Knowledge-intensive Business Services in National Innovation Systems

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Abstract In order to find the roles of knowledge-intensive business services (KIBS) in the innovation activities, this paper focuses on three perspectives. First, we find that KIBS possess good prerequisites to function as vehicles in innovation distribution, the sources of innovation and the facilitators of innovation in their client firms. Second, we further discuss KIBS as the knowledge and innovation infrastructure of society in parallel with the research, educational and other public institutions. Third, we present some research policies and agenda to promote the development of KIBS. It is regarded that much remains to be studied both in the use of KIBS and in their own activities, including integrating and networking the knowledge-intensive services into the client companies, the convergence of various services and closer connection with the client companies’ strategy, and the national policies to connect the KIBS to the different sectors.

Key words knowledge-intensive business service; national innovation system; knowledge infrastructure; research agenda

Though business services have been the fastest growing branch in most developed countries and newly developing countries during the last thirty years, and more and more knowledge is functioned in increasing productivity of business services, it has only been since the mid of the 1990s that research has focused specifically on knowledge-intensive business services. In 1995 these services were separated into their own group more precisely than previously and the definition of knowledge-intensive business services (KIBS) was adopted[1]. Since then there has been a constant growth in research interest into the nature of KIBS and into their role in society. Closely connected with the awareness of the importance of KIBS have been the new insights concerning innovation activity. The following three research trends and approaches are particularly important in this respect: 1) the broadening of the traditional innovation concept focused on science and radical inventions, 2) appreciation of the significance of service innovations and research into their special nature, and 3) the adoption of innovation systems thinking.

Services have until recently been considered of secondary importance in innovation. Research into KIBS has occupied a pivotal role in the change of this way of thinking. Firstly, in technology-based KIBS (T-KIBS), innovation activity is largely perceived as resembling high-technology industrial sectors[2-3]. Secondly, in the measurement of innovativeness the traditional indicators connected with technological innovation such as R&D activity, patents, etc. have been shown insufficient. Especially the role of human resources in underpinning innovations have been emphasised and, connected with this, investments in human resources as an important indicator of innovativeness have been brought up[3-4]. Research into innovation activity in the KIBS sector has been conducted side by side with more general research concerning service innovations. They both have also brought out factors that contribute to the understanding of innovation activity more broadly. That is to say not only in service sectors, but in manufacturing sectors as well. Such factors include the significance of incremental innovations and innovation combinations, interaction between product and process innovations and co-production of products and services together with the clients[5-6].

The innovation systems approach is closely connected to the new insights concerning the nature of innovation activity. Of central importance is particularly the perception of the many different actors involved in the innovation process. The capability of companies to innovate depends to a great extent on knowledge produced externally. Innovation is shaped...
by interactions between an innovating firm and its various suppliers, collaborators, competitors and customers, technological infrastructures, professional networks etc. Innovation is, by nature, a multi-organisational phenomenon and as such its success depends on efficient forms of coordination. Discussions about innovation systems have originally touched upon national innovation systems.

The significance of KIBS in innovation systems stems from their numerous and versatile contacts with different stakeholders. On this basis it has been suggested that KIBS act as orchestrators of innovations and even orchestrators of whole innovation networks. They are considered to form a node in a system of customers, cooperation partners, public institutions and R&D establishments and to constitute a part of the knowledge and innovation infrastructure of society together with education and research institutions[3, 6-9]. This paper examines in greater detail the theories and research results of how KIBS are connected with innovation systems and their components at different levels. On this basis some conclusions are drawn concerning further research needs, and needs for practical development work.

1 KIBS Role in National Innovation Systems

The importance of innovation activity in society has grown as a result of several societal development trends, such as globalisation, deregulation and liberalisation of markets, the ICT revolution, and the increasing complexity of science and technology. These intertwined factors have brought about an intensification of economic competition, and the ability for continuous renewal, the ability to produce, distribute and apply new knowledge, is necessary for success. So, now the researchers are paying more attentions to the knowledge as the major contributor to industrial competitiveness. Actually, the concept of a national innovation system (NIS) focuses on the problem of how to coordinate and manage the processes of knowledge creation, acquisition, distribution, and use in order to rapidly and continuously produce innovation. A national innovation system can be defined narrowly or more widely. In the narrowest sense it only includes those organisations that are directly related to the process of search for new knowledge: the R&D departments of firms, technological institutes and universities. In a broader sense it also refers to those organisations that facilitate the innovation process and provide additional input into it. These kinds of support organisations are training organisations, technology transfer institutes, investment banks and economic associations among others. In a still wider sense a national innovation system includes all the sectors of society that contribute to learning and the acquisition of knowledge: i.e. also the production system, the marketing system and the system of finance.

