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# LABOUR MARKETS AND THE GEOGRAPHY OF FIRM LEARNING

PHD THESIS

FACULTY OF SOCIAL SCIENCES  
DEPARTMENT OF SOCIOLOGY AND HUMAN GEOGRAPHY  
UNIVERSITY OF OSLO

March 2018

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*Series of dissertations submitted to the  
Faculty of Social Sciences, University of Oslo  
No. 707*

ISSN 1564-3991

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Cover: Hanne Baadsgaard Utigard.  
Print production: Repräsentralen, University of Oslo.

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## Acknowledgements

The work on this thesis has benefitted from support from several people, including my supervisors, colleagues, friends, and family.

First and foremost, I would like to thank my supervisors Sverre Herstad and Bjørnar Sæther for invaluable academic guidance at all stages of this PhD project. Both of you have been a source of inspiration, and I am extremely grateful for your support. I am also grateful to Kristian Stokke for support during the progress of my work, giving academic feedback as well as mental support.

I would also like to thank all my colleagues on the 3<sup>rd</sup> floor in Harriett Holters hus. I have felt privileged being part of such an encouraging and inclusive working community. I am also very grateful for being part of the Norwegian Research School in Innovation (NORSI), extending my network to other people working on innovation research. Thanks for providing excellent academic courses taught by leading professionals and scholars, and for arranging an unforgettable study trip to Stanford and Silicon Valley.

I would also like to thank my very best friends, Henriette, Ine, Hildegunn, Christel, Yngvild and Marie. Thank you for always inviting, including, and keeping in touch with me, even though my responses sometimes have been sporadic. Thank you for our forever-lasting friendship.

I would like to thank my parents for giving me the opportunity to grow up in an environment enriched with discussions and engagement about social and political issues. Thank you for teaching me that all goals are achievable through hard work. I would also like to thank my siblings, Inger Marie, Kristin, and Torbjørn for a strong fellowship, in particular after our dear father passed away in 2013.

Finally, I would like to thank my cohabitant, Ole-Anders, and our three children. Living together with someone who is constantly thinking about papers, course work, and teaching duties demands great strength. Thank you, Ole-Anders, for your support during many years, and for taking care of birthday gifts and school events, and for managing our calendar and everyday life. Thanks to our three children, Eyolf, Alvilde, and Tord for filling life with action, meaning, and fun at all hours, and for always reminding me of what is important in life.

Oslo, March 2018

Ingvild Jøranli

# PART I

Introduction



# 1. Introduction

## *1.1 Growth and industrial dynamics in the ICT services industry*

Throughout history, the introduction of new technologies has influenced economic, social, cultural, and human development. Today, the rapid development of new information and communication technology (ICT) services is changing society and work life radically. For the first time in history, information generation, processing, and transmission have become the main source of productivity growth (Dicken, 2015). The global expansion and diffusion of ICT have contributed to growth in both the supply of and the demand for new technologies. The influence of the ICT services industry is directly reflected in employment growth and contribution to GDP (Holmen et al., 2016), but is also and more indirectly expressed in which the industry, through its provision of technology-based services, exert strong influence on innovation across several domains of the larger economy. From 1970 to 2015, the Norwegian ICT services industry had a yearly growth in value creation of on average 8.4 per cent (Holmen et al., 2016).

Employment in the services segment of the ICT industry has exhibited strong concentration in large, high-cost and often congested urban locations (Isaksen, 2004). This concentration is resilient, despite the growing importance of global innovation networks (Martin et al., 2018), and current trends of services export and outsourcing to low-cost countries. In Norway, more than 50 per cent of employment in ICT services<sup>1</sup> is located within in the capital-city region<sup>2</sup> and nearly 75 per cent of total employment is located within either the capital-city region or the three largest urban agglomerations (Statistics Norway, 2017).<sup>3</sup> Thus, the ICT services industry is strongly concentrated in large-city regions, suggesting that industry concentration cannot be understood merely through the lenses of inter-firm collaboration and global innovation networks. The forces of particular urban locations and knowledge diffusion through local labour market mobility are also crucial to understand industry concentration.

Schumpeter identifies two patterns of innovation activities, ‘creative destruction’ (Mark I) and ‘creative accumulation’ (Mark II) (Schumpeter, 1934; 1942). The first describes the entry of new entrepreneurs and firms because of new market and technological opportunities. Entrepreneurs enter an industry with new ideas and innovations. New ideas and innovations

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<sup>1</sup> Note: Register-based employment data, Q4 in 2016. IT and information services is defined as businesses classified by industry codes 62 and 63 in the official employment register. Table 09315.

<sup>2</sup> Defined as Oslo and Akershus.

<sup>3</sup> Bergen (Hordaland), Stavanger/Sandnes (Rogaland), and Trondheim (Trøndelag)

challenge established firms, and disrupt current ways of producing, organising, and distributing goods and services (Breschi et al., 2000). The second pattern refers to the capacity of established firms to create barriers to new entrepreneurs and firms by continuously accumulating firm-specific knowledge and refining advanced organisational routines. While ‘creative destruction’ implies the radical recombination of knowledge and technology, ‘creative accumulation’ refers to incremental changes.

Duranton and Puga (2001) introduce the notion ‘nursery city’ to reflect that firms and industries grow out of new market opportunities available in cities (Mark I). In research on the services industry, much attention has traditionally been devoted to agglomeration benefits associated with proximity to a broad range of specialised markets available in urban regions (Isaksen, 2004; Shearmur, 2010). Limited research attention has until recently been devoted to the knowledge externalities arising from services firms’ ability to access advanced human capital available within larger and denser labour markets available in urban areas. Still, a larger labour market constitutes a strong motive for firms to agglomerate, because the size of the labour market lubricates the matching process between jobs and skills (Marshall, 1920; Combes and Duranton, 2006).

This PhD thesis explores how the knowledge dynamics of urban spaces shapes the Norwegian ICT services industry. The thesis is premised on the view that individuals learn and develop their skills and competencies at the workplace, and that knowledge is exchanged between firms and industries through the mobility of employees (Power and Lundmark, 2004; Boschma and Frenken, 2011). Learning and the creation of new knowledge is a prerequisite for innovation and industrial development. Based on this, firms develop by interacting with the external labour market, searching for individually embodied competencies that they need. The thesis explores how the mobility of employees is interlinked with the characteristics of surrounding labour markets and shaped by human resource management (HRM) practices of individual firms. The knowledge dynamics of the ICT services industry is explored from three complementary perspectives: 1) urban locations and how they influence recruitment channels that are open and used by firms, 2) firms’ individual recruitment behaviours, and 3) individuals’ career paths.

### ***1.2 Territorially embedded labour market dynamics***

Economic geographers have long explored what kind of industrial composition that leads to the most prosperous development of cities and regions (Florida, 2003; Lambooy, 2010), devoting



much attention to understanding how knowledge is shared and exchanged from one firm or industry to another. Building on the work of Jacobs (1969), scholars have argued that the industrial diversity of a city or a region (labour market diversity) facilitates the cross-fertilisation of ideas and knowledge amongst industries (Glaeser et al., 1992). The work of Marshall (1920) has strongly influenced research on industrial clusters, emphasising that the co-location of firms belonging to the same skilled-trade, or industrial specialisation, facilitates the development of highly specialised knowledge and labour markets. More recently, the debate has expanded into a third version of ‘related variety’ externalities, emphasising the unique industrial dynamics of regions that are diversified into different yet related industries (Frenken et al., 2007), and the benefits that accrue to firms located in them (Aarstad et al., 2016). Knowledge externalities arising from knowledge diversity, specialisation and/or relatedness, all but in different ways, touches upon the extent to which the industrial composition of regions affects knowledge flows and potentially also learning among individuals, firms, and industries that are co-located.

The debate has tended to focus on whether it is access to specialised *or* diverse sources of knowledge that fosters industrial development, but the findings are ambiguous (see de Groot et al., 2009). Duranton and Puga (2001) argue that both diversified *and* specialised urban structures are important to industrial development. The authors argue that diversified cities are more beneficial in the early stages of a product’s life cycle, whereas more specialised places are better to conduct mass production of mature products. Their perspective echoes the distinction between Mark I and Mark II technological regimes (Breschi et al., 2000). Relatively speaking, specialised cities and regions may be particularly supportive of ‘creative accumulation’ (Mark II) of existing technologies (and knowledge), while diversified cities are more likely to be nurseries for entrepreneurial experimentation, that is, ‘creative destruction’ (Mark I). Therefore, specialised and diversified cities play different roles in industrial development. The research conducted in this thesis shows that ICT services firms located in distinct urban spaces *simultaneously* gain from a better access to specialised industrial experiences facilitated by industrial concentration of other ICT services firms, and from the larger diversity of industrial experiences available within urban labour markets more generally.

