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Swift transition and knowledge cycling
A study of knowledge transfer in technical consulting

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ABSTRACT

The prominent shifts towards greater flexibility in work arrangements as well as in organizational forms have had profound effects on the labor market for engineers, and given rise to the technical consulting industry. The technical consulting firm is becoming increasingly important in many technology-based industries, as a growing number of technology-based firms rely on technical consulting firms to produce their outputs. In that respect, the technical consulting firm is an important actor for the organization and development of engineering knowledge, as well as for the transfer of knowledge to and among technology-based firms. However, despite its growing importance, the technical consulting firm has received scant scholarly attention. Hence, the purpose of this thesis is to enhance the understanding of the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations.

This thesis is comprised of a compilation of three papers and an extended summary. It draws upon a qualitative single-case study in one of Scandinavia's leading technical consulting firms. This thesis takes a multilevel perspective, and utilizes an embedded case study design to study both the organizational and the individual level of analysis. In total, it builds on 54 interviews with managers and consultants, 14 observations of a competence development program for engineers who are in the beginning of their careers as technical consultants, and 2 workshops with managers.

This thesis identifies two primary capabilities, developed through the interaction between the firm and the individual level: swift transition and knowledge cycling. The findings indicate that the link between the respective capabilities creates the foundation for the successful organization of engineering knowledge. Hence, these capabilities illustrate that the technical consulting firm has other roles to play than merely solving the problem of numerical and functional flexibility. Moreover, this thesis develops the process of knowledge cycling. The knowledge cycling process addresses the role of the individual consultant in the transfer of knowledge within and among problem-solving contexts, and consists of three distinct knowledge processes found prominent during the different phases of a consulting assignment: (1) knowledge acquisition, (2) knowledge integration, and (3) knowledge transfer. Furthermore, this thesis provides insight into how formal training affects the technical consultants' ability to transfer knowledge. The findings suggest that this ability is developed through a three-stage process: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant.

Keywords: professional service firm, technical consulting firm, technical consultants, mobile engineers, knowledge transfer, mobility, swift transition, knowledge cycling, formal training

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Svetlana Pantic-Dragisic

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APPENDED PAPERS

Paper I: Pantic-Dragisic, S. & Söderlund, J.: Exploring the knowledge-based advantages of the technical consulting firm: Swift transition and knowledge cycling. Earlier version presented at the *Academy of Management Annual Meeting*, Philadelphia, USA, 2014.

Paper II: Pantic-Dragisic, S. & Söderlund, J.: The nature and process of knowledge cycling: A study of labor mobility among technical consultants. Earlier version presented at the *International Conference on Organizational Learning, Knowledge and Capabilities*, Oslo, Norway, 2014.

Paper III: Pantic-Dragisic, S. & Borg, E.: Training for knowledge transfer: A study of formal training for mobile engineers. Earlier version presented at the *Academy of Management Annual Meeting*, Philadelphia, USA, 2014. Submitted for publication.

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PART II: PAPERS

Paper I: Exploring the knowledge-based advantages of the technical consulting firm: Swift transition and knowledge cycling.

Paper II: The nature and process of knowledge cycling: A study of labor mobility among technical consultants.

Paper III: Training for knowledge transfer: A study of formal training for mobile engineers.

PART I:

SYNTHESIS

CHAPTER 1

INTRODUCTION

“Because of the interdependence of work and organizing, significant shifts in the nature of work should coincide with significant changes in the way organizations are structured and in how people experience their daily lives. Contemporary organizational theorists may, therefore, face the same challenge that confronted the field’s founders: the need to develop images of organizations that are congruent with the realities of work in a new economic order”(Barley and Kunda, 2001: 77).

In line with this, Ashford et al. (2007: 67) argue that the “desire in much of our theorizing is that employees maintain the 1950s’ “organization man” terms of engagement with organizations, even as organizations themselves have abandoned it.” Moreover, Walsh et al. (2006) claim that the established organizational and management theories are adrift, and that their relevance for understanding the new world of work are limited. The authors argue that organizational and management theories have not been adapted to the changes that occurred during the latter portion of the 20th century. These changes “created value chains that are heavily dependent on the creativity of individuals and their knowledge-based human capital” (Walsh et al., 2006: 661), and hence altered the nature of organizations and work itself (Grant and Parker, 2009). One of the fundamental changes during the late 20th century has been the rise of nonstandard work arrangements, i.e. arrangements that differ from the traditional lifetime employment (Ashford et al., 2007; Cappelli, 1999). Consequently, Walsh et al. (2006) argue that in order to gain a better understanding of the new world of work, one of the central challenges for organizational scholars is to explore how the unraveling of the traditional employment relationships has impacted the organization and management of knowledge workers. This thesis contributes to an enhanced understanding of one type of nonstandard work arrangement by focusing on the technical consulting firm which is becoming an increasingly important actor in many technology-based industries (Berggren et al., 2011; Teknikföretagen, 2013), as a consequence of the unraveling of the traditional employment relationships. Ashford et al. (2007: 67) claim that the nonstandard work arrangement is “an ideal context for testing and developing theory about organizations, work, and workers.” In the following section the changes in nonstandard work arrangements, which have blurred the distinction between *good* and *bad* jobs, are depicted.

NONSTANDARD WORK ARRANGEMENTS IN TRANSITION

“Changes beginning in the mid-1970 created conditions that led countries, organizations, and workers to search for greater flexibility in employment” (Kalleberg, 2000: 342). The rise of the nonstandard work arrangements has been one of the most radical breaks with the system of bureaucratic employment (Ashford et al., 2007; Barker and Christensen, 1998; Barley and

Kunda, 2001). The use of nonstandard work arrangements is not new; work has always been organized in this fashion in certain occupations (Cappelli, 1999). However, this form of work has been “seen with increasing frequency in the last decades of the 20th century” in numerous firms and across industries (Ashford et al., 2007: 66). Previous research indicates that this shift has been driven by factors such as: the globalization of markets, increased competition, greater uncertainty and technology (Kalleberg, 2000; Schilling and Steensma, 2001). This development has led firms to increasingly rely on external workers employed through nonstandard work arrangements in order to achieve greater numerical flexibility of labor and minimize labor costs (Atkinson et al., 1984; Davis-Blake and Uzzi, 1993; Handy, 1989; Kalleberg, 2001; Marler et al., 2002).

Nonstandard work arrangements have primarily been depicted in literature using two broad labels *nonstandard work* and *contingent work* (Cappelli and Keller, 2013). These classifications were made in order to distinguish traditional work arrangements which have been equated with good jobs in prior literature, from temporary work arrangements which have been denoted as bad jobs characterized by low wages, minimum job security, no benefits and no possibility for advancement (Ashford et al., 2007; Barker and Christensen, 1998; Kalleberg, 2000; McAllister, 1998; Rogers, 1995). However, several researchers have argued that changes in the workforce have blurred the distinction between good and bad jobs, as today a wide range of different nonstandard work arrangements exist (Ashford et al., 2007; Cappelli and Keller, 2013; Kalleberg, 2000; Marler et al., 2002). This shift demonstrates that blue-collar workers are no longer the only workers employed through nonstandard work arrangements, so are white-collar workers, as well as knowledge workers (Kalleberg, 2009; Kunda et al., 2002).

As a result of the development of nonstandard work arrangements, Cappelli and Keller (2013) challenge the two previously coined categories, nonstandard work and contingent work, and present a classification of economic work arrangements comprising four distinct categories: (1) direct employment between the employer and the employee, (2) coemployment involving three parties: the client organization, the agency and the worker, (3) direct contracting between the client organization and a self-employed worker and (4) subcontracting involving three parties: the client organization, the vendor and the worker (Cappelli and Keller, 2013: 577). The authors argue that nonstandard work arrangements are understudied at present, despite the size and impact of such arrangements.

This thesis addresses the triangular work arrangement, involving the client organization, the agency and the worker, which Cappelli and Keller (2013: 591) denote as “the biggest deviation from traditional research topics associate with employment”, and identify as an important research subject that requires further investigation. This thesis focuses primarily on two actors in the triangular work arrangement, namely the agency, a technical consulting firm, and the workers, the technical consultants who are employed by the technical consulting firm, responsible for managing them, but who perform their work in client organizations (Cappelli and Keller, 2013) .

THE INCREASING IMPORTANCE OF THE TECHNICAL CONSULTING FIRM

The unraveling of the traditional employment relationships (Ashford et al., 2007; Cappelli, 1999; Cappelli et al., 1997; Cappelli and Keller, 2013; Kalleberg, 2001; Kalleberg, 2009) coupled with the increasing significance of project-based forms of organizing work (Ekstedt, 2009; Hobday, 2000; Maylor et al., 2006; Midler, 1995; Whittington et al., 1999) has profoundly changed the nature of technical problem-solving and engineering work (Ramirez, 2007). The project-based form of organizing has had an growing significance in a wide range of industries, such as construction, telecommunication, software, computer hardware and consulting (Sydow et al., 2004; Whitley, 2006). In addition, it is an organizational form which has gained increasing ground in firms working with complex problem-solving, as it is found to be an ideal form for managing technological uncertainty and complex tasks and problems (Hobday, 2000). These prominent shifts towards greater flexibility in work arrangements as well as in organizational forms have had effects on the labor market for engineers, and given rise to the technical consulting industry.

The technical consulting industry is one of the fastest growing industries in Europe and North America, and its rapid growth is estimated to continue throughout this decade (Henderson, 2013; Teknikföretagen, 2011; Teknikföretagen, 2013). As touched upon earlier, the growth of the technical consulting industry is suggested to be driven by the shift towards knowledge specialization, flexible organizing, and the externalization of the workforce (Brusoni et al., 2001; Davis-Blake and Uzzi, 1993; Gambardella and Torrisi, 1998; Løwendahl, 2005; Matusik and Hill, 1998). In addition, Berggren et al. (2011: 6) claim that “products, systems, processes and services embody an increasing number of rapidly evolving components and subsystems and draw on a broadening range of technologies and knowledge fields.” Accordingly, the increased technological complexity has led a growing number of technology-based firms to rely on technical consulting firms in order to master the advances within relevant knowledge fields (Berggren et al., 2011; Teknikföretagen, 2013). As a consequence of this development, a growing portion of newly graduated engineers, such as programmers, software engineers, systems engineers, electrical engineers and mechanical engineers, are expected to enter the job market through a technical consulting firm (Teknikföretagen, 2009). In that respect, the technical consulting firm will assume greater responsibilities for human resource management, including recruitment, assignment rotation, and individual competence development to ensure that relevant knowledge and competencies are being sourced to its clients (Teknikföretagen, 2011; Wright et al., 2001). This implies that the technical consulting firm is becoming an increasingly important actor with regard to the organization of engineers and development of engineering expertise, as well as the transfer of engineering knowledge among client organizations, and technology-based industries (Malhotra, 2003; Teknikföretagen, 2011).

Despite its increasing importance, the technical consulting firm has received limited scholarly attention. Extant literature on knowledge-intensive firms and professional service firms has mainly focused on firms such as accounting firms, law firms, architectural firms, advertising agencies and management consulting firms (Cooper et al., 1996; Empson, 2001a; Greenwood

et al., 1990; Løwendahl, 2005; Pinnington and Morris, 2002; Werr and Stjernberg, 2003; von Nordenflycht, 2011). Hence, there is limited research on knowledge-intensive engineering firms, such as the technical consulting firm (von Nordenflycht, 2010). Prior research has indicated that there are considerable differences between the various types of professional service firms (Løwendahl, 2005; Malhotra and Morris, 2009). Malhotra and Morris (2009: 895) claim that these differences “affect the nature of the professionals’ work and, in turn, the organization and management of firms across different professional sectors.” Thus, by focusing on the technical consulting firm, this thesis addresses a largely unexplored industrial actor which has become increasingly important in number of technology-based industries. This thesis thereby contributes to an enhance understanding of the nature of the technical consulting firm, as well as the heterogeneity across professional service firms (Løwendahl, 2005; Malhotra and Morris, 2009).

TECHNICAL CONSULTANTS: PARTICIPANTS IN INTER- ORGANIZATIONAL KNOWLEDGE TRANSFER

At the heart of the technical consulting firm are the technical consultants (Bessant and Rush, 1995) or *mobile engineers* as they have also been referred to in prior literature (Söderlund and Bredin, 2011). Prior research has documented that the technical consultants are increasing in numbers in project-based organizations (Bredin and Söderlund, 2011), and that firms hire technical consultants because of their unique expertise and the difficulty of organizing such expertise in-house (Bessant and Rush, 1995; Gambardella and Torrisi, 1998; Matusik and Hill, 1998). “Clients want to benefit from the consulting firms’ broad experience and, more importantly, have access to the knowledge that emerges from this experience” (Sarvary, 1999: 97). Hence, a primary reason for client organizations to hire consultants is to “[gain] access to consultant knowledge” (Davenport and Prusak, 2005: 305; Werr, 2002: 92). In that respect, the transfer of knowledge from the consultant to the client organization becomes crucial (Werr, 2002; Werr et al., 1997).

Extant literature regarding knowledge transfer within client-consultant relationships has documented the consultants’ ability of transferring knowledge to client organizations (e.g. Berthoin Antal and Krebsbach-Gnath, 2001). For instance, Handley et al. (2007: 183) argue that the consultants’ “status as outsiders” accounts for their “ability to introduce new knowledge or to surface previously ignored knowledge” within the client organization. Thus, the consultants’ outsider status enables them to bring an external view to the client organization, and hence contribute with knowledge and expertise (Creplet et al., 2001). Sarvary (1999: 98) claims that:

“Through the consulting assignments, the consultant is connected to many firms in different industries. As a result of this central position, the consultant is aware of a large set of business problems as well as a large set of solutions. Problems and solutions may not always match within an industry. In fact, if they do, industry participants are likely to be aware of them. However, they are typically not aware of solutions that exist in other—especially unrelated—industries.”

Hence, McKenna (2006: 12) proposes that “consultants have flourished primarily because they have remained outside the traditional boundaries of the firm.” Prior research addressing knowledge transfer within client-consultant relationships has however primarily focused on management consultants. Although management consultants and technical consultants are similar in a number of respects, such as the ones presented above, the nature of the technical consultants’ work distinguishes them from management consultants. This, in turn, affects the transfer of knowledge to client organizations. Management consultants usually work in teams and take on roles as advisors in client organizations (Hicks et al., 2009; Werr and Stjernberg, 2003; Werr et al., 1997), thus they are “external specialists and so have no organizational responsibility” (Clark and Salaman, 1996: 155). The technical consultants, on the other hand, typically enter client projects independently and take part in complex problem-solving alongside members of the client organization, as well as other technical consultants (Matusik and Hill, 1998), and are hence involved in the knowledge integration processes in client projects to a larger extent (Söderlund and Bredin, 2011). This thesis addresses the technical consultants’ role in the transfer of knowledge within and among problem-solving contexts, a topic which has received limited scholarly attention (Argote et al., 2000; Foss et al., 2010).