The background to the broad interpretation of the innovation system is the idea of the close connection of innovation activity with learning, which itself takes place to a great extent in everyday activity. Innovations are often based on existing products and processes, improvements to them and new combinations. Learning-by-doing, learning-by-using and learning-by-interacting produce important inputs to the process of innovation. Thus, the national innovation system is rooted in a national system of production. National characteristics of inter-firm relationships, networks, and of financial and educational systems among others are issues which should be taken into consideration when investigating the prerequisites for innovation[11-10].

Also in those studies where the innovation system is interpreted in a more narrow way, its close connection with other sub-systems of the economy and society is emphasised. In addition to the aforementioned organisations, the importance of the labour market and legal systems has been brought up. The former is connected to innovation activity in terms of its function in the allocation of skills and competences, and the latter in terms of the topical issues of property rights and competition law. On the other hand, it should be pointed out that all the organisations in society, even the universities, also have other tasks than those connected with innovation activity. It is therefore often more fruitful to examine the innovation-related functions of these organisations rather than the organisation itself.

In order to understand the role of KIBS, some kind of broad perspective to the innovation systems is needed. It is also important that the examination takes into consideration both the creation of new knowledge as well as the dissemination of knowledge: the significance of the latter to an enterprise’s innovativeness and competitiveness is still often underestimated. However, a huge national knowledge base does not necessarily guarantee intensive innovation activities at the firm level - the distribution power within national innovation systems is at least as important as the creation of new knowledge[6-12].
Neither can the generation of innovations nor their diffusion be seen as consecutive stages as in the previous linear concept of innovation, but as activities within a continuous interaction\[10\]. The role of KIBS in innovation activity is important for both the creation and distribution of new knowledge.

So far there is little detailed empirical description of the functioning of KIBS as a vehicle for innovations. According to an OECD study in 1999, it was thought, however, in some of the member countries, that KIBS are the most common vehicle for the diffusion of innovations from larger firms to small and medium-sized enterprises\[13\]. The importance of KIBS as diffusers of innovation and new knowledge is based on the fact that client firms are rarely able to adopt acquired external knowledge in practice as such and by themselves, but need the assistance of an experienced expert\[8\]. The development of information technology alone has significantly increased the demanding nature of finding and combining relevant knowledge, at the same time as it has facilitated the processing, storage and transfer of knowledge\[14\]. In the distribution of knowledge both the transfer capacity and absorptive capacity are of essential importance\[6\]. With regard to the former, KIBS play a role, for example in guidance relating to the commercialisation of innovations, including intellectual property rights issues. Concerning the latter, consultancy and training targeted to improve the level of expertise of the personnel, as well as information technology services are contributions that KIBS are able to provide.

From the viewpoint of the diffusion of innovations and the dissemination of new knowledge, the connections that KIBS have with the different parts of the innovation system are significant. At a general level empirical studies in European countries have shown that formal and informal networks and cooperation are common as regards KIBS\[15\]. It is precisely due to their wide-ranging connections that KIBS are supposed to possess good prerequisites to function as brokers between different actors and bridge different functions. Some studies examining more specifically the nature of these connections have been carried out. Results gained from Finland show that the bridging function of KIBS is mainly horizontal, linking firms within and across industries. The most common collaboration partners of KIBS are clients, other service firms and equipment and software suppliers. The situation is more complicated in relation to research and education institutions and public business-development institutions. Technology-based KIBS have connections to universities and research institutions to a certain extent. And for enterprises providing R&D services universities are even one of the most important partners. However, in KIBS that are not technology-based connections to universities and research institutions are rare. The same difference between technology-based and non technology-based KIBS can be observed in connections with public business development organisations. The result may partly be influenced by the strong emphasis on technology that has long prevailed in the Finnish national innovation system, for which reason only a small amount of public development services are on offer to non technology-based KIBS\[16-17\]. Professional and sector-specific networks play a crucial role in the maintenance of the level of expertise within both technology-based as well as non technology-based KIBS\[18\].