Research in economic geography suggests that the geographical concentration of people, firms, and industries promotes the exchange of tacit, specific, and context-dependent elements of knowledge. Tacit knowledge is difficult to exchange over long distances, which provides incentives for firms to concentrate in certain spaces to access spatially sticky knowledge

(Gertler, 2003). Geographic proximity may also increase the likelihood of serendipitous meetings, and to develop social relationships that facilitate the exchange of ideas and knowledge (Agrawal et al., 2006). Dahl and Pedersen (2004) found that besides enhancing the exchange of specific knowledge about products and technology, geographic proximity strengthens informal contact networks. The authors suggest that the exchange of locality-specific information enhances the networks of employees, which also might include information about prospective career opportunities.

For long, knowledge-exchange and learning opportunities arising from geographic proximity were depicted as being ‘in the air’ and exchanged more or less implicitly as ‘local buzz’. Still, this view of tacit knowledge being shared rather implicitly and informally between firms and industries has been criticised. Power and Lundmark (2004) argue that tacit, specific, and context-dependent elements of knowledge are developed at the workplace and exchanged across firms and industries through the mobility of employees. Individuals develop their competencies at the workplace, and firms learn by recruiting employees from each other. Geographic proximity facilitates this process because people are more inclined to switch their workplaces within the boundaries of a region, than across regions (Eriksson and Lindgren, 2008; Eriksson, 2011). Inter-firm business relationships, by contrast, are purpose-built and tend to extend beyond the region (Trippel et al., 2009; Fitjar and Rodríguez-Pose, 2017).

Rutten and Boekema (2012) argue for a paradigmatic shift in conceptualisation of the knowledge economy. In the knowledge economy 1.0 paradigm, learning processes were thought of as occurring primarily in organised inter-firm networks and collaborations; *the firm* was seen as the principle agent of learning and *firm networks* as the principle channel for knowledge diffusion. In the knowledge economy 2.0 perspective, individuals are the main agents of learning, and learning is conceptualised as processes taking place in social contexts that transcend organisational boundaries. Knowledge exchange is connected to the mobility and networks of individuals, and is much more diffused across organisational boundaries because people are members of multiple social and professional networks. Knowledge, experiences, abilities, and relationships are tacitly embodied in employees and evolve throughout the career path of the individual.

### ***1.3 Recruiting embodied skills and competencies***

ICT services is a human capital-intensive industry. Human capital is defined as the knowledge, skills, and expertise embodied in people (Becker, 1964; Schultz, 1971). The creation of ICT services relies upon formalised skills and competencies reflected in educational background (know-why), as well as in industrial and technical experiences (know-how) (Lundvall and Johnson, 1994; Hausmann, 2016). Still, the value of generic technological knowledge is low, if the firm is unable to use this into the production of customised services. Differences in clients' demands create high degrees of variability in a firm's production processes (Skaggs and Youndt, 2004) and client interaction is therefore important during the production process (Isaksen, 2004). Lam (2000) argues that, for example, management consultancies and software firms are strongly dependent upon non-standardised work processes and knowledge that are tacitly embodied in individual experts. Strong dependence upon individually embodied knowledge draws attention to how firms and managers validate tacit skills and non-standardised experiences when recruiting.

The kinds of skills and competencies flowing into a firm are determined by the recruitment strategies and behaviours of individual firms. Recruitment defines the mechanisms by which firms search for and select new skills and competencies and integrate them into the organisation. The search dimension concerns how firms connect to the external labour market, and selection relates to how managers and firm executives validate and select embodied knowledge and skills during the recruitment process. Knowledge integration refers to the ability of the firm to create competitive advantage by using incoming competencies. Knott (2001) argues that the manager performs two roles that create value for the firm, an administrative role and an entrepreneurial role. While the first role accentuates the role of the manager in enforcing the firm's operational routine, the second role points to the manager's role in keeping a meta-perspective by continuously revising the firm's operational routine, to keep pace with changes in the business environment. The recruitment function can be approached accordingly. The manager might select entrants on the basis of solving task-specific competence demands, but the process can also be encouraged by selection strategies that consider the skill composition of the work force and thus also the firm's overall learning capabilities.

This thesis seeks to bridge economic geography and research on HRM. By doing so, the PhD project explores how learning capabilities of ICT services firms evolve at the intersection between managerial capabilities, and individually embodied skills and experiences that reflect the characteristics of urban economies. This thesis addresses the mechanism whereby firms

approach and interact with the external labour market, searching for skills and competencies, and the thesis discusses whether firms tend to select employees using criteria that explicitly or implicitly are influenced by the composition of the surrounding labour market. The project discusses whether individuals' career paths are shaped by locations, and therefore also provide the basis for human capital formation that are reflected in the location patterns of ICT services firms, as well as in their recruitment practices and internal knowledge bases.

#### ***1.4 Research objectives and questions***

Conceptually, ICT services firms can be defined as establishments that contribute in the production of services that build on information and communication technology. The activities include the provision of ICT-based infrastructure and technology-based liaison services, customised and standardised software services, as well as the provision of other operational ICT services (Holmen et al., 2016). Empirically, ICT services have been delineated using the Standard Industrial Classification (SIC) as comprising firms classified as 'Computer programming; consultancy and related activities' (62) and 'Information services' (63) in the official business and employment register (Statistics Norway, 2007). Employment among ICT services firms specialised in computer programming, consultancy activities, and information services (SIC 62 and 63) increased from 32 000 to 47 000 employees between 2007 and 2015, reflecting an employment growth rate of 47 per cent (Statistics Norway, 2017). Thus, the ICT services industry is an important job creator in the Norwegian economy.

ICT services firms are strongly concentrated in the largest urban agglomerations. This research project has focused particular attention on the knowledge dynamics of ICT services in the capital-city region, the urban agglomeration where the ICT services industry is most highly concentrated. The thesis explores the territorial, organisational, and individual knowledge dynamics characterising the knowledge exchange and learning opportunities of the urban ICT services industry. It starts by discussing the extent to which high-end technology services firms learn and develop by interacting with the external labour market. Learning is seen as an interactive and context-dependent process, which may be embedded in external conditions (labour market composition), in internal managerial capabilities of the firm (organisational context), and in skills embodied in employees (education, experiences, and career paths).

The focus on services, rather than on ICT hardware/manufacturing industries, is warranted because of the shift towards a services-based economy generally, and towards ICT services in particular. Furthermore, because the project discusses the role of human competencies, the

services segment is particularly relevant. Niosi et al. (2012) argue that the services and hardware segments have different economic paradigms associated with them. Compared to hardware producers, ICT services providers have very few fixed costs. Most costs of firms providing ICT services are tied to labour costs. Therefore, the competitiveness of firms is closely related to their capacity to accumulate and exploit specialised human resources. Relatively speaking, services providers require little physical capital and demand instead highly skilled employees.

The two overarching research questions for this PhD thesis are as follow: 1) *How are knowledge-intensive business services (KIBS) firms interacting with external labour markets?* 2) *In what ways does this interaction influence firm learning?* These two broad questions are reflected in four research questions and in the contributions of four papers. The first research question sees the firm from within the context of regions. The second research question discusses human resources and recruitment behaviour in the context of the firm. The third discusses how competence search and selection are shaped by various dimensions of proximity. The fourth research question places ICT services firms in a broader context of research conducted on KIBS organisations. By exploring these questions, the thesis aims to contribute to the conceptualisation of the firm in economic geography (Taylor and Asheim, 2001) and to increase understanding of how firms are shaped by characteristics of their locations. The research questions addressed in the papers are presented below and seek to address the overarching topic in complementary ways.

***Research question and paper 1:*** *What characterises sector dynamics and labour market positions of individual ICT services firms located in the four largest Norwegian cities (Oslo, Bergen, Trondheim, and Stavanger)?*

***Research question and paper 2:*** *How are ICT services firms managing organisational learning by searching and selecting competencies from external labour markets?*

***Research question and paper 3:*** *How are geographical, cognitive, institutional, social, and organisational dimensions of proximity interacting in competence selection processes?*

***Research question and paper 4:*** *How does competence mobility affect knowledge development in KIBS firms?*

### ***1.5 Contributions from the different papers***

The first paper, entitled ‘Urban concentration and labour market linkages in the Norwegian ICT services sector’, was co-authored with Sverre Herstad and published in *European Planning Studies* in May 2017. The objective of this paper is to map the employment growth (2000–2010), urban concentration, organisational form, and labour market positions (2010) of ICT services firms located in the four largest Norwegian cities. The paper investigates whether inter-urban and intra-urban industrial variation shape the recruitment channels activated by firms. The results suggest that ICT services firms, depending on city region, as well as on their location within certain districts of the capital city, have access to particular knowledge sources – and that differences are most pronounced for small and independent firms. The recruitment channels open for ICT services firms mirror the industrial and institutional composition of their locations, thus determining what experience-based knowledge (know-how) is most readily available. The paper suggests that the urban ICT services industry is benefitting from different, but distinct knowledge dynamics of their surroundings, represented in labour market linkages to highly specialised, related, diverse, and research-based knowledge sources.

