



Fraunhofer Institute
Systems and
Innovation Research

Working Papers Firms and Region
No. R2/2004

**On the significance of geographical
proximity for the structure and devel-
opment of newly founded knowledge-
intensive business service firms**

Thomas Stahlecker
PD Dr. Knut Koschatzky

ISSN 1438-9843



Fraunhofer Institute
Systems and
Innovation Research

Contact:

Fraunhofer Institute for Systems
and Innovation Research (Fraunhofer ISI)
Department "Innovation Services
and Regional Development"
Breslauer Strasse 48
D-76139 Karlsruhe
Telephone: +49 / 721 / 6809-138
Telefax: +49 / 721 / 6809-176
e-mail: c.schaedel@isi.fraunhofer.de
URL: www.isi.fraunhofer.de/ir/departm.htm

Karlsruhe 2004
ISSN 1438-9843

| Contents | Page |
|---|-------------|
| 1 Introduction | 1 |
| 2 Theoretical considerations: Geographical proximity, regional ties and the development of newly founded KIBS..... | 4 |
| 3 Factors affecting the development of KIBS: The empirical research | 7 |
| 3.1 Data and methodology | 7 |
| 3.2 Selection of the indicators..... | 8 |
| 4 Empirical Results | 9 |
| 4.1 Structural firm characteristics: Sectoral view, R&D and innovation activities, importance of regional market | 10 |
| 4.2 Factors related to the entrepreneur of KIBS | 12 |
| 4.3 Factors related to characteristics of the KIBS firm | 13 |
| 4.4 Factors related to the regional environment | 15 |
| 5 Synthesis of results | 16 |
| 6 Concluding remarks..... | 17 |
| Acknowledgements | 18 |
| References | 18 |

Tables

| | | |
|----------|---|----|
| Table 1: | Chosen indicators with relation to KIBS growth..... | 9 |
| Table 2: | Regional turnover with relation to selected characteristics of firm and region..... | 11 |
| Table 3: | Entrepreneur-related factors and employment-growth 1996/2000-2003 | 13 |
| Table 4: | KIBS characteristics and employment growth 1996/2000-2003..... | 15 |
| Table 5: | Regional environment and employment growth 1996/2000-2003..... | 16 |

Abstract: A key feature of the knowledge-based economy is a remarkable increase in the number, foundation rates, and employees of knowledge-intensive business service firms (KIBS). KIBS are knowledge-intensive, in the sense that they are founded upon highly specialised knowledge. Based on the assumption that knowledge and knowledge organisation are tied to personal capabilities and information, spatial "proximity" to knowledge-providers and –users appears to be crucial in the development and growth process of KIBS. The idea that the region affects foundation activities primarily derives from a resource-based view. Different regional environments (e.g. configurations of incubator and intermediate organisations, regional "entrepreneurial social infrastructure") and the foundation pattern of KIBS are obviously interrelated. In addition to environmental factors affecting the development or growth of newly founded KIBS, factors related to the entrepreneur of KIBS and to characteristics of the KIBS firms have to be taken into consideration. Based upon a survey with founders of KIBS firms in three German regions, a selection of indicators will be used as determinants for new KIBS growth. Comparing the successful KIBS start-ups with those showing an employment decrease in the relevant time period, it has to be emphasized that KIBS with employment increase co-operate with other firms and institutions on all spatial levels, regardless of the function of the partner firms for the KIBS activities.

Keywords: KIBS – Region - Spatial proximity – Growth

1 Introduction

The increased use of the term "proximity" is recent, but it has long been important in economic literature, in particular with authors interested in the question of space, either in districts, milieus, technopoles, distance analyses or in the recent advances of economic geography. Interest has even gone beyond this field and has now touched works dedicated to the process of innovation, and the link between science and industry, relations between users and producers, national systems of innovation, innovative milieus or the development of newly founded companies in connection with a specific regional environment (Danson 2000). This new interest in the questions of proximity can be linked to a recent trend in economics, and in particular in spatial and industrial economics, which are more and more dedicated to the environment of enterprises. Research which used to focus essentially on independent firms and on the way they function internally has now turned towards the ensembles within which they are inserted, whether they are productive systems or networks of production, knowledge and innovation. The behaviour or development of firms is now explained to a great extent by their productive and institutional environment and by the relations of exchange, competition and co-operation which they maintain with other economic actors, often located at a short distance. Similarly in terms of spatial externalities, Papageorgiou/

Smith (1983) formulate the hypothesis that individuals have a fundamental propensity to interact and to seek social contact, considered as a basic human need which is not necessarily fulfilled in the market. Each agent benefits in this case from positive spatial externalities produced by others. The intensity of these externalities diminishes with distance. The need for contact is considered here as fulfilled by the physical proximity between economic agents. Recent studies apply the need of firms for contacts to the exchange of information and knowledge during the process of production or the demand and supply of knowledge-intensive services (Lo 2003). Information and knowledge is considered an impure public good whose conservation and acquisition are encouraged by the concentration of agents (e.g. knowledge-providers) in the same space.

However, applied to newly founded or young firms, the concept of spatial proximity is often attributed to the idea that a region – or location – matters to the foundation structure of a particular technology or knowledge sector (i.e. intensity, functionality, and quality) and to aspects of development or growth. This particular conception puts the emphasis on the importance of good starting conditions for new firms. Arguing from a regional development point of view, the survival or success of new firms appears to be more essential to a regional economy than merely the presence of a large number of new firms (Schutjens/Wever 2000). This seems to be valid especially for technology- and knowledge-intensive firms. It is argued here that the renewal or modernisation of regional innovation and production systems depends more and more on the ability to exploit endogenous technological and knowledge potentials via newly founded companies. New technology- and knowledge-oriented firms are able to contribute to the structural change as well as to growth of employment, income, and productivity.

Against this background, the 1990s have seen so-called knowledge-intensive business service firms (KIBS) being examined within the political as well as scientific debate (Almus et al. 2001; Meyer-Krahmer/Lay 2001; Strambach 1995). The KIBS sector can be characterised by a remarkable increase in the number of firms, firm foundation rates, and employees. KIBS are believed to be one of the main drivers of technical changes and economic progress (Czarnitzki/Spielkamp 2000). These developments combine several sub-trends – shifts in management philosophy (e.g. towards "leaner" firms, outsourcing of more functions, and towards a greater emphasis on customer relationships), structural shifts in the composition of demand, and unevenness in the application of new technologies to product and process innovation (Miles 2003). KIBS include *professional business services* (such as accountants and lawyers) and also services with a *scientific and technical knowledge base* (for instance, various types of engineering and information technology (IT) services).