As touched upon earlier, the technical consultants are employed by the technical consulting firm, who is responsible for managing them, but they perform their work in client projects, as members of teams which are managed by the client organization (Barley and Kunda, 2006; Cappelli and Keller, 2013). The technical consultants’ assignments in client projects usually last for several months, in some cases even years (Borg and Söderlund, 2014). After completing their assignment the mobile engineers return to the technical consulting firm for reassignment (Cappelli and Keller, 2013). The technical consultants assume various resource, expertise and specialists roles in complex development and engineering projects in technology-based firms (Söderlund and Bredin, 2011). They are called upon when the stock of engineering resources within the client organization is not sufficient, or capable to handle the development and engineering work that is to be executed, making the technical consultants important actors for technology and systems development in client organizations (Borg and Söderlund, 2014).

The mobile engineers perform their work in cross-functional teams (Kunda et al., 2002; Lindkvist, 2005; Matusik and Hill, 1998), thus, their work situation is characterized by “rapid socialization, speedy deliveries and tough deadlines” (Söderlund and Bredin, 2011: 98). The technical consultants move from project to project on a recurrent basis, frequently collaborating with new team members (Söderlund and Bredin, 2011), which implies that “there isn’t time to engage in the usual form of confidence-building activities that contribute to development and maintenance of trust” (Meyerson et al., 1996: 167). Based on these characteristics, this thesis argues that the mobile engineers’ work context does not correspond to the conventional image of the knowledge community characterized by intimacy, shared understanding, and situated learning (Brown and Duguid, 1991; Lindkvist, 2005). Instead, due to high mobility, dynamism and temporariness the work context of mobile engineers to a greater extent resembles the knowledge collectivity (Lindkvist, 2005). Lindkvist (2005: 1189) claims that:

“/.../ these kinds of groups consist of diversely skilled individuals, most of whom have not met before, who have to solve a problem or carry out a pre-specified task within tightly set limits as to time and costs. As a result they tend to become less well-developed groups, operating on a minimal basis of shared knowledge and understandings.”

As abovementioned, the mobile engineers often travel among problem-solving contexts and client organizations. Hence, they are important actors in the transfer of knowledge among client organizations (Argote and Ingram, 2000; Song et al., 2003). Bessant and Rush (1995: 102) argue that technical consultants “act rather like bees, cross-pollinating between firms, carrying experiences and ideas from one location or contexts into another.” In that respect, Malhotra (2003) suggest that the nature of the technical consultants’ work bears analogy to that of Hargadon and Sutton’s (1997) technology brokers, as the consultants bridge “ideas and knowledge gained from disparate industry clients” (Malhotra, 2003: 954). Hence, technical consultants can be seen as knowledge brokers, who facilitate the flow of knowledge among client organizations and industries (Bessant and Rush, 1995; Creplet et al., 2001; McKenna, 2006; Sarvary, 1999).

LIMINALITY AND THE TRANSFER OF KNOWLEDGE

As aforementioned, prior research has indicated that the consultants’ outsider status enables them to transfer knowledge among client organizations (Handley et al., 2007; McKenna, 2006). This status has in previous literature been denoted as liminal (Czarniawska and Mazza, 2003). Tempest and Starkey (2004: 507) describe working in a liminal position as “existing at the limits of existing [organizational] structures.” Borg and Söderlund (2015) argue that in order to be able to successfully transfer knowledge among client organizations, the consultants must first learn to master their liminal work positions.

The concept of liminality has been adopted from anthropology (van Gennep, 1960), into management and organization literature, where it has been used to describe a work position of being betwixt and between traditional organizational structures (Tempest and Starkey, 2004), in which the individual’s organizational belonging is temporary and ambiguous (Borg, 2014). Thus, workers holding liminal positions continuously exist in blurred and ambiguous organizational settings (Ellis and Ybema, 2010). Tansley and Tietze (2013) claim that liminality is an inherent feature of a consultant’s work, as the consultant continuously “[accepts] temporality of assignments and relationships” (Tansley and Tietze, 2013: 1813). Thus, the technical consultant’s work situation, in itself, constitutes a liminal position at work.

Prior literature has indicated that liminality has both negative and positive consequences for individuals working in transient and mobile work contexts. Working in liminal positions can result in a reduced access to certain organizational information and resources (Garsten, 1999), such as learning activities supporting specialist knowledge (Tempest and Starkey, 2004). However, liminality can also result in an increased feeling of freedom, as individuals working

in such contexts are “liberated from the social structures that define the experiences of regular employment” (Garsten, 1999: 607). Moreover, the mobility inherent in liminal work situations is found to have positive effects on learning, as it broadens the individuals’ learning opportunities (Tempest and Starkey, 2004). The authors argue that liminality enables individuals to gain access to different learning contexts, and thereby broadens their repertoires of knowledge.

Previous studies have indicated that some individuals are better at reaping the positive effects of liminality, such as seizing opportunities for learning and using their liminal positions to broaden their knowledge-bases (Borg and Söderlund, 2015; Tempest and Starkey, 2004). Borg and Söderlund (2015: 11) demonstrate that these individuals perceive their work as knowledge transfer, and consider one of their “major missions in work to use knowledge from other firms and contexts in the current assignment.” As technical consultants are important actors in the transfer of knowledge among client organizations (Bessant and Rush, 1995; Malhotra, 2003), it is important to understand how this ability can be developed. Cabrera and Cabrera (2005) argue that formal training positively affects and facilitates knowledge transfer. However, as abovementioned, individuals holding liminal positions often become marginalized and receive less formal training opportunities than workers employed through standard work arrangements (Garsten, 1999; Legge, 1998; Tempest and Starkey, 2004). Hence, this topic remains largely unexplored. Exploring this issue would contribute to an enhanced understanding of how formal training in the context of technical consulting affects the individuals’ ability to transfer of knowledge.

AIM AND RESEARCH QUESTIONS

The overall aim of this thesis is to enhance the understanding of the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations. More specifically, this thesis addresses the following research questions:

1. What is the nature of the technical consulting firm?
2. How does the nature of the technical consultants’ work affect the transfer of knowledge within and among problem-solving contexts?
3. How does formal training affect the technical consultants’ ability to transfer knowledge?

THESIS OUTLINE

This thesis is comprised of three papers and an extended summary. The extended summary consists of six chapters, which are based on the three appended papers in Part II of this thesis. The thesis outline is presented below.

Chapter 2 presents the theoretical background for this thesis. This chapter illustrates the characteristics of professional service firms, and depicts four types of such firms. In addition,

it discusses knowledge transfer and the impact of labor mobility on knowledge transfer. Finally, this chapter illuminates how knowledge transfer can be managed in professional service firms.

Chapter 3 describes and motivates the methodological choices of this thesis. This chapter describes the two empirical studies conducted within the boundaries of one technical consulting firm, which lay the foundation for this thesis. Moreover, it elaborates on the data collection methods used in each empirical study. Finally, this chapter describes how the use of multiple qualitative methods, multiple data sources and multiple investigators strengthens the trustworthiness of this thesis.

Chapter 4 summarizes the three appended papers that form the basis for this thesis.

Chapter 5 presents a synthesized discussion which addresses the research questions based on the findings and contributions of the appended papers.

Chapter 6 concludes this thesis, and presents suggestions for future research.

Part II consists of the complete versions of the three papers.

CHAPTER 2

THEORETICAL BACKGROUND

In this chapter, the theoretical background for this thesis is presented. The chapter begins by highlighting the growing significance of professional service firms. Subsequently, the characteristics of such firms are discussed, and four types of professional service firms are presented. The second section centers on knowledge transfer, which is central for the existence of professional service firms. Following, the impact of labor mobility on knowledge transfer is discussed. The chapter ends by illuminating a number of methods through which professional service firms can manage knowledge transfer effectively.

PROFESSIONAL SERVICE FIRMS

Professional service firms (PSF), sometimes also denoted in literature as knowledge-intensive firms (Starbuck, 1992) or knowledge-based organizations (Winch and Schneider, 1993), have received increasing scholarly attention since the 1990s (Empson, 2001b; Hinings and Leblebici, 2003; von Nordenflycht, 2010). PSFs are firms that deliver professional services to their clients (Greenwood and Empson, 2003; Maister, 1997). Examples of PSFs are law firms, accounting firms, management consulting firms, technical consulting firms, advertising agencies and architectural firms (Cooper et al., 1996; Criscuolo et al., 2007; Empson, 2001a; Greenwood et al., 1990; Løwendahl, 2005; Malhotra, 2003; Morris and Empson, 1998; Pinnington and Morris, 2002; Werr and Stjernberg, 2003; von Nordenflycht, 2011).

The number of firms providing professional services has increased rapidly in the last decades, and the increasing importance of PSFs is expected to continue in the coming years (Løwendahl, 2005). The trend towards greater reliance on PSFs is suggested to be driven by factors such as: increased competition, the speed of technology development, flexible organizing and knowledge specialization (Brusoni et al., 2001; Gambardella and Torrissi, 1998; Kalleberg, 2001; Løwendahl, 2005; Teece, 2003).

The primary activity of the PSF is creating value for its clients, through the application of expert knowledge (Empson, 2001a; Løwendahl, 1997). In order to create value for its clients, the PSF must be able to “attract, mobilize, develop and transform” the employees’ knowledge (Løwendahl et al., 2001: 912). This indicates that the PSF competes in two markets simultaneously, the *output market* for the services it provides to its clients, and the *input market* for its employees (Maister, 1997). Hence, the PSF is an economic institution where both client needs and employee requirements are intermeshed to form the basic functions of the firm (Løwendahl, 2005; von Nordenflycht, 2010).

THE CHARACTERISTICS OF PROFESSIONAL SERVICE FIRMS

Von Nordenflycht (2010) states that previous studies on PSFs have to a large extent only defined the term *professional service firm* indirectly, by for example presenting a list of firms that can be classified as PSFs. Thus, the author argues that explicit criteria are needed to describe what constitutes a PSF, and suggests that the definition of PSFs should focus on the characteristics of these firms, rather than on examples of specific firms and industries.

One of the few authors who has identified distinctive characteristics that define PSFs is Løwendahl (2005). Løwendahl (2005: 146) singles out five characteristics that distinguish PSFs from more traditional firms, for instance manufacturing firms, in order to describe the uniqueness of PSFs. The first characteristic, *intangible inputs and outputs*, denotes that the inputs, such as the knowledge and expertise of the employees, as well as the outputs, as for example production processes, are intangibles. *Interaction* signifies that it is crucial to manage the interaction process with the individual client effectively, in order to be able to develop solutions that satisfy the client. The following characteristic, *individual judgment and local solutions*, refers to the fact that PSFs are dependent on individuals who hold valuable expertise, and the ability of retaining a close relationship with the clients. *Innovation* is a significant part of the PSFs operations, as these firms in many cases develop new solutions for each client. The last characteristic, *information asymmetry*, indicates that PSFs must always be one step ahead of their clients, as they are hired because they possess unique expertise which is difficult for the clients to organize in-house.

Based on a literature review, von Nordenflycht (2010: 159) identified three central characteristics which are frequently associated with PSFs: knowledge intensity, low capital intensity and professionalized workforce. The author claims that these characteristics have been denoted as distinctive characteristic in prior literature, “not necessarily using the same labels, but with phrases that connote much of their meaning” (von Nordenflycht, 2010: 159). Thus, the three characteristics presented by von Nordenflycht (2010) build to a great extent on the characteristics identified by Løwendahl (2005).

Knowledge intensity denotes that the PSF’s outputs rely on a complex body of knowledge, thus, the PSF is dependent on knowledgeable and skilled employees in order to produce outputs (von Nordenflycht, 2010). There are two managerial challenges arising from knowledge intensity: (1) retaining and directing the intellectually skilled workforce (Greenwood and Empson, 2003), and (2) assessing the quality of the individual expert’s output, which is primarily challenging for the PSF’s clients (Løwendahl, 2005). *Low capital intensity* indicates that a PSF’s production primarily involves the firm’s human assets (von Nordenflycht, 2010). This characteristic has two significant implications: (1) it increases the individuals’ bargaining power, as the employees’ knowledge and expertise is crucial for the production of outputs (Teece, 2003), however on the positive side, (2) it reduces the need for external capital, which allows the PSF to better handle the challenges resulting from knowledge intensity, as it can “adopt more autonomy and informality to better satisfy employee preferences” (von Nordenflycht, 2010: 162). According to Torres (1991), there are three features that characterize a profession: particular knowledge base, regulation and control

and ideology. The last characteristic, *professionalized workforce*, encompasses the two latter features: self-control and ideology (von Nordenflycht, 2010). The managerial challenges stemming from a professionalized workforce are: (1) the individuals' preference for autonomy (Alvesson and Kärreman, 2006), (2) the professionals' resistance against organizational forms that threaten the interest of their clients (Løwendahl, 2005) and (3) muted competition which refers to entry barriers into the occupation, and professional codes that prevent competition (von Nordenflycht, 2010).

FOUR TYPES OF PROFESSIONAL SERVICE FIRMS

Building on the three characteristic presented above, von Nordenflycht (2010: 165) proposes a taxonomy of four types of PSFs. *Classic PSFs* are the first category of knowledge-intensive firms; this category includes firms such as law and accounting firms. These firms have the highest degree of professional service intensity, and meet all three characteristics. *Professional Campuses*, such as hospitals, differ from the first category, by being more capital intensive. The third category is different from *Classic PSFs*, as they have non-professionalized workforces. These firms are labeled *Neo-PSFs*, and include for instance management consulting firms and advertising agencies. *Technology Developers*, such as R&D labs, meet only one of the three characteristics, knowledge intensity, and have the lowest degree of professional service intensity.

This taxonomy illuminates the “multiple sources of PSF distinctiveness” (von Nordenflycht, 2010: 156). In line with this, Løwendahl (2005) claims that it is important to note that PSFs differ substantially from one and other. PSFs vary both among and within professional service industries in a number of respects, including size, maturity, industry characteristics, flexibility and heterogeneity, which is a result of past behaviors and present strategic priorities (Løwendahl, 2005). However, extant research has primarily focused on distinguishing PSFs from more traditional firms, Malhotra and Morris (2009: 896) argue that “the notion of similarity or homogeneity predominates much of the organization studies literature on professional service firms.”