The second paper, entitled ‘Managing organisational knowledge through recruitment: searching and selecting embodied competencies’, was published in the *Journal of Knowledge Management* in January 2018. This study discusses how ICT services firms build an organisational knowledge base by recruiting employees. The paper explores the micro-mechanisms at play in determining how firms connect to external environments when searching for embodied knowledge, and discusses how the skills of individual experts are selected and integrated according to the organisational framework of the firms (Lam, 2000). The paper discusses the tendency of technologists to learn and develop their careers through inter-firm mobility, rather than through learning and developing within one firm over time. Reflecting the theoretical argument and empirical results of paper 1, paper 2 discusses the implications of an ‘occupational labour market’ (OLM) structure for the learning capabilities of software services firms. The study argues that recruitment is a strategic function that confronts both external and internal processes of knowledge adaption and integration (Cohen and Levinthal, 1990), and provides a conceptual model for linking recruitment to organisational learning.

The third paper is entitled ‘Recruitment and the socio-spatial context of learning: Linking cognitive, social, organisational, institutional, and geographical proximity’, and it is currently under review at *Industrial and Corporate Change* (Submitted in September 2017). This paper explores the spatial dimension of firms’ recruitment behaviour. The theoretical framework is

derived from Boschma's (2005) critical assessment of the relationship between geographic proximity and learning. The paper analyses how geographical, cognitive social, institutional, and organisational dimensions of proximity interact when firms select new employees. The study maps the competence network of firms, reflected in the career paths of newly recruited senior technologists, and introduces a distinction between 'general' and 'strategic' deep-level diversity. By doing so, the paper contributes to a more comprehensive understanding of the underlying determinants and micro-mechanisms of skill relatedness and 'related variety' externalities (Frenken et al., 2007; Neffke and Henning, 2013), here in the context of high-end services firms but relevant also beyond. Prior research on skill relatedness (in the context of labour market mobility) have mainly focused on the industrial characteristics of the present and most recent prior employers (Boschma et al., 2009). The results from paper 3 suggest that research on skill relatedness should consider experience-based learning through focusing on the career paths of individuals (Bell et al., 2010) because the composition of experiences accumulated in the firm most strongly influences organisational learning.

The fourth paper, entitled 'Competence mobility in knowledge-intensive business services organisations: Open issues in contemporary research', was submitted to the *Human Resource Management Journal* in March 2018. This paper is a review of papers published 2007–2017, and assess the effect of various employee mobility practices on knowledge development in KIBS firms. The paper discusses findings, conclusions, and implications of eight studies, with reference to how KIBS organisations manage their firm-specific knowledge bases. The results point to imbalances between the strategies and the practices used to attract competencies externally. The outcomes of the mobility practices used by the firms are rather ambiguous, pointing to the need for more research into how various mobility practices affect the performance of KIBS firms, at both individual and organisational levels. Consequently, conventional human resource practices must be rethought by incorporating employee mobility into a more holistic framework for managing knowledge in high-end services firms.

### ***1.6 Structure of the thesis***

The PhD thesis consists of two parts, an introduction and the four papers' contributions. The introduction comprises five chapters. While this first chapter has introduced the research topic, research questions, and the papers' contributions, chapter two presents and discusses the theoretical framework of the thesis. The third chapter outlines the methodological positions influencing the research project and the research design. The fourth chapter presents the major

findings and discusses how the ongoing debates in economic geography can gain from the HRM literature, as well as from empirical findings on the knowledge exchange and mobility dynamics of ICT services firms. The chapter also addresses limitations of the project and policy implications, and the chapter proposes questions for further research. Part two presents the core of the thesis – the four papers that have been either published by or submitted to journals for peer review. The papers have been written during a five-year period (2013–2018), and are presented chronologically according to when each was completed.



## 2. Theoretical framework

This chapter presents the conceptual framework developed through work on the thesis. The thesis is premised on the view that knowledge is transferred between people, firms, and industries through the mobility of employees (Boschma et al., 2009; Almeida and Kogut, 1999; Singh and Agrawal, 2011). Tacit, specific, and context-dependent knowledge is developed and shared at the workplace. Because such elements of knowledge are embodied in the minds of individuals (Nonaka, 1994), mobility is a particularly important mechanism by which experience-based knowledge is transferred across organisational boundaries (Tell et al., 2017; Mawdsley and Somaya, 2015). Given this premise, the thesis explores how the mobility of employees is interlinked with the competencies available in surrounding labour markets, with the HRM practices of individual firms, and with the career paths of individuals.

### *2.1 Agglomeration economies and knowledge dynamics*

The concept of agglomeration economies captures all benefits that accrue to firms from concentration in certain places. Recently, it has been suggested that advantages such as better infrastructures and broader local markets should be distinguished from urban knowledge dynamics (Shearmur, 2012). The latter includes the narrower concept of ‘agglomeration knowledge dynamics’, which refers specifically to advantages that arise when co-location of people and economic activities fosters inter-firm and inter-industry learning due to knowledge externalities.<sup>4</sup> Agglomeration knowledge dynamics may arise from interaction within the labour market, because the co-location of people and industries lubricates the skill-matching process between firms and industries in the labour market. A large pool of workers in an area can make it easier for firms to find workers with the characteristics they need and likewise, a large pool of firms can make it easier for workers to find a job suited to their skills. Moreover, the propensity of individuals to change jobs within the same (i.e., local) market is greater than their propensity to move between labour markets (Combes and Duranton, 2006). Due to the local dimension of labour-market processes, it is essential to explore the local labour markets and the regional economic composition to understand labour-market dynamism and knowledge flows expressed through the mobility of employees (Eriksson et al., 2008).

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<sup>4</sup> To constitute an externality, any costs or benefits must be experienced by one firm, but caused by another firm, without the former receiving explicit compensation or payment from the latter (Neffke, 2009).

In economic geography, it is generally agreed that geographic proximity facilitates the exchange of knowledge between firms and industries. However, the particular spatial context that may promote knowledge diffusion and firm learning has been widely debated. Marshall (1920) points to agglomeration economies arising from the concentration and growth of one particular industry within a city or a region, referring to this as *localisation economies*. The growth and concentration of firms within the same skilled-trade provide benefits associated with the creation of highly specialised knowledge and labour markets. New firms may be attracted by this highly specialised pool of labour, and workers may be attracted to career opportunities available in the area. Furthermore, the geographical concentration of one large industry may also strengthen the ability to lobby for educational institutions and training programs tailored to the industry's needs. Thus, this view points to the learning opportunities for firms and individuals arising from industrial specialisation.

Jacobs (1969) argues that if one industry dominates, this dominance may become a threat to the long-term development of the local economy. She argues that cities (and regions) need to be sufficiently diversified to keep reinventing themselves, and that the most important sources of knowledge for an industry come from outside the industry itself. Glaeser et al. (1992) develop these thoughts further, and stress that greater diversity in the local economy creates opportunities for cross-fertilisation of ideas between firms in different industries. *Jacobs externalities* refers to the effect of local diversity, while the term *urbanization externalities* indicates the effects of city size. Often, the most diversified cities are also the largest and most populous ones (Neffke, 2009). The size and diversity of the labour market may enhance learning opportunities by enhancing firms' access to novel ideas.

Duranton and Puga (2001) criticise that the debate is often framed by contrasting whether industrial specialisation *or* diversity promote the creation of new knowledge and industrial development. The authors suggest that both diversified and specialised urban environments are crucial to learning, innovation and industrial development. Diversified cities and labour markets are particularly beneficial in the early stages of a product's life cycle, while specialised cities and labour markets are better at facilitating mass production of mature products. Thus, some cities specialise in churning out new ideas and new products, which requires a diversified industrial structure, whereas other cities specialise in more standardised production which, in turn, is better carried out in a more specialised environment. Given these differences, diverse urban spaces may increase firms' access to novel ideas, which may strengthen the firms' explorative learning and 'creative destruction' (Mark I). On the contrary, access to highly

specialised knowledge and labour markets may facilitate exploitative learning and ‘creative accumulation’ of knowledge (Mark II).

## ***2.2 Skill composition in firms and external influences***

Echoing the discussion of the agglomeration economies arising from access to specialised and/or diverse sources of knowledge, a similar discussion is relevant to the context of firms. In organisational theory, a broad distinction is made between the so-called *cognitive resource diversity* perspective and the *similarity attraction* perspective. According to the first, teams consisting of people with more diverse knowledge and work-life experiences perform better than groups consisting of people with less diverse knowledge and fewer work-life experiences. The argument for this perspective is that diversity promotes creativity and problem-solving skills (Horwitz and Horwitz, 2007). Conversely, the similarity attraction perspective emphasises that people prefer to engage in relationships with people who are similar to themselves, and that similarity eases communication and enables a more efficient execution of tasks (Rivera, 2012; Parry and Jackling, 2015) and knowledge sharing (Nooteboom et al., 2007). Therefore, teams consisting of individuals having similar skills and experiences may work well together because of their shared characteristics. While the cognitive resource diversity perspective can be associated with urbanisation economies, the similar-attraction perspective can be associated with localisation economies.