2 KIBS in Knowledge Infrastructure

The discussion above has focused on questions of how KIBS firms function as a link between the various parts of the national innovation system and how they contribute to the diffusion of innovations. The idea that KIBS are developing into an essential element of the knowledge infrastructure or knowledge base of society\[8\], also includes another important perspective: the role of KIBS as sources of innovations and as facilitators of innovation and knowledge production at the corporate level.

KIBS’ own innovation activities have been studied both by applying the conventional indicators developed in the manufacturing sectors, such as the scope of R&D activities, and by analysing indicators particularly characteristic of innovative service firms, such as inputs made in the know-how of personnel. Even manufacturing-centred indicators reveal many KIBS as highly innovative, particularly T-KIBS like engineering companies and software houses\[19,3\]. Personnel’s training plays a prominent role in all kinds of KIBS companies. For instance, according to a study carried out in Germany, 71% of the KIBS companies regarded training linked to innovation as important or very important, while the corresponding share in the case of other service firms was 37\%\[20\].

In some studies the innovativeness of KIBS has been measured by asking firms what kinds of new service concepts they have adopted. A study carried out in Finland showed that more than forty percent of firms in KIBS industries had introduced completely
new services within the past three years\textsuperscript{[17]}. Even this finding may give too low a share, because just as service firms may often find it difficult to define what an innovation is, they may also consider it hard to determine when a service is wholly new. In qualitative face-to-face interviews of KIBS companies it has emerged that the major part of the concrete descriptions of innovations comes up in connection with themes other than those directly targeted at innovations. For instance, the outsourcing of expert services is often connected with important imperatives for change, and the KIBS companies may describe the new solutions they have provided for their clients when telling the interviewer how a service previously produced in-house came to be bought from them\textsuperscript{[18]}.

In facilitating the innovation activities of a client company, KIBS occupy a twofold role: firstly, they may contribute to the creation of new ideas, and, secondly, they can help in the management of the innovation process. When new ideas are being generated, the starting point may be a problem defined by the client, to which a KIBS company either directly brings a solution based on its expert knowledge or contributes to achieving a solution by analyzing and clarifying the problem. However, an initiative leading to innovations may also spring from a KIBS company, which makes the client aware of changes in the business environment or in the broader economic and societal contexts\textsuperscript{[8]}.

An interview study of Finnish KIBS companies revealed among others the following viewpoints that service companies aimed to convey to their clients and that may be a basis for new innovations\textsuperscript{[18]}:

Consultants in the information technology business were worried about the level of knowledge related to the man/machine interaction in the new environment based on the Internet and mobile technology.

Enterprises engaged in marketing communications inform their clients e.g. of changes in consumer behavior.

Accounting firms considered it important to develop the foresight thinking of their client companies and the futures accounting based on it.

Engineering firms regarded life-cycle thinking and the social impacts of technology as examples of issues in which they can provide their clients with new knowledge.

According to several researchers, the core of knowledge-intensity, the special characteristic of KIBS, lies in the capability of these firms to integrate different sources of information and knowledge into the intra-firm’s innovation process\textsuperscript{[20]}. The KIBS' activities are particularly important as an interface between explicit and tacit knowledge. In their cooperation with numerous clients and in their contacts to the scientific community, KIBS gather information that they combine with the experiences and knowledge buried in the daily practices and routines of the firm they currently serve\textsuperscript{[21]}.

Besides producing new ideas, KIBS support their client companies in many ways in the management of the innovation process. They act as the agents for change, or help enterprises to develop their activities and organisation by offering a neutral outside perspective. This operating method is a characteristic of management consultancy firms in particular. KIBS can also provide detailed expertise needed in some areas of the innovation process. As an example the IPR issues and international regulations can be mentioned: the advisory services related to these have raised one of the most traditional of KIBS sectors, the legal services, to a prominent position in terms of innovation activities.

