Knowledge economy and spatial clustering:

The Role of Knowledge-Intensive Business Services and Venture Capital Firms in the Innovation System

By:

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Abstract
Modern economies are innovation-driven economies. Science, technology and innovation increasingly determine the performance of such economies and the competitiveness of industries. Modern economies are also to large extent city-based economies. “New economy” industries such as ICT, software, telecom, biotech, business services and venture capital firms, are typically clustered in larger cities or urban areas. Learning and “creative forgetting” is vital in such economies since knowledge ages, and likewise important is efficient sharing and transferring of knowledge. Both Knowledge Intensive Business Services (KIBS) and Venture Capital Firms (VCF) play an important role in these learning and transaction processes.

Keywords: KIBS, Venture Capital, Knowledge economy, City Regions, Innovation Systems, Knowledge diffusion. JEL - code(s): D 82, D 83, G24, L 84, O 31, R12
I Introduction

Modern economies are innovation-driven economies. Science, technology and innovation increasingly determine the performance of such economies and the competitiveness of industries. Modern knowledge economies are typically defined as economies, which are directly based on the production, distribution and use of knowledge and information. Learning and “creative forgetting” is vital in such economies since knowledge ages, and likewise important is efficient sharing and transferring of knowledge. Both Knowledge Intensive Business Services (KIBS) and Venture Capital Firms (VCF) play an important role in these learning and transaction processes.

Modern economies are also to large extent city-based economies. “New economy” industries such as ICT, software, telecom, biotech, business services and venture capital firms, are typically clustered in larger cities or urban areas. Within the knowledge economy both the extent of technological and organisational innovations and the development of regional agglomerations or clusters, seem to stimulate the activity of Knowledge Intensive Business Services and the supply of Venture Capital. First, the greater rate of technological innovation provides a fertile ground for future venture capital investments and for interactive learning between KIBS and other knowledge-intensive firms. Second, the clustering of business services and venture capital related to the learning and the venture process in larger cities and urban areas, has reduced the transaction costs associated with both creating, sharing and transferring knowledge, and the financing of new firms.

A better understanding of the role the KIBS and the venture capital industry play in the innovation system will not only enhance our knowledge of innovation processes and strengthen the basis for innovation policies, but may also contribute to a better understanding of the industrial dynamics and the spatial development of a knowledge-based economy.

Focus

The purpose of the paper is twofold; First, to look closer into why Knowledge Intensive Business Services (KIBS) and Venture Capital Firms (VCF) tend to concentrate in
metropolitan areas and, second, to examine what roles they play in innovation systems. With regard to KIBS the paper focuses on ‘Other business activities’ (especially consultancy) in important city regions of Norway. Special focus is placed on the characteristics of consultancy activity, i.e. project-based activities, interactive learning and face-to-face-contacts. The main research questions here are:

1) What role do these actors have as receivers and spreaders of global codified knowledge into the region, and to other parts of the country linking regional and national actors to global innovation system?
2) How, do they through their presence contribute to local knowledge diffusion and what is their role in the regional innovation system?

With regard to venture capital the paper focuses on the formal venture capital market in larger city regions in Norway and the role venture capital play in the innovation system. Special focus will be placed on venture capitalists preferences regarding industry diversity and geographic scope of their investments and on their ability to act as competent investors and owners for knowledge-based firms based on interactive learning, tacit knowledge and face-to-face contact. The main research question here is:

1) To what extent will a venture capital-led innovation model enhance “new economy” industries in urban areas and thereby reinforce regional imbalances?
2) Do venture capitalists promote innovation through funding and transferring of commercial knowledge to innovative firms in early stages?

Method and data
The paper will mainly be based on data from two large projects; “Larger Cities as a Driving Force for the New Economy: An Analysis of the KIBS-industry”, and "The Spatial Clustering of Innovation and Venture Capital". Both projects are financed by the Norwegian Research Council for the period 2001-2004.

Several data sources will be used in the paper: 1) Data from “Statistics Norway's Central Register of Establishments and Enterprises” are used to describe the distribution of firms and
employment by regions, 2) survey data from 800 knowledge-intensive firms carried out in 2002, mainly including firms within the industries 'Computers and related activities' and 'Other business activities', and survey data from a study of 240 venture capital portfolio firm carried out in 2002/2003. In addition the paper draws on in-depth interviews with firms in the KIBS sector and the venture capital industry. First, 13 KIBS-firms (Management consultancy firms) in the Oslo-region has been interviewed in order to uncover the types of activities firms’ perform, and at which types of customers these activities were aimed. A further aim was to examine how innovation is carried out within these knowledge intensive service firms, and the role they play in innovation in client firms. Second, 18 venture capital firms in three large cities has been interviewed in order to obtain information about their investment strategies - industry diversity, geographical scope, investment stages, the relations to their portfolio firms and what kind contribution they make in addition to funding firms, i.e. transfer of business knowledge.

The paper is organised as follows. Section 2 discusses main characteristics of the knowledge economy and innovation focusing on spatial clustering of new economy industries and on innovation advantages of cities, i.e. cities as transaction centres for learning and diffusion of knowledge disseminated through face-to-face contacts and networks, and on the specific role KIBS and venture capital play in the innovation system within such an economy. Section 3 presents empirical evidence from both the KIBS and the venture capital industry in Norway but particularly from the Oslo-area in order to assess if and to what extent they play the anticipated important role in the innovation system. Section 4 concludes the paper by summarising and discussing theoretical assumptions and empirical evidence.

II Knowledge economy and spatial clustering

Knowledge economy is a much used but a not to well defined concept. It is comprehensive and it lacks the accuracy of an analytical tool but it can still function as a useful broad theoretical framework for discussing specific trends and developments within an advanced economy. This section first describes some main characteristics of a knowledge economy and innovation systems, it further focuses on the innovation advantages of cities and finally
examines the role the KIBS and the venture capital industry play in the innovation system within such an economy.

2.1 Knowledge economy and innovation

The concepts of a knowledge-based economy or learning economy reflect the tendency that knowledge and learning play an increasingly important role in the growth process in advanced economies. Knowledge-based economies are typically defined as “economies, which are directly based on the production, distribution and use of knowledge and information. This is reflected in the trend in OECD economies towards growth in high-technology investments, high-technology industries, more highly-skilled labour and associated productivity gains” (OECD 1996:229). Advanced economies are also characterised as learning economies because knowledge constitutes the most significant resource and learning is emphasised as the most important process behind economic growth (Lundvall 1994, 1996, Amin and Thrift 1994). According to Lundvall (1997) crucial elements in the learning economy remain specific and tacit, and rooted in specific organisations and locations. Both consultancy and venture capital represents such specific organisations, they rely heavily on tacit knowledge in their learning processes and services, and they are located in specific sites, i.e. in larger cities and urban areas.

Knowledge economies can be understood as regionalised and clustered economies in which learning and scientific knowledge is increasingly important for innovation and growth. And, knowledge economies are claimed to be innovation-driven economies and therefore dependent on well-functioning innovation systems. The concept of innovation system, however, is somewhat ambiguous and wide-ranging, but it can be understood as a system consisting of a production system and an institutional framework in which knowledge is created, shared and transferred (Lundvall 1992, Edquist 1997). The production system consisting of producer, customers and suppliers is supported by a formal institutional infrastructure (R&D-institutions, financial systems) and informal institutions (conventions, routines, language). Innovation takes place as a process of interactive learning among the different actors within the system, i.e. a social process characterised by complex relations and
intricate forms of knowledge-sharing which include reciprocity and feedback in several loops. Innovation, therefore, is hampered by uncertainty and it is a non-linear and cumulative process. To determine what sub-systems and social institutions that should be included in the analysis of an innovation system is both a historical and theoretical task. Lundvall (1992:16) put it this way: “In different historical periods different parts of the economic system, or different inter-faces between sub-systems, may play a more or less important role in the process of innovation”. The thesis in the paper is that both consultancy and venture capital play an increasingly important role in the innovation process in a “new” or knowledge-based and urban economy.