Prior research on cognitive diversity has tended to focus on fixed characteristics given at birth, rather than on educational backgrounds and work-life experiences. While so-called primary diversity relates to given individual characteristics such as age, gender, and ethnicity, secondary diversity relates to more task-related characteristics such as education and experience, thus drawing attention to the career paths of individuals. Bell et al. (2010) argue that measurements attributed to educational or industry background captures experiences that have a stronger impact on how an individual performs a given task, compared to measurements attributed to primary diversity. In other words, diversity attributed to demographic characteristics is less job-related than diversity attributed to educational backgrounds and work life experiences. Thus, scholars have argued that research on cognitive resource diversity should primarily assess how diversity in human experiences and career paths affects the performance of teams and firms (Bell et al., 2010; Shore et al., 2009).

Even though greater diversity in education and work-life experiences provides a team with a broader stock of knowledge from which ideas and solutions can be drawn, too much diversity can also be a disadvantage. Nooteboom et al. (2007) explore how diversity may affect the learning and innovation capabilities of firms, arguing that too much diversity may become a disadvantage because people at some point may fail to understand each other's technological context. Nooteboom et al. (2007) introduce the notion 'optimal cognitive distance' to express the trade-off made between learning opportunities arising from novel insight, and the increasing risk of misunderstandings because people may communicate past each other. The benefits of searching for heterogeneous resources to enhance learning in novel domains may at some point become disadvantageous to decision making and task execution.

In evolutionary economic geography, the effect of skill diversity is analysed primarily by looking at the industrial characteristics of the recruiting firm and of the most recent prior workplace of employees. Besides the benefits arising from knowledge diversity and specialisation, a third version of agglomeration economies points to the benefits arising from firms' access to knowledge sources that are *related* to the core activities of the firm. Boschma et al. (2009) find that the inflow of employees having skills that are 'technologically related', but not overly similar or too different from the firm's existing knowledge base, is most conducive to firm performance. However, the study shows that inflow from 'technologically unrelated' industries had a positive impact on firm performance when the skills were recruited within the region. This is explained by the fact that geographic proximity may compensate for unfavourable cognitive distances.

Neffke and Henning (2013) examine how industries are related by their skill demands, suggesting that similarities in human capital demands are an important determinant of a firm's choice of product diversification. Given this finding, the inflow of skills to a firm tends to be more beneficial if the entrant is recruited from a firm related in terms of technology and/or skill demands. In line with this reasoning, Borggren et al. (2016) show that the survival of high-growth firms is associated with the inflow of skills from technologically related industries. Furthermore, they find that firms located within large-city regions are more likely to survive if they are located near other technologically related firms. However, and in the context of urban and more diverse labour market regions, research findings pointing to the effect of employee inflow from technologically related sources is somewhat ambiguous. These contradictory findings suggest that effect of the particular skill inflow to an industry may be shaped by the industrial composition of different urban labour markets.

Reflecting this point, Timmermans and Boschma (2014) found that mobility flows between firms belonging to the same industry impact negatively on firm performance, except among those firms located within the capital city labour market region. Since capital cities are more dominated by services industries, one explanation could be that knowledge flowing in from related sources are less important for services industries. Alternatively, and particularly relevant in the context of KIBS firms, employees tend to develop job-related skills and work-life experiences by moving between different projects and clients. Employees learn by interacting with a wide range of industrial segments, and this interaction is part of an individual's occupational practice. Therefore, inflows of people from firms in the same industry may, when occurring in large, diversified regions, include people having competencies and work-life experiences that are much more diverse than is generally the case for recruitment between firms that are defined as technologically similar. As career paths of individuals may be more diverse in urban regions, this underscores the relevance of going beyond considering only the most recent prior workplace of new entrants and instead consider their entire biographies of learning (career path).

Herstad (2017) analyses how the innovation strategies of individual firms reflect the density, diversity and international connectivity of their urban locations. He finds that firms located in the central and western parts of the Norwegian capital city region are more inclined to engage in innovation activities than firms located elsewhere. However, once human resource endowments are accounted for, firms in these two main business districts exhibit lower propensities to engage in innovation yet a stronger commitment to innovation once engaged in it. The findings show that the propensity to engage in innovation is shaped by the micro-ecologies of various places, suggesting that urban agglomerations provide social structures for knowledge exchange, which forms the learning opportunities and innovation strategies of firms and industries.

### ***2.3 Entering the firm: Resources, knowledge, and competencies***

A much-debated conceptual question is why firms exist, that is, why production and workers are organised within firms, instead of taking the form of market transactions between self-employed individuals (Hodgson, 1998). This debate has given rise to numerous theories, discussing the existence of firms, their boundaries, and the internal organisation of workers in different firm contexts (Foss, 1996; Tell et al., 2017). Penrose (1959) laid the foundation for the resource-based view of the firm, seeing the firm as a complex and unique bundle of human

and non-human resources and capabilities. She argues that firms develop because of their capacity to manage resources efficiently. Unused resources constitute an internally generated incentive for firms to diversify their production. Firms will therefore constantly search for ways to put unused resources to use, and the surplus of resources is more valuable in producing goods and services that are not yet produced. As a result, firms develop by expanding into fields where productive services yield the highest return. This view acknowledges the importance of diversification as a source of firm growth (Neffke and Henning 2013).

Grant (1996) argues that intrinsic knowledge characteristics have implications for how it is managed by the firm. He distinguishes between knowledge management associated with information processing, and knowledge management associated with knowledge application. While information processing relates to knowledge in its explicit form, the actual use of knowledge depends on tacit elements. Knowledge in its explicit form is often referred to as information and factual knowledge, while the term 'knowing how' is represented in the accumulated practical skills and expertise that 'allows employees to solve their tasks smoothly and efficiently' (Von Hippel, 1988 in Kogut and Zander, 1992). Grant (1996:111) argues that the critical distinction between explicit and tacit elements of knowledge lies in 'the mechanisms for transfer across individuals, across space, and across time'. Tacit knowledge is connected to circumstances of time and place, and is therefore context dependent.

HRM research tends to focus on knowledge management at the intra-organisational level, rather than at the level of inter-organisational knowledge exchange. Despite this, it is unlikely to believe all knowledge needed to develop new services can originate within a firm's boundaries (Enkel et al., 2009). The HRM literature has therefore been criticised for not paying enough attention to managerial capabilities that go beyond organisational boundaries (Tell et al., 2017). The ability of firms to develop is to an increasing extent dependent upon their capacity to adapt and respond to rapid economic and technological changes, underscoring the need to explore external factors that may affect the HRM decisions of firms (Martin-Rios, 2014). Thus, the ability to identify and recombine knowledge from external environments is becoming an increasingly important source of organisational learning.

#### ***2.4 Recruitment strategies – behaviour and choices***

Recruitment is a mechanism that provide insight into how firms search for, select, integrate and exploit external knowledge. Throughout the recruitment process, firms strive to attract and select individuals who have educational backgrounds, work-life experiences, and relationships that strengthen the expertise of the firm (Teece, 2003). The process can be broadly defined as consisting of three phases. The first phase involves searching for knowledge (Cohen and Levinthal, 1990; Laursen, 2012). The second phase consists of selection processes. In this phase, firms use certain methods to screen and select the skills and competencies that respond to their current demand (Hatch and Dyer, 2004). The third phase involves integrating new embodied competencies into the knowledge base and work processes of the firm. Tell et al. (2017) define knowledge integration as ‘the purposeful combination of specialised and complementary knowledge to achieve specific tasks’.

In their study of recruitment in high-end services firms, Groysberg and Lee (2009) found that expert employees recruited into a firm to explore new markets and activities suffered from a long-term decline in their performance. By contrast, expert employees recruited to exploit and reinforce existing markets and activities suffered only a short-term drop in performance after entering the firm. Their findings indicate that even if individuals are considered experts in their respective fields, their performance is affected by the degree of organisational support they receive. Thus, the performance of an expert is not solely matter of accessing skills and competencies that respond to particular task-specific demands, but the performance is affected by existing firm capabilities. The findings also reflect that organisational learning is more difficult in novel domains.

The ICT services industry is characterised by rapid technological changes, and therefore is particularly reliant on connections to external sources of knowledge and collaboration (Shearmur, 2010). Much research has therefore accentuated the concentration of high-end services by exploring advantages arising from geographic proximity to the market. According to this line of reasoning, ICT services firms tend to concentrate in large-city regions because market opportunities are more extensive there, as well as because location in cities can provide firms contacts with international partners. Comparatively speaking, fewer studies have explored whether the urban concentration and growth of ICT services firms can be attributed to the supply of embodied competencies available in urban regions. Moreover, few studies have explored whether urban agglomerations contain particular social structures that facilitate the

radical recombination of existing resources ('creative destruction') and/or incremental changes by accumulating firm-specific stocks of knowledge ('creative accumulation').