Innovation activities are today an increasingly multidisciplinary effort. For KIBS this means that they all the more seldom can limit themselves to only one field of expertise. The boundaries between the various KIBS sectors are becoming blurred: individual KIBS companies recruit experts from many different fields and network contacts crossing sectoral boundaries are becoming more general\textsuperscript{[13,22]}. Across the board or total solutions and service packages produced on this basis often meet the needs of the customer better than separate services acquired from several different providers. However, they require that the KIBS themselves must be capable for co-operation and coordination of their activities at a new higher level. The coordination of activities also often presupposes that KIBS are aware of the strategic objectives of the client company to which the solutions and services relate. The position of KIBS in relation to the client company may go even further: the service company is no more the one that strives to understand the strategy of its client company and develop its operations on this basis, but the client company adjusts its activities to fit in with the service provider’s concept. Development of the latter kind has been discernible for example in the information technology sector where certain big
consultancy firms aim to extend their influence over the direction of some parts of their customers’ business.

3 Policy and Research Agenda

The role of KIBS as part of the innovation system and the knowledge infrastructure of society has already been recognized rather well at a general level. Still, much remains to be studied and developed as to what this role means in terms of the use of KIBS and the KIBS’ own practice. The central issues include the following: 1) know-how of the clients in acquiring and using knowledge-intensive services; 2) upkeep and development of expertise in KIBS companies; 3) balanced development of different types of knowledge-intensive services, including non-technological KIBS; 4) safeguarding the availability of KIBS outside big cities, and the related concrete policy measures; 5) development of private KIBS and the corresponding public and in-house services of client companies as a whole, so that they can yield the best possible benefit for innovation activities.

The significant advantage of an expert service bought from the outside is that it strengthens the company’s chances of keeping up with the latest developments and best practices and offers a wider perspective than the one that could usually be achieved inside one individual company[15]. However, gaining these benefits requires know-how of the client company, and if it does not possess these skills, serious mistakes and considerable economic losses may occur. The client must know what service to buy and must have, during the entire service process, a skilled recipient organization, which is capable of assessing the quality of the service. For this reason the guidance related to the use of KIBS should, more systematically than today, be integrated into the advisory and development activities provided by the innovation supporting organizations. To some extent, an attitudinal change also continues to be called for: there are companies that, for example, still regard accounting as an obligation imposed on them by law, and marketing as an extra cost.

Development of the KIBS expertise also constitutes an important challenge although it is justified to call the sector as a whole knowledge-intensive. This does not guarantee that each individual company in the sector would be a highly skilled expert. Especially the convergence of the various KIBS sectors described above will require a new kind of know-how: combining the in-depth knowledge of one’s own sector with a wide-scoped horizontal perspective. Another important challenge is combining sector-specific ‘technical’ knowledge with social and personal competencies, with the so-called general qualifications. Service packages and total solutions have a positive influence on the development of competences in KIBS companies at the level of the whole organization and not just at the level of individuals. According to a study carried out in Finland, KIBS companies whose operations are based on total solutions are more innovative than firms where the know-how of individual expert is provided to clients case-by-case. Knowledge embedded in service solutions or packages can be improved cumulatively, whereas expert skills applied to a variety of problems are likely to lead mainly to learning by individuals[17].

Many T-KIBS, especially KIBS related to information technology, are the core functions of the new Information Society and their development includes features whose study can give information on the on-going development also in a wider perspective. On the other hand, it is important that KIBS research or the development of the KIBS sector is not restricted to a specific sub-sector, but that the examination is also extended over to non-technological KIBS. In the previous subsection reference was made to those functions that the management consultant firms and legal services have in supporting the innovation process. Also, financial and marketing services are essential in this process and often especially important for new businesses. The importance of financial consultancy is stressed by the continuous acquisitions, mergers and other forms of corporate restructuring, which are typical of the present situation. The advisory duties related especially to international corporate restructuring are often very demanding and contribute in an important way to the knowledge base of a service company. International acquisitions and mergers are also situations in which the added value produced by KIBS for the client company may be considerable.