Most of the research studies dealing with KIBS focus, for example, on innovation activities in the service sector in general (Miles et al. 1995), on the inter-relationships

between SMEs or the manufacturing sector and KIBS (Meyer-Krahmer/Lay 2001, Muller 2001), and on the importance of KIBS under aspects of regional economic development and structural change (Muller/Zenker 2001). Within entrepreneurship research, Almus et al. (2001), Engel/Steil (1999) or Santarelli/Piergiovanni (1995) made quantitative studies on KIBS foundations by carrying out econometric analyses on regional levels or by gathering determinants on the start-up intensity. These studies measure, for instance, start-up frequencies, sectoral structures, and regional distribution. Even though important factors with regard to start-up, survival, and growth processes have been identified by generating large statistical data; the results, statements, and determinants based on firm-level investigations have rather been the exception. Largely missing are in particular investigations dealing with inter-organisational relationships, aspects of spatial proximity within the development or growth process. On the basis of a very heterogeneous group of firms within the KIBS sector, various differences concerning the importance of proximity or the necessity of a geographical collocation to potential knowledge-users and -providers¹ can be assumed and therefore have to be proved separately from company to company.

The paper is organised as follows: In the next section (2), theoretical considerations with reference to the concept of spatial proximity and its application to the development/growth of newly founded KIBS are outlined. The chapter will highlight that the development or growth of newly founded firms depends on a broad range of factors that – reviewing the literature – can be classified into three groups, namely those related to the entrepreneur, the firm, and environmental factors. The database and methodology as well as the selection of the indicators will be briefly described in section 3 before presenting and analysing the empirical results in section 4. Some relevant structural characteristics of the surveyed KIBS are outlined first (4.1), followed by the analysis of factors related to the entrepreneurs (4.2), to characteristics of the KIBS firm (4.3) and to the regional environment (4.4). Chapter 4.4 will focus particularly on the importance of regional framework conditions with regard to the existence of potential co-operation partners. In chapter 5, a synthesis of the major results will be presented. Finally, some concluding remarks concerning unanswered questions and future perspectives will be given in chapter 6.

¹ Czarnitzky/Spielkamp (2000) remark that, while classical *technical services* like engineering consultants are closely interwoven with the manufacturing sector (manufacturing firms are their most important clients and source of information concerning innovations), *software and information services* and *consultancies* show broader patterns regarding these inter-linkages. *Professional business services* like business consultants or advertisers are more closely related to their suppliers.

2 Theoretical considerations: Geographical proximity, regional ties and the development of newly founded KIBS

When overviewing the theoretical and empirical literature that has been devoted to the identification of growth or success factors of new firms in general and technology-oriented firms in particular (Storey 1994; Brüderl et al. 1996; Nerlinger 1998; Brüderl/Preisendörfer 1998; Sternberg/Tamasy 1999; Schutjens/Wever 2000), three groups of factors affecting success or failure can be distinguished: (1) individual characteristics of the founding person, (2) characteristics of the new firm itself, and (3) characteristics of the environment of the firm.

For quite a while, the reasons for different start-up probabilities were primarily seen on the supply side and in the personality of the entrepreneur. Within this context the focus of the researchers was directed to the motivations and motives (of an entrepreneur) for a firm foundation. Implicitly, these factors mainly relate to human capital theory (Becker 1975). In the early stages or when the firm is still small, the strengths and weaknesses of the entrepreneurs can be equated with the strengths and weaknesses of the firm (Cooper 1982). Entrepreneur-associated factors as preconditions for success are, for example (see Brüderl/Preisendörfer 1996): years of schooling, years of work experience, industry-specific experience, self-employment experience and management experience.

The characteristics of the firm and its economic activities may also effect growth or development. According to the organizational ecology approach, specific founding characteristics (size, the presence of a business partner, start-up capital) will determine future firm growth (Brüderl et al. 1996). The so-called liability of newness (younger firms are more failure-prone) and the liability of smallness (smaller firms have lower chances of success) are the most prominent hypotheses (Freeman et al. 1983; Brüderl/Preisendörfer 1996; Audretsch 1990). Wagner (1984) points out that the relationship between R&D intensity and growth or development is not straightforward. Although intensive R&D efforts can improve the market opportunities (and thus the success), they can also lead to increased risks.

More recently, the demand side or factors "external" to firms and entrepreneurs gained importance. Compared to entrepreneur-associated and firm-associated factors influencing the development or success of start-ups, "external factors" (environmental factors) to firms and entrepreneurs have been less investigated in entrepreneurship research (for an overview of relevant literature, see Malecki 1997; Sternberg 2000). Thus, the development or growth of new firms is much more dependant on the regional environment than for large firms. Regional factors correspond substantially with aggregated factors such as urbanization and agglomeration (i.e. number of other innovative or technology-oriented firms, economic prosperity and demand, degree of moderniza-

tion of the regional economy, public R&D infrastructure), availability of space, infrastructure and business networks (Reynolds et al. 1994; Storey 1994). The idea that region – or location – matters to growth primarily derives from the resource-based view in economic geography: this particular conception stresses the importance of good regional starting conditions for new firms. According to the incubation theory, regions with a specific mixture of existing (large and small) companies, R&D institutions (e.g. universities, non-university research facilities), private and public service institutions (e.g. finance and consulting) provide a more favourable breeding ground for the creation, survival and success of new firms (Bathelt/Glückler 2002). For example, newly founded innovative or knowledge-intensive firms are more successful, the more important existing relationships with regional universities/research institutes and the supply of qualified employees were for the location choice. Sternberg (2000) points to the importance of spatial proximity within the firm foundation (spatial immobility of the founder through job-related or private ties) and identifies high-grade networks (e.g. egocentric networks) as key elements of a regional "entrepreneurial social infrastructure".²

With regard to the early development process of KIBS, the specific characteristics of this particular type of firms in the shape of their knowledge orientation have to be considered. Strambach (2002) puts forward four main functions of KIBS in systems of innovation:

- the transfer of knowledge in the form of expert technological knowledge and managerial know-how,
- the exchange of empirical knowledge and best-practice from different branch contexts,
- the integration of the different stocks of knowledge and competencies existing in innovation systems, and
- the adaptation of existing knowledge to the specific needs of clients.