The knowledge economy is also characterised by new forms of knowledge creation and diffusion, which is less dominated by technology (Gibbons et al., 1996). This is reflected in a shift from scientific and technology-based innovation processes towards more service innovation and organisational innovation. The knowledge economy, however, depends, like the manufacturing-based economy did on specialisation through a division of labour (Windrum, 2002). Successful adoption and continued incremental development of new technologies is associated with organisational change (Chandler, 1980). The increasing interdependence of technological and organisational change is a significant feature of systems of innovation, and the rapid growth of KIBS and venture capital is an indicator of general changes in the characteristics of innovation in a knowledge economy.

Studies on innovation systems have mainly focused on the scientific-technological generation of knowledge and the organisation of the transfer of technological knowledge from science to the economy (Strambach, 2002). This innovation concept focuses on goal directed research towards technological product and process innovations, which is a too narrow perspective in a knowledge economy. In such an economy innovation is not always directly linked with technological innovations, especially not within services and new forms of work and organisations. This appears in the qualitative shifts in the demand and need for non-generic knowledge. The role of non-technological innovations (organisational innovations) in innovation systems which became part of the discussion in the mid-90’s (OECD/Eurostat,
1997), increasingly focused on the interrelationship between organisational change and technological innovations, and on the relation between organisational innovation and firms’ learning capacity. Vital requirements in the knowledge economy are linked to economic, technological and socio-cultural knowledge and competence, and the rapid growth of KIBS indicates the needs for multidisciplinary application and problem oriented knowledge in innovation systems.

2.2 Cities as innovation centres in the knowledge economy

Innovation is a geographically concentrated process and cities are claimed to be “incubators” of innovation (Florida in Acs 2001). This is not a new view. Several authors claim that the forces of agglomeration remain strong and cities have long been described as centres for transactions and development of new economic activities. In the “old” economy cities were regarded as “the powerhouse of the industrial economy” (Amin 2000), in the “new” economy they stand out as centres for service-based activities and emerging knowledge-intensive industries (Cook 2002, Cook et al. 2002). Services represent today the core of urban economic activities and the growth of knowledge-intensive business services (KIBS) has been especially strong. These changes are reflected in theories of agglomeration, which now put less weight on physical transport and communication costs but increasingly emphasise the significance of immaterial transactions when explaining the innovation advantages of cities. Storper and Venables (2002:4) put it like this: “Cities used to be centres of agglomeration of material production; now the motor force of agglomeration is the production and communication of ideas, knowledge and information.”

Amin (2000) points out three approaches for why (large) cities are the locus of knowledge intensive firms in general and innovations in particular. First; The fixed assets of cities-approach argues for cities, and in particular large cities, as clusters of competitive advantages; centres of the information age; and powers of proximity in a world of flows. Castells (1989, 1996, and 2001) and Sassen (1991, 1994, and 2000) are central contributors in this strand of thought, leaving no doubt that agglomeration, proximity, and density are
essential characteristics of the competitive advantages of large cities; i.e. cities are centres of information exchange and communication within the global network, and a key location for finance and specialized service firms. In a recent work Castells (2001) stresses the role of ICT and internet, and he asks why the new production and management system of the Information Age favour metropolitan concentration. His answer is that in the Information Age the sources of value and power are to be found in knowledge generation and information-processing, which depend on innovation and the ability in circulating innovations in networks producing synergies through the sharing of information and knowledge. According to Castells, the importance of territorial complexes of innovation in facilitating synergy has been uncovered during the last twenty years by urban and regional research. Furthermore, the ‘milieux of innovation’ is said to be central regarding (large) cities and their role as originators of wealth in the Information Age, and the network enterprise is an essential phenomenon in this respect; i.e. economic activities built around specific business projects wherein different types of networks play a central role; in short the network is the enterprise.

Second, The relational assets-approach, represented by Storper (1997) and his concept of untraded interdependencies, is based on evolutionary theory, wherein the access to relational and reflexive assets play an important role; i.e. reflexivity as a chosen way of forming our surroundings, and these phenomena are thriving in cities, helping to mobilise local networks through feedbacks. It is the reflexive way of acting, not the density of the professional and managerial class, presence of headquarters, etc. that matters. This might be taken further through Granovetter’s (1985) concept of ties, and the claim that cities characterised by overlapping networks of loose ties foster search and experimentation, and thereby the ability to take advantage of existing collective resources in order to innovate; i.e. markets function through trust-based links, created by face-to-face interaction. Furthermore, reflexivity is important as the combination of tacit and formal knowledge, and not least a cognitive dimension forming perception and action as premises for rationalities, which then is giving cities an advantage through research and development facilities, headquarters, etc. but not as

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1 The presentation of Amin’s approaches is to a large extent based on Geir I. Orderud’s contribution to the paper: “The Venture Capital Innovation Model”, which was presented at the RSA-conference in Pisa 12-15. May 2003.
underlined above the pure presence of these institutions. In a recent work Storper and Venables (2002) stress that face-to-face contact and trust are decisive for the understanding of cities as “loci of knowledge development and exchange, critical to higher levels of innovation and growth.” On the basis of face-to-face contact and trust Storper and Venables launch the concept of “buzz” (page 32), which is a phenomenon incorporating “the upstream conditions of knowing what is happening; intentional face-to-face contact; and unintentional or more diffuse face-to-face ‘rubbing elbows’, or the force of ‘being there’. Thus, buzz is much more than ‘circulation of information’, or participation in ‘networks’. It is, respectively, what enables the first to happen, and the way the second functions”. In certain cities buzz seems to be advantageous when knowledge is tacit and the environment is highly uncertain, which is the case in certain industries and in certain cities.

Third, The civic assets-approach focuses on social capital (Putnam 1993); i.e. informal and formal arrangements fostering mutual help and reciprocity, and in that way contributing to the (economic) development of the region or particular social strata, thereby creating either regional demise or prosperity. Secondly, the concept of social economy is launched to cope for an emerging third sector to handle local needs not otherwise taken care of, and the important element here are the city as a place for transformative and creative potential; i.e. the potential for economic regeneration, and “the assets of cities surely must be the scope they offer for building collective capabilities and social voice” (Amin 2000, page 127). According to Amin each of the three perspectives are to a certain degree relevant in explaining why (large) cities, and certain parts of these cities, seem to play a decisive role in the economy, and the phenomena of density, agglomeration, and proximity are common features. Together they may explain why KIBS and venture capital tend to concentrate in certain large cities.

2.3 The role of KIBS and VC in innovation systems
Both KIBS and VC are important elements in a knowledge economy and they represent vital parts of the innovation system. The knowledge economy, and in particular services concerned with the supply and management of knowledge and intangible assets (‘knowledge-about-
knowledge’), has made geographic location and the ability to combine and manipulate new knowledge increasingly important. KIBS are often seen as a driving force behind the spread of new knowledge and through ICT and new ways of organising industrial activity (post-fordist principles) they contribute to transition and change in firms. KIBS are supposed to enhance competitiveness and innovation in other industries, and as producers of intermediate inputs they are perceived to play the role as bridging institutions in innovation systems. Venture capital funding bridges the gap between investors and entrepreneurs and thereby stimulates innovation and entrepreneurship.

2.3.1 Consultants
KIBS is defined as private sector firms providing knowledge based services to other business and non-business organisations², and the knowledge they provide is strategic, technical and professional advice mainly employing the skills of information gathering, processing, and in particular interpretation of information. KIBS are significant because they offer specialist knowledge to other organisations in a rapidly changing, increasingly uncertain, and internationally oriented economic environment (Wood, 2001). KIBS are highly innovative in their own right but perhaps more important is the function of facilitating innovation in other economic sectors because they provide knowledge about change.

