (cf. Fig. 4).

A “secondary” network with somewhat lower intensive flows can be found between the FURs: Essen - Düsseldorf, Essen - Dortmund, Bonn - Düsseldorf and Bonn - Cologne. Apart from the relatively low linkages between Bonn - Essen and Bonn - Dortmund, five FURs (excluding the FUR Duisburg) constitute a kind of “strongly interlocked pentagon” (cf. Fig. 5). Only the FUR Duisburg shows comparatively low linkages to all other FURs constituting this pentagon. Nevertheless, the overall regional interconnectivity is relatively strong between all the FURs, although Duisburg has the lowest overall scores, but all of these connectivity values are at least 0.2. Consequently, in comparison to the other Mega-City-Regions in the framework of POLYNET, RhineRuhr is the only one that shows a totally interlocked intraregional city network, constituted by six FURs with connectivity values of at least 0.2.

The next, and the only one which comes relatively close to RhineRuhr, is the functional intraregional network of

| European Connectivity |      |     |      |      |
|-----------------------|------|-----|------|------|
| FUR Duesseldorf       | 3192 | 570 | 3762 | 1.00 |
| FUR Cologne           | 2049 | 264 | 2313 | 0.61 |
| FUR Essen             | 1533 | 33  | 1566 | 0.42 |
| FUR Dortmund          | 1347 | 50  | 1397 | 0.37 |
| FUR Bonn              | 1050 | 24  | 1074 | 0.29 |
| FUR Duisburg          | 849  | 62  | 911  | 0.24 |
| Wuppertal             | 665  | 0   | 665  | 0.18 |
| Bochum                | 586  | 0   | 586  | 0.16 |
| Krefeld               | 482  | 24  | 506  | 0.13 |
| Mönchengladbach       | 462  | 0   | 462  | 0.12 |
| Hagen                 | 403  | 0   | 403  | 0.11 |
| Soilingen             | 346  | 0   | 346  | 0.09 |
| Recklinghausen        | 336  | 0   | 336  | 0.09 |
| Velbert               | 306  | 0   | 306  | 0.08 |
| Herne                 | 294  | 0   | 294  | 0.08 |
| Marl                  | 278  | 0   | 278  | 0.07 |
| Witten                | 278  | 0   | 278  | 0.07 |
| Herten                | 272  | 0   | 272  | 0.07 |
| Viersen               | 270  | 0   | 270  | 0.07 |
| Remscheid             | 266  | 0   | 266  | 0.07 |
| Wesel                 | 266  | 0   | 266  | 0.07 |
| Dorsten               | 266  | 0   | 266  | 0.07 |
| Hamm                  | 266  | 0   | 266  | 0.07 |
| Lündenscheid          | 266  | 0   | 266  | 0.07 |
| Menden                | 266  | 0   | 266  | 0.07 |
| Iserlohn              | 226  | 0   | 226  | 0.06 |

| Global Connectivity |      |     |      |      |
|---------------------|------|-----|------|------|
| FUR Duesseldorf     | 3328 | 674 | 4002 | 1.00 |
| FUR Cologne         | 2082 | 222 | 2304 | 0.58 |
| FUR Essen           | 1537 | 10  | 1547 | 0.39 |
| FUR Dortmund        | 1336 | 28  | 1364 | 0.34 |
| FUR Bonn            | 1020 | 4   | 1024 | 0.26 |
| FUR Duisburg        | 852  | 24  | 876  | 0.22 |
| Wuppertal           | 664  | 0   | 664  | 0.17 |
| Bochum              | 604  | 0   | 604  | 0.15 |
| Krefeld             | 518  | 4   | 522  | 0.13 |
| Mönchengladbach     | 472  | 0   | 472  | 0.12 |
| Hagen               | 418  | 0   | 418  | 0.10 |
| Soilingen           | 368  | 0   | 368  | 0.09 |
| Velbert             | 337  | 0   | 337  | 0.08 |
| Recklinghausen      | 310  | 0   | 310  | 0.08 |
| Herne               | 310  | 0   | 310  | 0.08 |
| Marl                | 306  | 0   | 306  | 0.08 |
| Witten              | 306  | 0   | 306  | 0.08 |
| Viersen             | 292  | 0   | 292  | 0.07 |
| Herten              | 290  | 0   | 290  | 0.07 |
| Remscheid           | 288  | 0   | 288  | 0.07 |
| Wesel               | 288  | 0   | 288  | 0.07 |
| Dorsten             | 288  | 0   | 288  | 0.07 |
| Hamm                | 288  | 0   | 288  | 0.07 |
| Lündenscheid        | 288  | 0   | 288  | 0.07 |
| Menden              | 288  | 0   | 288  | 0.07 |
| Iserlohn            | 242  | 0   | 242  | 0.06 |