It is assumed that knowledge and knowledge management are tied to personal capabilities and information (know-how, know-who) and has therefore a geographical component (Foray/Lundvall 1996; Koschatzky 2001). "Tacit knowledge" in the form of business behaviour, routines, and attitudes is only available at certain locations where the respective learning processes can be realized. Storper (1995) formed the

² Regionally oriented social networks of entrepreneurs – which are crucial for the foundation of KIBS (in contrast to other ventures) – are difficult to classify into the categories "Entrepreneur-related factors" and "Factors related to the regional environment". On the one hand, social networks are a clear indicator for the entrepreneurial skills and are thus entrepreneur-related, on the other hand, social networks in the founding process of firms, especially with regard to knowledge-intensive foundations, are strongly oriented towards the region

term "untraded interdependencies". The economic advantages of untraded interdependencies such as commonly shared industrial conventions and business practices, or a culture of cooperation between economic agents, arise from local clustering and specialization. The latter are claimed to form part of a local nexus of relational assets playing a vital role in securing dynamic efficiency (Amin/Cohendet 1999). Due to the existence of tacit knowledge, Hausmann (1996) assumes that face-to-face communication is the most effective form of gathering information. Through learning-by-interacting, information and knowledge for innovations occur and will be transmitted or implemented.

In contrast to tacit knowledge, codified knowledge is – simply speaking – ubiquitously available, as it can be codified and standardized. The primary use of codified knowledge offers no or few regional competitive advantages (for a detailed description of the dualism between tacit and codified knowledge, see Gertler 2003 and Schamp et al. 2003)³. Koschatzky (2001) points out that according to the quality and the mixture of available codified and tacit ("embodied") knowledge, geographical "knowledge islands" (defined for example through labour markets) influence the production and innovation activities of the existing companies, as well as the willingness of the population to become entrepreneurs and founding new companies. Particularly with regard to less codified knowledge, it is generally assumed that "knowledge transverses corridors and streets more easily than continents and oceans" (Feldman 1994). Especially within the exchange process of implicit knowledge, the experience of common work and collocation is essential. Thus, geographical proximity is necessary for an efficient knowledge transfer.⁴

To summarize, we should be aware that the development or growth of newly founded firms depends on a broad range of factors that – reviewing the literature – can be classified into three groups, namely those related with entrepreneur, the firm, and environmental factors. Especially the last group gained in importance to explain firm foundation activities and performance of new firms. It is argued here that the location and integration advantages derive from the geographical proximity concept. For KIBS, the

³ For Hausmann (1996), "there is no doubt that under certain conditions spatial proximity may be advantageous for an intensive information flow. But (...) spatial proximity is neither a necessary nor a sufficient condition for a communicative interaction among actors. From this position, a sheer learning by 'being there', which is suggested by various approaches, seems to be rather naive and even spatially oversocialised. For these reasons, spatial proximity must be refused as a precondition for face-to-face communication."

⁴ Lo (2003) points out three distinctive features which are important for knowledge transfer: (1) in contrast to data and information, knowledge is bound to individuals and context, (2) the more implicit knowledge there is, the more difficult the transfer is without personal contact, (3) knowledge is limited to specific organisational and spatial territories; this may also be valid for codified knowledge.

proximity dimension with relation to knowledge orientation, acquisition, and transmission appears to be crucial. Based on the assumption that certain forms of knowledge (as a rule tacit and experience-based knowledge) are only available at certain locations where the connected learning process can be realized, spatial proximity to knowledge-providers (e.g. customers, suppliers, R&D institutions) is fundamental for the foundation and early development process of KIBS.

3 Factors affecting the development of KIBS: The empirical research

3.1 Data and methodology

Our research is based upon telephone interviews with the founders of recently set up KIBS in the German agglomeration regions of Bremen⁵, Munich, and Stuttgart. The telephone and address data derive from the firm registers of the Chambers of Industry and Commerce (IHK) of the respective regions. The KIBS sector has been delimited according to the mainstream of relevant KIBS publications (for an overview and discussion, see Stahlecker/Koch 2004), including firms classified under the NACE-Codes 72, 73 and 741-744.⁶ Furthermore, we only selected firms which were founded between 1996 and 2003.

Out of the adjusted population of 7,714 addresses⁷, a random sample, stratified by the 3-digit sectoral attribution, of 2,108 firms was drawn. Based upon that sample, 547 successful interviews were finally conducted. This means a response rate of nearly 26% - a quite moderate result, resulting in a satisfactory rate of return of 25.9%. The survey was carried out in October and November 2003. In principle, the founder of the firm was interviewed. In the case of firms founded by more than one person, one of

⁵ The region of Bremen is defined here as the city of Bremen (the state of Bremen consists of the city of Bremen and the "exclave" city of Bremerhaven) plus the surrounding areas in Lower Saxony. This is owed to the fact that the regions of Munich and Stuttgart also consist of the cities as well as the bordering districts, although only one Chamber of Commerce is responsible for the whole regions. With regard to the Bremen region, the Chambers of Commerce with districts bordering on the city of Bremen were contacted: Hanover, Oldenburg and Stade. This was primarily done in order to make the results comparable.

⁶ Some sub-sectors of 744 have been excluded. For example, a significant proportion (up to nearly 40% in Stuttgart) of firms was classified as "Management activities of holding companies" (7415) which we did not consider as KIBS and excluded from the basic population.

⁷ The sectoral distribution of the firms included in our dataset corresponds by and large to the data provided by the foundation panel of the Centre for European Economic Research (ZEW) which can be regarded as the most reliable and detailed data source for firm foundations in Germany.

these founders whom we were able to contact – and who was capable of answering our questions – was interviewed. In the case that no founder was available or belonging to the firm any more, which was the exception, a firm's manager was interviewed.

