

On the significance of geographical proximity for the structure and development of newly founded knowledge-intensive business service firms.

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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 is 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 a region matters to 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 as well as factors related 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 are co-operating 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 been important in economic literature, in particular with authors interested in the question of space, either in districts, milieux, 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 milieux 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 economical actors, often located at a short distance. Similarly in terms of spatial externalities, Papageorgiou and 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 for contacts of firms 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 as 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 1990ies 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 subtrends – shifts in the 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 the entrepreneurship research Almus et al. (2001) 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 particularly investigations dealing with inter-organisational relationships, aspects of spatial proximity within the development- or growth-process. On the basis of a very heterogenous group of firms within the KIBS sector, various differences concerning the importance of proximity or the necessity of a geographical co-location 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 with 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), factors related to characteristics of the KIBS-

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 closer related to their suppliers.

firm (4.3) and factors related 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.

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

Overviewing the theoretical and empirical literature that have 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 extracted: (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 and 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 and 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 “external” factors 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 devel-

opment 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 modernisation 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 (Schutjens, Wever 2000). For example, newly founded innovative or knowledge-intensive firms are the 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 is 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 term "untraded interdependencies". The economic advantages of untraded interdependencies such as commonly shared industrial conventions and business practices, or a culture of coopera-

² Regional 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 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

tion between economic agents, arise from local clustering and specialisation. 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 – simplified spoken – ubiquitous available as it can be codified and standardised. The primary use of codified knowledge offers no or little 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 transverse 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 co-location 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 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 experienced-based knowledge) are only available at certain location, 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 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 oversocialized. 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.

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 founded 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 Koch/Stahlecker 2004) including firms classified under the NACE-Codes 72, 73 and 741-744.⁶ Furthermore, we only selected firms which have been 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 could be finally conducted. This means a response rate of nearly 26% - a quite moderate result. resulting in a quite 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 case of firms founded by more than one person, one of these founders who we could get through to – and 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 standardised questionnaire was developed. The question programm 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

⁵ The region of Bremen is defined here as the city of Bremen (the Land 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 bordered 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: Hannover, Oldenburg and Stade. This was primarily done in order to make the results comparable.

⁶ Some subsectors 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 with 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.

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 ordinary KIBS foundations in the years 1996 to 2000 in the regions of Bremen, Munich and Stuttgart. Ordinary 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 personal (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 personal 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 foundation 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 both entrepreneurial, firm and regional factors can 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	Operationalization
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 “leadclient” 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 heterogenous, 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

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.)

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 have been at 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 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 shows table 2. For this analysis, different groups of regional turnover (in % of total turnover) have been formed. With the exception of regional leadlien existing no clear statements can be made. To our surprise, most of the characteristics that apply for the group of KIBS earning 0-25% of the total turnover in the region also apply for 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-

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.

regional markets than KIBS with other characteristics. Most strongly dependent upon the regional market are the KIBS with a regional leadclient. As most of the firms in our sample are young firms, a leadclient in the start-up phase leads to a strong dependence from 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 leadclient existing (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 a quite 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 have been 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 sheer existence of ideas, business contacts and commerciable 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 leadclient 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 leadclient 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 leadclients (e.g. financial volume and duration of the first contract), the existence of a leadclient 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)
d) Other (e.g. university studies) (n=50)			
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 leadclient existing (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. KIBS with an employment increase have more than 80% of its employees with a university degree. They spent 78,8% of the annual turnover for R&D activities (to a large share for 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 as being important. Regarding the KIBS sector, user-producer interaction during innovation and service provision between service provider and client is frequently emphasised. 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 (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 increase 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 can not 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 by themselves. A strong regional supply of knowledge-intensive services (demanded by regional manufacturing firms and other KIBS) could be an indication for 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 (=Bundesland)	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 (=Bundesland)	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 (=Bundesland)	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 who indicated to demand services)			
a) from regional suppliers	57,9 (124)	40,7 (46)	48,7 (19)
b) from extra-regional suppliers	33,6 (72)	30,1 (34)	28,2 (11)
	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 than 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 &

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 indicators should be carefully used - as innovation atmoshpere 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 modernisation 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 in existence	58,5 (138)	29,2 (69)	12,3 (29)
c) Appropriate suppliers in existence	61,1 (44)	27,8 (20)	11,1 (8)
d) Other firms with same activities in existence	58,9 (63)	28,9 (31)	12,1 (13)

Source: KIBS foundation survey 2003, own calculations

5 Synthesis of results

On the basis of 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 into the region and by considering the specific characteristics of KIBS in the form of knowledge-orientation. The analyse 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 have been 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) 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 sheer existence of ideas, business contacts and commerciable services is no guarantee for the firms' success. The quality of these contacts and experiences seem to matter much more. Using the indicator „regional leadclient existing“ a clear relationship to the employment growth of the KIBS can be noted. 61,7% of the KIBS with employment increase had a leadclient 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. KIBS with an employment increase have more than 80% of its employees with a university degree. They spent 78,8% of the annual turnover for R&D activities (to a large share for 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 increase 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 than 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 & 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 indicators 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.

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

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