Although the production of ICT services relies on explicit and generic technological knowledge that is globally available, the ability to create customised services depends on the experience-based knowledge embodied in expert employees. Expertise refers to the competence expressed through the cognitive combination of formal knowledge and experience. While formal education may express the employee's generic and analytical technological skills (know-why), previous projects contributions and work-life experiences express the technical and professional experiences (know-how) that an employee has gained throughout the entire career path. The ability to create customised services depends on embodied skills, drawn from previous work experiences, previous projects, and on-the-job learning in which employees have contributed. High-end services firms therefore have distinct industrial characteristics that affect the conceptualisation of skill diversity (and relatedness), and 'deep-level' diversity can be explored by considering the entire career paths of technologists.

This chapter has aimed to develop a conceptual framework bridging research on economic geography to research on HRM. Due to the tacit nature of expert knowledge and the non-standardised work processes of ICT services firms, labour market mobility is a crucial mechanism in forming knowledge flows between individual firms and industries. The somewhat contradictory research findings on the relationship between industrial variation and firm learning point to the need to explore i) skill relatedness within the organisational context of services firms, and ii) with reference to the industrial structure of large-city regions, and by considering iii) 'deep-level' diversity associated with the entire career histories of individuals.



### **3. Research philosophy and design**

#### ***3.1 Epistemological and ontological reflections***

The term ‘epistemology’ refers to the nature of knowledge and how we conceive our surroundings (Wilson, 2014). Traditionally, epistemology has dealt with questions such as: What is knowledge? What is the scope of our knowledge, as well as its limitations? While epistemology is the technical definition of theory of knowledge, ontology relates to the nature of reality and how we think about and perceive the social world (Benton and Craig, 2011). The choice of research questions and methods is a reflection of the researcher’s epistemological and ontological understanding of the world (Feilzer, 2009).

A broad distinction can be made between the social world as external to the behaviour of individual social actors, and the social world as created, or constructed, by them. While the first view is associated with objectivism, the latter is associated with subjectivism. Objectivism is an ontological perspective that implies that social phenomena originate from external realities that are beyond our reach or control. Subjectivism is connected to interpretivism, by which the researcher examines the motivations and social interactions of respondents. Therefore, the researcher must understand the subjective beliefs and attitudes motivating respondents to act in a particular way (Wilson, 2014).

Critical realist philosophy acknowledges that there exists an external world, and simultaneously a dimension which includes our socially determined knowledge about reality (Danermark et al., 2002). Science is thus seen as a historically changing and socially situated human and social practice aiming to produce knowledge about objects, relations, and processes that exist and act independently of our knowledge of them (Benton and Craig, 2011). Based on this, critical realism confronts the complexity of social phenomena by espousing explanations stated in terms of mechanisms that generalise, with empirical effects that are contingent. Although theories are social products, it is possible to achieve greater precision about the underlying structures by testing our theories (Miller and Tsang, 2011).

According to Bhaskar (1975), science is about making knowledge claims about an independently existing reality, using a transcendental argument. The transcendental argument starts with an uncontroversial description of a phenomenon that is observable, and then poses the question, ‘what must the structure of the world be like for scientific knowledge to be possible?’ (Harvey, 2002:165). Bhaskar (1975) uses the term ‘intransitive dimension’ to characterise what the world must be like for experiments to be possible, and the term ‘transitive

dimension' to characterise statements about, for example, what scientific investigators must be like to conduct experiments. The term 'intransitive objects of knowledge' refers to the 'real', and to the objects, structures, mechanisms, and powers that make up the world. Examples are planet rotation, fertility rates (Baert, 2005), labour power (see Sayer, 2000), and other structures of the world which exist independently of our knowledge about them (Baert, 2005).

The term 'transitive objects of knowledge' refers to 'material causes', such as previously established facts, methods, and theories. Different theories and research may provide transitive objects, but the intransitive dimension that is the social world itself remains the same. Sayer (2000:11) exemplifies the distinction between the transitive and intransitive dimensions, saying that 'there is no reason to believe that the shift from a flat earth theory to a round earth theory was accompanied by a change in the shape of the earth itself'. Thus, when researchers change their understanding of a phenomenon, this change in understanding does not imply any changes in the phenomenon itself. While it is possible to imagine the existence of the 'real' without people's knowledge about it, it is not possible to obtain knowledge about the 'actual' independently from the 'real'. Thus, there is an asymmetry between the two (Baert, 2005).

Critical realist philosophy therefore introduces a distinction between the causal powers and structures at play in the social world (the real), the events that occur as a result of these powers, irrespective of whether they are observed by social actors (the actual), and the 'empirical' (the events that are observed and interpreted) (Sayer, 2000). While the 'actual' refers to the patterns of events that take place, the 'empirical' refers to people's perception or observation of these events (Baert, 2005). Employment and productivity are found at the level of the 'actual', but their measurement by researchers belongs to the 'empirical' realm. In the transitive dimension, science may seek to identify structures and powers, while the 'actual' refers to when the structures and powers are activated. Sayer (2000) shows the distinction by referring to the Marxist distinction between labour power and labour. Labour power and the ability to work refer to structures of the 'real', while labour working is the actual exercise of this power and its effects, and part of the 'actual' (Sayer, 2000). The 'empirical' relates to our experience of the 'real' and/or the 'actual', and refers to how some phenomena may be observable, while others are not. What exists may be a matter of what we can observe, but not necessarily.

In this perspective, scientific research is about understanding the causal processes and mechanisms at play underneath 'the empirical' and how they materialise in time- and place-specific contexts. Danermark et al. (2002) argue that one cannot understand, or analyse the 'real', without using a theoretical language. Theories make up a language, informing

interpretations and enabling explanations by conceptualising structures and casual mechanisms. The development of knowledge therefore presupposes the development of a language that can be used to explain the social reality. Theoretical concepts are constantly being developed in relation to the experiences obtained when we use them to understand reality. However, development of theories and concepts is not only a matter of improving empirical studies, but is also a goal in its own right, aiming at constantly developing new insights. Theories and concepts are fallible and changeable, and there will always be a number of competing theories.

The work on this thesis has been inspired by the understanding that labour market dynamics is inherently part of the ‘real’, meaning that labour market dynamics is existing independently from our knowledge and consciousness about it. Concrete relationships, such as the mobility of individuals between different organisations, are affected by a number of elements, powers, and influences, and therefore there is a need to discuss these processes in context. ‘Abstraction’ refers to the practice of isolating one concrete phenomenon and considering it separately from other aspects of the ‘actual’ (Danermark et al., 2002). Reflected by its use of different conceptual theories and methods, this project seeks to isolate and explain certain mobility mechanisms belonging to the realm of the ‘actual’ (i.e., influences on the firm that occur independently of, e.g., managers’ awareness of them). Different data and methods are used to analyse mobility mechanisms and the exchange of embodied knowledge between firms and industries, evident from the ‘empirical’. Each paper’s contributions provide insight into distinct mechanisms triggering labour market mobility of ICT services or KIBS firms, but the overall thesis also aims to enhance the understanding of which mechanisms may relate to one another.

### ***3.2 Multimethod research, data sources, and analytical strategies***

The research questions addressed in this PhD thesis has required different methods. The research project has applied a multimethod research design, which can broadly be defined as the practice of using two or more methods within the same study or project (Hunter and Brewer, 2015). A multimethod design opens for combining two or more methods, regardless of whether they are qualitative or quantitative. Therefore, this design differs from mixed-method research, which is often restricted to the combination of qualitative and quantitative methods in the same study. This project has combined the use of register data, interview data, and document data. The overall project has combined the use of qualitative and quantitative methods, but one of the studies (paper 3) has also combined the use of different qualitative approaches in the same

analysis. The table below shows how different data sources and analytical strategies have been combined in the project:

	<b>Data source</b>	<b>Analytical strategy</b>
<b>RQ1</b>	Register data	Regression analysis
<b>RQ2</b>	Interview data	Thick description analysis
<b>RQ3</b>	Document data and interview data	Case analysis and comparative method (SNA analysis)
<b>RQ4</b>	Document data	Literature review

The analysis addressing the first research question uses linked employer-employee data (LEED). The data are drawn from the official employment and business registers, and made available for research purposes by Statistics Norway. Similar LEED have previously been used in Norwegian (Balsvik, 2011; Møen, 2005) and Swedish (Boschma et al., 2009; Eriksson et al., 2008; Eriksson and Lindgren, 2008) studies. The data used in this study cover all Norwegian enterprises and their individual establishments on a year-to-year basis from 2001 to 2010, in addition to all Norwegian citizens and foreign workers of 16 years or older. The data are collected annually, allowing all employment changes to be identified. The reliability of the data is high and sample selection absent due to the nature of the data. Thus, the analysis allows empirical generalisations about the labour-market linkages of ICT services firms located in different regional labour markets.