Von Nordenflycht (2010) argues that prior research on PSFs has mainly focused on a narrow set of firms, which can unambiguously be defined as PSFs, such as law firms, accounting firms and management consulting firms. Hence, as touched upon earlier, the technical consulting firm has remained largely unexplored. The technical consulting firm is similar to other PSFs in a number of respects; however there are two characteristics that distinguish it from the PSFs discussed in previous literature. The first characteristic is that of multidisciplinary. Malhotra and Morris (2009: 910) argue that technical consulting firms “have pursued opportunistic expansion into related areas such as risk management and health and safety consulting that lie outside the boundaries of the engineering profession.” This characteristic distinguishes technical consulting firms from other professional service firms, such as law and auditing firms (Malhotra and Morris, 2009). The second characteristic concerns the nature of the technical consultants' work. As aforementioned, the technical consultants are assigned to work in client projects, and thus work under the supervision of

managers from the client organization (Barley and Kunda, 2006; Cappelli and Keller, 2013). The technical consultants work in complex development and engineering projects alongside engineers employed by the client organization, as well as other technical consultants (Matusik and Hill, 1998; Söderlund and Bredin, 2011), which distinguishes them from for example management consultants.

However, it is not only important to study the technical consulting firm in order to enhance the understanding of the heterogeneity across PSFs (Løwendahl, 2005; Malhotra and Morris, 2009; von Nordenflycht, 2010). As touched upon earlier, technical consulting firms are becoming increasingly important in a number of technology-based industries, as a growing number of technology-based firms rely on technical consulting firms to produce their outputs (Berggren et al., 2011; Teknikföretagen, 2013). Hence, the technical consulting firm is an important actor for the organization and development of engineering knowledge, as well as for the transfer of knowledge among technology-based firms within, as well as beyond the same industry (Malhotra, 2003; Teknikföretagen, 2011).

KNOWLEDGE TRANSFER

Knowledge transfer is denoted as one of the core knowledge processes in the knowledge management literature (Davenport and Prusak, 1998; von Krogh et al., 2001). Prior research has indicated that firms need to transfer and acquire new knowledge in order to sustain competitiveness (Kogut and Zander, 1992). Von Krogh et al. (2001: 421) claim that “in the knowledge economy a key source of sustainable competitive advantage and superior profitability within an industry is how a company creates and shares its knowledge”. Knowledge transfer is particularly interesting to study within the context of PSFs, as knowledge is considered both the input and the output of such firms (Empson, 2001b; Løwendahl, 2005; Maister, 1997). Thus, knowledge transfer is central for the existence of PSFs.

Argote and Ingram (2000) define knowledge transfer in organizations as “the process through which one unit (e.g. group, department or division) is affected by the experiences of another” (2000: 151). Similarly, Singley and Anderson (1989: 1) define knowledge transfer at the individual level as “how knowledge acquired in one situation applies (or fails to apply) to another.” Knowledge transfer has been labeled in alternative, but related ways in prior literature (van Wijk et al., 2008), previous studies have used labels such as knowledge sharing (Hansen, 1999; Tsai, 2002) and knowledge flows (Gupta and Govindarajan, 2000; Schulz, 2001). Knowledge transfer has been studied within various contexts, such as groups (Argote and Ingram, 2000; Kane et al., 2005), networks (Guechtouli et al., 2013; Inkpen and Tsang, 2005), projects (Cacciatori et al., 2012; Landaeta, 2008) and strategic alliances (Mowery et al., 1996; Simonin, 1999). Prior research has demonstrated that knowledge transfer can occur through a range of mechanisms, such as communication (Levine et al., 2000; Stasser et al., 2000), personnel rotation (Kane et al., 2005) and training (Moreland and Myaskovsky, 2000; Thompson et al., 2000).

In extant literature on knowledge and knowledge transfer, knowledge is generally discussed as either tacit or explicit (Tywoniak, 2007). Polanyi (1966: 4) describes tacit knowledge in the following way: "I shall reconsider human knowledge by starting from the fact that we can know more than we can tell." Tacit knowledge is personal and rooted in the individual's actions, making it hard to formalize (Nonaka, 1994; Nonaka and Takeuchi, 1995). Nonaka (1994) argues that tacit knowledge can be transferred through the interaction between individuals; however the success of the transfer rests on the individuals' shared experience. Moreover, previous studies have indicated that tacit knowledge can be articulated through the use of metaphors and storytelling (Ambrosini and Bowman, 2001; Nonaka, 1994). Explicit knowledge, on the other hand, is objective, and can therefore fairly easily be articulated (Nonaka and Takeuchi, 1995). Explicit knowledge can be expressed in words and numbers, and is codified and transferred through for example hard data, procedures and universal principles (Nonaka, 1994; Nonaka and Takeuchi, 1995). Tsoukas (1996), however, argues that tacit and explicit knowledge should not be viewed as two distinct types of knowledge. The author claims that tacit knowledge is a prerequisite for the use of explicit knowledge.

The distinction between tacit and explicit knowledge exemplifies two dominating views within knowledge management (Empson, 2001b; Kalling and Styhre, 2003). The first view centers on the idea that knowledge is primarily captured and transferred through information technology or information systems. This view has been referred to as the IT perspective (Hislop, 2009). The IT perspective "takes a static view of knowledge, treating it as an object and possible to separate from practice" (Jonsson, 2013: 47). The second view takes a human perspective and centers on the idea that knowledge is socially embedded, and transferred through a dialog between individuals (Hislop, 2009; Kalling and Styhre, 2003). However, recent studies have demonstrated that these two views should not be seen as substitutes for one and other, but rather be viewed as complimentary (e.g. Haas and Hansen, 2007; Werr and Stjernberg, 2003). Hence, it is not only "important to manage and handle knowledge, by storing and transferring it, but also to share and learn, through a social process, in order to develop new as well as existing knowledge" (Jonsson, 2013: 47).

Knowledge transfer, both from internal and external sources, has been found to contribute to organizational performance (Argote and Ingram, 2000; Darr et al., 1995; Galbraith, 1990; Steensma and Lyles, 2000; van Wijk et al., 2008). Szulanski (1996) states that knowledge transfer contributes to the development of organizational capabilities, in turn leading to increased performance. However, Argote (1999) argues that effective knowledge transfer can be difficult to achieve. Previous research has identified several factors that can hinder knowledge transfer, such as (1) knowledge tacitness (Teece, 1986), (2) knowledge embeddedness (Kogut and Zander, 1992), (3) knowledge ambiguity (van Wijk et al., 2008), (4) low absorptive capacity (Cohen and Levinthal, 1990), and (5) lack of trust (Levin and Cross, 2004).

As abovementioned, tacit knowledge has been found difficult to transfer as this type of knowledge is rooted in practice, and thus cannot be fully articulated (Nonaka, 1994; Nonaka and Takeuchi, 1995; Polanyi, 1966; Teece, 1986). Embedded knowledge can hinder the

transfer of knowledge as it is highly context-specific (Kogut and Zander, 1992). Prior research has indicated that knowledge can be embedded in individuals, tools and routines (Argote and Ingram, 2000; McGrath and Argote, 2001; Szulanski, 1996; Walsh and Ungson, 1991). Knowledge ambiguity is “the inherent and irreducible uncertainty as to precisely what the underlying knowledge components and sources are and how they interact” (van Wijk et al., 2008: 833). Knowledge ambiguity has thus been identified as a major obstacle for effective knowledge transfer within as well as among organizations (Szulanski, 1996; van Wijk et al., 2008). Extant literature has also demonstrated that differences in the content of knowledge base may lead to difficulties in transferring knowledge. “Recipients might be unable to exploit outside sources of knowledge” (Szulanski, 1996: 31), resulting from a lack of absorptive capacity. Absorptive capacity is largely a function of the recipient’s prior knowledge (Cohen and Levinthal, 1990; Szulanski, 1996). Trust has been found to increase knowledge transfer (Dirks and Ferrin, 2001; Levin and Cross, 2004), as “it reduces apprehension about the veracity of knowledge, thereby diminishing the tendency to question the knowledge’s accuracy” (Argote et al., 2003: 577). Previous studies have indicated that trust increases the individuals’ willingness to share useful knowledge (Andrews and Delahaye, 2000; Tsai and Ghoshal, 1998), as well as absorb new knowledge (Carley, 1991; Mayer et al., 1995).

KNOWLEDGE TRANSFER AND LABOR MOBILITY

As touched upon earlier, McGrath and Argote (2001) identify three basic elements in which knowledge is embedded in organizations: members, tools, and tasks. These three elements are referred to as knowledge reservoirs by the authors, as the term reservoir implies that knowledge can be reused. Argote and Ingram (2000) argue that knowledge transfer is manifested through the changes in knowledge or performance of the recipient individual, group or organization. Adopting this idea to knowledge reservoirs, it entails that “knowledge can be transferred by moving a knowledge reservoir from one unit to another or by modifying a knowledge reservoir at a recipient site” (Argote and Ingram, 2000: 155).

One knowledge reservoir is especially interesting for this thesis, namely *members*, as knowledge in PSFs, such as technical consulting firms, is highly individualized and embedded in individual members (Alvesson, 2000; Starbuck, 1992). Previous research has indicated that the mobility of knowledge workers across firms has important implications for organizational performance, given the potential for firms to gain human capital (Kacmar et al., 2006; Shaw et al., 2005), and benefit from inter-organizational learning (Rosenkopf and Almeida, 2003; Song et al., 2003).

Given that a number of the individuals employed by a PSF, such as technical consultants, perform their work in client organizations, it is important to understand the impact of mobility on knowledge transfer. Prior studies have argued that mobility is a powerful tool for facilitating knowledge transfer within and among organizational contexts (Galbraith, 1990), as individuals are able to transfer both tacit and explicit knowledge, and alter it to better fit new contexts (Allen, 1977; Berry and Broadbent, 1987). Extant literature has found that labor mobility facilitates: (1) the transfer of human capital (Almeida and Kogut, 1999; Campbell et

al., 2012a; Campbell et al., 2012b; Rosenkopf and Almeida, 2003; Song et al., 2003; Wezel et al., 2006), (2) the transfer of social capital (Dokko and Rosenkopf, 2010), resulting in enhanced quality of client relationships (Somaya et al., 2008), and (3) the transfer of knowledge back to source organizations, through the development of new social ties (Corredoira and Rosenkopf, 2010).

However, several studies have found specific conditions under which labor mobility is most likely to result in effective knowledge transfer. Rosenkopf and Almeida (2003) found that the more technologically similar the firms are the less likely they are to draw on the others' knowledge stock. Similarly, Song et al. (2003: 361) argue that mobility is more likely to result in inter-firm knowledge transfer when: (1) the hiring firm is less path-dependent, (2) the hired engineers possess technological expertise distant from that of the hiring firm, and (3) the hired engineers work in noncore technological areas in their new firm.

Based on the discussion above it is evident that the hiring of technical consultants could bring new knowledge to client organizations, but the extent to which the consultants leverage their prior knowledge may vary substantially according to the attributes of both the client organizations (Song et al., 2003) and the competences of the mobile engineers (Borg and Söderlund, 2015). Borg and Söderlund (2015) argue that some technical consultants are better at taking advantage of the mobility inherent in their work situation; these mobile engineers view their work as knowledge transfer. They are competent in drawing on their experiences from prior and diverse problem-solving contexts, which enables them to bring new knowledge to the client organization (Borg and Söderlund, 2015). In addition to bringing new knowledge to their current assignment and the client organization, these technical consultants continuously look for opportunities to “acquire new knowledge to build on the existing repertoire” (Borg and Söderlund, 2015: 11). In order to be able to reap the benefits of their mobile and transient work situation and transfer knowledge within and among problem-solving contexts, the technical consultants must be able to effectively enter new assignments, hand over completed assignments and leave project teams and client organizations, as well as move among diverse problem-solving contexts where they take on new challenging assignments (Borg and Söderlund, 2014). Staying on the move is therefore critical for the success of knowledge transfer in the context of technical consulting.

STRATEGIES FOR KNOWLEDGE TRANSFER IN PROFESSIONAL SERVICE FIRMS

Criscuolo et al. (2007: 1604) argue that “increasing competition in the professional services market means that firms must constantly strive to better exploit their knowledge assets.” Hence, PSFs must strive to develop strategies for managing both intra- and inter-organizational knowledge transfer, in order to make the most of their knowledge assets.

Hansen et al. (1999) argue that professional service firms, more specifically management consulting firms, employ two distinct strategies for managing knowledge transfer: the codification strategy and the personalization strategy. The first strategy, *codification*, centers on the computer, and it is mainly used by organizations who deliver standardized solutions to their clients (Hansen et al., 1999). In these settings, knowledge can be articulated, codified

and disseminated to other members of the organization through databases. The *personalization* strategy, on the other hand, demands the use of tacit knowledge (Hansen et al., 1999). This strategy centers on the generation of new knowledge, which requires interaction among knowledgeable individuals. Organizations utilizing this strategy provide their clients with highly customized solutions to unique problems. Hansen et al. (1999) claim that it is crucial for organizations to pursue only one of the strategies above, as organizations trying to implement both strategies simultaneously risk failing at both.

Contrary to Hansen et al. (1999), Werr and Stjernberg (2003) claim that closer attention should be paid to the relations between tacit and explicit knowledge in understanding knowledge management in management consulting firms. Based on their analysis of the knowledge systems present in two management consulting firms, the authors identified three interrelated knowledge elements: methods and tools, cases and experience. *Methods and tools* and *cases* are characterized by explicit organizational knowledge, made available to others through electronic knowledge management systems. Although, these two knowledge elements rely on the same type of knowledge, it is important to note the differences between them. Methods and tools have a broad application area, as they produce general knowledge. Moreover, methods and tools provide the organization with a common language. Cases, on the other hand, are tied to one specific setting, making their general applicability limited. Werr and Stjernberg (2003) found that cases made highly individual knowledge available to the organization. In combination with discussion cases transferred portions of the tacit knowledge required to create a solution, to other consultants. *Experience* is characterized by tacit individual knowledge, and is transferred through extended face-to-face interaction. Werr and Stjernberg (2003: 895) conclude that “each knowledge element contributed to the overall knowledge system by leveraging the value of the other knowledge elements.” By providing a shared language, the methods and tools facilitated the exchange and codification of experience, whereas the cases produced narratives that contributed to the translation of general knowledge to specific cases. The authors state that the two explicit knowledge elements are reliant on the experienced consultants’ ability to translate them to the task at hand.