For the interviews, a standardized questionnaire was developed. The question program of our interviews required an average interview time of nearly 15 minutes. The first part of the interview concerned individual attributes of the founder (e.g. context of business idea, former occupation and location of workplace, skills etc.), the second part dealt with start-up characteristics of the firm and its development over time.

In order to handle the problem of different KIBS founding years in our database and therefore different time periods with regard to growth, we considered for this paper only firms founded in the years 1996 to 2000 (out of all founding cohorts 1996 to 2003). This procedure appears to be adequate as the firms founded between 1996 and 2000 survived the "critical three years" after foundation and therefore show other growth or development characteristics than the KIBS founding cohorts 2001 to 2003. Based on a database of 547 KIBS, 369 KIBS belong to the cohorts 1996 to 2000.

Our empirical results are based on a database of 369 original KIBS foundations in the years 1996 to 2000 in the regions of Bremen, Munich and Stuttgart. Original KIBS foundations mean that subsidiaries, branch offices, new firms arising from mergers & acquisitions and firm reformations have been excluded from the survey. The KIBS sector includes firms classified under the NACE-Codes 72, 73 and 74.1–74.4.

3.2 Selection of the indicators

Our database contains data about three potential success indicators, always at the end of the foundation year and at the end of 2003: size of turnover, number of personnel (incl. company founders) and number of freelancers. For a number of reasons we chose the indicator "growth in the number of employees between the year of foundation (1996-2000) and 2003" (including firm founders). Although employment growth is surely not a criterion directly reflecting financial performance, it definitely mirrors a secure growth path of new firms, since taking on personnel is a far-reaching decision and requires good business prospects. We argue that although firm success can be measured by different indicators, success and growth in small firms often goes hand in hand with employment growth. A more pragmatic reason for using "growth in number of employees" concerns the problems connected with the use of the turnover variable. This is due to the fact that the development of the turnover between the year of foun-

dation and 2003 could not be determined accurately in the database as it is measured in categories of different width.

Because of the multiplicity of growth indicators in the literature reviewed, it is difficult to obtain a straightforward picture of where the empirical research should be directed. The literature overview in chapter 2 showed that entrepreneurial, firm and regional factors can all help to explain the development/growth of the firms. According to this categorization, table 1 shows the selected indicators.

Table 1: Chosen indicators with relation to KIBS growth

| Indicators influencing firm growth | Operationalisation |
|---|--|
| Factors related to the entrepreneur of KIBS | Institutional context of the business idea Provenance of the founder (regional, extra-regional) Transfer of scientific and practical results from former occupation Regional "lead client" existing at the time of foundation |
| Factors related to characteristics of the KIBS firm | Employees with university degree R&D intensity Co-operating within the process of knowledge and technology transfer Demand for knowledge-intensive services from other KIBS |
| Factor related to the regional environment | Regional framework conditions at the time of foundation |

4 Empirical Results

In this chapter the empirical results of our investigation are outlined by presenting descriptive data. According to the research framework presented in section two, the empirical analysis will cover the following aspects:

- Structural firm characteristics,
- Factors relating to the entrepreneur of KIBS,
- Factors related to characteristics of the KIBS firms,
- Factors related to the regional environment.

4.1 Structural firm characteristics: Sectoral view, R&D and innovation activities, importance of regional market

As the KIBS sector is very heterogeneous, the *sectoral distribution* of the interviewed KIBS should be described first. Although the foundation intensity (KIBS foundations per 1,000 employees) in the three regions differs considerably⁸, the foundation pattern corresponds basically with the sectoral distribution of all newly founded KIBS in the years 1996-2003. Thus, based on a stratified random sample (cf. chapter 3), the existing database is considered to be representative. Applicable for all regions are the founding activities in the group of "Legal activities, tax consultancy, market research, business and management consultancy" (74.1), followed by 74.2 ("Architectural and engineering activities, related technical consultancy") and 72.2 ("Software consultancy and supply"). Regional differences have to be noted with regard to the groups of "Hardware consultancy" (72.1) and "Other computer-related activities" (72.6). Also worth mentioning is the over-representation of KIBS with business activities within the advertising branch (74.4) and within the group of "Research and experimental development on natural science and engineering" (73.1).⁹

The amount of *research and development* (R&D) activity is certainly one of the most important indicators in assessing the quality of new firm formations in general or their knowledge-intensity in particular. Firms carrying out R&D activities usually have a better performance, open new technological potentials, create employment opportunities and serve as knowledge-bridges between providers and users. Usually, R&D activity is measured by the input factor "share of R&D expenditures in total turnover" (Pfirrmann 1994). In the KIBS Foundation Survey, the interviewees declared that they had very high investments in R&D, up to 100% of the total annual turnover. On average, the investments in R&D amounted to 18.3% of the annual turnover.

Regarding *innovation activities*, the dataset allows us to distinguish three types of innovation behaviour: (1) the development of own new services, (2) the improvement or further development of own existing services (incremental innovations as a rule), and (3) the incorporation of already developed services into the own portfolio. As the percentages indicate, a majority of the interviewees are engaged in various types of innovation activities. In total, only 13.6% of the interviewees stated that their firm did not engage in any innovative activity. In regional differentiation, despite slight variations concerning the sectoral distribution of the KIBS foundations, no significant differences are apparent. Most of the firms carry out multiple innovation activities. The formation

⁸ There is a general prevalence of technical services (groups 72.1 – 72.6, 73.1, 74.2/74.3) in the surveyed time period in all three regions (for a regional differentiation of the KIBS foundation intensity see, Stahlecker, Koch 2004: 13ff.)

⁹ Foundations in the group 73.2 "Research and experimental development on social sciences and humanities" are not shown separately, due to the small number of firms in the sample.

of own new services, in combination with an improvement of own services, are the most common innovation patterns of KIBS. Whether the formation of own new services can be used as an indicator for "radical innovations", with corresponding effects to regional economic or technological development, is doubtful.

