

Working Papers Firms and Region
No. R7/2009



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Entering the KIBS' black box: There must be an angel! (or is there something like a knowledge angel?)

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Karlsruhe 2009

ISSN 1438-9843

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1 Introduction

The undeniable importance of knowledge and innovation in modern economies justifies the increasing interest that scholars are taking in studying knowledge-intensive business services (KIBS). Since the mid 1990s, there has been a significant increase in the attention paid to KIBS and their role and functions in innovation systems (den Hertog 2000; Illeris 1991; Miles et al. 1995; Muller/Zenker 2001; Strambach 2001; Tether 2005; Wood 2002). In general terms, the activity of KIBS can be mainly described as the provision of knowledge-intensive inputs to the business process of other organizations, private as well as public sector clients. Miles et al. (1995) identify three principal characteristics of KIBS: (i) they rely heavily upon professional knowledge; (ii) they either are themselves primary sources of information and knowledge or they use knowledge to produce intermediary services for their clients' production processes; (iii) they are of competitive importance and supply primarily to business. In more precise terms, Miles et al. (1995: 18) define KIBS as "services that involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge." Den Hertog (2000: 505) presents KIBS as being "private companies or organizations who rely heavily on professional knowledge, i.e. knowledge or expertise related to a specific (technical) discipline or (technical) functional-domain to supply intermediate products and services that are knowledge-based." In a similar way, Bettencourt et al. (2002: 100-101) depict KIBS as "enterprises whose primary value-added activities consist of the accumulation, creation, or dissemination of knowledge for the purpose of developing a customized service or product solution to satisfy the client's needs." All these definitions make clear that knowledge constitutes the core asset of KIBS' activities.

But if knowledge is the core asset for KIBS' activities, their competitive position on the markets and the base for their development, how does this core asset emerge and how is it being generated? What is exactly 'happening' within KIBS and which factors do KIBS use in order to successfully offer innovative services to their clients? These questions lead to the core of our paper. We will argue that there are specific persons within KIBS who assume a significant role in innovation-related issues both firm-internally and also in relation with the 'external world' (i.e. both the territorial environment and the network of actors and agents such as clients, suppliers, etc. related to the economic activities of KIBS).

Further, the point we address in this paper goes beyond knowledge. We try to explore the *creativity* dimension leading to innovation. In knowledge-intensive activities, like those fulfilled by KIBS, the relationship to innovation is of course central: innovation in the service they provide and/or innovation process of their clients. One face of innova-

tion is knowledge processing; the other face is related to creativity and entrepreneurial capabilities. What are the proportions of knowledge and creativity at KIBS level? Knowledge is a prerequisite for those business services related to a specifically specialized professional culture – a kind of specific asset shared by the profession, but not necessarily a firm's distinctive asset. But the fundamental factor leading to competitive advantage in such services is creativity, in bringing new ideas (novelties), or supplying customized support to innovation implementation through various networking/interfacing actions.

If creativity is defined as the process of generating new ideas and combining them to novelties then creativity appears as a precondition for innovation. According to Sternberg and Lubart (2008): "Creativity is the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)." As such, creativity can be seen as a subtle mix of ideas, visions, market knowledge and problem-solving competences which constitutes most probably a decisive skill in the frame of a knowledge-based economy. Considering KIBS more specifically, it can be assumed that individual persons, their motivations, talents and activities play specific roles within the innovation processes of KIBS. Indeed, probably more than knowledge processes like scientific and technological research or technology transfer, acts of creativity rely on the genius or vision of individuals.

To sum up, this paper focuses on creative individuals in KIBS, i.e. those persons suspected of playing a pertinent role with respect to the innovativeness of their company. We call these specific actors *knowledge angels* by analogy with business angels. In the same way that business angels can play a decisive role in the development of innovative firms through financial support, we assume here that specifically gifted persons can be the knowledge 'catalysts' within KIBS (and in relationship with their clients).

The paper contains three sections: the first one formulates the assumption of the existence of *knowledge angels* and attempts to elaborate a working definition of this specific kind of actor. The second section displays the results of an empirical research project conducted in France and Germany, whereas the third section synthesizes the findings.

2 Formulating the Assumption of the Existence of Knowledge Angels and Displaying their Main Characteristics

In emphasizing that "(s)ince KIBS' growth is much faster than that of other sectors, it cannot just be driven by the growth of these sectors that are users of KIBS", Miles (2005: 43) is strongly suggesting that something peculiar is happening within this type of firms which cannot just be explained by the changes affecting the context(s) in which they evolve. In line with this assumption, the starting point of the reflection proposed here consists of a basic observation: investigations of KIBS so far did not answer one question crucial for the understanding of their evolution. This question can be formulated very easily, using here voluntarily – and in a new context – the expression of Rosenberg (1982): What is happening inside the KIBS 'black box'? In other words: "Who is acting primarily in the added-value chain of KIBS?" Or "Who is making the difference between an innovative (and maybe successful) KIBS and a less innovative (and/or successful) one?" Potentially important aspects of the functioning of these firms may have been neglected so far. For instance, the individual motivations and specific knowledge added-value of key actors inside KIBS have not been the object of targeted investigations. Expressed in a very concrete way, this may take the form of abilities such as "knowing how to network people and further resources", "recognizing opportunities (faster than competitors)", "developing visions about the future firm development", etc. These abilities appear at the same time to be very subjective and also closely linked to specific individuals.