Developing versatile services outside big cities is a particularly challenging task. For instance, the innovation benefit gained from centers of excellence and technology villages remains half-finished if marketing and legal services are not connected with them. Extending public innovation subsidies and services, besides high-technology enterprises, over to knowledge-intensive service companies would be one
important way of developing the sector. In addition, sector- and theme-specific development work within the framework of a program could also be applied in the manner of technology programs\(^{27}\). Specialization based on a region’s own economic and industrial structure supports the development of expert services in remote areas; good experiences of this have been gained in services related to information technology. The possibilities of co-operation and division of labor between big international KIBS companies and small local KIBS should be studied and promoted. The big KIBS companies play a key role in improvement of the know-how of their own sector and in standardization of services\(^{15}\).

Besides expert companies specialized in knowledge-intensive services, the client companies themselves also provide these services. The extent to which these services are outsourced and to which they are provided in-house varies e.g. by country, sector and company size\(^{15}\). Increased outsourcing has been the main trend during the last few decades, but it has not reduced outright the services provided inside the client companies - both have increased hand in hand, one explanation being the need for a skilled recipient organization mentioned above\(^{23}\). In addition to private expert companies, services supporting innovation activities are also provided in the public sector. KIBS companies and the corresponding service organizations in the public sector co-operate to some extent, but competition also takes place between them. All in all, research into and development of the mutual interaction between the services provided by KIBS companies, the corresponding public services and those provided by the client companies themselves are only getting started. The OECD has recently launched a comprehensive research project, the so-called KISA (knowledge-intensive service activities) project, which maps out the unity formed by the services referred to above in various countries, analyses the related mechanisms of interaction and, based on this, lays the grounds for developing knowledge-intensive services as part of the innovation system\(^{24}\).

4 Conclusions

The new insights concerning innovation activity have significantly contributed to the understanding of the KIBS’ role in the economy and society. Innovation systems thinking, which emphasizes the importance of external knowledge sources and external support for the innovation process as well as the multiple actors involved in this process, can be counted among these insights. KIBS have been considered to be important providers of external knowledge and support and to act as brokers between different actors.

Empirical studies, too, have shown that networks and cooperation play a central role in KIBS’ activities. On this basis, KIBS possess good prerequisites to function as vehicles in innovation distribution. In practice, the distributive activities of KIBS have been found to focus on horizontal linkages between firms, whereas the linkages to universities, research institutes and public business-development organizations are rarer and found mainly in T-KIBS. In addition to functioning as innovation diffusers, KIBS play an important role as sources of innovation and as facilitators of innovation in their client firms. Even traditional innovation indicators, like R&D activity, have shown many KIBS highly innovative. The innovativeness of KIBS can be observed even more clearly when the forms of innovativeness characteristic of service companies are studied, such as the inputs in personnel training. Qualitative interviews of KIBS firms reveal still more innovative activities that firms describe in connection with other topics without recognizing them as innovations.

It has recently become increasingly evident that KIBS occupy an important position in the knowledge and innovation infrastructure of society in parallel with the research, educational and other public institutions. However, much remains to be studied and developed both in the use of KIBS and in their own activities. Integrating knowledge-intensive services into the operations of a client company is not a straightforward activity, but requires know-how of the client as well. On the other hand, internationalization and the convergence of various services and closer connection with the client companies’ strategy set challenges for the expertise of KIBS companies. In the development of KIBS, it is important to develop the sector as a whole in a diversified manner, and not just the technological KIBS at the heart of the Information Society. An especially demanding task is to find means of securing the supply of knowledge-intensive services for enterprises operating outside big cities. Finally, it is essential that the innovation services provided by private KIBS companies are examined together with those provided by the public sector and the client companies themselves, i.e., the entity formed by knowledge-intensive service activities, and its sufficiency and appropriateness must be studied.
References


Brief Introduction to Author(s)

WEI Jiang (魏 江) was born in Zhejiang Province, China, in 1970. He received the M.Sc. degree from the University of Science and Technology of Wuhan, Hubei, in 1994 and Ph.D. degree from Zhejiang University, Hangzhou, in 1997. He is a professor with Zhejiang University and the co-chair of National Innovative Research Base of Innovation Management, Zhejiang University. His research interests include technological innovation, strategic management, and knowledge-intensive business services.

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