A first assessment of the importance of the regional market for the KIBS in our sample is shown in table 2. For this analysis, different groups of regional turnover (in % of total turnover) have been formed. With the exception of existing regional lead clients, no clear statements can be made. To our surprise, most of the characteristics that apply to the group of KIBS earning 0-25% of the total turnover in the region also apply to the group earning 76-100% (i.e. strongly integrated) of the total turnover in the region. Differences have to be noted concerning "Formation of own services", "Scientific research as context of the business idea" and "Transfer of scientific and practical results from former occupation". For all of these aspects, the regional market is less important than the extra-regional market. Both, scientific origin of the venture as well as the formation of own new services (possibly radical innovations), obviously depend more on extra-regional markets than KIBS with other characteristics. Most strongly dependent upon the regional market are the KIBS with a regional lead client. As most of the firms in our sample are young firms, a lead client in the start-up phase leads to a strong dependence on the regional market, with the danger of neglecting extra-regional markets.

Table 2: Regional turnover with relation to selected characteristics of firm and region

| | turnover within the region (in % of total turnover) | | | |
|--|--|-----------|-----------|-----------|
| | 0-25 | 26-50 | 51-75 | 76-100 |
| Regional lead client (in %, n=170) | 28,2 (48) | 15,3 (26) | 14,1 (24) | 42,4 (72) |
| Transfer of scientific and practical results from former occupation (in %, n=305) | 44,3 (135) | 14,1 (43) | 11,1 (34) | 30,5 (93) |
| Closed supplier networks of potential clients as hindrance for regional market access (n=74) | 32,4 (24) | 20,3 (15) | 14,9 (11) | 32,4 (24) |
| Generation of innovations (n=307) | 43,6 (134) | 16,6 (51) | 10,4 (32) | 29,3 (90) |
| a) Improvement of own services (n=211) | 41,7 (88) | 15,2 (32) | 10,9 (23) | 32,2 (68) |
| b) Integration of external services (n=88) | 37,5 (33) | 12,5 (11) | 19,3 (17) | 30,7 (27) |
| c) Formation of own new services (n=258) | 45,3 (117) | 16,7 (43) | 10,5 (27) | 27,5 (71) |
| Context of business idea: | | | | |
| a) Scientific research (n=29) | 55,2 (16) | 10,3 (3) | 6,9 (2) | 27,6 (8) |
| b) Economy (n=179) | 43,0 (77) | 19,6 (35) | 10,1 (18) | 27,4 (49) |
| c) Self-employed (n=110) | 45,5 (50) | 9,1 (10) | 12,7 (14) | 32,7 (36) |

Source: KIBS foundation survey 2003, own calculations

4.2 Factors related to the entrepreneur of KIBS

New ventures can be differentiated by the context of their origin. By this context we refer to the provenance of the founder, as he is the main driver of his new venture. Principally, we can distinguish between a spatial and an institutional context.

Table 3 shows the relevant factors and their relevance for employment growth for the founding cohort 1996/2000. The context of the business idea refers to the institutional background of the founder or the activities immediately before the foundation. Although founders from universities or public research institutions are the focus of many policy initiatives, they only play a minor role for KIBS foundations. Most of the KIBS founder's former activities were economy- and self-employed-driven (i.e. a clear practical orientation rather than a science orientation). With regard to employment growth, KIBS originating from scientific research institutions have the best performance. But also KIBS originating from the business sector (i.e. economy and self-employed) show quite a good performance. In contrast to the scientific KIBS, those two groups of firms show slightly more employment stagnation. Comparing the performance of regional with extra-regional founders, the firms of the former group of entrepreneurs show a better growth performance than the latter. More than 60% of the KIBS are characterised by an employment increase, compared to only 53.3% from extra-regional founders. Analogous to the differences in employment increase of these two groups, 40% of the KIBS founded by extra-regional founders show an employment decrease. The figure for regional founders amounts only to 28.2%. Similarly to the former experiences of a firm founder, formal and informal transfers of subjects relevant for the new firm can have an impact on the development of the firm. By our survey data, we are able to account for a selection of these transfers. The most frequently mentioned objects of transfer were services and products, business contacts and business ideas (Stahlecker/Koch 2004). With regard to employment growth, no significant differences between the three groups of KIBS have to be noted. Regardless of growth potentials, between 81% and 85% of the KIBS founders were able to transfer scientific and practical results from the former occupation into the new firm. It can be concluded that the mere existence of ideas, business contacts and commercial services is no guarantee for the firms' success. The quality of these contacts and experiences seem to matter much more. Finally, the interviewees were asked whether they had a lead client in the initial stage of the development of their firm. Using this particular indicator, a clear relationship to the employment growth of the KIBS can be noted. 61.7% of the KIBS with employment increase had a lead client at the time of foundation, compared to only 13.5% with employment decrease. Although our database has no information about the concrete contracts of the lead clients (e.g. financial volume and duration of the first contract), the existence of a lead client seems to be crucial for most of the new KIBS. It can be assumed that most of those first business contacts are long-lasting – resulting in employment growth – or at least lead to follow-up contracts.

Table 3: Entrepreneur-related factors and employment-growth 1996/2000-2003 (n=369, in %, multiple answers possible)

| | KIBS with employment increase | KIBS with employment stagnation | KIBS with employment decrease |
|---|-------------------------------|---------------------------------|-------------------------------|
| Context of business idea (369) | | | |
| a) Scientific research (n=30) | 76,7 (23) | 13,3 (4) | 10,0 (3) |
| b) Economy (n=180) | 60,0 (108) | 27,8 (50) | 12,2 (22) |
| c) Self-employed (n=109) | 55,0 (60) | 31,2 (34) | 13,8 (15) |
| Regional founders (294) | 60,2 (177) | 11,5 (34) | 28,2 (83) |
| Extra-regional founders (75) | 53,3 (40) | 6,7 (5) | 40,0 (30) |
| Transfer of scientific and practical results from former occupation (in %, n=304) | 81,9 (177) | 83,9 (94) | 84,6 (33) |
| Regional lead client (in %, n=170) | 61,7 (105) | 24,7 (42) | 13,5 (23) |

Source: KIBS foundation survey 2003, own calculations

4.3 Factors related to characteristics of the KIBS firm

Most mentioned in the literature are the factors relating to a business partner, the input of start-up capital, the ownership structure of the firm, and the situation at start-up. Success and growth chances also seem to depend on the business situation at the time of start-up. For a better consideration of the essential characteristics of KIBS in the form of knowledge-orientation, we selected for this analysis the indicators "Employees with university degree", "R&D intensity", "Co-operation activities within the process of technology- and knowledge transfer", and "Demand for knowledge-intensive services" (see table 4). A clear connection between the number of highly-qualified employees, the R&D intensity and employment growth can be made. In KIBS with an employment increase more than 80% of its employees have a university degree. They spent 78.8% of the annual turnover on R&D activities (to a large extent on the salaries of their employees).