Similarly, Haas and Hansen (2007) argue that explicit and tacit knowledge should be viewed as complimentary, with respect to knowledge transfer. Based on a study of 182 sales teams in a management consulting firm, the authors find that different types of knowledge affect task performance differently. Haas and Hansen’s (2007) findings indicate that codified means of knowledge transfer, such as using high quality electronic documents, improved work efficiency, but did not enhance the quality of work. Whereas personalized means, such as drawing on advice from experienced colleagues, improved the quality of the consultants’ work output and signaled competence to clients, but did not save time. Thus, Haas and Hansen (2007) argue that the two knowledge types should not be viewed as substitutes for each other.

The studies presented above illuminate that intra- and inter-organizational knowledge transfer is crucial for the competitiveness of PSFs. This also holds true for the technical consulting

firm. Kogut and Zander (1992: 385) argue that “the knowledge of the firm must be understood /.../ as resting in the organizing of human resources.” Hence, in order to enable intra- and inter-organizational knowledge transfer, the technical consulting firm must be able to organize for the transfer of engineering knowledge among client organizations (Malhotra, 2003), as well as facilitate the development of individual capabilities to take part in the knowledge integration processes in client organizations (Söderlund and Bredin, 2011). Prior literature has demonstrated that knowledge transfer can be facilitated through organizational culture, as well as HRM practices such as training (Cabrera and Cabrera, 2005; Lam, 2005; Moreland and Myaskovsky, 2000). As touched upon earlier, the success of knowledge transfer also rests to a great extent on the competences of the technical consultants (Borg and Söderlund, 2015), as the technical consulting firm relies on the knowledge of its employees to produce its outputs (Løwendahl, 2005; von Nordenflycht, 2010). Thus, the interaction between the organizational and the individual level is critical in the formation of capabilities in the technical consulting firm (Felin and Foss, 2005). However, prior research has indicated that the individuals’ roles in affecting the development of organizational capabilities have been largely overlooked (Salvato, 2009).

CHAPTER 3

METHODOLOGY

In this chapter, the methodological choices are presented and motivated, and the overall research process is described. This thesis is based on two empirical studies, which have been conducted within the boundaries of one technical consulting firm. The chapter begins with a description of the research approach chosen for this thesis. Subsequently, the case firm, Advanced Engineering, is presented; moreover, the rationale for selecting this specific case is described. Thereafter, the research process, consisting of the two empirical studies conducted within Advanced Engineering, is illustrated. Further, the data collection methods used in each empirical study are portrayed. Followed by a description of how the empirical material was analyzed. The chapter ends by elaborating on how validity was established throughout the research process, and how it has strengthened the trustworthiness of the results of this thesis.

A QUALITATIVE RESEARCH APPROACH

The design of a study starts with the selection of a topic and a paradigm, whereby the latter helps people understand the phenomena (Creswell, 1994). That is, it advances assumptions about the social world, how science should be conducted and also what constitutes legitimate problems, solutions and criteria of proof (Gioia and Pitre, 1990; Kuhn, 1970). The paradigm encompasses both theory and methods. Even though they evolve and differ by the various discipline fields, two major paradigms are widely discussed in academic literature, namely the qualitative and quantitative paradigms (Reichardt and Cook, 1979; Webb et al., 1986). This underlying research is of qualitative character.

The first reason for choosing a qualitative research approach is the nature of the research aim. The aim of this thesis is to enhance the understanding of the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations, making the qualitative approach suitable for several reasons. First, this thesis seeks to illuminate an unexplored topic, making this research exploratory. A number of researchers claim that it is advantageous to use a qualitative research approach for exploratory aims (Creswell, 2013; Strauss and Corbin, 1998). Second, this study strives to understand a knowledge process in the context of technical consulting. According to Miles and Huberman (1994), qualitative research reveals the complexity within the context being studied, and it is favorable when studying processes. Finally, it is important to understand the views and experiences of those participating in the study, in order to analyze the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations. Corbin and Strauss (2008) argue that qualitative research gives the researcher the opportunity to grasp the experiences of the participants. In line with this, Creswell (2009: 4) states that “qualitative research is a means of

exploring and understanding the meaning individuals or groups ascribe to a social or human problem.”

Strauss and Corbin (1998) argue that researchers should take their preferences and experience into account when choosing a research approach. The choice of a qualitative approach has to a large extent been inspired by my own preferences as a researcher. As abovementioned, Creswell (2009) argues that a qualitative study is defined as an inquiry process of understanding a human or social problem, based on building a holistic and complex picture formed with words, which reports detailed views of informants and is conducted in a natural setting. Similarly, Denzin and Lincoln (2011: 3) claim that “qualitative research involves an interpretive, naturalistic approach to the world.” The characteristics presented in the definitions above depict the reasons why qualitative research appeals to me. By doing qualitative studies I have the privilege to enter into the world of participants, and see the world through their eyes (Corbin and Strauss, 2008). Thus, I have the possibility to understand the meanings people ascribe to processes and experiences. This rich data provides me with the opportunity to discover new concepts, which in turn leads to the advancement of existing theories or the creation of new theories, which I find intriguing. In addition to contributing to research, my ambition is that the participants will find the research process rewarding and learn from it.

A CASE STUDY APPROACH

Many researchers advocate the use of case studies for gaining in-depth understanding of the context being studied (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Flyvbjerg, 2011; Yin, 2009). Eisenhardt (1989: 534), for example, argues that this particular strategy of inquiry centers on “understanding the dynamics present within single settings.” According to Merriam (1994), case studies are favorable when studying practical problems – questions, situations or challenges occurring in daily life. Moreover, Stake (1995) argues that the case study approach is advantageous when exploring programs, events, activities, processes or individuals in depth, which is in line with the aim of this thesis.

Case studies can be comprised of either single or multiple cases (Yin, 2009). This case study is a single-case study of one Scandinavian technical consulting firm. Previous research has often pointed to the fact that single-case studies provide little bases for scientific generalization as they are too situation-specific (Weick, 1969; Yin, 1994). However, more recently this specific characteristic of single-case studies has come to be regarded as an opportunity. According to Dubois and Gadde (2002: 554): “Learning from a particular case (conditioned by the environmental context) should be considered a strength rather than a weakness. The interaction between a phenomenon and its context is best understood through in-depth case studies.” An in-depth single-case study can develop valuable insights regarding the studied phenomenon, given that knowledge transfer in the context of technical consulting remains a largely unexplored topic. A single-case study can employ a holistic design, covering a single level of analysis, or an embedded design, including multiple levels of

analysis within one case study (Yin, 2009). This case study applies an embedded design, conducting research on two levels of analysis: the firm and the individual.

THE CASE FIRM

The empirical focus of this thesis is one of Scandinavia's leading technical consulting firms, with its headquarters located in Sweden, here referred to by the pseudonym "Advanced Engineering". Two empirical studies conducted within Advanced Engineering comprise the basis for this thesis.

ADVANCED ENGINEERING

Advanced Engineering (hereafter AE) was founded in the 1990s; at that time it had only 20 employees and its technological focus was on embedded real-time systems engineering. Since then AE has undergone a merger and a number of acquisitions, and has existed in its present form since the beginning of this decade. Today the technical consulting firm has expertise in a wide range of areas, such as information security, system integration, systems development, communications, mechanical engineering, logistics and risk management. AE works both towards public and private clients, and operates in a wide range of industries, such as aviation and defense, automotive, infrastructure, telecom, medical technology, environmental technology, as well as banking and finance.

AE has grown considerably in recent years both through organic growth and acquisition. Today approximately 1400 employees work for the technical consulting firm, whereof 80 percent of the personnel have a master's degree in engineering. The majority of employees are men, although the share of female workers is steadily growing and has today reached about 20 percent. Most of AE's employees work in projects in client organizations. They work together with employees from the client's organization, with workers from other technical consulting firms, and in some cases also with other consultants from AE.

AE is divided into three divisions; the largest division employs approximately 700 people and works mainly toward the private sector. This division is the primary focus of this thesis. The division has four levels of managers, the division manager, who is responsible for the division as a whole, is on the highest level. Below the division manager are the business unit managers, they are each responsible for one business unit directed towards a specific competence area. The profit-unit managers are divided by regions, and are responsible for staff and sales, as well as business development, marketing strategies, clients and profits. The lowest-level managers are the consultant managers, who divide their time between managing consultants and working in consulting assignments.

THE CULTURE OF ADVANCED ENGINEERING

"The view on knowledge and the perception of knowledge development is what unites us; it is probably the strongest cultural expression in this firm." (AE manager)

This quote illuminates that continuous learning and competence development is embedded in AE's culture. Its mission is "to meet client needs and develop people with a desire for learning" (AE manager). In order to fulfill this mission the technical consulting firm has invested in a wide range of internal competence development activities.

AE has developed two competence development programs. The first program is directed towards senior consultants and project managers, where the goal is to learn from each other's experience. During the program the participants build their professionalism and courage, while learning from each other. The second competence development program is an introductory development program (henceforth IDP) created for newly hired employees who have recently graduated. The aim of the IDP is to become a capable engineering consultant faster. Throughout the program the participants increase their abilities to: (1) act independently in their assignments, and (2) cooperate with colleagues in the client organizations. Moreover, the IDP enhances the consultants' understanding of the business operations within AE as well as at client sites. In addition to these competence development programs, AE has a number of technological competence networks and internal courses to further strengthen and support on-the-job training.

THE CONSULTING ASSIGNMENTS

As mentioned earlier, most of AE's consultants work in assignments at client sites where they assume various resource, expertise and specialist roles, depending on the clients' needs. The technical consultants work in cross-functional teams, meaning that they collaborate with team members with diverse competencies. Moreover, they move from project to project on a recurrent basis, often travelling across client organizations. The typical consulting assignment within AE lasts between one and two years, however it can last shorter or longer depending on the area of technology. Since a few years back AE has started working with outsourced client projects to a larger extent. The projects are managed by and within AE, and are usually only assigned to AE consultants. The outsourced client projects generally include the development of a specific product or a part of a product. Moreover, as the projects at client sites, these outsourced client projects are also comprised of cross-functional teams.

CASE SELECTION

There are several reasons for choosing AE as the empirical focus of this thesis. The first reason for choosing this specific technical consulting firm is that it is assuming an increasing responsibility for human resource management activities, such as recruitment, mentoring, competence development, job rotation and retention, previously carried out by its clients. AE has invested a vast amount of resources in developing its employees to become the best technical consultants, not only with regards to engineering, but perhaps more so as knowledge workers, knowledge integrators and collective problem-solvers, to ensure that relevant knowledge and competencies are sourced to its clients.

The focus on knowledge and learning was another important reason for choosing AE. During the last fifteen years the management of AE has been developing methods for the transfer of

knowledge and experience in order to make problem-solving more effective. Writing as a means of reflection is at the heart of these methods. Throughout the internal competence development activities the employees learn by reflecting on their work experiences through writing about and discussing them with their coworkers. Thus, the majority of managers as well as consultants have practiced putting their work experiences into words. This is beneficial for this study as they are used to reflecting on how they perform their work, why they take certain decisions, and which consequences these decisions might have.

Finally, the last reason for studying AE is the managers' interest in this research project. Their enthusiasm and the general access to numerous people, information and internal documents within AE have benefited this study greatly.

THE RESEARCH PROCESS

As mentioned in the introduction to this chapter, this thesis is based on two empirical studies. The empirical material for this thesis was collected through two phases during the research process. The first empirical study was conducted during the first phase of the research process: *Exploring the nature of the technical consulting firm through interviews*, while the second empirical study was carried out through the second phase: *Exploring a competence development program through multiple methods*.

The two empirical studies constitute the foundation for the three papers included in this thesis. The first paper, "Exploring the knowledge-based advantages of the technical consulting firm: Swift transition and knowledge cycling", is based on the first phase of the research process. This phase consists of two interview studies, comprising interviews with AE managers and consultants. The second paper, "The nature and process of knowledge cycling: A study of labor mobility among technical consultants", builds on the interview studies from the first phase, and is supplemented with the interview study carried out with the participants of the IDP, conducted in the second phase of the research process. The last paper, "Training for knowledge transfer: A study of formal training for mobile engineers", is founded on the empirical material from the second phase, including three observation studies, as well as three interview studies, consisting of interviews conducted with the creators, leaders and participants of the IDP.

Table 1 below gives an overview over the data collection process. The first column in the table illustrates the methods used to collect the empirical material. The second column specifies the total number of times a data collection activity has been carried out, for example the number of interviews conducted. Finally, the last column indicates how long each activity lasted.

Data collection method	Data collected	Duration
Phase 1: Exploring the nature of the technical consulting firm through interviews		
Interviews with managers	16 ¹	45 minutes – 2.5 hours
Interviews with consultants	20	1.5 – 2.5 hours
Workshop with managers	1 (11 participants)	3 hours
Phase 2: Exploring a competence development program through multiple methods		
Interviews with the developers of the program	3	1 – 2 hours
Interviews with leaders of the program	4	1 – 1.5 hours
Observations of administrative meetings	3 (13 participants)	2 – 4 hours
Participant observations of the program	9 (36 participants and leaders in total)	5 hours
Observations of the examination of the program	2 (24 participants and leaders in total)	8 hours
Follow-up interviews with participants	11	45 minutes – 1.5 hours
Workshop with managers	1 (4 participants)	2 hours

Table 1: Overview of the data collection process

PHASE 1: EXPLORING THE NATURE OF THE TECHNICAL CONSULTING FIRM THROUGH INTERVIEWS

The primary source of data for the first empirical study has been qualitative interviews with managers and consultants employed by AE. The aim of the first study was to explore the nature of the technical consulting firm. Thus, the qualitative interview was chosen as a data collection method in order to both obtain facts as well as the respondents' opinions about the studied phenomenon (Yin, 2009). Interviews are an effective method to collect rich empirical material, and explore social and personal matters in-depth (DiCicco-Bloom and Crabtree, 2006; Eisenhardt and Graebner, 2007). In line with this, Denscombe (2010) argues that interviews are the most suitable method when the researcher's aim is to gain an understanding of the respondents' feelings, views and experiences.