The issues of identification, diffusion and appropriation of knowledge are addressed in knowledge management literature. Knowledge intermediaries or brokers can in this context be characterized as individuals or organizations that mediate the supply for and the demand of knowledge; more specifically, knowledge brokers network different knowledge sources or holders. They transfer knowledge and adapt it to different actors and contexts. Knowledge brokers can be characterized as "third parties who connect, recombine, and transfer knowledge to companies in order to facilitate innovation" (Cillo 2005: 404; see also Hargadon/Sutton 1997: 717). The knowledge brokerage role and function is strongly related to consulting firms: "As defined in the literature, KBs [knowledge brokers] work closely with their business customers and provide specific innovation solutions and have usually acted as innovation and design consulting firms' (Cillo 2005: 404).

While Hargadon and Sutton (1997) in their analyses on knowledge brokering strongly refer to third parties that link different (often distant) industries, which enables them to get a huge variety of ideas that they validate and translate to new contexts,¹ Cillo (2005) transfers this concept to the firm-internal level, and analyzes brokers under the specific aspect of integrating market knowledge into innovating companies. In her conception, knowledge brokers do not simply transfer (market) knowledge within the target company, but they also manipulate it "to facilitate the process of internal transfer between different groups or communities" (Cillo 2005: 405). Behboudi and Hart (2006; 2008) specify the essential role of those intermediaries in stating that knowledge-related relationships and exchanges between different parties would be difficult, if not impossible without the activities of knowledge brokers. Besides the category of 'knowledge-oriented human intermediaries' that would fit the focus of our paper, they also point to 'technically-oriented human intermediaries' to also refer to technical brokerage support.

Referring to this strand of literature, the following specific characteristics of knowledge brokers can be depicted:

- They act as intermediaries between units or parties previously unrelated.
- This 'in between' position enables them to diffuse existing knowledge in new contexts.
- Through these activities, they 'bridge' different communities² within the firm. However, 'bridging' does not only refer to the pure transfer of knowledge, but rather to a

1 Hargadon and Sutton (1997: 717) thus relate the macro perspective of networks between clients and industries with 'micro perspectives on internal routines to describe the role of brokering in innovation.' They argue that successful brokers are integrated in organizations whose structures allow the acquisition, storage and retrieval of information in diverse combinations. According to their findings, the core value generating activity of brokers lies in the initiation and realization of resource flows between formerly unconnected groups. Doing this, brokers – individuals or teams – create trust, pave the way for networks and transfer knowledge. Technology brokering is hence a creative process, since it requires the ability to create connections between knowledge available from other contexts, actors and time horizons; brokers thus assume a "gatekeeper" role (Hargadon/Sutton 1997: 725ff.).

2 We refer here to the concept of communities for instance in the sense of Cohendet and Simon (2007), that they consider pertinent in shaping informal structures which – in interaction with the formal (hierarchical) firm structure – strongly drive the innovation process within a firm. Knowing communities are in this respect defined as 'autonomous learning groups of individuals' with common beliefs and interests. Unlike project teams, their interactions have a rather long-term character. Members are related by a high degree of trust; they frequently communicate, share resources and so generate and diffuse knowledge. The firm is viewed as 'a bundle of interacting communities' with each community being specialized in a specific type of knowledge or technology and with specific social and cognitive repertoires that determine communities' interpretations of the external world (cf. Cohendet/Simon 2007).

translation process, i.e. to the adaptation of knowledge in relation to the community to which it is transferred: "Brokers [...] do not merely act as agents or negotiators, but manipulate knowledge before transferring it from one context to another." (Cillo 2005: 405).³

This highly creative process paves the way for 're-using' knowledge generated and/or applied in other contexts in order to find answers to new questions. From these findings it becomes apparent that linking different communities which would otherwise not collaborate represents a challenging task that requires understanding the respective goals and cultures of the different parties, further the capacity to formulate problems, to conceive solution strategies, to access the necessary resources and to translate them between the contexts (Dobbins et al. 2009).⁴ So, specific preconditions are necessary for successful knowledge intermediaries. First of all, this task requires a profound anchorage of these persons in their companies in order for them to be acquainted with the different units, teams and communities, as well as tasks and projects, and also the social skills including communicative capabilities to realize the transfer of knowledge. This person should also have the capacity to bridge cognitive and/or cultural distances, an issue which is strongly related to recognition, acceptance and trust among the company's staff. Especially in a context of enhanced technological change, increasingly changing and volatile competitive environments, these characteristics are supposed to be of high prominence (see also Cillo 2005: 405/406 in this respect).