For all newly founded enterprises, but especially in the knowledge and innovative branches, interaction and networking are important features for the development of the companies. As pointed out in chapter 2, spatial proximity for certain forms of knowledge or knowledge transfer is considered important. Regarding the KIBS sector, user-producer interaction during innovation and service provision between service provider and client is frequently emphasized. Among potential knowledge-users and – providers, both important co-operation partners for KIBS, customers are the most important co-operation partners for KIBS, followed by firms with similar innovation ac-

tivities and suppliers (see table 4). Regarding aspects of spatial proximity or whether distance matters, no clear statements can be made. Although interactions on a regional level clearly affect the growth process of KIBS, interactions on other spatial levels seem to be important as well. This applies to all potential co-operation partners mentioned above. Comparing the successful KIBS start-ups with those showing an employment decrease since the end of the first year and 2003, it has to be emphasized that KIBS with employment increases are co-operating within the process of knowledge and technology transfer on all spatial levels, regardless of the function of the partner firms for the KIBS activities. Concerning the form of knowledge that is transferred, no quantitative information from our database is available. It can be presumed that different knowledge bases – depending on the context and co-operation partners – are transferred. Whether certain forms of knowledge – e.g. tacit knowledge – are only transferred on a regional level cannot be derived from our data. Quite interesting appears the fact that partner-firms located abroad are obviously of huge relevance. The assumption is that growth or success of new firms is – in the long term – only possible when extra-regional clients and other co-operation partners become relevant.

With regard to supplier connections of the surveyed KIBS, the question was raised, whether KIBS demand knowledge-intensive services themselves. A strong regional supply of knowledge-intensive services (demanded by regional manufacturing firms and other KIBS) could be an indication of dense regional knowledge flows or a strong integration of knowledge-intensive service activities. Analogous to the co-operation structures mentioned above, KIBS with an increase of employment have a higher demand for knowledge-intensive services than KIBS with an employment decrease. On a regional level, no significant differences can be observed between successful and less successful KIBS.

Table 4: KIBS characteristics and employment growth 1996/2000-2003
(n=369, in %)

| | KIBS with employment increase | KIBS with employment stagnation | KIBS with employment decrease |
|--|-------------------------------------|---------------------------------------|-------------------------------------|
| Employees with university degree (in %) | 82,1 | 12,3 | 5,6 |
| R&D intensity (in % of annual turnover) | 78,8 | 17,9 | 3,3 |
| Co-operating within the process of knowledge and technology transfer (only firms who indicated co-operating with other firms, multiple answers possible) | | | |
| a) with firms w. similar innovation activities (n=204) | 128 | 47 | 29 |
| located in the region | 51,4 (37) | 29,2 (21) | 19,4 (14) |
| located in the extended region (= <i>Land</i>) | 62,5 (20) | 18,8 (6) | 18,8 (6) |
| located in the rest of Germany | 68,6 (48) | 21,4 (15) | 10,0 (7) |
| located abroad | 76,7 (23) | 16,7 (5) | 6,7 (2) |
| b) with customers (n=250) | 162 | 60 | 28 |
| located in the region | 62,4 (58) | 24,7 (23) | 12,9 (12) |
| located in the extended region (= <i>Land</i>) | 64,3 (27) | 23,8 (10) | 11,9 (5) |
| located in the rest of Germany | 54,6 (51) | 25,3 (20) | 10,1 (8) |
| located abroad | 72,2 (26) | 19,4 (7) | 8,3 (3) |
| c) with suppliers (n=173) | 124 | 38 | 11 |
| located in the region | 78,0 (39) | 16,0 (8) | 6,0 (3) |
| located in the extended region (= <i>Land</i>) | 73,9 (17) | 21,7 (5) | 4,3 (1) |
| located in the rest of Germany | 67,7 (44) | 26,2 (17) | 6,2 (4) |
| located abroad | 68,6 (24) | 22,9 (8) | 8,6 (3) |
| Demand for knowledge-intensive services (only firms which indicated demand for services) | 57,9 (124) | 40,7 (46) | 48,7 (19) |
| a) from regional suppliers | 33,6 (72) | 30,1 (34) | 28,2 (11) |
| b) from extra-regional suppliers | 24,3 (52) | 10,6 (12) | 20,5 (8) |

Source: KIBS foundation survey 2003, own calculations

4.4 Factors related to the regional environment

Framework conditions at the time of foundation can be used to assess the regional "set-up" with regard to growth of new firms in general and knowledge-intensive firms in particular. Similar to the importance of potential co-operation partners regarding knowledge transfer activities as analysed in chapter 4.3, the interviewees were asked which of the factors were considered to be important *at the time of foundation*. The results are more or less the same as presented above: The existence of appropriate customers, suppliers and other firms with the same innovation activities are the most im-

portant regional pre-conditions for growth-oriented KIBS. In addition, the regional business and innovation atmosphere is also considered to be important. More than 63% of the successful KIBS start-ups stress the importance of this factor. Although this indicator should be carefully used - as innovation atmosphere is hard to measure -, it nevertheless gives some indications of the importance of the location for newly founded KIBS. Regional embedded knowledge, the structure of networks, the degree of modernization of the regional economy, and policy initiatives to foster innovation activities are the most important framework conditions.