Miles et al.’s (1995) argue that the main characteristics of KIBS are that they;

- rely heavily upon professional knowledge;
- either are themselves primary sources of information and knowledge (reports, training consultancy etc.);
- or use their knowledge to produce intermediary services for their clients’ production processes (e.g. communication and computer services); and
- are of competitive importance and supplied primarily to business.

Two features have come close to identifying the economic characteristics of service transaction: First, the *ephemerality*; i.e., the fleeting existence, of service products and, second, the intense *user/producer interaction*, with a strong element of customisation. These

² Peter Wood (2001) uses the term KIS (knowledge intensive services) to this definition, but says in his book that the terms are more or less synonymous.
two features of economic service transactions are frequently used to emphasise the
coterminality of production and consumption as a characteristic aspect of many services
(Hauknes, 1998).

Consultancy is one of the largest sub-groups in the KIBS sector and there has been an
enormous growth in consultant activity in Norway in recent years, particularly in and around
cities. ICT and new organisational models are activities provided by consultants and they are
expected to influence business change and innovation by conveying and adapting technical
and managerial experience to their clients. Consultants are often regarded as capturing
fundamental changes and new trends in modern economies. The global consultancy growth
was especially associated with the introducing of ICT during the 1980s and within this sector
consultancy has increasingly addressed fundamental management systems associated with
ICT (Wood, 2001). Consultancy, therefore, are looked upon as a ‘driver’ in the ‘new
economy’. Innovation, however, is a multifactor event and it is important to distinguish
between mechanisms for diffusing information (ICT) and the knowledge production and the
way it is used (Andersen & Byrkjeland, 2001). Management consultancy is a knowledge
industry founded upon transfer of management models, theories and procedures that are
created in universities, large consultancy companies or within client organisations (Bryson,
2000). Management theories and solutions provided by management consultants, for
instance, is a process of “translation” or “problematisation” in which solutions are not simply
matched to problems; rather, problems are redefined (translated) in terms of existing
“solutions”.

**KIBS in innovation systems**

KIBS can use their knowledge to produce services as intermediate inputs in their clients’ own
knowledge-generating and information processing activities (e.g. communication, computer
services). These services are intensively tailored to the specific needs of the clients and client
participation is a fundamental characteristic of knowledge intensive services. Terms used to
denote the link between the service provider and client are numerous (interface, interaction,
co-production, ‘servuction’, socially regulated service relationship, service relationship), and
they can be differentiated from each other by their theoretical substance. KIBS acquire both explicit and tacit knowledge about the customer firms which enables them to adapt innovative problem solutions to the specific requirements of the organisation and to integrate them into the clients' firm structure and culture. The KIBS firms themselves also produce new knowledge during the interaction process. This knowledge is mainly tacit and experience-based, and it is collected, rearranged and organised by KIBS which can create new markets through these new knowledge products.

Two types of competencies are operative in the innovation process; those of the service provider and those of the client. Gallouj (2002) indicates three reasons for looking closer at the client/provider interface:

1) It may be the subject of innovations (organisational changes, interface management methods etc.)
2) It is the 'laboratory' where a form of innovation often neglected in economic analysis (ad hoc innovation) is initiated
3) The quality of the client firm's competencies is one criterion for the success of innovation and technology transfer

The purchase of business services, therefore, may affect the functioning of both service- and manufacturing firms. KIBS characteristics encompass the quality of technical knowledge and competencies, together with the capacity to translate and disseminate these qualities to clients' businesses. The codification of knowledge and the standardisation of consulting procedures are important if KIBS are to have effects on regional innovation capacities. Successful transfer also requires clients to be amenable to new learning contexts (Windrum, 2002). KIBS impact on the innovation performance and productivity of an economic system will depend on the relative share of knowledge intensive industries in the national economy, and the type of inter-sectoral linkages that exists between KIBS and manufacturing/services (Windrum and Tomlinson, 1999). It seems evident that KIBS have important functions in the system of innovation (Strambach, 2002) in that they:

- Transfers knowledge in the form of expert technological knowledge and management know-how
• Exchanges empirical knowledge and best practise from different branch contexts
• Integrates different stocks of knowledge and competencies that exists in innovation systems
• Adapts existing knowledge to the specific needs of the client.

Both formal and informal networks and co-operation are essential for the functioning of KIBS and this is an indication of their integration function. KIBS can also be seen as typical intermediaries deeply involved in various kinds of tangible and intangible knowledge flows, which is important in the knowledge economy. They are much in common with organisations within the public knowledge infrastructure (Gadrey and Gallouj, 2002). It is argued that KIBS develop into an informal (private) ‘second knowledge infrastructure’, an interpretation in stark contrast to the view of service firms as innovation followers.

2.3.2 Venture capitalists
Venture capital consists of equity or equity-linked investments in young businesses that are not quoted on a stock market and which have a large growth potential in international markets. Venture capital is high-risk investments and venture capitalists minimise their risk by relying on trusted network of professional intermediaries for referrals, syndication, staged investments, specific investment agreements and hands-on involvements in the portfolio firms. Venture capital is said to be “more than money” because venture capitalists in addition to capital, provide new firms with experienced management, strategic advice and give them access to business networks. This hands-on involvement in portfolio firms normally distinguishes venture capital from private equity. Both are risk capital investments in young firms not quoted on the stock exchange but private equity does not necessarily imply an active engagement in the portfolio firm. Venture capitalists typically exit their portfolio firms between three and seven years after the investment and they achieve their return in the form of capital gains rather than by dividend income (Bygrave and Timmons 1986, 1992; Gompers and Lerner 2000; Mason and Harrison 1994, 1999; Ruhnka and Young 1987, 1991; Sahlman 1990).

One often distinguishes between the informal venture capital market and the formal or institutional venture capital market (Mason and Harrison 1999). The informal venture capital
market is the oldest and probably the biggest in most countries. It consists of private investors or wealthy individuals, so called “business angels” that typically invest smaller amounts of money in companies in start-up or pre-start-up stages. Venture financing by informal investors has been an important source of capital for entrepreneurs for more than a century whereas the formal venture capital industry is a fairly young phenomena. The real take-off of for the worldwide venture industry came as late as the 1990s. During this decade venture capital played a key role in funding innovative firms in the United States, and gradually also in Europe and Asia (OECD 2000b). The beginning of the 21-century, however, has witnessed a dramatic slowdown of venture capital investments ICT-industry (OECD 2002).

Venture capital undertakes a variety of roles in the venture capital process - fundraising, selecting and follow up ventures, and exiting their investments (Gompers and Lerner 2000). Venture capitalists raise their capital from investors (pension funds, insurance companies, banks etc.) that are rich on financial capital but poor on the competence of financing high-risk and potentially high-reward projects. Venture capitalists possess this competence and they act as intermediaries for institutional and individual financial capital and thereby represent a solution to the problem of financing innovation and entrepreneurship. Venture capitalists play a second role in selecting and following up investments. They invest a lot of time and effort in assessing proposed projects, and in monitoring the selected firms in which they have invested. A venture capital firm typically receives hundreds of business plans each year. Most of the proposals are quickly discarded whereas a few serious projects are extensively scrutinised through both formal studies of the technology and markets studies and more informal assessment of the management team. They also closely follow up their portfolio firms and take board positions. Both in the assessment, investment and monitoring process, venture capitalists work with a number of partners, such as consultants, executive recruiters, lawyers and investment bankers. The final role is to harvest the investments by exiting the portfolio firms. Successful exits are the final aim for venture capitalists and it is crucial to ensure attractive return for the investors, and thereby to raise additional capital. The sale of a business to an industrial purchaser (trade sale) and initial public offering (IPO) are the most common exit routes.
VC in innovation systems

Venture capital firms represent a specific type of financial organisations and their location is also specific. They cluster in larger cities and urban areas and, this financial mechanism constitute a vital part of the innovation system in a knowledge-based economy in which “new economy” industries located in urban areas makes up an important part of the economy. The relationship between finance and innovation, i.e. the close interaction between the part of economy known as financial capital and the evolution of technologies, was already emphasised by Schumpeter (1934), but it has to a large extent been neglected in later innovation studies (Perez 2002). The system for financing innovation and entrepreneurship, however, is regarded as a key institutional element in a national innovation system (Lundvall 1992), and as a result of the past decade’s growing importance of venture capital for financing high-growth new technology-based firms, the question of financing innovation has again been brought to the fore (OECD 1996, 2000, 2001, Murray 1994, 1998).