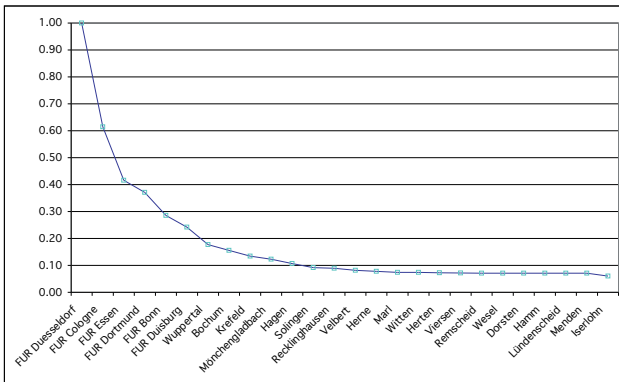


Figure 3c: European Connectivities

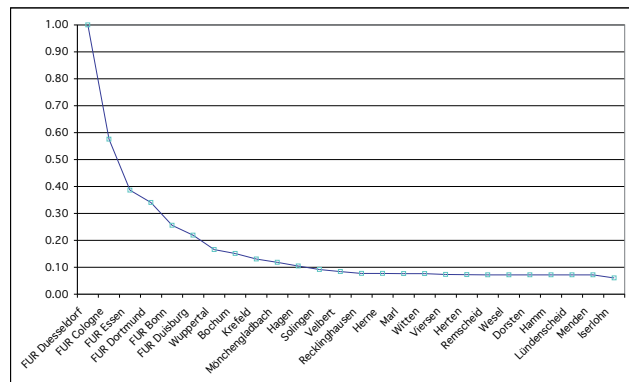


Figure 3d: Global Connectivities

the Randstad, which illustrates a somehow strongly interlocked tetragon constituted by the FURs Amsterdam, Rotterdam, The Hague and Utrecht. The other “study areas” show in this respect rather “monocentric” directed linkages within their intraregional networks.

This picture of a somewhat very balanced distribution of “connectivities” in the six FURs that represent the Mega-City-Region RhineRuhr and partly beyond (the other named economic cores, cf. Fig. 3a and 3b), is however almost turned upside down when looking at the European and global level (cf. Fig. 3c and 3d).

Now the FUR Düsseldorf functions as the by far most connected “place” through such networks constituted by our sample of business service firms. Having been more important at the national scale than the FUR Düsseldorf, the FUR Cologne and naturally also the other four FURs do show a considerable gap with relation to the FUR Düsseldorf. Although this gap is observable at both scales, the European as well as the global, and is of almost the same magnitude, it shows very obviously that the FUR Düsseldorf is the by far most important place or node, through which “international flows of communication” are conducted. However, in comparison with the other study areas within POLYNET, the connectivity scores of the other FURs within RhineRuhr are comparatively high: for instance, the second-ranked one, Cologne, shows a value of over 0.5.

This is also verified by the comparison of overall ratios (between the most connected and the second/third/fourth etc. connected FUR) in the eight Mega-City Regions, as RhineRuhr ranks generally in first place. Consequently, this geographic pattern of places and flows as related here to the six FURs of the Mega-City-Region RhineRuhr suggests that there is a very high degree of polycentricity and that there also might be some moderately strong linkages to the other economic cores.

## F. Considering Polycentricity

As elucidated in section D, the Mega-City-Region RhineRuhr together with the Randstad seem to be the only two of our study areas with a high degree of polycentricity. RhineRuhr is unique among all of the regions investigated in the POLYNET study, as it shows strong linkages in a polycentric network between a considerable number of urban centres (FURs and/or economic cores). Although this network is dominated in terms of international information flows by the FUR Düsseldorf, it demonstrates a very high degree of balanced polycentricity in national and regional respects (cf. Fig. 3a and 3b). Consequently, in line with the quantity of linkages at the intra-regional scale (cf. Fig. 4), one can conclude that the urban network of RhineRuhr is in this view an outstanding example for a high degree of complementarity.