To qualitatively analyse the labour mobility dynamics at play, interview data about firms' recruitment strategies and selection behaviour were gathered. The sampling process was based on a purposive sampling (Wilson, 2014), initiated by contacting managers and executives responsible for recruitment in ICT services firms. Some preliminary premises were set to guide the sampling process. First, all firms had to be located in the capital-city region. Second, all firms had to be registered as providers of either computer programming (62.01) or programming consultancy (62.02) activities. Third, the firms had to count five employees or more. ICT services firms were identified by using the business search engine [www.purehelp.no](http://www.purehelp.no) and The Brønnøysund Register Centre. The sampling process started by identifying firm names, according to firm location (in Oslo and Akershus), business activities (SIC code), and number of employees (> 5). In the next phase of the sampling process, firms' websites were screened looking for potential job openings and recruitment approaches. In parallel to this screening, I

also visited two career events for technologists, a HR conference, and a software technology conference. These conferences were used as an opportunity to learn more about the industry, as well as to identify firms, get in touch with managers, and establish contact points to people in the industry.

During the summer of 2015, I began to contact firms and managers to ask for their participation in the research project. The firms were contacted by e-mail (see appendix for invitation and information letter (only in Norwegian)), then by phone. I contacted firms and gathered interview data on an ongoing basis. The interviews followed a semi-structured approach, and the interview guide was used to ensure that the same questions were addressed in each conversation. Three pilot interviews were conducted in the preliminary stages of data gathering to test and modify the interview guide. After the pilot interviews, I decided to make several changes to the interview guide. The first version of the interview guide included too many detailed questions, and I realised that the guide approached recruitment in a very structured and planned way, asking questions such as how the firms used public channels to announce their job openings and how managers screened application letters. However, it became clear that the use of more formal application procedures was less relevant to these firms than expected and reflected in the questions. The interview guide was therefore revised (see appendix for interview guide (only in Norwegian)). After four months, I had contacted in total 40 firms and had conducted interviews in 12 firms. By then, many of the same points were repeated during the interviews and thus theoretical saturation was achieved. Each interview lasted 45–80 minutes and was conducted at each firm's physical location. All interviews were transcribed and stored in NVivo. Besides the interviews, I collected 77 anonymised CVs of technologists recruited by the respective firms during 2015. The CVs were stored and analysed in NVivo together with the interview transcripts.

To answer research question two, the interview data were analysed according to a thematic scheme whereby the different firms 'search for' and 'select' employees. Statements that provided information about recruitment strategies and behaviour were coded thematically. Information about how firms approached external labour markets was identified as being part of their search strategy. Informants' statements about which embodied competencies were validated, screened, and tested during the recruitment process were defined as being part of their selection strategy. Then the two thematic approaches were analysed in relationship to each other. The interview data were analysed by following an interpretive research method, inspired by 'thick description' (Geertz, 1973). Geertz (1973) describes thick description as a way of

providing a cultural context to people's actions and understanding the meaning they place on their actions. Rather than reflecting recruitment as a 'static' process of matching skills within the external labour market, the thick description depicts recruitment as being intrinsically intertwined by internally driven strategies and behaviour of the firm (organisational context or 'culture') (Sayer, 2000). In contrast to paper 1 that sought to make empirical generalisations, the objective of paper 2 was to provide a basis for theoretical advancement about recruitment practices among high-end ICT services firms. By doing so, the paper enhances the current conceptual understanding of how high-end services firms access competencies outside their own boundaries.

The research conducted in response to the third research question used both CVs and interview data. This study examines how different dimensions of proximity shape the recruitment behaviour of firms. The CVs were analysed in two ways. First, the CVs were analysed in NVivo according to whether technologists had obtained their education (know-why) and their latest work experience (know-how) within the capital-city region, nationally, or abroad. Then the industrial career paths of technologists recruited among the firms were mapped in a social network analysis (SNA). This mapping provides insight into how industrial diversity and specialisation, mirrored by the career paths of technologists, are validated in the screening process. The relative comparison enhances insight into the qualitative dimension of skill relatedness in the context of high-end services firms. The paper explores whether the imprint of geographical proximity in recruitment behaviour is implicitly shaped by any screening criteria (e.g., the candidates' contextual understandings of and relationships to the local market, and/or knowledge about national laws and regulations concerning data use and data availability, to mention some). By doing so, the study seeks to build on and strengthen the conceptual understanding of the mechanism shaping the effect of geographic proximity on the competence inflow of capital city-based ICT services firms.

The fourth research question address competence mobility practices in KIBS organisations. The data were based on a review of papers published in peer-reviewed journals from 2007 to 2017. The data were analysed by comparing, contrasting and critically examining research findings across eight studies. This paper contributes to the overall project by discussing mobility mechanisms of ICT firms in relation to the larger KIBS sector. The analytical strategy of this paper is to identify research gaps that can have implications for further research on recruitment and HR practices in high-end services firms more broadly than in the ICT services industry.

### ***3.3 Validity and reliability of the research***

A fundamental objective of research processes is to build arguments that are consistent (logical), corresponding (to the data), and convincing (believable) (Hunter and Brewer, 2015). Important principles are that the research must be systematic, open, reproducible, believable, reliable and valid. While *reliability* refers to the extent to which a measure provides stable and consistent results, *validity* refers to whether a particular study measures what the researcher intends to measure (Wilson, 2014). The research is conducted in a consistent way, so that all analyses should be reproducible at any time and by other researchers (Brinkman and Kvale, 2015). Triangulation is a validity procedure whereby the researcher searches for convergence among multiple and different sources of information to form themes and categories in a study. Denzin (1978) identifies four types of triangulation: across data sources, theories, and methods, and among different investigators. In this project, validity is obtained through triangulation across data sources and methods. The use of different data sources and methods has aimed to provide knowledge that is complementary to the overarching research questions.

The research design touches upon almost all aspects of collecting and analysing data (Ragin and Amoroso, 2011). Narrowly speaking, the research design includes sampling techniques, measurement, data transformation, and mode(s) of analysis. Nevertheless, more broadly, the research design also relates to issues and changes that occur during the research process, and according to the prospective plans (Hunter and Brewer, 2015). The work with this thesis followed a planned research design; however, several changes were made as the research process evolved. For instance, collecting CV data was part of the planned process, but it was after I had collected all the CVs I realized that the industrial career paths could be well suited to conduct SNA analysis. Moreover, while the choice of investigating the ICT services industry was decided in the initial stages of the project, the decision to geographically focus on large-city regions and the capital city was made as the project evolved.

The Norwegian Centre for Research Data (NSD) has approved the research project, according to the existing rules and regulations for sufficiently securing and protecting data during the entire project period. The first approval letter was given by NSD 12 February 2013 (see appendix). At that time, the duration of the project was set to 28 February 2014. Because the project period was extended, NSD was informed and I received a second approval letter on 6 January 2016. In January 2018 the project was further extended until March 2018 (see appendix).





## 4. Concluding discussion

### 4.1 Research contribution

During the 1990s, some writers argued that globalisation, especially as driven by the revolution in ICTs, marked the ‘end of geography’ (O’Brian, 1992) and the ‘end of distance’ (Cairncross, 1997). Later on, Friedman (2006) argued that ICT marked time-space compression of economic processes, and that ICT would reduce any disadvantages (and thus relative advantages) in economic relationships caused by geography. Today we experience that although ICT are ‘consumed’ everywhere, the production of it, and in particular ICT services, is strongly concentrated in urban economic spaces. The ICT industry has a dual effect on the economy. The influence of the industry is directly reflected in employment growth and contribution to GDP (Holmen et al., 2016), but is also and more indirectly expressed in which the industry, through its provision of technology-based services, is transforming several domains of the larger economy. This PhD thesis has sought to provide insight into the organisational and spatial knowledge dynamics shaping the Norwegian ICT services industry.

The research project has addressed *how KIBS firms interact with external labour markets and in what ways this interaction influences firm learning*. The overarching conclusion is that competence mobility is a crucial source of learning and knowledge development for ICT services firms. The findings indicate that rather than seeing tacit knowledge as sticky and place-specific per se, its stickiness rests in the embodied skills and competencies available in certain locations (i.e., in people who live, work and learn in places). The competencies available in certain locations are therefore decisive in firm formation, learning opportunities, and industrial development. The industrial development of the Norwegian ICT services industry is strongly connected to new market opportunities, but also to the labour markets that allow firms to access the skilled employees that they need to identify and pursue new opportunities.