The thesis in this paper is that in the past years, the financial system, or to be more precise; the venture capital market, has played a more important role in the innovation process. This assumption is in line with statements from OECD (OECD 2002) and with arguments presented by Cook et al (2002) and their concept of a “VC-led innovation model”. This model is a city-based innovation model in which “new economy” industries and private venture capital are the main elements, or to quote Cook et al (2002:240): “In and near the great cities are found a rich private infrastructure of innovation support whose presence has become particularly visible during the period of emergence and consolidation of the “new economy”. According to Cooke et al, a “private system of innovation” (PSI) is emerging on the basis of this “new” economy. In contrast to regional innovation system (RIS) which emerged in support of “old” economy regions, and where large-firm R&D, supply-chain and public infrastructure were important elements, PSI focuses on “hands-on, investor-led, equity-oriented, clusters with incubation for innovative start-ups more typical of “new economy” innovation” (Cooke et al 2002:242). The reason for this is that “new economy” industry is distinctive in its conventions and is thus peculiarly dependent on less public and more private innovation.
support” (Cooke et al 2002:240). And, in this new economy, venture capital emerges “as a key means of dynamizing innovation potential” (op. cit.:242) within clusters, cities and urban regions.

III KIBS and VC as knowledge agents and innovation drivers
Both KIBS and VC are taken to be important actors in the innovation process, especially with regard to growth of “new economy” industries in cities and urban areas, and in particular because they create, share and transfer explicit and tacit knowledge to their clients. These assumptions make our point of departure for presenting empirical evidence from both KIBS and venture capital activities in order to examine if these actors really play their intended role in the innovation system.

3.1 KIBS
This section first gives an overview of the location pattern of KIBS activity in city areas in Norway, followed by short characteristics of consultancy actors in the Oslo-region. Thereafter it examines the role and activities of consultants, based on in-depth interviews with consultancy firms and on survey results. It focuses on how consultants act as economic agents, and how they receive and spread knowledge. Finally, it presents empirical evidence to the highlight the question if and how consultants play a role in regional innovation systems.

3.1.1 Consultancy activity in Norwegian city regions
This paper focuses especially on consultants as a sub-category of KIBS and particularly at the Oslo-region. The location pattern of ‘Other business activities’ in Norway is clearly skewed towards city regions. The Oslo-region is clearly overrepresented both with regard to number of firms and number of employees within ‘Other business activities’, cf. table 1 and 2. As

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1 The survey gathered information from 199 consultants, 57% are to be found among technical consultants and 43% among management consultants. Most of the consultants in the survey are to be found in the category 5-19 employees, the management consultants have a larger share of firms in this group than the technical consultants, as much as 85%, leaving few firms in the larger groups. Technical consultants also have firms among the larger groups, 20% of the firms have more than 20 employees.

4 Even though the term KIBS is often used, it is hard to find a precise definition, especially in statistical terms. Practical studies are often based on slightly different adaptations of established classification systems. In this paper the following NACE classification seems relevant as defining KIBS: 642,671,672,721,722,723,724,725,726,741,742,743,744.
much as 40.5% of the firms are located within the region, the figures are significantly higher than for other city regions in Norway. Hordaland (with the city of Bergen) comes on a second place and third is Sør-Trøndelag (with the city of Trondheim) with 8% and 5% respectively. Oslo is in a class of its own with regard to these industries, and it is far ahead of the other large cities in Norway. The growth of firms has also been slightly stronger in the Oslo-region than in rest of the country, whereas the employment growth is similar in the Oslo-region and in Norway.

Table 1. Regional distribution of firms in ‘Computers and related activity’ (Nace 72) and ‘Other business services’ (Nace 74). 2000.

<table>
<thead>
<tr>
<th>Industries</th>
<th>Nace</th>
<th>Total</th>
<th>Relative share of firms (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Norway</td>
<td>Oslo-region</td>
</tr>
<tr>
<td>Computers and related activities</td>
<td>72</td>
<td>6492</td>
<td>45.1</td>
</tr>
<tr>
<td>Other business activities</td>
<td>74</td>
<td>35914</td>
<td>39.6</td>
</tr>
<tr>
<td>Sum chosen industries</td>
<td>72+74</td>
<td>42406</td>
<td>40.5</td>
</tr>
<tr>
<td>Sum Business Services*</td>
<td>All</td>
<td>70053</td>
<td>35.2</td>
</tr>
</tbody>
</table>

*Source: Statistics Norway's Central Register of Establishments and Enterprises

Table 2. Regional distribution of employment in ‘Computers and related activity’ (Nace 72) and ‘Other business services’ (Nace 74). 2000.

<table>
<thead>
<tr>
<th>Industries</th>
<th>Nace</th>
<th>Sum</th>
<th>Relative share of employees (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Norway employment</td>
<td>Oslo-region</td>
</tr>
<tr>
<td>Computers and related activities</td>
<td>72</td>
<td>36250</td>
<td>64.1</td>
</tr>
<tr>
<td>Other business activities</td>
<td>74</td>
<td>160765</td>
<td>46.1</td>
</tr>
<tr>
<td>Sum chosen industries</td>
<td>72+74</td>
<td>197015</td>
<td>49.4</td>
</tr>
<tr>
<td>Sum Business Services*</td>
<td>All</td>
<td>234685</td>
<td>47.7</td>
</tr>
</tbody>
</table>

*Source: Statistics Norway's Central Register of Establishments and Enterprises

Consultancy activity in the Oslo-region can roughly be divided into two main categories; 1) Global Management Consultants (MC) and 2) Regional Management Consultants.
Global MCs have extended their presence throughout Europe the last twenty years through branches and subsidiaries. Many of the largest MC firms are present in Norway, normally established through mergers and acquisitions of regional consultancy activity. These are firms that are specialised in certain main MC activities (Boston Consulting group, Mc Kinsey, A.T. Kearney, Booz Allen & Hamilton), and multifunctional firms (like KPMG, Cap Gemini and Ernst and Young). These major players have expanded their core skills the last years from accountancy and computing into more general, and often more profitable, consultancy work. They address clients that are often themselves MNC, some of them with headquarters located in the Oslo region.

Regionally based MCs have spun-out from existing activity – mainly in the Oslo region. The many small and medium sized consultancies, including sole practitioners, are often found within ‘niches’, based on their ‘local knowledge’. The regionally based consultancy firms also have nationally based MNC as their clients, providing them with supplementary services. The regional consultants have had a positive development the last years. What they lack in their ‘service portfolio’, is being compensated for by strategic alliances and networks (often with competitors) which make them able to take on larger projects. Nevertheless, the large global MCs still have the largest turnover, number of assignments and number of employees.

Table 3 below gives brief characteristics of the Global and Regional MC’s in Oslo.
Table 3. Two main categories of Management Consultants in the Oslo region.