Now, how could knowledge angels be positioned in this context and how can they be differentiated from knowledge brokers? Knowledge angels, as we believe, clearly act as knowledge intermediaries, but in our vision, their role goes beyond knowledge brokerage. Our view is twofold in this respect: first of all, we clearly depart from the internal perspective of a KIBS firm, however, we also include the 'external world' from the point of view of the KIBS in question. Consequently, in our conceptual framework, we tend to integrate the internal and external broker conceptions by assuming that knowledge angels are adopting both roles and functions. Further, we assume that knowledge angels are visionary persons who – based on their creativity, their experience and their profound knowledge of markets, competitors, and challenges – have the ability to 'see'

³ Cillo (2005: 405), referring to Pawlowski and Robey (2004) speaks in this context of 'world views' of the diverging communities.

⁴ This aspect is emphasized by Behboudi and Hart (2008: 54): '... not every actor can fulfill this role [acting as a link between employees for knowledge transfer] because brokers should have appropriate network positions to access a variety of knowledge sources.'

which knowledge could be a useful base to be applicable in other contexts, and to develop visions about the future development of their company.⁵

This capacity would also correspond to the somewhat 'unusual' nature of angels, acting 'beyond the tangible spheres' of their KIBS. The external dimension in this respect refers to the KIBS' market environments and also to actors supporting the internal knowledge generation and adaptation process of the KIBS (ex. consultants, network of sales and distribution partners and the like).⁶ It can thus be assumed that knowledge angels adopt both a firm-internal and an external brokerage function. Internally, they are embedded in the formal organization of the KIBS. But especially in the case of smaller KIBS, we do not assume that these persons occupy a formal position in knowledge management, i.e. we suppose that they fulfill the role of knowledge intermediation, but (i) not exclusively and (ii) rather informally than formally. Externally, their position can be conceived as being centered between their company, market and clients, as well as (knowledge) suppliers, partners, etc.

Secondly, we would like to refer to the two-wing character of angels, an expression which is borrowed from the business angel discussion and indicates the double benefit both types of 'angels' incorporate in companies. While business angels offer financial resources and business experience to their corporate partners, knowledge angels are conceived as delivering ideas and visions for their KIBS (cf. also Table 1). Here, ideas rather refer to the content-level of KIBS' services, i.e. to knowledge referring to the specific service to be generated. Visions, on the other hand, would rather incorporate conceptions about the further development of the KIBS in its environment; thus, this component is linked to markets, technologies and competition. Insofar, this twofold aspect is related to the internal/external dimensions evoked above.

At this stage of reflection, an explorative parallel between the knowledge angel and business angel concepts seems meaningful. Table 1 schematically displays in this respect similarities and differences between business angels and knowledge angels. The 'angel' function in both cases is related to the ability and competence of core individuals to bring in pertinent assets to companies. These angels thus strongly contribute to the success of the companies they engage in, mainly through the motivation and opportunity to combine corporate and personal interests: while business angels empha-

⁵ When discussing specific necessary characteristics of knowledge brokers, Dobbins et al. (2009) speak of 'interpreting the information in terms of the bigger picture.'

⁶ The differentiation of these two types of "external environments" is important since it refers to two different basic functions: while market knowledge is significant for the strategic development of the KIBS, consultants and implementation partners act on the operative level, i.e. are significant for service production.

size the 'fun aspect' and the desire to bring in own knowledge and experience, knowledge angels search for self-realization, on the one hand, and for the realization of visionary ideas concerning their companies on the other hand.

Table 1: Core characteristics of business angels and knowledge angels

Type of angel Characteristics	Business angels	Knowledge angels
Core resources	Money and business experience (and to a lesser extent ideas)	Ideas and visions (and to a lesser extent business experience)
Strongest motivation for action	'Fun factor' and financial interest (and a willingness to support younger entrepreneurs)	Quest for freedom and self-realization (and a willingness to support co-workers)
Main forms of knowledge support	Supporting already existing knowledge creation processes and situations	Initiating new knowledge creation processes and situations

Source: Own compilation, business angel characteristics based on Just (2000), Hemer (2001).

However, there is one large difference between both types of actors that becomes evident when considering both angel types under the brokering aspect. Business angels are – at least in the first phase when approaching the young companies they seek to support – external actors from the viewpoint of the targeted young firm. In the course of the further collaboration between both actors, it is possible – and even probable – that business angels increasingly engage in internal processes, for instance as a board member or consultant who regularly visits the company and gets acquainted with internal structures and processes. Knowledge angels – in our vision – are individuals with internal activities in KIBS who then broaden their focus of activity towards an external orientation. This means that, according to our conception, knowledge angels are primarily rooted in their KIBS, but develop own visions and perspectives for their work based on knowledge and experiences gained from information from the 'external world'.

Summarizing, the core assumption of this paper deals with the existence of specific individuals within KIBS (called knowledge angels for the sake of demonstration) who perform tasks – based on their creative abilities – that significantly increase the creative capacities of the firms they are embedded in. Until now, studies in this field analyzed the characteristics of innovating KIBS and the consequences of these innovations, but so far only superficial knowledge was gained about what is really happening *within* KIBS. In order to identify the possible individual motivations as well as the (expected) specific knowledge added-value of knowledge angels, the choice was made to adopt

an explorative methodology (detailed in the second section of this paper). This choice was mainly dictated by the novelty of the research field – for which no previous investigation can be found – as well as by the issues adopted, i.e. the assumptions to be tested. These assumptions can be briefly summarized as follows. Knowledge angels are (or may be) specific individuals, who:

1. typically act as consultants (but not necessarily exclusively);
2. may have the talent to 'sense' things before they happen, or make them 'happen' (from the subjective point of view of an external observer);
3. make a difference in the way knowledge is created, organized and flowing within the firm and between the firm and its partners.