Table 5: Regional environment and employment growth 1996/2000-2003
(n=369, in %)

| | KIBS with employment increase | KIBS with employment stagnation | KIBS with employment decrease |
|--|-------------------------------|---------------------------------|-------------------------------|
| Regional framework conditions at the time of foundation (only firms considered framework conditions to be important) | | | |
| a) Business & innovation atmosphere | 63.1 (99) | 25.5 (40) | 11.5 (18) |
| b) Appropriate customers | 58.5 (138) | 29.2 (69) | 12.3 (29) |
| c) Appropriate suppliers | 6.1 (44) | 27.8 (20) | 11.1 (8) |
| d) Other firms with same activities | 58.9 (63) | 28.9 (31) | 12.1 (13) |

Source: KIBS foundation survey 2003, own calculations

5 Synthesis of results

On the basis of the first empirical results of a recent survey of young KIBS, the question was raised whether spatial proximity matters within the founding and early-development process. The application of the spatial proximity concept to young KIBS was done by focussing on the founder with his ties to the region and by considering the specific characteristics of KIBS in the form of knowledge orientation. The analysis of the regional/institutional provenance of the KIBS showed that regional scientific-based KIBS (i.e. KIBS originating from scientific institutions) are growing more dynamic than KIBS originating from other institutions. Although scientific-based service spin-offs are rather the exception (most of the KIBS originate from other companies), they obviously create more jobs than the others. Concerning the transfer of scientific or practical results from the former occupation, the most frequently mentioned objects of transfer were services and products, business contacts and business ideas. With regard to employment growth, no significant differences between the three groups of KIBS (growing, stagnating, shrinking) were noted. Regardless of growth potentials, between

81% and 85% of the KIBS founders were able to transfer scientific and practical results from the former occupation into the new firm. It can be concluded that the mere existence of ideas, business contacts and commercial services is no guarantee for the firms' success. The quality of these contacts and experiences seem to matter much more. Using the indicator "existence of regional lead client", a clear relationship to the employment growth of the KIBS can be noted. 61.7% of the KIBS with employment increase had a lead client at the time of foundation, compared to only 13.5% with employment decrease. With regard to the factors related to structural firm characteristics, a clear connection between the number of highly-qualified employees, the R&D intensity and employment growth can be made. In KIBS with an employment increase, more than 80% of the employees have a university degree. They spent 78.8% of the annual turnover on R&D activities (to a large extent on the salaries of their employees). Among potential knowledge-users and –providers, both important co-operation partners for KIBS, customers are the most important co-operation partners for KIBS, followed by firms with similar innovation activities and suppliers. Regarding aspects of spatial proximity or whether distance matters, no clear statements can be made. Although interactions on a regional level clearly affect the growth process of KIBS, interactions on other spatial levels seem to be important as well. This applies to all potential co-operation partners mentioned above. Comparing the successful KIBS start-ups with those showing an employment decrease since the end of the first year and 2003, it has to be emphasized that KIBS with employment increases are co-operating within the process of knowledge and technology transfer on all spatial levels, regardless of the function of the partner firms for the KIBS activities. Quite interesting appears the fact that partner-firms located abroad are obviously of huge relevance. The assumption is that growth or success of new firms is – in the long term – only possible when extra-regional clients and other co-operation partners become relevant. Similar to the importance of potential co-operation partners regarding knowledge transfer activities, factors relevant *at the time of foundation* were analysed. The results are more or less the same as presented above: The existence of appropriate customers, suppliers and other firms with the same innovation activities are the most important regional pre-conditions for growth-oriented KIBS. In addition, the regional business and innovation atmosphere is also considered to be important. More than 63% of the successful KIBS start-ups stress the importance of this factor.

6 Concluding remarks

Although some quite interesting connections between entrepreneur, firm, region and the development of newly founded KIBS were detected, the analysis could not answer the question which concrete contribution KIBS accomplish for regional (technological) development and change. Still unanswered are also the questions whether KIBS

could open or contribute to new technological paths and whether KIBS account for further regional specialization patterns or rather for a diversification. Further investigations within this project will cover a comparative regional analysis by using multivariate methods.

Acknowledgements

This paper presents results of the research project "*The Foundation of Knowledge-Intensive Business Services in the Context of Industrial Core Regions: A Comparative Analysis in a Regional Economic Perspective*". We owe our thanks to the German Research Foundation (DFG) for funding the project within the Main Research Programme "Interdisciplinary Entrepreneurship Research" (Project No. RO 534/6). The project is jointly carried out by the Fraunhofer Institute for Systems and Innovation Research (Karlsruhe) and the Institute of Applied Economic Research (Tübingen). The Chambers of Industry and Commerce (IHK) in the regions of Bremen, Munich, and Stuttgart are greatly appreciated for providing data to support the empirical study. All opinions expressed in the paper and remaining errors are the sole responsibility of the authors.

References

- Almus, M./Egeln, J./Engel, D. (2001): Determinanten regionaler Unterschiede in der Gründungshäufigkeit wissensintensiver Dienstleister, *Jahrbuch für Regionalwissenschaften*, 21, 25-51.
- Bathelt, H./Glückler, J. (2002): *Wirtschaftsgeographie. Ökonomische Beziehungen in räumlicher Perspektive*. Stuttgart: UTB.
- Becker, G.S. (1975): *Human capital*. Chicago.
- Cooper, A.C. (1982): The entrepreneurship small-business interface. In: Kent, C.A., Sexton, D.L., Vesper, K.H. (Eds.): *Encyclopaedia of entrepreneurship*. New York, 193-208.
- Czarnitzky, D./Spielkamp, A. (2000): *Business services in Germany: bridges for innovation*. ZEW Discussion Paper 00-52. Mannheim: ZEW
- Danson, M.W. (2000): Debates and Surveys, *Regional Studies*, 34.2, 169-180.
- Engel, D./Steil, F. (1999): *Dienstleistungsneugründungen in Baden-Württemberg* (= Arbeitsbericht der Akademie für Technikfolgenabschätzung in Baden-Württemberg Nr.139). Stuttgart: Akademie für Technikfolgenabschätzung.