Paper 1 provides insight into how intra-urban industrial variation of the capital city, as well as industrial variation between different city regions, is interlinked with geographically differentiated growth patterns of the Norwegian ICT services industry. The findings shed light on mechanisms at play allowing urban environments to serve as ‘nurseries’ for new entrepreneurial ICT services firms, represented in new combinations of knowledge originating in different industrial domains available in different urban contexts (Duranton and Puga, 2001; McCann, 2007; Shearmur, 2015). The results indicate that small and independent firms are particularly receptive to the labour markets of *certain* urban locations (Mark I). The findings

show that location within the capital city provides privileged access to both a highly specialised labour market and a diversity of knowledge, originating not only from the variation of industries represented within the capital city itself but also from the position of this region in the national labour market. This suggests that a defining characteristic of certain large diversified regions is the co-existence of multiple specialised business clusters ('localisation economies') within the larger urban context, translate into co-existence of knowledge dynamics from localisation (specialisation) and urbanization (diversity) economies.

By explicitly looking at the recruitment behaviour of individual firms, paper 2 provides a closer look at labour market dynamics in computer programming and consultancy firms located within the capital-city region. The results suggest that managers and executives are taking an active role in connecting their organisations to external knowledge sources, exhibiting a high degree of awareness of how these processes influence their technological capabilities and market position. Rather than viewing recruitment as a 'static' matching process between employers and employees, the study depicts recruitment as interlinked with the internal community of the firm as well as with the external networks of experts. Thus, further HRM research should more strongly emphasise organisational learning as being dependent on interpersonal linkages that transcend organisational boundaries, and on labour market dynamics that are ultimately triggered by the behaviour of individuals.

The case study presented in paper 3 provides insight into the spatial dimension of firms' recruitment behaviour. The analysis enhances the conceptual understanding of 'deep-level diversity' of high-end services firms, accumulated in the work-life experiences that individuals gain throughout their entire careers (Bell et al., 2010). The results show that mobility flows are formed by the particular industrial composition available in the surrounding labour market, as well as being formed by the market orientation of the firm. The screening behaviour indicates that some consultancy-based environments favour a candidate's contextual understanding, which can implicitly favour intra-regional recruitments. Managers should therefore be increasingly aware of how selection strategies and criteria affect their multidimensional learning space, and should in particular pay more attention to the geographical dimension. The comparative mapping of the web design and e-learning technology firm reflects quite distinct and firm-specific versions of 'general' and 'strategic' diversity. The findings underscore the need for more qualitative research considering the micro mechanisms and firm-specific determinants of industrial relatedness and competence complementarities in high-end technology services firms.

The fourth paper discusses recent studies that have examined the relationship between employee mobility and knowledge development in KIBS organisations more generally. The review shows that firms use a variety of strategies to attract competencies, expressed by conventional recruitment or more temporary exchanges of personnel between the KIBS and the client during a defined project period. The various practices used by the firms are intended to strengthen their competence base, but the outcome of the behaviour in terms of performance is ambiguous or rather negative. For example, employee mobility practices defined by contractual projects, redefines employment from being a trade between an individual and its employer to become a trade between two organisations. This may reduce the degree of individual choice, and temporary staff transfer might provide incentives for individuals to withhold knowledge. However, more research is needed into how different mobility practices affect the performance of KIBS firms, at the level of individuals as well as at the level of organisations. The conclusion suggests that due to the boundary-spanning activities of KIBS organisations, they must build capabilities by placing competence management at the very core of their business activities and operations.

In complementary ways, all four papers have addressed the question of interdependencies between firms and their surrounding environments. By doing so, this project links research in economic geography to the HRM field. During the last ten years, much attention has been paid to large-scale studies investigating how labour market externalities affect firm learning and innovation. Nevertheless, limited attention has been paid to in-depth analysis of the micro level mechanisms at play that link firms to their respective local labour markets. Thus, ‘the firm’ has remained somewhat of a ‘black box’ in economic geography, although a bit less so regarding firms’ labour market positions and the basic characteristics of locations where they reside. Research in economic geography can gain from the HRM field through advancing and nuancing current theories on the behaviour of firms in different organisational and spatial contexts.

Conversely, the HRM field has tended to relate knowledge management solely to the endogenous and intra-organisational dimension of the firm. However, the boundary-spanning activities of KIBS organisations argue in favour of paying more attention to knowledge management as increasingly being shaped by external conditions. ICT services firms, and KIBS firms more generally, operate as open and dynamic entities, and the organisational capabilities of the firms are closely connected to the ability to manage tacit, non-standardised, and individually embodied knowledge transcending organisational boundaries. The HRM field can

therefore gain from research in economic geography by seeing knowledge management as part of inter-organisational knowledge management and exchange.

#### ***4.2 Limitations and implications for further research***

The research presented here on the localised aspects of organisational learning in ICT services has a parallel in research dealing with the global innovation networks linkages of the sector (Chaminade and Vang, 2008; Chaminade and Plechero, 2015). The ability to learn through global innovation networks cannot be explored independently from the embodied competencies available in different locations. Still, ICT services, and particularly software services, are among the most globalised industries. The industry is exploiting opportunities by outsourcing parts of the production process to low-cost countries, fronted by India, Malaysia, and the Philippines (Niosi et al., 2012). The global knowledge dynamics of the ICT services industry has not been thoroughly explored in this project, except for briefly being discussed in paper 3. Further research is necessary to consider how global and local knowledge dynamics interacting in shaping the industry itself, and the regions in which it locates.

The findings presented in paper 1 reflect that the Norwegian ICT services industry has evolved almost in a symbiotic relationship with surrounding industrial configurations and labour markets. However, the discussion of the labour market linkages has been limited to the context of ICT services firms located in the capital city and larger urban agglomerations. The studies presented in papers 2 and 3 are also focusing on recruitment behaviour of firms located in the largest and most dense labour market region. However, the descriptive analysis presented in paper 1 shows that ICT services firms in non-urban locations also experienced an employment growth of 32 per cent from 2000 to 2010 (table three in paper 1). To provide a complete picture of the knowledge dynamics of the ICT services sector, further research should explore the characteristics of labour inflow and knowledge dynamics of ICT services firms in non-urban locations. This non-urban perspective is important to provide a more comprehensive view of the local dynamics of industrial development in Norway. One assumption is that ICT services firms surrounded by a 'thinner' industrial labour market will attempt to build knowledge bases by recruiting employees from other regions.

Research on evolutionary economic geography has been criticised for not paying enough attention to the societal dimension of economic development, such as how economic growth, innovation, or other performance measurements relate to wealth distribution and social

inequality. Much research takes a rather uncritical approach towards the societal advantages that may arise from industrial development, instead of acknowledging potentially problematic aspects and negative externalities (Phelps et al., 2017). For instance, a strong relationship between the growth of the larger KIBS sector and rising socio-economic inequality has been found in the Norwegian capital-city region (Wessel, 2013). The concentration of ICT services in urban agglomerations indicates the development of a spatial division of labour (Simmie, 2010). As innovation and competitiveness in the services economy increasingly depend on the experiences and skills of individuals, important questions arise concerning consequences for those individuals who experience a decline in job security or who lack sufficient competence to participate in an increasingly ever-changing work life. More research is also needed to analyse the social consequences of the digitalised, services-based, and increasingly urbanised learning economy.

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## *Information letter to informants (only in Norwegian)*

### **Rekruttering i kunnskapsintensive bedrifter i Oslo og Akershus – Hvordan rekrutterer tjenesteytende IKT-bedrifter nye medarbeidere?**

#### **Bakgrunn**

I forbindelse med mitt doktorgradsprosjekt, gjennomfører jeg en undersøkelse av rekruttering i tjenesteytende programvarebedrifter (herunder rekrutteringsstrategier- metoder og ansettelsesbeslutninger). Formålet er å samle bedriftenes erfaringer og bruke disse til å skrive 1-2 vitenskapelige artikler om rekruttering kompetansebehov i tjenesteytende programvarebedrifter. Kompetanse defineres som kombinasjonen av formell utdanning, tidligere arbeidserfaringer og andre kvalifikasjoner og ferdigheter som er avgjørende for ansettelsen.

Mer enn 60 % av alle som jobber med å utvikle IKT-tjenester er ansatt i hovedstadsregionen, definert som Oslo og Akershus, og regionen kan anses for å være en næringsklynge for både IT og programvarebedrifter.<sup>1</sup> Likevel er det få som har forsket på tilstrømning til -og sysselsettingsmobilitet innenfor næringen. I tillegg til å undersøke rekrutteringsmønsteret i den enkelte bedrift, vil studien også belyse hvorvidt de som ansettes, rekrutteres fra et lokalt, nasjonalt eller internasjonalt arbeidsmarked.

#### **Metode**

Temaet vil bli belyst gjennom et kvalitativt forskningsdesign. Det vil bli gjennomført intervjuer med representanter for HR i utvalgte bedrifter, lokalisert i Oslo og Akershus. Fortrinnsvis vil jeg analysere hvilke kvalifikasjoner som er viktig for bedriftene, i henhold til hvilke funksjoner bedriftene forsøker å styrke gjennom sine nyansettelser. Hvert intervju vil ta om lag 45-60 minutter. Om mulig vil nyansattes CV (i anonymisert form) brukes som støttemateriale for analysen.