In other words, knowledge angels are 'suspected' of being able to a certain extent to generate their own markets (and/or to create their own jobs and working environments). It is assumed that these key actors within KIBS have the talent and creativity to evaluate externally available knowledge and to match it with the KIBS' needs. This process requires existing knowledge to be scanned absorbed and assessed and – most important – a decision to be made whether it may be valuable for the internal innovation activities of the KIBS.

These assumptions which guided the empirical analysis will be detailed in the next section.

3 Knowledge Angels in France and Germany: An Explorative Investigation

3.1 Introduction to the Explorative Investigation

To sum up, the investigation aims to identify within KIBS individuals who (i) act as internal and external knowledge brokers, (ii) have the ability and visionary talent to develop strategies for themselves and their companies, and (iii) have the position in their company's structure to implement and realize those ideas. For these purposes, the project named KAIROS (Knowledge Angels or the Reinvention of Outstanding Services) after the Greek god of "right time and timeless" was initiated in 2007 in order to gain new knowledge in this respect with the help of empirical material collected within KIBS located in the border regions of France and Germany: Alsace and Baden-Württemberg. Since this investigation had a strongly explorative character, the procedure adopted does not aim to be exhaustive, but instead to maximize the probability of detecting specific features revealing the existence and characteristics of knowledge angels, and to identify pertinent aspects for further research. The bi-national character

of the study was chosen in order to obtain indications concerning possible typical characteristics of KIBS and knowledge angels which can be traced back to the respective national environments.

The detection and empirical investigation of knowledge angels primarily took the form of personal interviews performed in selected firms. These interviews collected information along very heterogeneous dimensions and thus allow a better understanding of what is happening inside KIBS (an overview is given in Table 2).

The first dimension (A) deals with the personal biography of the interviewees. Questions related to educational background and professional experience as well as possible experiences in the foundation of an own company were discussed under this topic. These types of topics are related to the above mentioned assumption that the key actors in firm-internal knowledge intermediation are supposed to be deeply anchored within their companies in order to successfully bring together ideas, knowledge and communities, and to be accepted and trusted by their co-workers. This is even more strongly the case when the external networking capacities of knowledge angels are examined. So we assume, as a deduction, that most potential knowledge angels are rather senior than junior experts in their business and are working in positions within the internal hierarchy – however not necessarily leading management positions – that enable them to fulfill the above mentioned tasks.

The second dimension (B) deals with interlocutors' assessments of their location, i.e. their perception of their firms' environments for stimulating creativity and innovation within their company. The most crucial topic in this dimension is related to the factors explaining the choice of the current location of the firm considered as well as the regional factors stimulating (or hindering) KIBS' internal innovation activities. These conceptual elements are rooted in reflections about the context in which KIBS are acting, based on discussions in economic geography that emphasize the interconnection between creativity and the environment in which creative processes take place (cf. for instance Florida 2002 or Cohendet and Simon 2007 who highlight the importance of creative cities as fertile grounds for the firms located there). More precisely, the issue investigated here is to determine to what extent knowledge angels rely on their location in specific territories for developing the creative activity.

A third set of questions (dimension C) addressed types and forms of interactions within the firm and with external actors. More specific issues dealt with the ways firms solve problems concerning, for instance, the design of their services or their market development and to whom they turn for solutions (within and outside the firm). Moreover, the question of accessing knowledge created elsewhere (i.e. other firms, other industries,

other places within and outside the country, etc.) was raised. More specifically, it was asked to what extent it appears as a challenge to attract (and to retain) 'brilliant' co-workers (and what are the main incentives in this respect). In the same way, interviews were used to identify factors that stimulate (and hinder) the individual abilities of the interviewees to solve problems. Since knowledge is considered a core resource in KIBS, these topics seem to be at the center of analyses dealing with innovation in KIBS.

Dimension D was devoted to specific modes of generating solutions and services, as well as personal characteristics with respect to problem-solving competence, stimulating and hindering factors, and 'seeing and feeling' or 'visionary' capacities of the interlocutors. This dimension is clearly determined by personality traits of the interlocutor and is at the core of the discussion what knowledge angels may be.

A final set of questions (dimension E) attempts to characterize the firms in which the potential knowledge angels are working. In particular, the interviews aimed to identify the main strengths and weaknesses of the concerned firms, their degree of innovativeness (comparative to their main competitors), and the way they act in the market. In addition, questions intended to specify the working atmosphere within the firm, the existence of a firm-specific (financial or non-financial) incentives or rewards system as well as to envisage possible future developments of the concerned company. These final aspects are useful mainly in order to characterize the firm's context in which the interlocutors act and interact, and to obtain indications about possibly specific firm-internal structures or hierarchies that might foster KIBS' knowledge-related activities.