- Hausmann, U. (1996): *Neither Industrial District nor Innovation Milieu: Entrepreneurs and their contexts. An actor-oriented framework and case studies from Greater London and Zurich*. Paper prepared for the European Regional Science Association, 36th European Congress held at ETH Zürich, Switzerland, 26-30 August 1996.
- Koschatzky, K. (2001): *Räumliche Aspekte im Innovationsprozess. Ein Beitrag zur neuen Wirtschaftsgeographie aus Sicht der regionalen Innovationsforschung*. Münster: Lit-Verlag.
- Lo, V. (2003): *Wissensbasierte Netzwerke im Finanzsektor. Das Beispiel des Mergers & Acquisitions-Geschäfts*. Wiesbaden: DUV/Gabler.
- Meyer-Krahmer F./Lay, G. (2001): Der Stellenwert innovativer Dienstleistungen in der Modernisierungsdebatte, *WSI-Mitteilungen*, 6, 396-400.
- Miles, I. (2003): Services and the Knowledge-Based Economy. In: Tidd, J./Hull, F.M. (Eds.): *Service Innovation, Organizational Responses to Technological Opportunities & Market Imperatives*. London, 81-112.
- Muller, E. (2001): *Innovation interaction between knowledge-intensive business services and small and medium-sized enterprises – an analysis in terms of evolution, knowledge and territories*. Heidelberg: Physica.
- Muller, E./Zenker, A. (2001): Business services as actors of knowledge and diffusion: some empirical findings and the role of KIBS in regional and national innovation systems (= Arbeitspapiere Unternehmen und Region Nr. R2/2001). Karlsruhe: Fraunhofer ISI.
- Papageorgiou, Y.Y., Smith, T.R. (1983): Agglomeration as local instability of spatially uniform steady-states, *Econometrica*, 51, 1, 109-119.
- Reynolds, P.D./Storey, D.J./Westhead, P. (1994): Cross national comparisons of the variation in new firm formation rates, *Regional Studies*, 28, 510-516.
- Santarelli, E./Piergiovanni, R. (1995): The determinants of firm start-up and entry in Italian producer services, *Small Business Economics* 7, 221-230.
- Schutjens, V./Wever, E. (2000): Determinants of new firm success, *Papers in Regional Science* 79, 135-159.
- Stahlecker, T./Koch, A. (2004): On the significance of economic structure and regional innovation systems for the foundation of knowledge-intensive business services. A comparative study in Bremen, Munich, and Stuttgart, Germany. (= Working Papers Firms and Regions, No. R1/2004, Fraunhofer Institute for Systems and Innovation Research, Karlsruhe).
- Strambach, S. (1995): *Wissensintensive unternehmensorientierte Dienstleistungen: Netzwerke und Interaktion: Am Beispiel des Rhein-Neckar-Raums*. Münster, Hamburg (=Wirtschaftsgeographie Bd. 6).

Sternberg, R./Tamasy, C (1999): Erfolgsfaktoren junger innovativer Unternehmen unter besonderer Berücksichtigung von Interorganisationsbeziehungen. In: Fuchs, G./Krauss, G./Wolf, H.-G. (Eds.): *Die Bindungen der Globalisierung. Interorganisationsbeziehungen im regionalen und globalen Wirtschaftsraum*. Marburg, 255-284.

Storey, D.J. (1994): *Understanding the small business sector*. London, New York.

The series "Working Papers Firms and Region" presents research work of the department "Innovation Services and Regional Development" of Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI), Karlsruhe, Germany. The former "Arbeitspapiere Regionalforschung", published between 1995 and 1999, was merged in this new series.

| No. | Authors | Title |
|------------|--|--|
| R2/2004 | Thomas Stahlecker Knut Koschatzky | On the significance of geographical proximity for the structure and development of newly founded knowledge-intensive business service firms |
| R1/2004 | Thomas Stahlecker Andreas Koch | On the Significance of Economic Structure and Regional Innovation Systems for the Foundation of Knowledge-Intensive Business Services A Comparative Study in Bremen, Munich, and Stuttgart, Germany |
| R1/2003 | Bodo Kubartz | Wirtschaftliche, soziale und geographische Aspekte in Innovationsnetzwerken – Eine Untersuchung des Nähekonzeptes am Beispiel von Forschungs- und Entwicklungsdienstleistern |
| R2/2002 | Knut Koschatzky | Innovationsorientierte Regionalentwicklungsstrategien: Konzepte zur regionalen Technik- und Innovationsförderung |
| R1/2002 | Ralph W. Bruns Jens Görisch | Unternehmensgründungen aus Hochschulen im regionalen Kontext – Gründungsneigung und Mobilitätsbereitschaft von Studierenden |
| U1/2001 | Rana Adib Frank Gagelmann Knut Koschatzky Klaus Preiser Günter Hans Walter | An Integrated Microfinancing Concept for Rural Electrification by Photovoltaics in Developing Countries |
| R3/2001 | Knut Koschatzky | The role of higher education institutions for entrepreneurship stimulation in regional innovation systems – Evidence from the network-oriented "EXIST: Promotion of university-based start-ups" programme in Germany |
| R2/2001 | Emmanuel Muller Andrea Zenker | Business services as actors of knowledge transformation and diffusion: some empirical findings on the role of KIBS in regional and national innovation systems |

| No. | Authors | Title |
|------------|---|---|
| R1/2001 | Knut Koschatzky Casper Merkle Martin Berger Volker Meyer | Innovation und Kooperation bei unternehmensnahen Dienstleistern in Baden, Gironde und Südhollland - Ein Vergleich zwischen jungen und alten Betrieben |
| R2/2000 | Ulrike Broß Günter H. Walter | Socio-economic Analysis of North Rhine-Westphalia Joint Research Project INCO-COPERNICUS |
| R1/2000 | Knut Koschatzky | The regionalisation of innovation policy in Germany – Theoretical foundations and recent experience |
| R4/1999 | Knut Koschatzky Ulrike Broß | Struktur und Dynamik von regionalen Innovationsnetzwerken unter Transformationsbedingungen – das Beispiel Slowenien |
| R3/1999 | Emmanuel Muller | There is no territorial fatality! (or how innovation interactions between KIBS and SMEs may modify the development patterns of peripheral regions) |
| R2/1999 | Knut Koschatzky Andrea Zenker | The Regional Embeddedness of Small Manufacturing and Service Firms: Regional Networking as Knowledge Source for Innovation? |
| R1/1999* | Ulrike Broß Knut Koschatzky Peter Stanovnik | Development and Innovation Potential in the Slovene Manufacturing Industry First analysis of an industrial innovation survey * Already published as "Arbeitspapier Regionalforschung" No. 16 |

Address to order:
 Fraunhofer Institute for Systems
 and Innovation Research
 Library
 Breslauer Strasse 48
 D-76139 Karlsruhe
 Germany
 Tel. +49 / 721 / 6809-217 / -219
 Fax: +49 / 721 / 689152
 e-mail: bibl@isi.fraunhofer.de