#### **Tidsrom**

Tidsrommet for datainnsamlingen er fra august 2015-februar 2016. Intervjuer i de første bedriftene er allerede i gang, og innsamlingene avsluttes fortløpende ettersom informasjonsmetningen er nådd og jeg har utført de intervjuerne som er planlagt.

#### **Konfidensialitet**

All informasjon som blir samlet inn vil bli behandlet konfidensielt, og opplysninger som kan knyttes til bedrift eller enkeltpersoner vil bli anonymisert, og vil ikke gjenkjennes i publikasjonene. Det er frivillig å delta i studien og du kan trekke deg underveis. Prosjektet er godkjent av Norsk samfunnsvitenskapelig datatjeneste.

#### **Faglig tilknytning**

Undersøkelsen er en av fire delstudier som inngår i doktorgradsprosjektet mitt ved Institutt for sosiologi og samfunnsgeografi, Universitetet i Oslo. Prosjektet blir veiledet av Sverre Herstad ved Nordisk Institutt for innovasjonsstudier og Professor Bjørnar Sæther ved Universitetet i Oslo. Jeg er tilknyttet den nasjonale forskerutdanningen for innovasjonsstudier NORSI, som er et samarbeid mellom NTNU (<http://www.ntnu.edu/innovation/ping>) og BI (<http://www.bi.edu/ping>).

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<sup>1</sup> Isaksen (2004)

## **Intervjuguide (26.08.2015)**

### **Arbeidstitel: 'Rekruttering i tjenesteytende IKT-bedrifter'**

Antall bedrifter: 15-20. Endelig antall bedrifter er avhengig av når informasjonsmetningen er nådd.

Datainnsamlingen vil bestå av:

- Intervju med HR-ansvarlige og bedriftsledere
- Gjennomgang av CV-et til de som er ansatt i 2015

### **Kartlegging før intervjuerunde**

Hvilke produkt, tjeneste leverer bedriften

Informasjon om partnere, kunder, tjenester på hjemmeside eller i media for øvrig.

Økonomisk utvikling, gjennomgang av årsrapport.

### **Kort presentasjon av prosjektet (gir informante ne informasjonskriv)**

#### **Tema for intervjuet:**

Hvilke rekrutteringsstrategier og rekrutteringsmetoder ligger til grunn, og hvilke ansettelsesbeslutninger tas. Hvor kommer de som rekrutteres fra geografisk sett, hva slags utdanningsbakgrunn og arbeidserfaring har de som ansettes?

### **Om bedriftens historikk og informanten**

1. Kan du fortelle om bedriften?
2. Hva slags tjenester leverer dere?
  - a. Forretningsidé/Egenutviklet teknologi
  - b. Noe innledende om bedriftens historikk. 'Spin-off' (i så fall fra hvor) eller etablert fra 'scratch', i så fall - hvem var entreprenøren.
3. Noe utdypende om bedriftens kompetansestruktur.
  - a. Knyttet på den ene siden til hva slags tjenester den leverer - og på den andre til de påfølgende bolkene om 'search' og 'select'.
4. Om informanten: Hvor lenge har du jobbet her?
  - a. Hva består dine oppgaver av?
  - b. Din funksjon i rekrutteringsprosesser?

### **Om rekruttering – 'Search'**

5. Hvordan arbeider dere med rekruttering?
  - a. Kan du fortelle litt om prosessen dere går gjennom? (fra dere har avklart internt at dere har behov for en ny ressurs og til ansettelse)
6. Hva slags type aktiviteter
  - a. Oppfølging: Formelle og uformelle utlysningskanaler
    - Stillingsutlysninger
    - 'Employer branding'
    - 'Headhunting?'
    - Rekrutteringsbyråer?
7. Hvor mange ansatte dere i 2015?
  - a. Gjennom hvilke type aktiviteter? (jf. ovenfor)
8. Hva slags stillingstyper rekrutterte dere til?
9. Er det noen posisjoner eller stillingstyper som dere rekrutterer mer til enn andre?
10. Hvordan opplever du det er å finne kandidater til stillingene dere utlyser?
  - a. Hvor mange søkere har dere i snitt på en stilling?

- b. Stor variasjon i søkerantallet med tanke på stillingstype og nivå?

### **Kompetansevariasjon – ‘Select’**

Forskning har vist at det kan være viktig med en viss kompetansevariasjon, fordi dette bidrar til kreativitet og utvikling av nye idéer. Dersom alle kan det samme er det mindre å lære av hverandre, enn om teamet består av folk med til dels forskjellig kompetanse.

11. Har du noen tanker omkring et dette?
12. Hvordan mener du kompetansevariasjonen er i denne bedriften?
  - a. Oppfølging: Bredde/spesialisering
13. Kan du fortelle litt om hvilke type kompetanse dere er ute etter?
14. Hvordan vurderes nyutdannede versus de med erfaring?
  - a. Utdanningsbakgrunn
    - Noen utdanningsretninger som utmerker seg mer enn andre?
    - Noen utdanningsinstitusjoner som utmerker seg?
    - Erfaring fra konkurrerende bedrifter/andre bransjer?
    - Teknisk ekspertise
15. Tidligere arbeidserfaringer?
  - Prosjekterfaring
  - Relasjoner og nettverk – den typiske konsulenten?
  - Internasjonal erfaring?
16. Geografisk sett, hvor rekrutter dere fra?
  - a. Lokalt vs. utenfor Oslo og Akershus?
  - b. Utenfor Norge?
  - c. Hva betyr sted:
    - Hvorfor er bedriften lokalisert i Oslo/Akershus?
    - Oppfølging: Betydning av nærhet til arbeidsmarkedet vs. kundenærhet?

### **Avslutningsvis**

17. Opplever dere at det er konkurranse om de beste kandidatene? (utdyp)
  - a. Hvor lenge blir de ansatte i bedriften? (turnover)
    - Hva tror du er årsaken?
    - Holdes kontakten når ansatte slutter, og om man holder kontakt eller brytes den?
18. Har bedriften noen uttalte visjoner om hva slags kompetanse bedriften trenger mer av fremover?
  - a. Planer for nyansettelser i 2016?
19. Hva slags kompetanse er viktig for bedriften fremover?
  - a. Reflekterer dette ‘exploitativ’ eller ‘explorative’ aktiviteter
    - Er det noen enkelte læresteder, tidligere arbeidssteder, eller andre læringsarenaer som ansees for å være mer sentrale enn andre?

NSD letter of approval, (two letters)<sup>2</sup> (only in Norwegian)

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Vår dato: 21.02.2014

Vår ref: 33280/3 - KM

Grensene

Direktør

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, nummer 06.02.2013. All nødvendig informasjon om prosjektet forelå i sin helhet 12.02.2013. Meldingen gjelder prosjektet:

33230 *Absorptive Capacity, Labour Mobility and Innovation Processes within Software Firms*  
Behandlingsansvarlig: *Universitetet i Oslo, ved institusjonens erverste leder*  
Daglig ansvarlig: *Ingvild Jernåli*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er medleipiktig i henhold til personopplysningsloven, § 31. Behandlingen tilfredstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldingsskjemaet, korrespondanse med ombudet, eventuelle korrekturater samt personopplysningsloven og helsebegrensningene med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema <http://www.nsd.no/personvern/ny-deklarasjon.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://www.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 28.02.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Kjetsi Håvardstun

Kjetsi Håvardstun tlf 55 58 29 53  
Vedlegg: Personvurdering

Personvernombudet i Norge  
NSD AS, Torshovstredet 1, Postboks 1047 Blindern, 0316 Oslo, Tlf: +47 22 95 52 11, nsd@nsd.no  
NSD AS, P.O. Box 1047 Blindern, 0316 Oslo, Tlf: +47 22 95 52 11, nsd@nsd.no  
NSD AS, Torshovstredet 1, Postboks 1047 Blindern, 0316 Oslo, Tlf: +47 22 95 52 11, nsd@nsd.no

<sup>2</sup> NSD is informed and has registered that the project period has been extended until 17.03.2018. Approval received per e-mail 26.01.2018.



Ingvild Jøranli  
Institutt for sosiologi og samfunnsgeografi Universitetet i Oslo  
Postboks 1096 Blindern  
0317 OSLO

Vår dato: 06.01.2016

Vår ref: 45966 / 3 / MHM

Deres dato:

Deres ref:

## TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 03.12.2015. Meldingen gjelder prosjektet:

45966                                    *ICT services, absorptive capacity and Labour recruitment patterns*  
Behandlingsansvarlig            *Universitetet i Oslo, ved institusjonens øverste leder*  
Daglig ansvarlig                    *Ingvild Jøranli*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, <http://www.nsd.uio.no/personvern/meldeplikt/skjema.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://pvo.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 31.12.2017, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Marianne Høgetveit Myhren

Kontaktperson: Marianne Høgetveit Myhren tlf: 55 58 25 29

Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Arkivgjennomgang: 02/01/2016

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