<table>
<thead>
<tr>
<th></th>
<th>Global Management Consultants</th>
<th>Regional Management Consultants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originate</td>
<td>Originates mainly from the USA in the early 1920’s</td>
<td>Mainly Oslo based firms developed in the 1970’s and later.</td>
</tr>
<tr>
<td>Expertise</td>
<td>IT and management</td>
<td>Follows up consultancy activities that is induced by global actors, can be seen as supplementary activities to global actors, specialisation related to 'niches' and to 'local knowledge'</td>
</tr>
<tr>
<td>Analytical level</td>
<td>Often directed towards MNC and CEO and top management, and with focus on 'industry' level. Analytical level depended on core activities.</td>
<td>Directed towards large firms, and top and middle manager, dependent on core activities. More focused towards the 'firm' level</td>
</tr>
<tr>
<td>Client base</td>
<td>MNC located in Oslo</td>
<td>Large firms in the Oslo region, also some medium sized firms located outside the Oslo region</td>
</tr>
</tbody>
</table>

3.1.2 Consultants as receivers and spreaders of global codified knowledge

Consultants serve the whole national market with their services. However, the local market is of great importance for the consultants, the average sales being 43%. Average sales to international markets are 17%, significantly smaller than local sales, but consultants perceive the competition experienced in these markets to be quite important for triggering competitiveness. A diversified portfolio of customers located locally, nationally and internationally, gives possibilities of knowledge diffusion, making consultants important satellites and disseminators of information between clients at different spatial levels, thus emphasising their integration function in innovation systems (Wood, 2001).

Some of the consultants in our survey are global consultancy firms, which are important spreaders of new consultancy products, methods and instruments developed through formal R&D functions of mother companies. The transformation process from tacit knowledge to standard products – which is easy to transmit - is said to be hastened by large international firms, fuelling the spread of global knowledge to national and local actors.
Table 4. How important are following actors in developing the firms competitiveness? (N=199) (1=irrelevant and 6=of major importance)

<table>
<thead>
<tr>
<th></th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence within the firm or enterprise</td>
<td>5.6</td>
</tr>
<tr>
<td>Clients, customers</td>
<td>5.1</td>
</tr>
<tr>
<td>Suppliers</td>
<td>3.5</td>
</tr>
<tr>
<td>Competitors</td>
<td>3.5</td>
</tr>
<tr>
<td>Consultancy firms</td>
<td>2.8</td>
</tr>
<tr>
<td>Research institutes, universities, Higher education institutions</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Consultants’ ability to exploit ‘local’ strengths seems to be an important prerequisite for consultancy competitiveness. Competence within the firm (table 4) – mainly recruited locally - is the single most important factor for developing competitiveness. Human capital is the carriers of knowledge in KIBS (such as skills, experience and contacts), and consultants, thereby, represent a localised pool of specialised expertise and knowledge in the regional innovation system.

The most important external factor for developing competitiveness is clients and customers and geographical proximity to customers is the most important factor explaining city location. The importance of proximity to clients emphasises the tacit and explicit character of the services provided, services that are hard to transfer through distant relationships. Private sector clients were perceived to be the most stimulating client group, while least importance in this sense was public administration.

Furthermore, linkages with Research institutes, Universities and other Higher education institutions are perceived to have little impact on the development of consultants’ competitiveness. These findings suggest that application and context related knowledge and experience play a much more important role, than targeted research and development activities and institutes. The knowledge base is often more loosely formulated and codified and more based on cumulated experienced based knowledge through consultants’ customer project. KIBS firms’ innovation activities are in many studies characterised to be incremental, step-by-step processes, where new elements and combinations of services are a part of
overall, continuous process of development guided by the strategy of a firm (Scarborough and Lannon 1989, Sundbo 1997), making formal R&D projects between an R&D unit and the knowledge infrastructure less relevant.

Survey results also show that consultants primarily search locally for the competence needed for innovation purposes. Only 22% of the consultants had to look elsewhere in the country for innovation competence, whereas 13% of the consultancy firms had to look outside the country. The local dimension is therefore highly relevant for these consultants’ innovation activities.

Informal contacts and meetings with people working in the same business sector seem to be of crucial importance in order to sustain competitiveness. The availability of arenas for such informal meetings and the ability for firms to meet colleagues informally is, in interviews with consultants, perceived as a very important location factor. It provides the consultants with the opportunity to keep up-to-date with developments and being ‘close to events’ and to get knowledge about market and technological trends, and for acquiring information about potential partners. These findings underlines that informal networks in city areas are important for information transfer between actors cf. the arguments of the innovation advantages of cities presented in section 2.2.

Our findings show that consultants might be viewed as spreaders of global codified knowledge, through being part of a multinational enterprise spreading working methods locally, or simply through having customers from regional, national and international markets. Nevertheless, the local dimension is of greatest importance to consultants’ own generation of knowledge and innovation, indicating that consultants’ ability to receive global knowledge and at the same time to be able to adapt it to local circumstances is an important prerequisite for knowledge diffusion in the regional economy.
3.1.3 Consultants role in innovation system

Consultancy firms' role in innovation systems is linked to their ability to provide services which increase their clients' competitiveness and innovation activity. Our survey to potential consultancy users showed that more than half the respondents (53%) had, in the period of the last three years, made use of consultants. However, there are differences between industries and size of firms in this regard. The use of consultants is most common among supposedly knowledge intensive firms, such as pharmaceutical firms and firms in telecommunication (67% and 64% respectively), and among firms with more than 20 employees (especially firms with 20-40 employees). Interviews with consultants reveal that the largest consultancy users in the Oslo-region are headquarters of mature national firms, which have branches spread out in Norway. This implies that technical and management changes, initiated by city headquarters are to be implemented exactly in divisions or departments located outside the city of Oslo. Consultants’ work will thus have an effect not only locally, where most of the day-to-day interaction between consultant and clients takes place, but also outside the city. In this way local consultant activity in the city of Oslo will be part of national production systems as well.

Table 5. The main reason for clients to buy the consultants services? (N=199) (1= irrelevant and 6= of major importance)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The client lacks relevant specialised competence</td>
<td>5,3</td>
</tr>
<tr>
<td>The client has good experience with earlier use of consultants</td>
<td>4,7</td>
</tr>
<tr>
<td>The client has a strategy towards buying such services externally</td>
<td>4,6</td>
</tr>
<tr>
<td>The client lacks capacity</td>
<td>4,5</td>
</tr>
<tr>
<td>The client is in need of strategic advice</td>
<td>4,5</td>
</tr>
<tr>
<td>The project is often time-limited</td>
<td>3,9</td>
</tr>
</tbody>
</table>

5 The telephone survey was directed at 4 different business sectors, representing both knowledge intensive firms clustered in city areas in Norway (NACE 22,33,64) and not so knowledge intensive but large manufacturing sectors in city areas (especially Oslo, NACE 22). By selecting different business sectors, it might be possible to detect differences in the use and role of knowledge intensive business services in city areas, suggesting that these actors play different roles vis-à-vis different actors. 200 firms responded to the survey, of which 65% were in ‘Publishing, printing and reproduction of recorded media’, and 22% were found in ‘Manufacture of medical, precision and optical instruments, watches and clocks’. There were also respondents from the pharmaceutical industry (6%) and from actors within telecommunication (7%).

6 It is important to have in mind that the survey was not a random stratified sample of industries and size of firms.
The most important reason for consultancy use (table 5) is lack of relevant specialised knowledge followed by ‘lack of internal capacity’ and ‘time limited projects’, and more than 2/3 of the consultancy users perceives proximity as a facilitating factor with regard to use of consultants. The availability of consultants locally is in this way an important prerequisite for consultancy use. Other studies have also pointed to consultancy clients’ ‘restricted search process’ (Bryson and Daniels, 1998, Rusten, 2000), and relates it to the difficulty in determining the quality of the consultants’ expertise – which is intangible and difficult to measure. To be able to overcome this imperfect market, clients employ individuals and companies that the client already know directly or indirectly (Rusten, Gammelsæter, Bryson 2003).

Clients firms were asked in what ways the consultant had contributed to innovation related tasks in the firms, controlling for industry, size, location and innovation cost intensity7. Quite many firms responded that the questions were irrelevant, indicating that a large number of firms do not relate to consultants in their innovation activity. This is in many ways an obvious point, as processes of innovation are fundamentally complex, making it hard to isolate influences of particular actors in the innovation system.

