The role of KIBS in the IC development of regional clusters

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Abstract

Purpose – The paper seeks to introduce the concept of knowledge-intensive business services (KIBS) in the context of regional networks and to analyze the roles of KIBS in regional development, especially from the viewpoint of regional intellectual capital.

Design/methodology/approach – Regional networks are presented as the networks of production, development and innovation in the region. Drawing from recent literature, the roles of KIBS in regional networks are discussed.

Findings – It is argued that networks for production emphasize explicit knowledge, networks for development emphasize tacit knowledge, and networks for innovation emphasize emergent, potential knowledge. It is further stated that KIBS provide the timely information needed in production networks, transfer best practices that support learning in development networks, and function as sources of innovation and facilitators of innovation processes in innovation networks.

Practical implications – The paper provides an approach to reduce the complexity of regional networks into a more manageable level, and highlights the importance of knowledge-intensive business services in regions.

Originality/value – The approach used in this paper addresses the following gaps in existing research: it argues that KIBS are important actors in the regional IC development, highlights that the roles of KIBS are different in production, development and innovation activities, and argues that a successful region needs all of these activities.

Keywords Intellectual capital, Knowledge management, Networking, Knowledge organizations

Introduction

The role of knowledge has been widely discussed in the management literature. It has been argued that the so-called “knowledge-based economy” functions – at least to some extent – with a different value-creating logic to the industrial economy. The special attributes of knowledge, especially its characteristic as a “public good” and the endless replication possibilities included in it, make knowledge a key economic resource. Knowledge is seen today as the dominant source of competitive advantage (Drucker, 1995; Matt, 2005).

The role of regions is highlighted in knowledge-based economy. Knowledge sharing contains elements that require physical proximity – learning by doing and learning by using are good examples of this. Although the new information technology increases the possibilities for codifying knowledge and transferring it over long distances, much
of what needs to be communicated remains tacit. Besides the opportunities for contacts and informal links provided by spatial proximity, there are also other rationales behind focusing on regions. The peculiarities of the institutional fabric vary between regions, and the primary place of firms' decision-making is at the regional level. Furthermore, there are often localised pools of specialised expertise for certain industries. Finally, actors in the same region share, at least to some extent, common perspectives, norms and culture, which helps in creating an atmosphere of trust and confidence (Dosi, 1999; Howells, 1999; Kautonen, 2001; Zenker, 2001).

Thus, the increasing internationalisation does not erode the significance of regions. On the contrary, many researchers consider the globalisation and regionalisation tendencies to be interconnected and mutually reinforcing (Howells, 1999). However, regions have to be active and find their own strengths in order to survive. With this kind of a strategy even remote regions can attract different kinds of flows: capital, employee and knowledge flows (Castells, 1996).

Networking and the development of strong regional clusters have been argued to be a method by which the competitiveness of regions can be increased. The discussion on regional clusters is topical, for example, in those peripheral regions of the European Union where structural alterations have made traditional industries and agriculture unprofitable. The role of supporting services beside the industrial core has aroused growing interest in regional networks and clusters in recent years. Sufficient supply of services in a region often causes the emergence of “a virtuous circle”: the services attract more firms to the region and the growing regional economy needs more services (Martinelli, 1991). Along with the development of the knowledge-based economy, advanced manufacturing industries depend on the availability of so-called “knowledge-intensive business services” (KIBS) in particular.

The purpose of this paper is to analyse the roles of KIBS in regional development, especially from the viewpoint of IC development in regional clusters. Regional clusters are collaborations of several organizations within the same geographical area and industry (Porter, 1990). The roles of KIBS are examined in three kinds of networks developing in the context of a regional cluster:

1. production networks;
2. development networks; and
3. innovation networks.

It is argued that in each of these network types a specific type of knowledge – explicit, tacit and potential, respectively – becomes highlighted (although also other kinds of knowledge are needed). Correspondingly, the roles of KIBS are to some extent different in different kinds of networks. Before going more deeply into these roles, we summarise briefly the central findings of the earlier KIBS research as well the arguments behind the above-mentioned categorisations of networks and knowledge.[1]

The nature and significance of KIBS

KIBS are expert companies that provide services to other companies and organisations. IT services, R&D services, technical consultancy, legal, financial and management consultancy, and marketing communications are typical KIBS industries (Miles et al., 1995; Hermelin, 1997; Strambach, 2001).