It is interesting in this regard to notice that business organisations do not consider the Mega-City-Region as such an urban network (cf. section D). A much more broader oriented investigation in 2000 took on board also the views of other key actors (planning officers at the local and regional level, representatives of regional agencies and state ministries, research institutions and universities etc.), but, however, with the same “poor” result (cf. Schmitt & Knapp 2001).

However, even though we have gained an idea about such urban networks by means of this relatively simple survey within Action 1.2 as well as our rather mathematical calculations and analysis based on commuting data within Action 1.1, which yielded certain numbers on such specific kinds of personal movements, one should not overestimate the results of these two approaches.

The web-survey (Action 2.2.) will hopefully give us a much more differentiated view on these “virtual networks”. Not only will the quantity of information flows will be illuminated somewhat more completely, but we will also get an

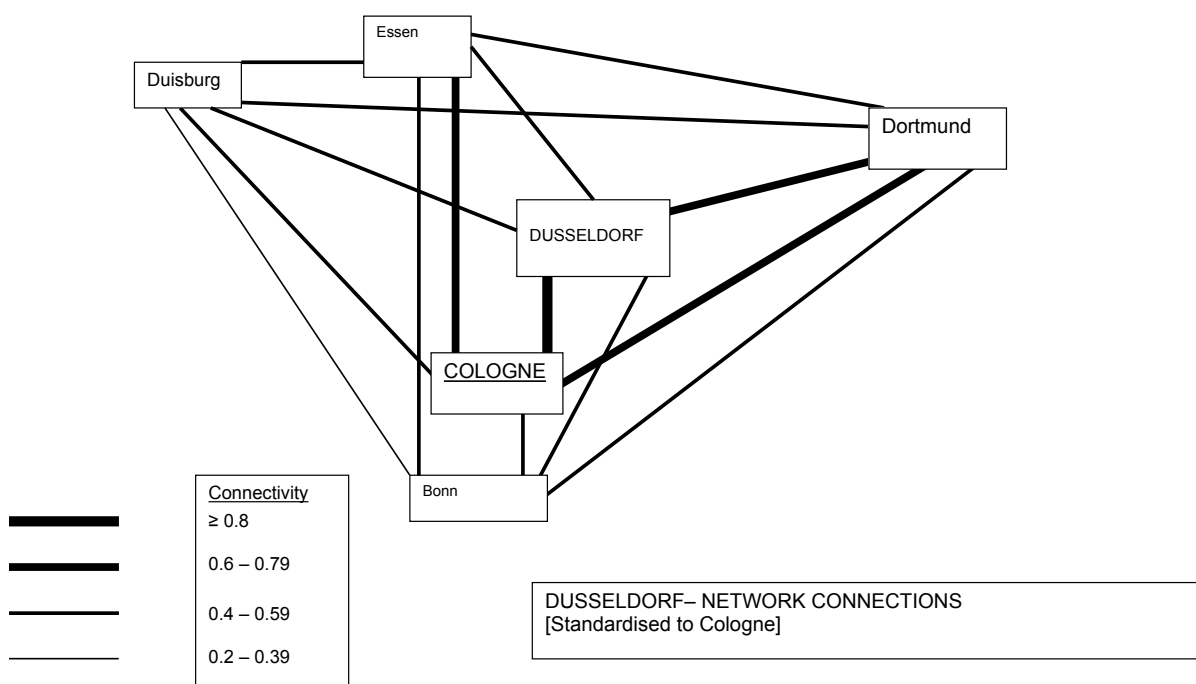


Figure 4: Dusseldorf network connections standardised to Cologne

impression of the different kinds of such flows and their exact geographic scope. However, such flows are embedded in and produced through strategic business planning. Thus our firms’ interviews (Action 2.1) are crucial in this respect. With regard to the Mega-City-Region RhineRuhr we expect to learn more about the perception of that region as a certain “complementary urban configuration” that will prove critical for forward-looking strategies in the sectors of interest. In other words, it will be interesting to discover how far the Mega-City-Region RhineRuhr as such plays a

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vital role in strategic business planning today, which might possibly question the views earlier quoted from stakeholders (see above). Is such an urban network really a locational advantage and, if so, how will this be enumerated by the interviewees? Additionally, we need to learn much more about the quality of the connectivities and linkages that constitute these networks, that are still rather virtual than actual and tangible. How do such firms really use those networks? How are these “likely” information flows conducted and what kind of changes have been seen or are expected in the future? Those thorny, but very vital, issues will be hopefully assessed more thoroughly by means of our interviews within Action 2.1.

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## G. References

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