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7 Innovation cost intensity is defined as innovation costs as a percentage of turnover. We approach the problem by constructing categories of firms, depending upon how much they spend on innovation inputs. We have constructed three categories, with innovation intensities ‘less than 1 including 0’, ‘1-3.99’ and ‘4 or above’. These categories are somewhat arbitrary, and the choice of demarcation lines will affect the differences between the categories. The categories do, however, apply the same borderlines as used by the OECD to classify low, medium and high tech industries based on R&D expenses.
The consultants’ most important contribution is their ability to draw ‘new professional and technological expertise’ into the client firm, supporting the notion that consultants’ extended range of expertise (acquired nationally or internationally) is taken into use in some local client firms, cf. figure 1. Not surprisingly, it seems that innovation cost intensive clients emphasise stronger ‘new professional and technological expertise’ and the consultants contribution towards ‘crystallising needs in innovation activity’ and towards giving the client ‘a deeper understanding of firms core areas’. These findings suggest that clients’ initial internal innovation activity decides what sorts of innovation related input the client are interested in and able to respond to.

Consultants’ contribution to ‘the development of core competencies’ in the client firms is likewise important. Especially, very small firms (5-9 employees) and firms that are subject to low innovation cost intensity, emphasise this type of contribution from the consultants – possibly due to lack of internal competence resources. Larger firms with high innovation costs intensity, are, on the other hand, able to exert primacy over change in their core functions,
making consultants less influential in firms with these characteristics with regard to developing core competence.

As earlier noted, there is a skewed distribution of KIBS activity in Norway, a trend that has been intensified through high growth rates of these activities in city regions. This makes the pool of consultancy smaller outside metropolitan regions. However, our findings indicate that client firms located in the smaller city region in Norway seem to value consultants’ contributions to innovation slightly higher than clients located in the largest city areas in Norway. This might suggest that consultancy firms are even more important as external information input in regions characterised by ‘institutional thinness’ than in regions with ‘institutional thickness’. It also emphasises consultants’ role as constituting the second knowledge infrastructure, of special importance in regions where there the public infrastructure is scarce or lacking. The presence and quality of consultancy firms located outside core regions is, in this sense, important.

3.2 Venture capital
This section first gives a short overview of a few facts of the Norwegian venture capital industry and then presents empirical evidence in order to answer the research questions if venture capital enhances new economy industries in cities and urban areas and if and to what extent VC promote innovation through funding and transfer of commercial competence and industrial knowledge.

3.2.1 The Norwegian venture capital industry
The first Norwegian venture capital firm; Teknoinvest, was started in the early 1980s but most of the venture capital activity in Norway is a phenomenon of the late 1990s. This development reflects a general trend in industrialised economies. There is no official statistics of the venture capital industry in Norway and the overview presented here is made on the basis of collected data from several sources. The Norwegian Venture Capital Association (nvca) has 26 primary member and 35 associated members (May 2003). Some of the venture capital firms are part of or have relations to international venture capitalists. The nvca-members include the far largest part of the Norwegian venture capital industry. But there are a number
of venture capitalists outside nvca, both independent venture capital firms and corporate venture capital. To make a comprehensive picture of venture capital in Norway, therefore, is a demanding puzzle and due to lack of statistics both the figures of the total number of venture capital firms and the amount of venture capital are encumbered with uncertainty.

According to EVCA 2001 yearbook there are approximately 40 firms in Norway that have private equity investments as one of their main financial activities. The yearbook also claims that the number of players has increased the past years. The amount of funds raised in 2000 was NOK 4 billion, a solid increase from 1.2 billion in 1999. In a Norwegian study from 1997, Grytli and Langeland found about the same number of venture capital and investment firms as EVCA did in 2000, but with a total amount of funds of approximately NOK 11 billion (Aslesen et al 1997). According to the Norwegian Venture Capital Association their 23 primary members in 2001 managed fund worth NOK 14 billions (1.9 Euro) whereas new members in 2002 manage additionally NOK 4 billions (0.5 Euro).

3.2.2 VC investment preferences – industry diversity and geographic scope

The determinants of venture capital firms’ preferences regarding industry diversity and geographic scope of their investments are discussed by Gupta and Sapienza (1992) who claim that VCs preferences and strategies are a result of the pressure VCs face to seek lower risk investment, improve rate of returns, and add value to new ventures. Empirical evidence from their study indicates that 1) VCs specialising in early stage venture prefer less industry diversity and narrower geographic scope relative to other VCs; 2) corporate VCs prefer less industry diversity but broader geographic scope relative to non-corporate VCs; 3) larger VCs prefer greater industry diversity and broader geographic scope than do smaller VCs, and 4) regional public funds prefer to invest within a narrower geographic scope than other VCs.

Early stage investments are more risky than late stage ventures due to uncertainties in demand, technology (product and process), resources (skill, raw material, distribution channels), and management (entrepreneur capability, balanced management team). VCs normally follows an add value strategy with hands-on involvement which imply providing
industry and market knowledge, contacts and networks, strategic advice and managerial expertise to their portfolio firms. Along with this strategy comes the need to develop specialised industry knowledge and to maintain close interaction with their ventures. Close monitoring and involvement is not only time-consuming but also an activity that to a large extent depends on face-to-face contact between the venture capitalist and the entrepreneur. For that reason VCs specialising on early stage investments also prefer to invest in a narrower geographic scope than other VCs.

Corporate VC also prefers less industry diversity than other VCs because they normally invest in parent company industry or in related industries for strategic reasons. Venture capital investments can give them “a window” to new technologies and markets, a potential to develop new products, to acquire new companies, and to improve manufacturing processes. Large VCs prefer to invest in a more diverse set of industries and within a broader geographic scope because they have a larger pool of capital at their disposal and thereby a larger need to spread their risk on a wider set of investment opportunities. Large VCs also have bigger networks, access to larger deal flows and stronger investment capabilities. Public regional funds often have a limited geographic scope and a special responsibility to regional development is often part of their investment criteria.

Looking into the investment pattern of Norwegian VCs in the light of venture capitalists’ preferences regarding industry diversity and geographic scope of their investments, only some of the findings resemble the empirical evidence reported by Gupta and Sapienza (1992). The tendency to specialise in industries is clear but it is hard to trace any differences in the investment pattern due to stage of investments. Nearly all Norwegian VC firms concentrate their investments within a few industries, but no one specialise on stages, except from the seed funds which invest in the seed or start-up stage. All other VC firms diversify with regard to investment stages. In accordance with the findings from Gupta and Sapienza, however, our study also shows that corporate VC primarily invest in the parent company industry or in related industries and, that the larger VC firms have a somewhat broader investment profile both with regard to industry and geography (Langeland and Orderud 2003).
With regard to industry specialisation investment data shows that IT/ICT is the far largest target industry for nearly all Norwegian VC firms, cf. table 6. This high-tech-profile is in line with international trends which show that the far greater part of VC investments flow into two areas – ICT and biotechnology. Most large international high-technology firms in the past decades are offspring of VC – e.g. Microsoft, Netscape, Compaq, Sun Microsystems, Intel, Apple, Digital Equipment, and Genentech (OECD 2000b). According to the EVCA Yearbook 2001 high-tech was the largest industry category at 31 per cent of the total amount of private equity and venture capital invested in Europe in 2000. The corresponding figure for Norway is 25.2 per cent (EVCA 2001). The high-tech profile in Norwegian venture capital investments is even more evident when looking into figures from the Norwegian Venture Capital Association (nvca) and findings from own studies. According to nvca app. 58 per cent of VC investments are in ICT and app. 20 per cent in Telecom. The study of portfolio firms shows that app. 60% of the 240 venture-supported firms8 belong to knowledge-intensive industries and, that four out five firms among those are to be found within knowledge-intensive business services (KIBS).