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KIBS have been found to hold a crucial position in the knowledge processes between and within firms, due to which their role as a supporter of the development of the knowledge-based economy has inspired broad discussion. Several studies have shown that KIBS are important sources of knowledge, facilitators of knowledge creation and carriers of knowledge (Miles, 1999). The role of KIBS as knowledge sources is linked to their functioning as active innovators. The versatile innovation activities in KIBS – measured both by investments in innovation and by the outputs of innovation – have been confirmed, for example, by the Community Innovation Surveys (Miles, 2001). The ability of KIBS to facilitate the knowledge processes of other companies stems from their numerous and versatile contacts with various stakeholders. On the basis of these abundant contacts KIBS have a broad view of the latest developments, which enables benchmarking (Stránský, 2001). While “shuttling” between different clients, KIBS also carry new ideas and best practices from one firm to another. They have been found to be the most common vehicle for the diffusion of innovations from larger firms to small and medium-sized enterprises in many countries (Organisation for Economic Co-operation and Development, 1999).

In the analysis of knowledge networks, the role of KIBS as “brokers” or “bridging intermediaries” has been the focus of several studies, i.e. besides the above-mentioned functions KIBS have been studied as actors which combine knowledge sources and knowledge users. They have been seen to form nodes in systems of customers, cooperation partners, public institutions and R&D establishments (Werner, 2003). The significance of the brokering function of KIBS is highlighted by the fact that most innovations today are not created inside single companies, but in networks of multiple companies (i.e. Powell, 1998). Empirical studies suggest that the network relationships and the bridging function of KIBS are mainly horizontal, linking firms within and across industries. However, as the employees in KIBS typically have an academic background, there are also natural linkages to the scientific world (Kautonen, 2001; Leiponen, 2001).

KIBS act as an interface and mediator between the knowledge buried in the daily practice of firms and the generic knowledge available in the economy as a whole. They are containers and dynamic sources of “quasi-generic knowledge” extracted from repeated interactions with firms and other actors, including producers of new scientific knowledge (Antonelli, 1998, 1999). Some researchers have summarised the role of KIBS in the society by saying that KIBS form an informal, private, “second” knowledge infrastructure, which complements the intermediate role played by the formal, public knowledge base, i.e. education and research institutions (den Hertog and Bilderbeek, 2000).

The development of information and communication technologies (ICT) furthers the demand for KIBS in several ways. Along with the “explosion” of the amount of information, there is a growing need for highly qualified professionals who are able to provide comprehensive and customised interpretation of random data (Lundvall and Johnson, 1994). On the other hand, the development of ICT also gives new incentives to the codification of knowledge (Lundvall, 2003). It increases the divisibility of information, which, together with the enhanced accessibility, results in the growth of the commercial potential of information. KIBS tend to be among the chief advocates and supporters of the emerging information markets. Finally, ICT has essentially increased the opportunities to effectively combine external and internal knowledge.

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Knowledge types and different kinds of regional networks

Researchers of knowledge management have identified three different types of knowledge:

1. explicit knowledge;
2. tacit knowledge; and
3. potential knowledge.

Explicit knowledge is especially linked with the issues of timely information provision. Tacit knowledge is most often discussed in the framework of conversions between tacit and explicit knowledge brought to general awareness by Nonaka with his SECI model (Nonaka and Takeuchi, 1995). In the strategic management of a firm, the SECI model has been argued to be best suited to situations where existing processes are gradually improved (Scharmer, 2001). At the moment, the chaotic and complex elements of knowledge and their management are attracting increasing attention. Scharmer (2001) describes this third knowledge type – potential knowledge – as "not-yet embodied, self-transcending". It is needed in sensing and actualizing emergent business possibilities; in other words, it is the type of knowledge that gives momentum to the knowledge spiral of the SECI model[2].

In general, the focus in the knowledge management literature has shifted from seeing knowledge as an asset of a firm towards seeing it as a capability. This notion has also been the starting point in the network model of a regional cluster described in this paper (Smedlund and Pöyhönen, 2006).

In some earlier studies (Pöyhönen and Smedlund, 2004; Smedlund and Pöyhönen, 2005), we found that the nature and structure of networks in a regional cluster vary according to the strategic goals of cooperation. These goals may be:

- efficient production;
- gradual development; or
- continuous innovation.

In order to reach competitive advantage, a regional cluster needs efficient production of pre-designed products, learning of best practices and ideas with trustworthy sources. It has enabled easier interfaces and higher levels of appropriability of specific problem-solving methodologies. Through the use of these new means, KIBS can better than previously provide their clients with access to information dispersed in the society and enhance shared learning experiences between the nodes of innovation networks (Antonelli, 1998, 1999).