Table 2: Main characteristics of interviews with KIBS in Alsace and Baden-Württemberg

Dimension of the interviews	Main aspects
A Professional and personal background	Individual professional development Experiences from other sectors or fields of activities Experiences in the creation of a company
B Business location and environment	Relation between location and professional success Selection of current location: strategic or at random Relation of current location and creativity
C Knowledge access and interaction	Internal and external sources for solutions Attractiveness for 'brilliant' co-workers Relations with academic world

Dimension of the interviews	Main aspects
D Problem solving and visions	Engineer vs. constructor/draftsman Anticipation and vision Personal factors in risk-taking and problem-solving
E Corporate frame, enterprise culture	Specific culture and atmosphere Incentive and reward system Visions on future development of the company

Twenty interviews were performed in parallel in the two regions in France and Germany (i.e. ten interviews in each country) between October 2008 and May 2009. Participating companies were generally rather small to medium-sized. The search for interview partners was realized in three steps: first of all, in order to identify appropriate KIBS, company databases were consulted. We extracted NACE 72 (data processing and databases), 73 (research and development) and 74 (provision of business-related services) firms in the targeted regions. This pre-selection process enabled us to cover the whole spectrum of knowledge-intensive business-related services, ranging from technically and IT-oriented firms to market-related consultants (and research and development institutions that mostly do not correspond to the characteristics of private companies). This procedure was followed by a web-based search of companies with 10 or more employees (in order to avoid too small companies) concerning their main fields of activity. We attempted to get hints concerning those firms' innovativeness and to explore companies' affinity concerning knowledge- and creativity-related issues. Finally, we tried to identify persons within the companies who were assumed to fit our vision of potential knowledge angels. When possible, those key persons were contacted directly, but in most cases, companies did not present their staff on their website and suggested an interview partner to us. The selection process for our sample was finally largely dependent on the willingness of interviewed firms to engage in a discussion of the topic. We do not consider that only as a bias for our explanatory qualitative study, but also as an indicator of open-minded attitude, possibly a proxy variable for creativity. The interviews took place in business-related as well as in technical KIBS, but the majority of respondents was found in the first group (i.e. business consulting, market research, advertising, etc.). The persons we were looking for are not necessarily the founders or owners of the concerned KIBS, and indeed, the relevant persons were found at various levels of their organization.

As underlined previously, the investigation has a fully explorative character and was not conceived as an exhaustive, representative survey. Consequently, and as a clear limitation to the interpretation of the results, the analysis can only be qualitative, showing specific characteristics of individuals embedded in KIBS (taking into account their respective national environments). In other words, these results should not be

(over)generalized without the support of additional data, but are rather thought to open the way for further investigations.

3.2 Interviews in French and German KIBS: Main Results

The main results of the interviews can be displayed as follows along the five considered dimensions (quoted A to E):

(A) First of all, with regard to individual trajectories and personal experience, all interlocutors hold higher education (or equivalent) degrees, and most of them have solid professional experience in their company. From a general point of view, it can be asserted that interviewees perceive their individual professional trajectories as an accumulation of knowledge and/or contacts provided by previous experiences. Some of them manage their own company, others – mainly among the French cases – created their own company, but are now employed by the company that participated in the KAIROS project. Almost all the interview partners perform leading, most of them strategic and management functions within the company we visited, either in the company they also (co-)founded, or in the company where they are employed. In the latter case, they generally started their professional career within the company at the operative level and gradually were entrusted with further strategic tasks. However, the large majority of them are still engaged at the operative, project-related level (besides their management tasks), which they emphasize as very important. They strive to 'keep contact with the base' and to stay involved in daily work, as well as maintaining contacts to clients. Referring to knowledge-related functions, most of them would describe their position as 'knowledge broker' and/or 'idea giver'.

(B) Most interlocutors, both in Alsace as well as in Baden-Württemberg, consider they would have been successful and/or creative more or less everywhere, but they are nevertheless pleased about being anchored in their current location. The question of the geographical location does not seem to be an aspect they deeply think about (i.e. relocations do not seem to be a relevant topic in the companies visited, even when the location was not assessed as highly favorable). The current location of the company results generally from the personal and educational backgrounds of founders and/or is related to specific sectors and markets. A considerable share of the investigated companies was founded as spin-offs of universities and thus are located in close geographic proximity (the same city) to this university. A further important locational motivation can be seen in the residence of the founder and/or the workforce. Some interlocutors stressed the high importance of their employees (the human capital being described as the company's most valuable resource) who have established their residence and social contacts at the current location and would not easily move to another

city or region. However, this does not refer to intra-city locational shifts that are more common, mainly due to lack of office rooms in the context of company growth. All in all, the company representatives we talked to are generally quite – if not always extraordinarily – content with their location in Alsace, respectively in Baden-Württemberg. They appreciate not only the cities they live in, but also the wider region as a favorable place to spend their leisure time. Most of the interlocutors did not seem to belong in the classification of highly footloose and extremely creative 'bohemians', constantly seeking new opportunities and challenges, but rather as being more "rooted to the soil and their social environment". Some of them even mentioned that their location cannot compete with current 'hip cities', but that this is even not desired because they want to establish medium- and long-term working relations with their staff and would not appreciate losing their employees to new locations after a short period. All in all, it can be assumed that even if the regional surrounding is not seen as exceptional for business (but nevertheless good), once located in this environment, the interviewed persons tried to adapt themselves to their environment by making the best of the situation.