The respondents for the interview studies were selected based on representativeness and quality sampling (Alvesson, 2011). Representativeness focuses on getting a comprehensive understanding of the studied phenomenon and avoiding possible skewed views of individuals. Thus, a wide variety of respondents should be included in the interview study. Quality

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¹ Four of the sixteen interviews with managers and all the twenty interviews with consultants were conducted by a colleague within the research group, Elisabeth Borg.

sampling centers on the characteristics which make the respondents particularly relevant as informants, such as their knowledge about the studied phenomenon, experience or their interest in the research project. The interviewed managers had different areas of responsibility within the technical consulting firm, and were selected based on their knowledge of the consulting firm's culture, organization, business strategies, operations and processes. The consultants work within different business units in AE as well as at different client sites, and were chosen based on their work experience. A more detailed account of the execution of the two interview studies is described in the sections that follow.

Eisenhardt and Graebner (2007) argue that the interview data may be biased by the respondents' recollection of impressions and experiences of events in retrospect. This bias can be limited by "using numerous and highly knowledgeable informants who view the focal phenomena from diverse perspectives" (Eisenhardt and Graebner, 2007: 28). In order to avoid the bias in this empirical study, respondents were selected based on representativeness and quality sampling, as abovementioned.

INTERVIEWS WITH MANAGERS

This interview study was initiated with a start-up meeting between my supervisor, Jonas Söderlund, and the division manager of the largest division within AE. This meeting had two purposes. The first was to ensure that the manager was interested and willing to participate in the research project. The second purpose was to describe the focus of the research, how it could be conducted and which results could potentially be expected.

Following the start-up meeting, twelve interviews were conducted with AE managers; seven of these interviews were conducted by my supervisor and me, while I solely carried out the remaining five interviews. Eisenhardt (1989) argues that multiple investigators enhance both the creativity and the confidence in the results. In addition to the twelve interviews conducted by my supervisor and me, four interviews with AE managers carried out by a colleague within the research group, Elisabeth Borg, were included in order to strengthen the representativeness of the study. As abovementioned, the respondents were selected based on representativeness and quality sampling (Alvesson, 2011), and included managers with diverse competencies and areas of responsibility, such as human resource managers, division managers, business-unit managers, senior project managers and consultant managers.

The interviews were semi-structured, implying that they focused on a number of predetermined themes (DiCicco-Bloom and Crabtree, 2006; Flick, 2014). Before conducting the interviews two separate interview-guides, organized around predefined themes were constructed. One interview guide was used for the twelve interviews carried out by my supervisor and me, and the second interview guide was utilized for the four interviews executed by Elisabeth Borg. The interview guides had a flexible design, consisting of open-ended questions, which allowed follow-up questions to be posed. Rubin and Rubin (2012) use the term "responsive interview" to describe this style of interviewing; "the pattern of questioning is flexible; questions evolve in response to what interviewees just said, and new questions are designed to tap the experience and knowledge of each interviewee" (Rubin and

Rubin, 2012: 36). This interview style permits the researcher to develop a comprehensive picture of the studied phenomenon from the interviewees' point of view (Flick, 2014).

The interviews with the managers aimed at exploring the organizational roles of the technical consulting firm. The interviews focused on AE's strategic development, its business model and its business strategies. At the beginning of each interview, the interviewer(s) presented the research project and themselves and asked the interviewee to elaborate on his/her background. This contributed to the creation of a trust between the interviewer(s) and the interviewee (Rubin and Rubin, 2012). Further, the interview guides included questions about the technical consulting firm's vision and mission, leadership, organizational structure, competences, knowledge processes, clients, human resources, consultant careers, consulting assignments and competence development. In addition to these predefined themes, the interviews included a number of follow-up questions. The follow-up questions were used to clarify the statements made by the interviewees, and to gain a more in-depth understanding of the themes covered by the interview guide (Rubin and Rubin, 2012). These interviews lasted between 45 minutes and 2.5 hours, and were all recorded and transcribed.

The interviews were complemented with additional sources, such as books written about the technical consulting firm, internal documents and the company website. These sources served as a means for understanding AE's history, culture and recent developments.

INTERVIEWS WITH CONSULTANTS

The interviews with the AE consultants were conducted by Elisabeth Borg. The data from these interviews has been used for various purposes, such as studying the practices technical consultants rely upon to cope with their transient work situations (Borg and Söderlund, 2014). The rationale for including the interviews with the consultants in this phase of the research process was to gain a comprehensive understanding of AE, both at the firm and individual level. Another important reason for choosing to include the individual level of analysis in this phase, is the fact that technical consulting firms rely on the knowledge of their consultants to produce their outputs (Løwendahl, 2005; von Nordenflycht, 2010), which indicates a tight coupling between the two levels.

In total, twenty interviews were carried out with consultants employed by AE. As for the managers, representativeness and quality sampling was utilized to select the respondents. The sample included respondents who represented different engineering areas of expertise, and had experience from working in several consulting assignments. Moreover, the consultants included in the study work at different client sites, as well as working in different business units within AE.

These interviews were also semi-structured, and lasted between 1.5 and 2.5 hours. The interview guide included questions about the consultant's background, their work situation and the advantages and challenges related to it, their current and previous assignments in client projects, and the transition between assignments. Moreover the consultants were asked about what it entails to be a technical consultant, and which qualities a good consultant should

have. All interviews were recorded and transcribed. For more details on how this interview study was conducted see Borg (2014).

WORKSHOP

In addition to the two interview studies, Jonas Söderlund and I held a workshop with eleven managers working within AE. The objective of the workshop was to discuss the initial data analysis and the results of this empirical study. The workshop was initiated with a presentation of the research project, followed by a presentation of the study. Then the managers were divided into four groups to discuss their views on the analysis in detail. This gave us the opportunity to gain insight into the managers' reflections about the analysis. The workshop was concluded with a general discussion, which provided us with valuable input on how to further develop the analysis.

PHASE 2: EXPLORING A COMPETENCE DEVELOPMENT PROGRAM THROUGH MULTIPLE METHODS

The first version of the IDP was launched in 2007; by the end of 2012 18 IDP classes had been started. The program runs over a period of 24 months, and the IDP classes consist mainly of recently graduated engineers. One IDP class is made up of 10-12 participants, who go through the 24-month long program together. Each class is most often led by two consultant managers at AE, who lead and administrate the program, on rare occasions there is only a single leader.

AE's policy is that all employees recruited straight out of university should start the program within their first months at AE. During the course of the program the IDP participants work in their consulting assignments. Previously, IDP classes consisted of consultants working on different projects within the same client organization. However, the classes started more recently are comprised of consultants working for various clients, and different projects within the client organizations.

THE INTRODUCTORY DEVELOPMENT PROGRAM

The program focuses on developing the technical consultants' professionalism. Professionalism, here, is described as understanding both the technical and social aspects of the work situation. One of the creators of the program, a business developer at AE, conveyed the purpose of the IDP as follows:

“All experience grows while you work. But why work for 10-15 years before you get the hang of the real important stuff, and what is really the core of the work? What we have done here is to create a program where we try to get our young colleagues to see all this.” (IDP creator)

During the IDP the participants go through three different development stages simultaneously: experience-sharing seminars, sparring talks and coaching sessions, and formal technical and business courses. For an overview of the structure of the IDP see Figure 1 below.

Figure 1: The structure of the Introductory Development Program

The first development stage consists of nine 5-hour seminars, focusing on experience sharing between the participants. These seminars are divided into three phases with three seminars in each phase. The first phase deals with the consulting assignments, and aims at making the consultants more independent in their assignments. The second phase revolves around the operations in the client organizations, and its objective is to increase the interaction at client site. The final phase addresses the business, the purpose of this phase is to increase the understanding of both the consulting firm's and the client's business. Within each phase the general theme of the phase is divided into three predefined topics, such as for example *personal leadership, roles or dual loyalties*, each dealt with during one seminar.

The participants are expected to come prepared to each seminar, meaning that they should read a number of writings, connected to the topic of the seminar, and then write a reflection, of approximately one page, which connects the writings to their own work experiences. At the seminar each participant reads his/her reflection a loud, and a discussion on the reflection follows. During the discussions the other participants relate the reflection read to their own experiences, and discuss lessons learned from the examples in the reflection.

The second development stage involves sparring talks in pairs during the first phase of the program, and coaching sessions in the following two phases. During the sparring talks two consultants, working in different projects, meet up two times a month to discuss their work assignments in order to understand them better. After the first phase, the sparring talks evolve into coaching sessions. As for the sparring talks, the consultants meet twice a month to coach each other in order to reach their long term goals. The final development stage consists of a number of formal technical and business courses that the consultants are expected to take in order to finish the program.

At the end of the program the participants go through an examination seminar. The participants prepare for this seminar by reading through all their reflections, from the nine previous seminars, and writing a short paper reflecting on what they have learned during the last 24 months. The structure of the examination seminar is similar to all other seminars; each participant reads his/her paper a loud and then a fellow participant, appointed by the IDP leaders, gives his/her views on the paper before the leaders open up for a more general

discussion on the paper. At the end of the seminar the participants receive a diploma for completing the program.

USING MULTIPLE METHODS TO STUDY THE IDP

Multiple qualitative methods were used to study the IDP, in order to explore how the program affects the technical consultants' ability to transfer knowledge. This strengthened the trustworthiness of the results (Yin, 2009). First, creators and leaders of the IDP were interviewed to create an understanding of the program. Next, observations were made during administrative meetings with the IDP leaders. Subsequently, the nine IDP seminars and two examination seminars were observed, and finally follow-up interviews with the participant of the IDP were made regarding their experiences of the program. The data collection for this study was conducted together with a colleague, Elisabeth Borg. This enhanced the creative potential of the study and improved the confidence in our results (Eisenhardt, 1989). A more detailed account of the methods used is described in the sections that follow.

INTERVIEWS WITH IDP CREATORS AND LEADERS

The study of the IDP was initiated by interviewing two business developers at AE who had created the program. Moreover, a business unit manager involved in the development and management of the IDP was also interviewed. These interviews were semi-structured (DiCicco-Bloom and Crabtree, 2006) and lasted between 1 and 2 hours. The purpose of these interviews was to gain a better understanding of the program; how the program was structured, what the goals of the program were, and which learning outcomes could be expected from the program. Following, five IDP leaders were interviewed. These five leaders were suggested by one of the IDP creators, because of their experience in leading the program. The interviews with the IDP leaders were semi-structured and lasted between 1 and 1.5 hours. The interviews covered topics such as the leaders' background, the design and process of the program, the main learning outcomes, and the participants' development throughout the IDP. All the interviews were recorded and transcribed. In addition to these interviews, three observations were made during administrative meetings concerning the IDP, lasting between 2 and 4 hours. The discussions at these meetings revolved around the IDP leaders' role, the challenges in running the program and potential improvements of the IDP. Moreover, the IDP leaders also shared their lessons learned from the program. Careful field notes were taken during the meetings, focusing on the discussions between the IDP leaders.

PARTICIPANT OBSERVATIONS OF THE IDP

Following the interviews and the observations of the administrative meetings, observations of nine five-hour IDP seminars and two examination seminars were conducted. The reason for putting the focus on the seminars, and not the other development stages of the program, is that the seminars are considered to be the essence of the program. By observing the seminars the IDP participants' work experiences could be captured, which enhanced the understanding of how they perceive their work situations and assignments, what they find rewarding and challenging with their work, and how they face the challenges they come across (Denscombe,

2010). Moreover, it was also possible to observe which matters the IDP leaders highlighted as important during the program.

Marshall and Rossman (1989: 79) define observation as “the systematic description of events, behaviors, and artifacts in the social setting chosen for study.” The main focus during the observations of the seminars was put on the discussions produced by the participants, in order to thoroughly capture their work experiences. According to Creswell (2007), the role of the observer can range from being a complete observer to going native. These particular observations could be classified as participant observations. “Participant-observation is a special mode of observation in which you are not merely a passive observer” (Yin, 2009: 111). A number of researchers have argued that the main advantage of participant observations is the development of trust (DeWalt and DeWalt, 2010; Schensul et al., 1999). DeWalt and DeWalt (2010) argued that the access to knowledge about events and behaviors rests on the development of trust through participant observation. Participant observation in this case implied that my colleague, Elisabeth Borg, and I, as all other participants in the program, had to read a number of writings, write our reflections connected to the writings, read our reflections aloud during the seminar and discuss them with the other participants. We participated actively during these discussions. However, during the remaining time of the seminars, while the other participants’ reflections were processed, my colleague and I listened and wrote careful field notes (Creswell, 2007; Denscombe, 2010), focusing on the discussion among the other participants. As a result of our participation in the program, we were quickly accepted as part of the group, as we managed to gain the participants’ trust early on in the process. This implied that the participants more openly shared their personal experiences with us and the rest of the IDP class.

According to Guest et al. (2013: 93), observations can be “subject to the bias of the researcher regarding what to note or record.” The authors argue that the researcher’s views and assumptions can limit the recorded material. This bias was minimized in this study by taking detailed notes of what happened, what was said and by whom during the seminars. Moreover, the researcher’s own views and reflections were separated from the descriptive notes, and written down on the edges of the field note protocol (Creswell, 2007).

The participant observations of the seminars were conducted in three separate IDP classes, in parallel. In practice, this implied that we followed one seminar phase with every class. These classes were chosen based on opportunistic sampling (Patton, 1990), meaning that we took advantage of the opportunity that three classes started a different seminar phase at the time when this study was initiated. The participant observations were carried out in this manner: Phase 1 (three seminars) with class X, Phase 2 (three seminars) with class Y, and Phase 3 (three seminars) with class Z. As my colleague and I did not jointly conduct all the nine participant observations, a detailed account of the process follows. We conducted the participant observations together for all the three seminars in Phase 1 with class X. In Phase 2 we jointly followed the first seminar with class Y, the participant observation for the second seminar were conducted by my colleague, and I carried out the participant observation of the

third seminar in Phase 2 by myself. My colleague solely executed the participant observations for Phase 3 with class Z.

In addition to the participant observations of the IDP seminars, two examination seminars were observed. As preparation for these seminars we read the participants' reflections on what they had learned during the program; however my colleague and I did not write reflections ourselves neither did we participate in the discussions of the participants' reflections throughout the seminars. Thus, during the examinations our sole focus was on writing thorough field notes on what occurred, and what was said by the participants. My colleague and I jointly observed the first examination, while my colleague carried out the second observation by herself. Each examination seminar lasted eight hours.

FOLLOW-UP INTERVIEWS AND WORKSHOP

Eleven follow-up interviews were carried out with consultants who had participated in the IDP, in addition to the participant observations. The interviewees were participants who had finished the first phase of the IDP, and participants who had finished the program in its entirety. These consultants were chosen in order to gain a better understanding of the lessons learned at the beginning of the program and at the end of the program. By including participants from these two phases it was easier to conclude the extent of their development, as the differences in their progress between Phase 1 and Phase 3 are more prominent. All the participants in the IDP classes which we had followed, who had finished Phase 1 and Phase 3 of the program, were invited to participate in this interview study. Out of the nineteen consultants, eleven agreed to participate, while eight declined. The interviews were semi-structured (DiCicco-Bloom and Crabtree, 2006), and revolved around issues such as the participants' expectations of the IDP, their experiences of the program, their development during the IDP, and the program's effect on their daily work. The interviews lasted between 45 min and 1.5 hours, and were all recorded and transcribed.