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8 A list of 240 portfolio firms is made up of information from all the largest venture capital companies in Norway. Information on portfolio firms regarding industry classification, geographical location, and year of establishment is gathered from the Statistics Norway Central Register of Establishments and Enterprises, and cover all the 240 firms. A survey comprising a range of questions about the portfolio firms experience with venture capitalists as investors and owners has been conducted among the same firms at the end of 2002 and the beginning of 2003. The response rate is 32% which is fairly low but not to bad when considering that the sample to a large extent comprises small firms and bussy entrepreneurs.
Table 6. Norwegian VC investment in different industries

<table>
<thead>
<tr>
<th>Company</th>
<th>Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC Company A</td>
<td>Ocean farming, environment, oil/offshore</td>
</tr>
<tr>
<td>VC Company B</td>
<td>Internet, telecom, technological infrastructure</td>
</tr>
<tr>
<td>VC Company C</td>
<td>IT, telecom, finance, (life science)</td>
</tr>
<tr>
<td>VC Company D</td>
<td>Environment, energy, ocean farming, bio-marine technology</td>
</tr>
<tr>
<td>VC Company E</td>
<td>IT/software, telecom, technology/capital goods, services, food products</td>
</tr>
<tr>
<td>VC Company F</td>
<td>Telecom, Internet, business services, software</td>
</tr>
<tr>
<td>VC Company G</td>
<td>Seafood, oil&amp;maritime, invest.management, service, technology</td>
</tr>
<tr>
<td>VC Company H</td>
<td>Biotechnology &amp; medicine, ICT, Internet, environment &amp; manufacturing industry</td>
</tr>
<tr>
<td>VC Company I</td>
<td>IT, telecom, Internet, life science</td>
</tr>
<tr>
<td>VC Company J</td>
<td>ICT, wireless comm.technology, broadband, media/Internet</td>
</tr>
<tr>
<td>VC Company K</td>
<td>IT, telecom, optics, environment technology</td>
</tr>
<tr>
<td>VC Company L</td>
<td>ICT, medical technology/biotech., marine technology, energy&amp; environment technology</td>
</tr>
<tr>
<td>VC Company M</td>
<td>Food products, fishery, ocean farming, ICT, maritime, offshore, medical technology, health</td>
</tr>
<tr>
<td>VC Company N</td>
<td>Ocean farming, high technology</td>
</tr>
<tr>
<td>VC Company O</td>
<td>Marine industries, ocean farming, manufacturing industry</td>
</tr>
<tr>
<td>VC Company P</td>
<td>Fishery/ ocean farming, ICT, biotechnology, medical &amp; maritime</td>
</tr>
<tr>
<td>VC Company Q</td>
<td>IT, telemedicine</td>
</tr>
</tbody>
</table>

The overall tendency of industry specialisation may be due to the fact that most Norwegian VC firms are fairly small. They manage limited amounts of money and their industrial competence is restricted to relatively few industries and, as a result, they are not able to diversify their investments in a wider range of industries. The observed investment pattern, therefore, is probably more likely due to smallness, than a result of early stage investments, as Gupta and Sapienza suggest as an explanation for less industry diversity. The concentration of investments in “new economy” industries may also be a mere reflection of the international flock-tendency to invest in dot.com-firms at the end of the 1990s, and may not prove that Norwegian venture capitalist had special investment capabilities within these particular industries. Especially in the late 1990s, the ICT-sector was regarded as the essence of high-tech industries, and the sector in which the strongest growth companies were to find and where returns were expected to be highest. Investments in these industries, however, have not been very successful for the past two, three years, neither in Norway nor anywhere else. The dot.com meltdown has burned off inconceivable values on the stock market all over the world and venture capital investments has to a large extent dried out for the past two years.

Finally, the investment pattern also indicates a regional specialisation in that VC firms in Mid- and North-Norway to a larger extent invest in marine industries such as ocean farming,
whereas VC firms in the Oslo-region invest more in computer related industries, the Internet and telecom industries. This investment pattern is as expected in the light of the regional distribution of the Norwegian industry structure. It also seems reasonable that Norwegian VC may have an advantage within industries such as ocean farming and the oil and energy sector. It is more unlikely, however, that they should have a similar advantage within the IT/ICT-sector, i.e. in an industry in which international competition is very strong and where Norway probably lack a "critical mass". The clustering of VC investments in cities is also very clear. The study of portfolio firms show that two third of the 240 firms are situated in the five largest cities in Norway, and that the main bulk of firms are located in the Oslo-region (44%). The high-tech-city Trondheim has the second largest share of firms (15%). The fact that the majority of the firms are newly established, near two third of them are founded later than 1995, and every fifth firm in the past two year, also indicates that venture capital is especially important for financing early stages and risky projects, i.e. for financing innovation and entrepreneurship. But do venture capitalists also transfer commercial and industrial knowledge to their portfolio firms, i.e. is venture capital more than money?

3.2.3 Venture capital – providers of commercial and industrial knowledge?

One way of evaluating if venture capital actually plays an active role in the innovation process, is to examine the experiences the portfolio firms have with venture capital in order to see if they act like competent investors and active owners that transfer important business knowledge to their firms. Norwegian venture capitalists claim, in in-depth interviews, that they in addition to capital also supply portfolio firms with “all necessary competence” needed for running and developing an enterprise. In order to assess this statement and to see if perceptions on the supply and demand side in the venture capital market are in accordance on this matter, a sample of 240 portfolio firms has been surveyed for information about their experience with venture capitalists. The survey seek to reveal if and to what extent venture capital is “more than money” and if venture capitalists in addition to capital, provide new firms with experienced management, strategic advice and give them access to business networks. The survey assesses this “hands-on” involvement and its possible impacts on the portfolio firm’s ability to innovate and develop.
Results from the survey show that nearly all the portfolio firms (92%) have made investments in three-year period 1999-2001 which were “high times” of the dot. com wave. In addition to venture capital approximately half of the firms also had financing from business angels and from public funds. The main reason for seeking external financing was insufficient own means (72%), whereas the need for spreading risk does not seem to be particularly important (11%) for the entrepreneurs. About half of the firms (51%) claim to have had problems financing their investment which is not surprising when considering the large information problems relating to investments in early stages. Even though only every fifth firm received money in their seed stage, venture capital invested in the start-up stage in almost half of the firms, i.e. when uncertainty is still high, cf. table 7. Two out of five firms (39%) also claim that it has been difficult to obtain financing from venture capitalists or seed funds in the region where the firm is located, and approximately half of the firms (47%) say that it is a big problem not having regionally based venture or seed funds.

<table>
<thead>
<tr>
<th>Table 7. Venture capital investments by investment stages (N = 76)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-up</td>
</tr>
<tr>
<td>First expansion</td>
</tr>
<tr>
<td>Second expansion</td>
</tr>
<tr>
<td>Seed</td>
</tr>
</tbody>
</table>

Portfolio firm’s perceptions of venture capital contributions
Venture capital is said to be “more than money” due to other important contributions they make to their portfolio firms, and this statement is partly confirmed in the portfolio survey. Although access to risk capital is the most important reason for the firms to contact venture capitalists (79%) a fairly large share of the firms also mention the need for a competent long-term investor (57%) and qualified advisor (43%). Almost three out of five firms (57%) claim that contributions related to strategy, networks and competence is important or very important for the firm. Venture capitalists follow up their portfolio firms rather closely on a weekly (36%) or monthly (77%) basis, and a large percentage of firms claim that they would have not
existed (42%) or developed more slowly (41%) without capital and competence from venture capitalists. A clear majority of the firm (69%) also claim that the time-horizon for the venture capitalist’s investments is suitable. Norwegian venture capitalists should be pleased with these results.