As many KIBS operate regionally or locally, selling services to nearby firms (Kautonen, 2001; Muller and Zenker, 2001), their contribution has been considered to be of special importance in the regional context. Besides the creation and transfer of knowledge, KIBS also develop an understanding of the different actors in a region. In knowledge networks, KIBS use their sense of the surrounding business environments and bring different actors together. Thus, KIBS have an important role not only from the general IC point of view, but also in the formation of regional IC. Regional IC can be viewed as a capacity of a region to create wealth with intangible assets.
relationships, and finally, innovation of totally new products, production methods or processes. Correspondingly, the network structure consists of:

- production networks targeted primarily to the implementation of knowledge;
- development networks targeted primarily to the transfer of existing knowledge; and
- innovation networks targeted primarily to the creation of new knowledge.

When the production, development and innovation networks are working properly, innovative ideas find the right parties in order to become processed; also, new innovations diffuse fast and thus enhance productivity.

It is important to point out that the three network types are not closed systems inside a region. A regional cluster consists of many overlapping production, development and innovation networks, and some of the networks have also actors from outside the region. An actor in the regional cluster can simultaneously participate in every type of network. From the viewpoint of individual firms, a certain type of network may dominate the firm’s operations in a given time, but successful firms usually have elements of all three network types simultaneously. In other words, a firm has to be able to manage its existing business efficiently, to ensure the growth with these businesses, and to develop new businesses (Fitzory and Halbert, 2000).

The idea of three basic types of networks provides a model that helps to understand how competitive advantage is created in regional clusters. The separation of the functions linked with production, gradual development and innovation activities also reduces the complexity of the network relationships into a more manageable level.

In the following, we combine the ideas of the three different network types and the three different knowledge types. We argue that explicit knowledge is especially important for production-centred networks. In development networks, tacit forms of knowledge and the conversions between tacit and explicit knowledge play a central role. In innovation networks, knowledge is still to a large extent in a potential, chaotic form: the task of the network is to bring order to this chaos and make some elements of the potential knowledge "exist". A more detailed discussion on this argument follows in the next section, where we analyse the knowledge functions of KIBS in each of the different types of networks.

The roles of KIBS in production, development and innovation networks

The three types of networks can be described with some basic dimensions. Following our earlier work (Pöyhönen and Smedlund, 2004, Smedlund and Pöyhönen, 2005), we analyse the networks in terms of the nature of relationships, competences, information flows, and leadership methods. These dimensions were originally identified by Stahle in her study on the “knowledge environments” of different types of companies (Stahle et al., 2003). We also find the categorisation to be applicable at the network level, and we have discovered differences between the three network types on the above-mentioned dimensions. This result provides additional grounds for our argument about the different nature of knowledge and the different roles of KIBS needed in different kinds of networks.

The roles of KIBS in regional clusters

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KIBS in production networks

In the production network (Figure 1), pre-designed products are produced in a hierarchical network of suppliers and customers. The relationships are seen as long-term investments and they are dyadic between the focal company and other actors. The relationships are strategic in Jarillo’s (1988) terms, because in production networks the competencies are well-specified core competencies of participants. Allowing the actors to concentrate on their core competencies, a well functioning production network reduces the transaction costs of the actors, and all participants are able to benefit from the strategic networking.

In order to produce permanent high quality and to achieve the pre-determined goals, clear and coherent rules and regulations are enforced by the focal actor. Thus, the essential knowledge of the production network should be in an explicit form and circulated to all relevant actors. It is enough that information flows in one direction, mostly top-down, because discussion and elaboration open up the possibility for modifications, which in this type of network are unwanted and mere hindrances to its effectiveness.

In the production network, KIBS also operate first and foremost in the realm of explicit knowledge. There are, however, several different functions that KIBS can carry out in this context. First, they can take care of some well-defined tasks or some specific stage in the client’s business process – work on behalf of the client. Financial analyses, feasibility studies, design documents and managerial services (e.g. facility management) are examples of such services. For example, in the case of feasibility studies, KIBS can provide information about the regional structures that include knowledge about factors of production, demand conditions, related and supporting industries, and rivalry (Porter, 1990). The activity of KIBS may consist of the provision of an individual service, but it can also contain a broader service package or a turnkey service.

Secondly, the activity of KIBS may concentrate on solving the client’s production-related problems, including, among others, diagnosis and problem clarification tasks. After a diagnosis, KIBS usually provide some advice. Thus, suggesting and evaluating possible solutions for the client is the third typical function of an individual service, but it can also contain a broader service package or a turnkey service.