Additionally, Elisabeth Borg and I held a workshop with four managers involved in the design and execution of the IDP. The aim of the workshop was to discuss the preliminary data analysis and the findings of the IDP study. First, a short presentation about the study was held, before a general discussion with the participants was initiated. The managers discussed their thoughts on the analysis of the study, and pointed to aspect that they thought had been captured well, as well as aspects that could have been more emphasized in the analysis. Thus, the workshop provided input for further interpretation of the empirical material.

DATA ANALYSIS

Thematic analysis was utilized to analyze the empirical material collected in both phases of the research process. Several researchers have argued that thematic analysis is the most commonly used qualitative analytical method (Braun and Clarke, 2006; Guest et al., 2012; Howitt and Cramer, 2008). This analytical method is used for "identifying, analysing and reporting patterns" within the empirical material (Braun and Clarke, 2006: 79). In line with

this, Guest et al. (2012: 10) argue that thematic analysis focuses on “identifying and describing both implicit and explicit ideas within the data, that is, themes.”

In the initial stage of the analysis I familiarized myself with the data (Braun and Clarke, 2006). The process of transcription was utilized to get acquainted with the empirical material (Riessman, 1993). Through transcribing the data, I gained a comprehensive understanding of the content. Another method used to familiarize myself with the breadth and depth of the material was reading the transcripts written by my colleague Elisabeth Borg. While reading through the transcripts I searched for meanings within the content (Braun and Clarke, 2006). Subsequently, codes were generated from the empirical material. In this second stage each interview was coded separately by using descriptive codes (Saldana, 2009), the same procedure was applied to the transcripts of the field notes. A descriptive code “summarizes the primary topic of the excerpt” (Saldana, 2009: 3). Below, in Table 2, an excerpt from the field notes written during one of the IDP seminars illustrates how descriptive coding was applied:

Excerpt from the field notes	Code
<i>It is important to learn from more experienced consultants, and to “cheat” if possible – not to overwork or use too much time to figure something out, when existing solutions are available.</i>	Learning through observation

Table 2: Excerpt from field notes

The empirical material gathered in the second phase of the research process was initially coded independently by Elisabeth Borg and me, which resulted in two coding processes. The coding processes were compared before moving on to the next stage of the analysis. In the following stage, the transcripts were reread and similar codes were discovered across transcripts. Next, overarching themes were created by combining different codes (Braun and Clarke, 2006). This stage resulted in a collection of candidate themes. The succeeding stage of the analysis centered on reviewing the overarching themes created. During this stage some themes were abandoned, as there was a lack of support for them in the empirical material, while other themes were combined to form a broader theme (Braun and Clarke, 2006). The final stage of the analysis, defining the themes, will be described separately for the three papers. In order to elaborate on how the contributions of the different papers were derived, this last stage of the analysis has to be paper specific.

EXPLORING THE KNOWLEDGE-BASED ADVANTAGES OF THE TECHNICAL CONSULTING FIRM: SWIFT TRANSITION AND KNOWLEDGE CYCLING

Defining the themes is the last stage of the analysis, before a report is written. Defining the themes entails “identifying the “essence” of what each theme is about /.../, and determining what aspects of data each theme captures” (Braun and Clarke, 2006: 92). For the first paper included in this thesis, two main themes were identified through the analysis of the interviews with managers and consultants: *strategies for attracting and retaining employees and clients* and *the nature of consulting assignments*. For each theme a number of sub-themes were identified.

The first theme revolves around the technical consulting firm's ability to (1) create an organizational culture which centers on continuous learning, (2) build close client relationships in order to understand the needs of the clients, and (3) facilitate internal as well as external knowledge transfer. Recruiting talented employees is crucial for attracting and retaining clients, however it not sufficient. The consulting firm must also be able to understand the clients' needs for particular competences and match the right consultants to the needs of the clients. Moreover, in order to attract employees and clients, the consulting firm must be able to enable internal knowledge transfer through competence development activities, as well as external knowledge transfer through mobility among problem-solving context. The second theme concerns the technical consulting firm's ability to organize for mobility among projects and client organizations. The consulting firm continuously broadens the consultants' repertoire of skills through competence development and challenging client assignments, to ensure that the consultant do not become too specialized or dependent on one technology. Moreover, the second theme centers on the technical consultants' ability to (1) utilize both social and technical skills to quickly enter new assignments, and (2) make use of the mobility inherent in their work situation in order to develop their competences and build experience. The two main themes are illustrated though a thematic map (Braun and Clarke, 2006) in Figure 2.

Figure 2: Thematic map

The analysis resulted in two capabilities: *swift transition* and *knowledge cycling*. After the preliminary analysis, a workshop was held with eleven managers working within AE. The aim

of the workshop was to validate the two capabilities identified through the initial analysis through member checking (Lincoln and Guba, 1985). The feedback from the managers provided valuable input on the essence of swift transition and knowledge cycling. Moreover, the interaction between the technical consulting firm and the technical consultants in the formation of swift transition and knowledge cycling was emphasized. After the workshop the preliminary analysis was extended, and a larger emphasis was put on the interaction between the firm and the individual level, as well as on the interplay between the two capabilities. Hence, the definitions of the capabilities of swift transition and knowledge cycling were refined. Swift transition centers on the technical consulting firm's ability to respond to clients' needs by swiftly allocating consultants to client projects, and the technical consultant's ability to enter new assignments quickly in order to add value to the project and the client organization. Knowledge cycling concerns the technical consulting firm's ability to rotate the consultants among projects and client organizations, at certain points in time, to allow for the transfer of knowledge among problem-solving contexts, and the technical consultants' ability to develop competence through the mobility inherent in their work situation. The features of the two capabilities are exemplified through quotes in the first paper of this thesis.

THE NATURE AND PROCESS OF KNOWLEDGE CYCLING: A STUDY OF LABOR MOBILITY AMONG TECHNICAL CONSULTANTS

As for the previous paper, themes were defined as the last step of the analysis. In the second paper, this step of the analysis was conducted in two primary stages. In the first stage four main themes were identified: *entering an assignment*, *building experience*, *contributing to the project* and *shifting to a new assignment*. The four themes are based on the analysis of the interview studies conducted in the first phase of the research process, as well as the interview study carried out with the participants of the IDP during the second phase of the research process. These themes are related to the different phases of a consulting assignment, and illuminate the mobility inherent in the consultants work situation.

The first theme centers on the consulting firm's ability to respond to clients' needs for particular competences and resources, and match the right resources to the needs of the clients, as well as the technical consultants' ability to analyze the problem-solving context, become a part of the project team, and identify the boundaries of the assignment. The second theme revolves around the consultants' ability to develop experience through formal competence development activities, as well as on-the-job training. The third theme concerns the consultants' ability to take initiative, identify solutions, and suggest improvements in order to add value to the project and the client organization. The final theme zeros in on the consulting firm's ability to stimulate and organize for mobility among problem-solving contexts, as well as the consultants' ability to utilize the mobility inherent in their work situation. A thematic map, similar to the one in the first paper, was developed to illustrate the connections between the themes and sub-themes.

In the second stage of the analysis, the initial data analysis was extended, and emphasis was put on identifying the knowledge processes operating in the different phases of the consulting assignment. The focus was put on knowledge processes due to the fact that Paper I sparked

our interest for further developing the notion of knowledge cycling, and investigating how the mobility among consulting assignments affects knowledge transfer within as well as among problem-solving contexts. The second stage of the analysis pointed to three knowledge processes prominent during the course of an assignment: *knowledge acquisition*, *knowledge integration* and *knowledge transfer*. The three knowledge processes form an overarching knowledge process, denoted as the *knowledge cycling process*. In order for the knowledge cycling process to be successful it is important for the consultants to acquire knowledge, participate in knowledge integration in client projects, and transfer knowledge among projects and client organizations. This process is facilitated through the scheduled rotation of technical consultants among problem-solving contexts. The characteristics of the three knowledge processes comprising the process of knowledge cycling are illustrated through quotes in the second paper.

TRAINING FOR KNOWLEDGE TRANSFER: A STUDY OF FORMAL TRAINING FOR MOBILE ENGINEERS

Based on the analysis of the interviews, observations and participant observations conducted during the IDP study, three main themes were defined in the third paper: *defining the assignment*, *defining the client* and *defining the learning outcomes*. The three themes depict the participants' experience of their transient work situation, the perceived advantages and challenges connected to this work situation, and the lessons learned during the IDP. The first theme centers on the challenges of unclear assignments and ambiguous roles. The analysis identified that the mobile engineers address and deal with these challenges by reflecting on the role of a technical consultant, defining the boundaries of the assignment, and creating a role for themselves in the project team. The second theme revolves around the challenge of the ambiguous client. The consultants found it challenging not knowing who to create value for. Nevertheless, creating value for the clients was emphasized as an important aspect of consulting work. The advantage of being a consultant is the ability to distance oneself from the task at hand, and make use of the role as an inside-outsider in order to present the client with an outside view, and thus bring new knowledge to the project and the client organization. The final theme centers on the learning outcomes of the IDP. Through participating in the IDP the mobile engineers developed a greater sense of security regarding their assignments, and became more self-confident in their roles as consultants. This enabled them to move beyond "safe zones" in their projects, take on greater responsibility, and seize opportunities for learning which broadened their knowledge-bases. As for the previous papers, a thematic map illustrating the three themes in connection to the sub-themes was generated.

The analysis resulted in a three-stage process which enables the mobile engineers to manage their mobile and the transient work situation, and thereby develops their ability to effectively transfer knowledge. The stages are repeated each time the mobile engineer enters a new assignment. The three identified stages are: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant. The three stages of the process are demonstrated through quotes in the third paper.

MY CONTRIBUTIONS TO THE PAPERS

As aforementioned, this thesis is based on the three papers appended in Part II of the thesis. The three papers were developed through joint collaboration, which implies that the collection and analysis of the empirical material, as well as the authoring of the papers was carried out with other researchers. In this section I will describe the division of work regarding each paper, with emphasis on my contributions to the papers.

PAPER I

Pantic-Dragisic, S. & Söderlund, J.: Exploring the knowledge-based advantages of the technical consulting firm: Swift transition and knowledge cycling. Working paper.

The empirical material for this paper was collected in collaboration with Jonas Söderlund. My main responsibility regarding the first draft of the paper was analyzing the interview data, as well as writing the methodological and empirical sections. Jonas Söderlund framed the paper, while we jointly discussed the analytical ideas, after which Jonas Söderlund completed the first draft of the paper. The paper was then submitted to the IRNOP conference, *The International Research Network on Organizing by Projects*, in Oslo in 2013, where I presented it. After receiving comments at the conference we worked in iterations revising the paper before submitting it to the *Academy of Management Annual Meeting*, where it was accepted. I presented the paper in Philadelphia in 2014. We again worked in iterations revising the paper based on the comments we received at the Academy of Management Annual Meeting. The paper was then presented at the pre-final seminar for this licentiate thesis, where we received additional comments, after which I took the lead in revising the paper.

PAPER II

Pantic-Dragisic, S. & Söderlund, J.: The nature and process of knowledge cycling: A study of labor mobility among technical consultants. Working paper.

The idea for this paper was developed jointly by Jonas Söderlund and me, as Paper I sparked our interest in further advancing the notion of knowledge cycling. The empirical material from Paper I was supplemented with interviews carried out with consultants who had participated in the IDP. These interviews were conducted by Elisabeth Borg and me. As for Paper I, I was responsible for analyzing the empirical material. Jonas Söderlund framed the paper, and I wrote the methodological and empirical sections, while we wrote the analytical section jointly. The paper was then revised in iterations before it was submitted to the OLKC conference, *The International Conference on Organizational Learning, Knowledge and Capabilities*, where I presented the paper in Oslo in 2014. After the conference we worked in iterations revising the paper based on the comments. The paper was then presented at my pre-final seminar, where we received a number of suggestions for improvement. After the seminar, Jonas Söderlund and I discussed the improvements to be made, which I took the lead in

implementing. I reframed the paper, and revised the methodological, empirical and analytical sections of the paper. The paper was then further revised through a number of iterations.

PAPER III

Pantic-Dragisic, S. & Borg. E.: Training for knowledge transfer: A study of formal training for mobile engineers. Submitted for publication.

The idea for this paper was developed in collaboration with Elisabeth Borg during a PhD course, *The Dynamics of Knowledge Integration*, at Linköping University, at that time Elisabeth Borg was the first author of this paper. Elisabeth Borg and I jointly collected the empirical material, as well as analyzed the empirical data. In developing the first draft of the paper Elisabeth Borg and I created a structure for the paper; Elisabeth Borg took the lead in framing the paper, while we wrote the methodological and empirical sections jointly. Following, we discussed the analytical ideas, which Elisabeth Borg took the lead in implementing. The paper was then submitted to the IRNOP conference, *The International Research Network on Organizing by Projects*, in Oslo in 2013, where it was presented by Elisabeth Borg. The same year the paper was also submitted to the NFF conference, *Nordic Academy of Management*, in Reykjavik. At this conference we presented the paper jointly. The paper was then revised in iterations based on the comments we received at the conferences. In 2014, the paper was included in Elisabeth's doctoral thesis, as well as presented at the *Academy of Management Annual Meeting* in Philadelphia, where I presented the paper. After the conference I took over the main responsibility for the paper and became the first author. I took the lead in implementing the suggestions for improvements by reframing the paper, and revising the methodological, empirical and analytical sections. It was then presented at my pre-final seminar, after which I revised the paper based on the comments and submitted it for publication in *Journal of Knowledge Management*.

ESTABLISHING TRUSTWORTHINESS IN QUALITATIVE RESEARCH

“The concept of validity in qualitative research has undergone numerous transformations to strengthen the unique contribution this scientific tradition offers to knowledge development” (Whittemore et al., 2001: 523). Initially, validity and reliability standards utilized in the positivistic research traditions were applied to qualitative research (LeCompte and Goetz, 1982). However, these standards were found to be incompatible with the underlying assumptions of qualitative research, which led to various transformations in the conceptualization of validity (Whittemore et al., 2001). Today, numerous perspectives and definitions of validity, in addition to criteria for establishing validity in qualitative research exist (Creswell, 2013). Based on previous literature, Whittemore et al. (2001) synthesize the validation criteria for qualitative research. The authors present a reconceptualization of the concept of validity and discuss four primary criteria for obtaining validity in qualitative research. In addition to the four criteria, I have chosen to include the criterion of transferability (Lincoln and Guba, 1985), in order to account for applicability of the results of this thesis. The criteria are discussed in detail below.