Looking at the contributions more in detail, however, reveals a more nuanced picture. On average venture capitalists also score relatively good on their contribution with regard to board activities which of course is one of the most significant contributions. But overall the rating is ordinary or mediocre on most of the factors which make up the “more than money” contributions, cf. table 8. Two out of five firms claim not to be satisfied or very little satisfied with venture capitalists contributions with regard to management support, economic advice and access to additional finance. The discontent is strongest for marketing and product and organisational development where 80%, 76% and 64% of the firms, respectively, claim to be not satisfied or very little satisfied with venture capitalists contributions. So at least from the portfolio firms’ point of view venture capitalists still seem to have a large potential for improvement before they can fulfil the important role they are supposed to play in the innovation systems, and emerge “as a key means of dynamizing innovation potential” within clusters, cities and regions as Cooke et al (2002:242) points out.

Table 8. How satisfied portfolio firms with venture capital contributions in addition to capital supply (N = 76). (1 = not satisfied and 6 = very satisfied).

<table>
<thead>
<tr>
<th>Contribution</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board activities</td>
<td>4,12</td>
</tr>
<tr>
<td>Support to management</td>
<td>3,58</td>
</tr>
<tr>
<td>Economic advice</td>
<td>3,44</td>
</tr>
<tr>
<td>Access to additional finance</td>
<td>3,25</td>
</tr>
<tr>
<td>Legal assistance</td>
<td>2,94</td>
</tr>
<tr>
<td>Internationalisation</td>
<td>2,91</td>
</tr>
<tr>
<td>Organisational development</td>
<td>2,80</td>
</tr>
<tr>
<td>Product development</td>
<td>2,52</td>
</tr>
<tr>
<td>Marketing</td>
<td>2,39</td>
</tr>
</tbody>
</table>
IV Conclusion

The paper focuses on the role of KIBS and venture capital in the innovation system and the innovation advantages of cities in a knowledge economy, i.e. cities as sites for clustering, networking and transfer of both explicit and tacit knowledge. Both dimensions are intertwined in the discussion of the knowledge economy. Empirical evidence clearly indicates the spatial clustering of innovation, business services and venture capital in the larger cities in Norway. The paper has examined this development by looking at how KIBS/consultancy diffuse both global codified knowledge and local, often more tacit knowledge to their clients, and at venture capital investment preferences for city-based investments in knowledge-intensive or “new economy” industries, and at venture capitalists as providers of business knowledge.

KIBS – spreaders of global and local knowledge

One of the most important agglomeration advantages cities represent for the consultants’, are the large and demanding markets they hold. However, consultants have a diversified geographical set of clients in their portfolio, making them bridging institutions between the regional and the national/international innovation systems through recycling of information and knowledge between their clients which intensifies the knowledge spillovers between different spatial levels. Consultants’ ability to receive global knowledge and to adapt it to the local context is an important prerequisite for the exploitation of consultants knowledge in the regional economy.

Consultant’s competitiveness is to a large degree linked to its human capital and to close client interaction. Even though consultants have both national and international clients, the results show that localism is inherent in consultancy exchange and development (Wood, 2001), making the regional innovation system an important contributor to knowledge creation and exploitation. However, the knowledge infrastructure seems to be less important as an agglomeration advantages in cities, possibly due to consultants knowledge base being more based on cumulative experienced-based knowledge. This makes informal networks of great importance to consultants, emphasising the importance of being located in city regions were ‘light institutions’ are dense.
Consultants contribute differently towards innovation related tasks in client firms. They are valued more as developer of clients’ core competence among firms with less than 20 employees, and in firms with low share of sales used on innovation. This may indicate that for some client’s consultant’s act as an important external factor for developing core business activity. In this they function as a secondary knowledge infrastructure towards actors that might have problems in approaching the public knowledge infrastructure due to lack of resources and capabilities.

Looking at the regional dimensions of clients’ perception of consultants’ importance in relation to innovation, the results show that client’s in small cities are more positive to consultants’ contribution towards innovation than clients in the Oslo region. This may suggest that consultants are perceived to be a more important external knowledge input in areas with ‘institutional thinness’ than in areas with ‘institutional thickness’, playing the role as the second knowledge infrastructure more clearly. Based on the presented empirical evidence it seems reasonable to conclude that consultants play an important role as knowledge generators towards their clients in cities. What specific kind of role they play depends to a large extent on clients’ internal resources, their initial innovation activity and whether the firm is situated in regions with alternative external knowledge providers.

Venture capital – “new economy” industry drivers and providers of business knowledge

Venture capital firms act as intermediaries between investors and entrepreneurs. They add value by bridging the gap between these actors and through hands-on involvement in their ventures, and thereby represent a vital part of innovation systems in a knowledge economy. The venture capital innovation model discussed in the paper focuses primarily on commercialisation of R&D and not on R&D in itself. Due to the rapid growth of venture capital in many OECD countries the past decade one has witnessed an increase in private-sector investments in R&D, not as direct support of R&D but as the financing of high-risk, fast-growing and early stage knowledge-intensive firms.
Empirical evidence confirms that venture capitalists mainly invest in “new economy” industries clustered in cities and urban areas also in Norway. When investing in high-risk and high-return businesses, investors seek to reduce risk and to improve the rate of return and, as a result, VC investment preferences regarding industry diversity and geographic scope are supposed to be determined by stage of investment, size and ownership of the venture capital firms (Gupta and Sapienza 1992). The assumption that large venture capital firms diversify in both industry and geography is confirmed, as is the hypothesis that corporate venture capital mainly invest for strategic purposes in parent company industry or related industries. It is, however, hard to find support for the assumption that early stage venture capitalists prefer less industry diversity than do later stage venture capitalists. As mentioned, almost every Norwegian venture capital firm specialise within a few industries, whereas they all diversify on investment stage. Less industry diversity, therefore, may be more due to smallness than to stage. Most Norwegian VCs are relatively small and have neither the money nor the expertise to invest in a broad range of industries. Another explanation for the investment pattern may be that most Norwegian venture capitalists just have followed the main stream of dot.com investments in the 1990s.

If the last explanation is valid, and if venture capital investing to a large extent just reflects industrial growth, it will contribute less to innovation and industrial renewal than anticipated in the literature. If, on the other hand, venture capital primarily invests in emerging industries and in early stages, then it may play an important role in the innovation system. In Norway this can imply a change in the investment pattern in that relatively more investments might be directed to expected national growth sectors or clusters with an international potential such as ocean farming, energy and maritime industries (Reve and Jacobsen 2001). This could also change the regional distribution of venture capital and lead to formation of stronger capital bases, for instance, in the western and Northern parts of Norway. Further on, regional imbalances due to spatial clustering of innovation and capital could also be reduced by more extensive syndication and if regional based venture capitalists are strengthened through private-public venture capital partnerships.
The innovation advantages of cities related to *fixed* and *relational* assets, as presented by Amin, seem to be valid. In-depth interviews confirm that agglomeration, proximity and density influence the location pattern of venture capitalists, whereas they have a more mixed view of the presence of knowledge generating milieus. The importance venture capitalists put on face-to-face contact, being part of a network and to be able to intermingle with people having the relevant competence, also seem to confirm the significance of relational assets. Face-to-face contact often is necessary when the exchange of information and knowledge has a tacit and/or non-codified element and when people have to discuss problems at hand in-depth and at great length in trust-based relations. Venture capitalists often act in such relations.

Empirical evidence also seems to confirm that venture capital is more than money, and that they provide entrepreneurs and start-ups with significant business knowledge. Portfolio firms report that venture capitalists’ contribution to strategy, networks and competence is important, and many of them claim that they would not have existed or developed more slowly, if not for venture capital. But they are not only pleased; a large majority of the portfolio firms are dissatisfied with venture capitalists contribution to marketing, product and organisational development. A fairly large share of the firms also has higher expectation to venture capitalists with regard to management support, economic advice and access to extra finance. Venture capitalists get the best rating from their “clients” with regard to board activities which of course is quite important for the development of the firm. A final conclusion then is that venture capitalist without doubt are important for financing innovation and entrepreneurship, but that they still have a potential for improvement before they can fulfill their anticipated key role in the innovation process in the knowledge economy.
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