(C) The question of knowledge access can be seen as a crucial topic: the investigated KIBS are all in their specific way networked with other partners, be it higher education or research institutions, external consultants and experts, or other companies. These partners display different degrees of closeness in their relations to the KIBS, ranging from contract-based and durable relations to rather loose contacts on a project base. The observed KIBS enhance their internal knowledge base via internal and external resources, i.e. through the employment of new staff, through diploma theses, partly also PhD theses, internal qualification measures and through composing project teams with various mixed qualification types and orientations. Especially this latter aspect is emphasized by a high share of interlocutors. Accordingly, team compositions are flexible and respond to the specific requirements of the project in question. In some cases, knowledge generation processes within the companies have a formalized character, for instance as brainstorming sessions (partly also integrating external consultants), or exchange processes with fixed teams from the science sector. On a horizontal level, the exchange of project information and knowledge is assessed as crucial; here, specific tools such as short project profiles for every member of the companies have also been developed. Quite common is further the appropriation of knowledge available in publications, on the internet, etc. Concerning the competencies of their co-workers, some companies employ persons who already worked in the frame of an internship or a diploma thesis in their KIBS.

(D) Decisions are rarely taken on an individual base, but are generally discussed in a broader spectrum. When talking about solving problems the word 'constraints' appeared quite often, which echoes the definition of creativity evoked previously (*the abil-*

ity to produce work that is both novel and appropriate, i.e., useful, adaptive concerning task constraints). Nevertheless, most interlocutors think they somehow "see or feel things before others" and/ or to have the ability to "bring the right people together" and use a wide diversity of sources (including interactions with the academic world or further external actors such as consultants) in order to solve problems and provide new or enhanced services. They rather seem to adopt a '*bricoleur* approach' (in the meaning of Levy-Strauss 1962) i.e. adaptive and explorative thinking than to seek some perfect (i.e. maximizing) solution. One interviewee used the expression 'infinite puzzle' in this respect. Concerning the factors favoring or inhibiting their creativity, it appears that generally, interlocutors are very sensitive to corporate environment and culture and perceive the working atmosphere in their companies as very positive and stimulating. Hierarchies in most visited companies are rather flat: employees work in project teams, and there is generally a high degree of exchange and communication, both at the individual and the team level. Co-workers are mostly promoted in defining and developing their specific competencies and fields of activity, so that individual competencies and preferences can be appropriated for the benefit of the company. Key characteristics in this respect are self-motivation, soft skills, flexibility, exchange and communication.

(E) All the companies visited are active in market niches, offer highly specialized services and act in extremely competitive markets. They explicitly feel those market pressures, are aware of the need to react to these challenges and generally characterize their companies as innovative. According to them, this capability to react to new and changing market conditions with new innovative services distinguishes them from their main competitors. Generally, interlocutors perceive their markets and environments as highly (and partly increasingly) competitive, so that their companies are constantly confronted with the challenge to maintain and widen their market position. Specific strengths of the examined KIBS are – besides their innovativeness and in some cases their degree of scientific and/or methodological competence – their capacity to react to volatile framework conditions and client requirements in a competent and flexible way, all in all leading to a high quality of the supply. Asked about their visions for the coming years, interlocutors generally emphasize content-related goals. At the same time, most interlocutors would rather appreciate a moderate and stable growth of their companies (i.e. no booms or exponential developments) for the next years. Some KIBS experienced high growth in the preceding years and were confronted with large challenges concerning the integration of new employees and maintaining the business after this 'boom phase'. Also, they desire to get and to stay involved in different and challenging projects that require creativity and new developments.

3.3 Interpretation of the Findings

Concerning the professional trajectories of the investigated persons, it can be asserted that most of them pursued individual and original ways of reaching the position they are currently occupying. Some of them indeed had experiences of own business foundations; partly, they are still working in these companies and in leading positions, but partly they re-oriented towards being employed in other KIBS. This seems to be especially the case in France, where a considerable part of the interlocutors also had prior experiences in other sectors of activity. Thus, interestingly, own business start-ups were revealed to be not always successful, but even in cases of business failures, the closing down of the created firms was interpreted (at least afterwards) as a source of progress and personal development. Furthermore, the wide and long-term professional experience of most of our experts supports the assumption of a deep knowledge about firm-related processes as well as of the people, tasks and projects. We observed a high degree of identification with the company, its missions and development.

We consider the explicit wish of most of our interview partners to remain involved in operative work besides the strategic tasks they are fulfilling as a very interesting issue which might be an important key to our discussion about knowledge angels. Implicitly, this involvement in operative tasks seems to stimulate and deliver input for their strategic work. This involvement further enables them to stay informed about client needs and requirements, firm-internal competences and probable challenges. Their self-perception as knowledge intermediary might be also related to the fact that they have sound professional experience and know their business 'from scratch', either because they have been working in their company from the beginning (as founder and manager) or due to many years of employment in the company with experience from different positions and angles.