The first criterion for obtaining validity in qualitative research is *credibility*. Credibility refers to the match between the research results and the experiences of the participants or the studied context (Lincoln and Guba, 1985). Lincoln and Guba (1985) propose using triangulation as one technique for establishing credibility. Combining multiple qualitative methods “offers enormous potential for generating new ways of understanding the complexities and contexts of social experience” (Mason, 2006: 10). The aim of this thesis has been explored from different perspectives, and has included multiple qualitative methods, multiple data sources and multiple investigators. The descriptions of the two phases of the research process illustrate that both interviews and observations have been used to study AE. By combining interviews and observations the bias of retrospective sense-making was mitigated (Eisenhardt and Graebner, 2007). In addition, multiple data sources were utilized in both phases of the research process. In the first phase interviews were conducted with managers from different levels of the organizational hierarchy, as well as with consultants employed by AE. The second phase consisted of interviews with the IDP creators, leaders and AE consultants participating in the program. Moreover, observations were carried out during administrative meetings with IDP leaders, IDP seminars and examinations. The third type of triangulation employed in this thesis is investigator triangulation. Several researchers have argued that the use of multiple investigators enhances the credibility of the findings (Eisenhardt, 1989; Merriam, 1994). The majority of the interviews conducted in the two empirical studies were carried out jointly with either my supervisor, Jonas Söderlund, or my colleague, Elisabeth Borg. During the interviews, one of us executed the interview, while the other took notes. Moreover, follow-up questions were asked throughout the interviews to gain an in-depth understanding of the participants’ experiences and to ensure that their statements were understood correctly (Rubin and Rubin, 2012). In the second empirical study, a total of fourteen observations were conducted, whereof eight observations were carried out together with Elisabeth Borg. During these observations both Elisabeth Borg and I took thorough field notes. The second technique used to establish credibility was member checking. Lincoln and Guba (1985: 314) argue that member checking is “the most critical technique for establishing credibility.” Both phases of the research process included member checking executed through workshops with AE managers. During the two workshops the preliminary analyses and findings were presented to the participants. The objective of the workshops was to get the participants’ views on the analyses and the findings, which in turn provided input for further interpretation of the empirical material and the development of the analyses. The techniques of triangulation and member checking combined contributed to a broad understanding of AE.

The second criterion, *authenticity* is tightly coupled with the criterion of credibility. Authenticity denotes the awareness of the researcher of subtle differences in the experiences of the participants (Lincoln, 1995). In order to establish authenticity, Whittemore et al. (2001) claim that the researcher must be conscious of the influence he or she might have on the participants. To ensure authenticity during the research process I have entered the interviews and observations with an open mind, and with the objective to gain a comprehensive understanding of AE, both at the firm and the individual level, which made me observant of the differences in the participants’ experiences. In addition, to encourage the participants to be

open about their experiences, confidentiality of information and anonymity was offered to the participants. Oliver (2010) argues that anonymity frees the respondents to express their true feelings. Thus, the participants should be more willing to provide information if they are offered anonymity. As for ensuring credibility, triangulation and member checking were used as techniques to establish authenticity. Triangulation of methods, data sources and investigators contributed to a nuanced picture of the participants' experiences. Moreover, the workshops with the managers were used as technique to identify alternative interpretations within the data.

Criticality is the third criterion for obtaining validity in qualitative research (Whittemore et al., 2001). Criticality involves the portrayal of a systematic research design and a critical analysis of the research process. This methodological chapter demonstrates the use of a systematic research design and the critical assessment of every stage of the process. First, the rationale for choosing a qualitative research approach was described. In addition, the strengths of a case study design were discussed. Following, the research process, based on the two empirical studies conducted within AE, was illustrated, and the choices of data collection and sampling methods were depicted. Finally, thematic analysis was utilized to analyze the empirical material, and each stage of the analytical process was accounted for. Marshall (1990) argues that the researcher needs to be critical in his/her search for alternative interpretations within the empirical material. As abovementioned, the techniques of triangulation and member checking were used to uncover different interpretations. Moreover, I have searched for alternative explanations throughout the analytical process by rereading the transcripts from the interviews and field notes, and reviewing the codes and themes created. The data collected in the second phase of the research process was coded separately by Elisabeth Borg and me, and later merged into one coding process. This allowed alternative interpretations to emerge during the first stages of the analytical process (Kvale, 1997).

The fourth criterion is *integrity*; it refers to the critical reflection and modest presentation of the research findings. The criterion of integrity is closely linked to criticality. Whittemore et al. (2001: 531) claim that "integrity must be evidenced in the process to assure that the interpretation is valid and grounded within the data." Integrity was established through the same techniques as criticality, a systematic research design, triangulation, member checking and a critical analysis of every stage of the research process. Moreover, the analysis demonstrates how the coding process was performed and how the themes were defined, which assures that the interpretation is grounded within the empirical material. In addition, the three papers included in this thesis have all been accepted to and presented at academic conferences, and have thus been peer-reviewed. Through the peer-reviews the quality and validity of the three papers have been evaluated, which has further enhanced the integrity.

The criterion of *transferability* concerns the applicability of the findings to broader contexts (Lincoln and Guba, 1985). As the criterion of external validity has been found to be incompatible with the qualitative research approach (Whittemore et al., 2001), Lincoln and Guba (1985: 297, emphasis in original) argue that we should move "from a question of generalizability to a question of transferability. Transferability inferences cannot be made by

an investigator who knows *only* the sending context.” In line with this, Whittemore et al. (2001) claim that rather than being generalizable and objective, qualitative research is contextual and subjective. Thus, it is not the investigator’s “task to provide an *index* of transferability; it is his or her responsibility to provide a *data base* that makes transferability judgements possible on the part of potential appliers” (Lincoln and Guba, 1985: 316, emphasis in original). Descriptive data was provided in order to make transferability judgements possible (Lincoln and Guba, 1985). I have aimed at providing a thick description of the studied context, by presenting a detailed description of AE and the nature of the technical consultants’ work. Moreover, the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations have been thoroughly discussed in the latter chapters of this thesis.

CHAPTER 4

SUMMARY OF PAPERS

In this chapter, the three papers, that constitute the basis of this thesis, are summarized and their main findings are presented. The complete versions of the three papers can be found in Part II of this thesis.

PAPER I:

EXPLORING THE KNOWLEDGE-BASED ADVANTAGES OF THE TECHNICAL CONSULTING FIRM: SWIFT TRANSITION AND KNOWLEDGE CYCLING

The purpose of this paper is to enhance the understanding of the organization of engineering knowledge, by exploring the nature of the technical consulting firm. More specifically, this paper addresses the knowledge dynamics operating in the technical consulting firm, and aims at uncovering the knowledge-based advantages that this type of firm is able to achieve. This paper is based on a single-case study of one of Scandinavia's leading technical consulting firms. It spans multiple organizational levels, and consists of sixteen interviews with managers, and twenty interviews with technical consultants working for the case study firm. This paper takes its departure in the professional service firm literature, and argues that technical consulting firms remain largely unexplored despite their growing importance in a number of technology-based industries.

The study shows that the technical consulting firm has other roles to play than merely solving the problem of numerical and functional flexibility, and offers a supplementary analysis to the dominant view pertaining flexibility. The paper identifies particular knowledge-based advantages that the technical consulting firm is able to achieve. More specifically, two capabilities are identified: swift transition and knowledge cycling. Swift transition revolves around the technical consulting firm's ability to swiftly allocate consultants to client projects, and the technical consultants' ability to quickly enter new assignments in order to add value to the project and the client organization. Knowledge cycling concerns the technical consulting firm's ability to rotate its consultants among problem-solving situations, at certain points in time, to allow for the transfer of knowledge among problem-solving contexts, and the technical consultants' ability to develop competence through the mobility inherent in their work situation. The study illustrates that these two capabilities are formed through the interaction between the firm and the individual level. Furthermore, the paper argues that the interplay between the capabilities of swift transition and knowledge cycling creates the foundation for the successful organization of engineering knowledge.

PAPER II:

THE NATURE AND PROCESS OF KNOWLEDGE CYCLING: A STUDY OF LABOR MOBILITY AMONG TECHNICAL CONSULTANTS

This paper addresses the individual level in the transfer of knowledge in the context of technical consulting. The aim of this paper is to investigate how the mobility, inherent in the technical consultants' work situation, affects the transfer of knowledge within as well as among organizational contexts. This paper is based on a single-case study of one of Scandinavia's leading technical consulting firms. The study is comprised of thirty-six interviews with managers and consultants employed by the case study firm. In addition, eleven interviews were carried out with consultants who had participated in the case study firm's introductory development program for newly graduated engineers, during which the participants reflect on and discuss their work experiences. The paper's point of departure is in two streams of literature – knowledge transfer and labor mobility. The study centers on the linkages between these two streams of literature.

The study further develops the notion of knowledge cycling, identified in the preceding paper, and illustrates how labor mobility facilitates a specific kind of knowledge transfer process that is labeled the knowledge cycling process. The knowledge cycling process is comprised of three primary phases corresponding to three distinct knowledge processes: (1) knowledge acquisition, (2) knowledge integration and (3) knowledge transfer. These knowledge processes are found to be prominent during the different phases of a consulting assignment. The paper identifies that the success of knowledge cycling rests on the dual responsibility of the technical consultant and the technical consulting firm. Knowledge cycling hinges on the technical consultant's ability to understand the context, as well as acquire, integrate and transfer knowledge to new contexts. Moreover, knowledge cycling is facilitated through the scheduled rotation of technical consultants among problem-solving contexts and client organizations, and is influenced by the technical consulting firm's ability to understand the client's problem-solving context. The paper emphasizes that knowledge cycling is particularly relevant in the context of project-based work, and knowledge-intensive teamwork taking place in knowledge collectivities.

PAPER III:

TRAINING FOR KNOWLEDGE TRANSFER: A STUDY OF FORMAL TRAINING FOR MOBILE ENGINEERS

This paper is based on a single-case study of an introductory development program for newly graduated engineers in one of Scandinavia's leading technical consulting firms. The purpose of this paper is to explore how the technical consultants participating in the introductory development program (IDP) develop the ability to effectively transfer knowledge. This paper relies on eighteen interviews with creators, leaders and participants of the IDP. In addition, the empirical material consists of nine participant observations conducted during the IDP, as

well as five observations carried out during administrative meetings with IDP leaders and examinations of the IDP. The paper takes its departure in the knowledge transfer literature, and utilized the literature of liminality to illuminate the specific employment context of mobile engineers.

In order to be able to transfer knowledge effectively within and among organizational contexts, the mobile engineers must first learn how to manage their liminal work situations. The study identifies a process, consisting of three stages, which enables the mobile engineers to master their liminal work situation, and thereby develops their ability to effectively transfer knowledge. The three stages comprising the process are consecutive, and are repeated each time the mobile engineer enters a new assignment: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant. Upon entering the assignment the mobile engineers first need to define the essence of their assignment, which in turn helps them gain an understanding of the knowledge relevant for the current assignments. This broadens their scope of action and enables them to make use of their roles as inside-outsider in order to bring new knowledge to the client organization. At the final stage of the process mobile engineers are able to create learning opportunities for themselves, by for example taking on greater responsibility in the client organization, in order to broaden their knowledge-bases and acquire new knowledge which they can later transfer to other organizational contexts.

SUMMARIZING THE THREE PAPERS

Table 3 below summarizes the three papers with respect to the research questions addressed, and the data collection methods used. In addition, the table sums up the main findings of the papers.

Paper	Research question addressed	Data collection methods	Findings
Paper I	RQ1 and general aim	Sixteen interviews with managers and twenty interviews consultants.	This paper singles out knowledge cycling and swift transition as two salient capabilities within the technical consulting firm.
Paper II	RQ2 and general aim	Sixteen interviews with managers and twenty interviews consultants. In addition to eleven interviews with IDP participants.	This paper develops the process of knowledge cycling, consisting of three phases: (1) knowledge acquisition, (2) knowledge integration and (3) knowledge transfer.
Paper III	RQ3	Three interviews with IDP creators, four interviews with IDP leaders, eleven interviews with IDP participants. In addition to three observations of administrative meetings, nine participant observations of the IDP and two observations of IDP examinations.	This paper singles out a three-stage process that enables the mobile engineers to manage their liminal work situation, and thereby develops their ability to effectively transfer knowledge: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant.

Table 3: Overview of the three papers comprising the thesis

CHAPTER 5

DISCUSSION

In this chapter, the research questions are addressed and discussed based on the findings presented in the three appended papers. Prior to the discussion, the aim of this thesis and the research questions will be revisited. The general aim of this thesis is to enhance the understanding of the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations. The thesis addresses the following research questions: (1) What is the nature of the technical consulting firm?, (2) How does the nature of the technical consultants' work affect the transfer of knowledge within and among problem-solving contexts?, and (3) How does formal training affect the technical consultants' ability to transfer knowledge? This chapter depicts the nature of the technical consulting firm through the example of Advanced Engineering. The chapter begins by portraying the capabilities of swift transition and knowledge cycling, and illuminates the interplay between the respective capabilities. Following, the process of knowledge cycling is presented, which illustrates the process through which technical consultants transfer knowledge within and among problem-solving contexts. The chapter ends by depicting the process through which the technical consultants develop the ability to effectively transfer knowledge.

THE NATURE OF THE TECHNICAL CONSULTING FIRM: THE CASE OF ADVANCED ENGINEERING

As aforementioned, prior research on professional service firms has mainly focused on a narrow set of firms, which has left knowledge intensive engineering firms largely unexplored (von Nordenflycht, 2010). This thesis therefore zeroes in on the technical consulting firm. The technical consulting firm can be classified as a Neo-PSF (von Nordenflycht, 2010), characterized by knowledge intensity and low capital intensity.

The case study firm, AE, relies on an intellectually skilled workforce to produce its outputs (Alvesson, 2000; Løwendahl, 2005; Starbuck, 1992; von Nordenflycht, 2010). Thus, AE focuses on attracting talented engineers to the firm, to be able to create value for its clients (Løwendahl et al., 2001). However, the technical consulting firm has recognized that it is not solely technical skills that make an engineer a good technical consultant; the possession of social skills is equally important in order to be successful in the consulting assignments. The AE managers argue that engineers who possess both technical and social skills are more successful in handling the continual shifts among assignments and client organizations.