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Figure 1.
The role of KIBS in production networks (cf. Stähle et al., 2003; Smedlund and Pöyhönen, 2005)

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Production network</th>
<th>Nature of the network</th>
<th>Position of KIBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Efficient production of a pre-designed product for a focal company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>Hierarchical, long-term relationships with selected partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competences</td>
<td>Well specified core competencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information flow</td>
<td>Specified, one-way and mostly top-down</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership method</td>
<td>Focal company, direct use of power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of KIBS</td>
<td>Providing explicit and timely knowledge, performing a specified phase in clients’ business processes, diagnosing and clarifying clients’ problems, providing advice, acting as a change agent</td>
<td></td>
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Source: Stähle et al. (2003); Smedlund and Pöyhönen (2005)
of KIBS, which can vary from legal issues to environmental engineering. Finally, KIBS also function as a change agent, i.e. they provide a neutral outside perspective, which facilitates the implementation of changes. It is, however, typical of KIBS operating in a production network that they do not get deeply involved in the decision making process of the customer. Their activity can be characterized more as indurcement of the clients’ decisions by providing timely and context-specific information (Miles, 1999).

KIBS in development networks
The development network (Figure 2) is a horizontal network that can be used for joining firms in a regional cluster, even though they do not cooperate in the production function. Benefits that can be acquired through a development network in a regional cluster are, for example, improved marketing or the acquisition of venture capital. In development networks, co-operation is conducted in everyday casual communication between the actors, and active participation is encouraged. There is no single dominating actor, but there can be a coordinator who supports knowledge sharing.

Tacit knowledge based on best practices plays a central role in development networks. This knowledge is related both to products, production methods and processes. The actors of a regional cluster learn from each other’s firm-specific experiences, and in this way their competencies develop gradually in the course of time. The continuous step-by-step development occurring in the development network is based on lateral two-way information flows, double contingent relationships, and empowering leadership. Also learning about innovations and new solutions takes place in reciprocal, long-term and trustworthy relationships at the inter-personal level and through informal dialogue — in a way which very much resembles the idea of the working of communities of practice (Brown and Duguid, 1991). Further, important information about the behaviour of customers can be conveyed in development networks, and they also provide opportunities for the actors to get to know each other (Smedlund and Pöyhönen, 2005).

The role of KIBS in a development network is to intermediate tacit knowledge by distributing experiences and ideas, and by benchmarking different actors in a region. Several studies have confirmed that the role of KIBS as an intermediary of tacit knowledge is highly important, besides the provision of explicit expert knowledge (Bessant and Rush, 1995; Miles, 1999). KIBS also help their clients to convert tacit knowledge based on best practices plays a central role in development networks. This knowledge is related both to products, production methods and processes. The actors of a regional cluster learn from each other’s firm-specific experiences, and in this way their competencies develop gradually in the course of time. The continuous step-by-step development occurring in the development network is based on lateral two-way information flows, double contingent relationships, and empowering leadership. Also learning about innovations and new solutions takes place in reciprocal, long-term and trustworthy relationships at the inter-personal level and through informal dialogue — in a way which very much resembles the idea of the working of communities of practice (Brown and Duguid, 1991). Further, important information about the behaviour of customers can be conveyed in development networks, and they also provide opportunities for the actors to get to know each other (Smedlund and Pöyhönen, 2005).

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Figure 2. The role of KIBS in development networks (cf. Stähle et al., 2003; Smedlund and Pöyhönen, 2005).

Role of KIBS in regional clusters

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knowledge into explicit knowledge, and vice versa. Activation of these conversions when a client hires a KIBS shows itself, for example, in the new project teams that are often set up in this connection (den Hertog, 2002). The contribution of KIBS in a development network is based on the fact that they serve numerous clients in a region. The firms often learn from each other through KIBS. KIBS do not only carry best practices between firms in the same industry, but also across industries, modifying the original industry’s ideas so that they are applicable in another environment. For example, management consultants can support the development of a new regional cluster by gathering experiences and models from other, already established clusters in the region. In the course of time, KIBS develop a solid base of expertise on different best practices adopted from previous clients and use this with their new clients.

KIBS in innovation networks

In the innovation network (Figure 3), the goal is to continuously innovate new products, production methods or processes. The relationships are mainly informal and spontaneous, and they last until the innovation is finished. The relationship structure in an innovation network is diagonal. This means that the actors participating in the innovation network can be from different production chains and from different industries. The innovation network can also tie together institutional and entrepreneurial actors. As the innovation process moves forward, a lot of actors join the innovation network (Powell, 1998). The information flow is fast, chaotic and includes a lot of extra information.