Concerning questions of the territorial environment and the 'embeddedness' of the company in its (regional) context, we found that the participants of our investigation are generally satisfied with their surroundings, though not always considering it exceptional. The issue of relocation did not appear to be on their agenda, the visited companies rather adapt to their environment, thus creating a 'mutually enriching' relationship. This may induce that personal perceptions and reactions towards a given environment, as well as the exploitation of locational opportunities in line with corporate goals and visions, seem to be particularly important. Summarizing, the observed KIBS can be described as being 'embedded' in their environment rather than completely 'footloose' (seeking permanently for new locational advantages).

This issue is strongly related to the issues of access to knowledge and the acquisition of new knowledge sources. The investigated KIBS seem to have developed individual 'sets of procedures' in this respect. They generally (more or less strongly) rely on the academic world and strive to be attractive employers. However, in some cases, attracting brilliant co-workers seems to be an important issue which is not always easy to cope with. These findings strongly support the assumption that (i) high complementarities exist between internal and externally available knowledge, and (ii) a high degree of knowledge content as well as knowledge processing activities of KIBS are interlinked. In this line, the successes displayed by the investigated KIBS in highly volatile markets may be based on their interdisciplinarity and networking capacity both in terms of internal orientation and capacity to establish appropriate external contacts.

Asked about their specific ways of solving problems, most of the selected persons display a strong capacity for developing visionary ideas, not only with respect to individual services and solutions, but also concerning the future development of individual fields of activity within their company or for the whole company. Interestingly, when being asked about their visions for the near future, the interviewees rarely mentioned explicitly strategic goals, but rather stressed content-oriented goals, projects and markets. The fact that precise services are at the core of their answers and not exclusively strategic aspects, may mirror the 'intermediate position' of these individuals between strategic and operative work, and also their self-perception in a position between these two areas. However, if interviewees stress the importance of visions and intuition for solving problems, which may appear of primary meaning for defining the profile of knowledge angels, the decisions they take are not exclusively taken on this intuitive basis. The impression resulting from most interviews is that ideas and visions clearly 'emerge' in the mind of the considered individuals, but are mostly ensured through discussion in teams and/or the management before implementation.

4 Knowledge Angels: A useful Concept for exploring Innovation in KIBS?

At this stage, the question that must be addressed is: Can the knowledge angel concept be considered as a useful one for exploring innovation processes in KIBS? In other words: Can the assumption of the existence of knowledge angels be confirmed in the course of the investigation? If this is the case, it leads to a further question, which is: What specific characteristics make knowledge angels so different from other KIBS employees?

First of all, the investigation clearly showed that innovation and knowledge-oriented processes are fairly common in KIBS. There is also a high awareness for creative

processes in the realization of innovative developments, albeit with different degrees of formality (explicit creative sessions versus attribution of creative ideas to the management). Based on the 20 interviews performed in the border regions of France and Germany, it can be concluded that persons acting as knowledge angels within KIBS can indeed be identified, who correspond (more or less) to our assumptions. Nevertheless, only some of the selected persons can be characterized as very likely to be knowledge angels.

Referring to outstanding characteristics of those knowledge angels, we find that the most marked characteristic with regard to individual trajectories of our interlocutors may be described as "typical path of individual career development". The identified interlocutors generally have a solid professional career within their companies, based on the continual advancement of their knowledge, core competencies and experience. Most of them have been working in their companies for a couple of years, and within this period succeeded in generating a position and working field compatible to their individual backgrounds where they can bring in their competencies, experience and personal characteristics. It is interesting to note that the observed people seem to be guided by a desire for freedom, a willingness for independence even (especially?) when being employed. Freedom from their point of view can be described as being able to shape their working place according to their wishes, working styles and preferences, meaning for them to stay engaged in project work, in content-related tasks and not predominantly in administrative and routinized aspects. A possible interpretation would be that knowledge angels consider themselves free to perform interesting project work, to define and to establish a 'niche' within the context of the 'umbrella' of the company, in other words, to define their 'own agenda'.

Table 3 synthesizes the main findings in attempting to characterize the interviewees with respect to the hypotheses developed below and indicates if the results corresponding to each considered persons fit with a strong likelihood to 'be a knowledge angel'. The underlying arguments for the assessments are the following:

- A: Extent and variety of professional experience
- B: Strategic assessment (and use) of location for internal creativity
- C: Type and degree of interactions
- D: Personal willingness to solve problems and visionary capacity
- E: Creativity-supporting corporate culture.

Besides, the main field of activity is given, differentiated between technical and business KIBS.