The innovation network should master the creation of knowledge that is novel for everyone in the network. This requires that there is room for creativity and that the operational mode of the network is not too structured and formalized. Potential and intuitive knowledge, not yet invented – in Scharmer’s (2001) terms “not-yet embodied, self-transcending” – should be highly valued. The relations are informal and rich and the actors’ competencies are “hidden”, to be found with innovation activities. The innovation network is ideally led by the actor who is the most suitable for coordinating the resources and knowledge (i.e. authority migrates according to expertise rather than position in the hierarchy).

In innovation networks, KIBS contribute to the client’s processes and decision making more actively than in the production and development networks. There are

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<th>Innovation network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Constant innovation of new products, production methods or processes</td>
</tr>
<tr>
<td>Relationships</td>
<td>Informal and spontaneous relationships that last until the innovation is finished</td>
</tr>
<tr>
<td>Competencies</td>
<td>Intuitive, hidden</td>
</tr>
<tr>
<td>Information flow</td>
<td>Fast, chaotic and a lot of extra information</td>
</tr>
<tr>
<td>Leadership method</td>
<td>Leader in the one who suits best in terms of resources and skills, Relinquishing power</td>
</tr>
<tr>
<td>Role of KIBS</td>
<td>Facilitating as owners of potential knowledge, as facilitators of the complex process, typical of innovation and as brokers between the actors</td>
</tr>
</tbody>
</table>

Source: Stähle et al. (2003); Smedlund and Pöyhönen (2005)
three main ways in which KIBS help in discovering potential, hidden knowledge in a regional cluster:

1. they function as sources of innovation;
2. they function as facilitators in the management of innovation processes; and
3. they function as brokers between the actors in the innovation network.

The first role is made possible by the fact that KIBS themselves are active innovators, i.e. they can act as “containers” of new ideas. The second role is especially important due to the recursive and complex nature of the innovation process. The outcomes searched for cannot be known precisely beforehand and the procedure leading to a solution is unknown; most often there are several plausible alternatives that have to be explored (Schienstock and Hamalainen, 2001). Carrying out innovation processes successfully — coping with uncertainty and complexity — is often a bigger problem than the ability to create new ideas. Facilitation provided by experienced management experts can be of great help here.

The brokering function of KIBS is important for all kinds of networks. In the case of innovation networks it is especially crucial, as innovations are more and more often created by recombining existing things. This means that innovation processes are today multi-organisational phenomena, collective undertakings where different actors with different skills and competences have to be brought together (Schienstock and Hamalainen, 2001). Due to their abundant contacts with various stakeholders, KIBS are able to recognise relevant actors for each case. For example, IT infrastructure providers in the region may have good contacts to the law firms that provide consulting in IPR issues in the region, and they can further recommend these law firms to new customers.

Concluding remarks

In this paper we have argued that regional clusters need three different kinds of networks to carry out successful business – production, development and innovation networks. In each network a specific type of knowledge is dominant, although also other kinds of knowledge are needed. In order to produce products efficiently, production networks need first and foremost directly applicable explicit knowledge. Tacit forms of knowledge and conversions between tacit and explicit knowledge are characteristic of development networks, where firms concentrate on step-by-step learning from each others’ experiences. In innovation networks knowledge is still to a great extent in a potential form. The development of regional intellectual capital, and consequently the competitive advantage of a regional cluster, is based on successful functioning of all network types and on the use of all knowledge types. This way regions can build on to their existing success factors, building new strengths simultaneously.

We have further argued that the intermediating functions of KIBS in knowledge processes — a topic that has aroused growing interest in recent years — can be examined in the framework of the three network types and three knowledge types. KIBS convey explicit knowledge to help their clients to manage their existing business efficiently. They ensure the growth of their clients’ business by transferring best practices which abundantly involve tacit knowledge. Finally, they help their clients develop new business by acting as sources of potential knowledge and by facilitating.

Role of KIBS in regional clusters

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everyday life are intermingled in many ways. We hope, however, that our simplified
categorisations may bring some new light to the complex issues of networks and
knowledge management.

Notes
1. This paper is theoretical by nature. It is, however, based on earlier empirical studies made by
the authors in Finnish regions and companies. The first author has, together with his
colleagues, conducted studies of different network types in particular (Smedlund and
Poeyhonen, 2005; Poeyhonen and Smedlund, 2004), the second author has examined the
functioning of KIBS (Toivonen, 2004).
2. The different knowledge types have been recognized in different stages during the
development of the discipline of knowledge management. At the first stage, explicit
knowledge was the focus of attention. Gradually the significance of the tacit forms of
knowledge was understood. The adoption of the concept of potential knowledge is the
newest stage (Blowden, 2002).

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