Table 3: Synthesis of the 20 investigated cases (Baden-Württemberg: Cases 1-10, Alsace: Cases 11-20)

No. case	Activity	Dimension					Most probable knowledge angels
		A Professional and personal background	B Business location and environment	C Knowledge access and interaction	D Problem solving and visions	E Corporate frame, enterprise culture	
1	BK	■	■	■	■	■	✓
2	BK	■	■	■	■	■	
3	TK	■	■	■	■	■	
4	BK	■	■	■	■	■	
5	BK	■	■	■	■	■	✓
6	TK	■	■	■	■	■	✓
7	BK	■	■	■	■	■	✓
8	BK	■	■	■	■	■	✓
9	BK	■	■	■	■	■	
10	BK	■	■	■	■	■	
11	BK	■	■	■	■	■	✓
12	TK	■	■	■	■	■	
13	BK	■	■	■	■	■	✓
14	TK	■	■	■	■	■	
15	TK	■	■	■	■	■	
16	TK	■	■	■	■	■	
17	BK	■	■	■	■	■	✓
18	BK	■	■	■	■	■	
19	BK	■	■	■	■	■	✓
20	BK	■	■	■	■	■	✓

Legend:

Activity: Business KIBS (BK) or Technical KIBS (TK)

- High probability to correspond to knowledge angel assumptions
- Medium probability to correspond to knowledge angel assumptions
- Low probability to correspond to knowledge angel assumptions

Most of the individuals identified as knowledge angels can be characterized as showing a high degree of identity with the company, its objectives and further development. In this general frame and also referring to the bridging function with the external environment, internal creativity is perceived as an important precondition for innovation. From the conducted interviews it can be concluded that knowledge-creation and knowledge-exploitation issues seem to be widespread among the companies visited. Knowledge generation and diffusion consequently seems to be a 'common process' in those KIBS, a process that, in turn, requires certain working conditions, a certain degree of freedom for action (and for failure). This seems to be supported by trust, identity and motivation.

Returning to the initial assumptions regarding the personalities and characteristics of knowledge angels, the following can be stressed:

- knowledge angels clearly seem to act as internal and external knowledge intermediaries
- knowledge angels seem to benefit from capabilities and a personality allowing them to develop visions based on a mix of trust, identity, assertiveness, as well as on knowledge, formal qualification, and experience
- knowledge angels seem to be able to found (and often create) a position within the KIBS they are working for which is tailored to their personal and professional visions and wishes, which enables them realize and implement these visions.

5 Conclusion

Our preliminary test of the notion of knowledge angels confirmed the existence of such creative individuals within KIBS. They describe themselves as 'knowledge brokers' and 'idea givers'; however, as identified and detailed above, their specific roles and functions go beyond knowledge brokering. They are well educated, have important learning capacities (including the capability to recover after professional failures), react quickly to changing conditions of business. Nevertheless, they are not 'bohemians' (highly foot-loose), in the sense that they perceive their local environment as a crucial asset and are steadily looking for new opportunities. They consider the ability to develop personal visions ('feeling before the others') as one of their most important qualities, but observe that such a vision can only emerge after having gathered a certain experience and after many discussions and interactive work. They fully participate in strategic decisions but express the need to keep contact with operational tasks. We can place those observations in the wider framework of knowledge economics by quoting the concept of 'knowledge communities'. Creativity – and especially economic creativity – does not primarily or exclusively depend on the existence of 'gifted' or 'talented' individuals, but rather results from the development of knowledge communities in the sense of Cohen-

det et al. (2006). Knowledge angels draw a large part of their creativity from participating in knowledge communities within and across the firms' boundaries. In particular, their insistence on "keeping contact with operational tasks" points to the existence of 'communities of practice'.⁷

The territorial dimension we confirmed through the enquiry shows how relevant knowledge communities are embedded in the local milieu, but not only in terms of professional relationships: apparently, knowledge angels (and other KIBS employees) are attached to their region also for personal reasons. It is possible that local culture and amenities play a significant role, and therefore, 'space does matter'. As a result, KIBS efficiency varies among regions as proved in previous studies on the same areas (Zenker 2007). The next question to address in future research is the translation of such analytical conclusions into policy recommendations for regional policy-makers. Can we design a *creativity policy* using the focal role of KIBS for regional development in the knowledge-based economy? Can we help KIBS in their recruitment strategy and can we make knowledge angels appear?

At this stage of the investigation it is not possible to suggest detailed policy initiatives or measures in this respect. Nevertheless, the insights gained into KIBS and their knowledge-related processes enabled us to confirm our initial assumptions concerning the significance of individual persons for the stimulation of creative processes in KIBS. Consequently, it can be deduced that it may be of utmost importance for KIBS to give co-workers the chance, confidence and freedom to find their own way of action and the corresponding position, especially when those seem to be unusual or unexpected.

Acknowledgement

The writing of this paper was made possible by a project granted by the Fraunhofer ISI strategic research fund and supported by the evoREG initiative funded by the Région Alsace. The authors owe thanks to M. Guy-René Perrin and Mrs. Coralie Bajas-Schaefer.

⁷ As Cohendet and Simon (2007) state: '[T]he core of the innovative potential of the firm resides at the interaction between the hierarchical structures of the firm (the projects) and the informal structures (the knowing communities that nurture and capture the creative slack of the company).' This interaction is realized by creative individuals who fall in the knowledge angel category as conceived in the frame of the KAIROS project.

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