According to von Nordenflycht (2010), two key managerial challenges arise from knowledge intensity. The first challenge is retaining and directing skilled employees (Greenwood and Empson, 2003). AE invests in a wide range of internal learning opportunities, in order to retain its employees and create a stronger corporate culture. The consulting firm's culture

revolves around continuous learning and competence development. AE broadens its employees' learning opportunities through competence development programs, competence networks, internal courses and on-the-job training, as previously mentioned. The AE managers argue that these learning opportunities make the consultants more confident in their roles, and increase their willingness to take on more challenging assignments. In addition, the mobility among assignments, offered by AE, is important for the consultants as they "do not want to end up in the situation where a lot of regular employees end up – holding desperately on to their desks and their tasks" (AE manager). AE consultants emphasize that the mobility among problem-solving contexts is critical for the broadening of their knowledge-bases.

Authority is found to be problematic in knowledge-intensive firms, as skilled individuals have a strong preference for autonomy (Lorsch and Tierney, 2002; Teece, 2003). Thus, PSFs should focus on guiding and persuading their employees, rather than commanding them to perform certain tasks (Malhotra et al., 2006). AE directs its consultants through guidance, i.e. consultant managers guide the consultants through continuous dialog. The consultant managers work part-time as consultants in client projects, hence they can easily understand and relate to the consultants' situation. The discussions between the consultant managers and the consultants revolve around the consultants' current assignments, the shift to future assignments, and the consultants' competence development in connection to future assignments.

The second challenge refers to cases where the quality of the individual expert's output is difficult for the PSF's clients to assess (Løwendahl, 2005; von Nordenflycht, 2010). This challenge brings about the need for firms to signal quality to their clients (von Nordenflycht, 2010). AE does this by developing and maintaining a good reputation, through close interaction with its clients (Greenwood et al., 2005; Løwendahl, 2005). The AE managers argue that developing close client relationships is crucial in order to create value for their clients. Thus, AE focuses a great deal on developing an understanding of what clients need, how clients work, and what the client culture dictates. In addition, the managers emphasize that it is important to discern the problem-solving conditions set by the internal structuring of the client organization, as it aids the consulting firm in matching client needs with individual competence portfolios.

Low capital intensity indicates that a firm's production does not involve substantial amounts of nonhuman assets (von Nordenflycht, 2010). As abovementioned, AE's production requires primarily the knowledge and competence of its employees. According to von Nordenflycht (2010: 162), low capital intensity coupled with knowledge intensity creates a situation where "the firm can't control whether [the human assets] come back" to work the following day. Thus, in this situation it is vital to employ effective employee retention methods to keep the intellectually skilled workers from leaving the firm.

The characteristics presented above illustrate that AE is similar to other PSFs, such as management consulting firms and advertising agencies (von Nordenflycht, 2010). Apart from these traditional characteristics, the analysis of AE illuminates two capabilities, which create

the foundation for the successful organization of engineering knowledge. In that respect, this thesis illustrates the incompleteness of the traditional flexibility analysis, and demonstrates that the technical consulting firm has other roles to play than merely solving the problem of numerical and functional flexibility (Atkinson et al., 1984; Handy, 1989; Kalleberg, 2001). This thesis argues that one of the main explanations for the increasing importance of the technical consulting firm (Henderson, 2013; Teknikföretagen, 2011), in addition to the dominant explanations of numerical and functional flexibility, is the creation of knowledge dynamics and the acquiring of skills that are not primarily relating to specialized technical expertise, but more so to social dynamics and teamwork. The following sections present the capabilities of *swift transition* and *knowledge cycling*, identified in Paper I.

THE CAPABILITY OF SWIFT TRANSITION

Staying on the move has been singled out as critical for the success of mobile engineers employed by AE. AE has therefore been devoted to building capabilities of swiftly responding to client requirements for resources and engineering expertise by quickly moving its consultants among problem-solving contexts. However, swift transition is not only about quickly responding to client needs, and making sure that the consultants stay on the move; it is also about ensuring that the movements occur with greater precision and less friction, which requires a good understanding of the clients' technologies and problem-solving contexts. AE has developed this ability through the fostering of close client relationships (Løwendahl, 2005). The consulting firm has considerable experience from working closely with its clients. This has provided the AE managers with a greater understanding of the clients' needs for particular competences, which aids them in match the right consultants with the needs of the clients. One of the interviewed managers described the importance of this ability as follows:

“We are trying to work as close with the clients as possible, every consultant is like a piece of puzzle, if you choose the wrong piece it does not matter how hard you push it, it just will not fit. It is like that with consultants too. We want to know [the clients] well so that we can say Joe does not fit here, Jane is better for this assignment. If you know what the workplace looks like and the people they are looking for, then you can estimate where [the consultants] should work. The clients appreciate that we have an ability to recognize where people would fit, and that we are not only trying to sell a consultant.” (AE manager)

However, equally important to the effectiveness of swift transition, is the mobile engineers' ability to swiftly enter new assignments and problem-solving contexts. The mobile engineers have to possess the necessary skills to master swift transition, as they usually move into projects where there is a need to focus on rapid solutions, and to adjust quickly to the team and project requirements at large (Lindkvist, 2005; Meyerson et al., 1996). Thus, they are required to quickly get involved in the project teams and problem-solving contexts in which they enter (Borg and Söderlund, 2014). Upon entering a new assignment the mobile engineers must unravel their roles in the assignment and the project team (Barley and Kunda, 2006), both in terms of the technical as well as the social elements, meaning that they need to

untangle the nature of their technical task, as well as their social roles in the project team (Borg and Söderlund, 2014). Hence, in order to swiftly become a part of the project team, and thus be able to add value to the project, the consultants must establish themselves in their new work situation by building trust among their team members, and carving out a role for themselves in the project (Barley and Kunda, 2006; Meyerson et al., 1996). This is illustrated through the quote below:

“It is always about establishing yourself. Entering a new assignment costs a lot of energy, because you have to get to know people and earn their trust. You have to create a spot for yourself in this new firm.” (AE consultant)

Apart from swiftly entering new problem-solving contexts, the mobile engineers have to be able to successfully hand-over assignments to the project team and the client organization, before leaving the assignment (Borg and Söderlund, 2014). AE consultants develop this ability through the recurrent movement among projects and client organizations.

THE CAPABILITY OF KNOWLEDGE CYCLING

In addition to the capability of swift transition, Paper I identified another kind of capability that the technical consulting firm is accruing, the capability of knowledge cycling. The notion of knowledge cycling was further developed in Paper II.

The concept of cycling is taken from biology (Brown and Nathwani, 2005: 6), where it refers to “the scheduled rotation of one class of antibiotics with one or more different classes exhibiting comparable spectra of activity.” Applied to an organizational context, knowledge cycling entails the scheduled rotation of individuals among organizational contexts to allow for the transfer of knowledge. The typical consulting assignment lasts between one and two years, however several AE managers argue that consultants should stay shorter on their assignments in order to be able to develop new skills, while others argue that the assignments should last longer in order for the consultants to mature in their roles. The effectiveness of knowledge cycling rests on the balance between rotating the consultants among problem-solving contexts in order for them to stay current, and allowing them to stay long enough in one assignment to be able to add value to the new problem-solving context and develop their knowledge further. Thus, it can be argued that the technical consulting firm functions as an organization that better transfers and distributes knowledge among organizational contexts (Kogut and Zander, 1992):

“We can look at it as follows, Sweden benefits from the technical consulting market as we enable the mobility of knowledge among various industries; this is how we create innovations. A labor market in which people do not move between industries does not have the same dynamics. The work we do is good for the Swedish industrial development.” (AE manager)

As for swift transition, the competences of the mobile engineers are crucial for the success of knowledge cycling, as it is the mobile engineers who transfer knowledge among various organizational contexts:

“It is the consultants who transfer knowledge between different client firms. If we have consultants who have worked for [one client firm], then for [another client firm], and then they move to [a third client firm], then they bring with them solutions and different perspectives, which a client firm is not able to acquire on its own.” (AE manager)

In order for knowledge cycling to be effective, the mobile engineers must be able to apply the knowledge acquired in prior problem-solving contexts to the current assignment (Allen, 1977). In addition, the mobile engineers must be able to learn from the current assignment, and acquire new knowledge which can be transferred to future assignments (Borg and Söderlund, 2015; Song et al., 2003).

THE INTERPLAY BETWEEN SWIFT TRANSITION AND KNOWLEDGE CYCLING

The capabilities of swift transition and knowledge cycling are tightly coupled, as will be illustrated further in the coming sections. This thesis argues that the link between the two capabilities creates the foundation for the successful organization of engineering knowledge. Paper I illustrates that it is difficult to achieve knowledge cycling without the capability of swift transition. In order for knowledge cycling to be successful, AE must be able to understand the clients' needs for particular resources and engineering expertise, swiftly move resources among problem-solving contexts to respond to the clients' requirements, and match the right consultants to the needs of the clients. This ability is developed through close client collaboration (Løwendahl, 2005). The same applies for the individual level; the consultants must be able to move swiftly from one context to another, quickly get involved in the project teams in which they enter, and become part of the problem-solving situation (Barley and Kunda, 2006; Borg and Söderlund, 2014), in order for knowledge cycling to be effective.

Based on the discussion above it is evident that the capabilities of swift transition and knowledge cycling transcend organizational levels, thus this thesis claims that the two capabilities are formed through the interaction between the firm and the individual level (Felin and Foss, 2005). This observation is perhaps not surprising given that AE relies on the knowledge of its consultants to produce its outputs (Løwendahl, 2005; von Nordenflycht, 2010). Table 4 summarizes the discussion on the content of the respective capabilities, and illustrates their underlying activities, with respect to both the organizational and individual level.

	Swift transition capability	Knowledge cycling capability
Organization-level activities	Understanding client needs for particular competences and resources. Swiftly moving resources among problem-solving contexts to respond to client needs, and match available resources with client needs. Regularly reviewing opportunities for moving out resources from ongoing assignments, and evaluating the added value in current assignments. Creating plans for future assignments, and matching development needs with future assignments.	Transferring learning and knowledge among problem-solving contexts. Staffing client teams with the right resources based on prior performance and experience. Detecting possibilities to transfer lessons learned among problem-solving contexts. Developing policies for scheduled rotation that gives enough time to understand the actual problem situation, however, which is short enough to stay tuned and able to engage in knowledge-transfer activities.
Individual-level activities	Quickly entering new problem-solving situations and project teams. Developing the ability to swiftly create trust. Successfully handing-over assignments to clients and other project team members. Creating plans for future assignments that match the competence development needs with challenging assignments.	Learning from one problem-solving situation, and transferring the lessons learned to another. Understanding what is relevant to transfer and what is not relevant to transfer. Understanding how and when to transfer such knowledge. Combining the transfer with observations of what works and what is not working, and building higher-order principles of how to transfer knowledge among problem-solving situations.

Table 4: The capabilities of swift transition and knowledge cycling

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THE KNOWLEDGE CYCLING PROCESS

In addition to advancing the notion of knowledge cycling, Paper II develops the *knowledge cycling process*. The knowledge cycling process consists of three phases which correspond to three distinct knowledge processes found prominent during the different phases of a consulting assignment: (1) knowledge acquisition, (2) knowledge integration, and (3) knowledge transfer.

The first phase of the knowledge cycling process, *knowledge acquisition*, builds on the capability of swift transition identified in Paper I. Fenwick (2008: 231) defines individual

knowledge acquisition as “an individual human process of consuming and storing new concepts and skills/behaviors, frequently in terms of translating learning to capabilities.” Paper II indicates that the successful acquisition of knowledge rests on the mobile engineers’ ability to swiftly enter new assignments, analyze the problem-solving context, establish trust, and create a role for themselves in the project team (Barley and Kunda, 2006; Borg and Söderlund, 2014; Meyerson et al., 1996). In addition, the mobile engineers must also acquire knowledge about the technical domain which they will be working on (Borg and Söderlund, 2014). The mobile engineers acquire knowledge about the domain by identifying knowledgeable colleagues who can guide them in their work. This phase is facilitated through AE’s ability of swiftly responding to client needs for engineering expertise, and matching the needs of the client with individual competence portfolios.

The second phase, *knowledge integration*, revolves around the mobile engineers’ ability to share and apply knowledge acquired in other projects and client organizations, in order to solve a particular problem in the current project (Allen, 1977; Argote and Ingram, 2000). Okhuysen and Eisenhardt (2002: 371) argue that “the knowledge integration process involves the actions of group members by which they share their individual knowledge within the group and combine it to create new knowledge.” The mobile engineers learn and develop their competences through participating in the knowledge integration process at client site (Hicks et al., 2009). Moreover, the mobile engineers’ competence development is further enhanced through formal training provided by AE. The on-the-job training coupled with formal training make the mobile engineers more competent in drawing on their experiences from prior problem-solving contexts (Borg and Söderlund, 2015). In line with this, Paper III illustrates that formal training positively affects the mobile engineers’ ability to transfer knowledge. In addition, the mobile engineers argue that they become more confident in their competences through on-the-job training as well as formal training, leading them to take on more challenging tasks that might lie outside their assignment specification in order to accelerate their own development, and contribute to the project and the client organization.

The last phase, *knowledge transfer*, relates to the transfer of knowledge to new projects and client organizations. Previous research has indicated that labor mobility enhances inter-firm knowledge transfer (Almeida and Kogut, 1999; Rosenkopf and Almeida, 2003; Song et al., 2003). In line with this, Argote and Ingram (2000) argue that individuals can effectively transfer knowledge among organizations, by applying their knowledge to new contexts. In order to effectively transfer knowledge among problem-solving contexts, the mobile engineers must be able to transfer relevant knowledge to the new context, as well as seize learning opportunities in order to acquire new knowledge which can be transferred to future assignments (Borg and Söderlund, 2015). The mobile engineers are encouraged to reflect on their work situation, which according to Paper III enables them to more easily identify the knowledge relevant for their current assignments. AE facilitates the transfer of knowledge among projects and client organizations by organizing for mobility. This phase requires AE to deliberately search for clients who might provide fertile soil for the consultants to learn and develop their competences. AE managers stress the importance of mobility in keeping the consultants’ competences current, and argue that broad competences are central for the

consultants' employability. The AE managers emphasize that the continuous discussions between the consultant, consultant manager and the client facilitate the transfer of consultants to new assignments. The findings presented above can be summarized through the five following propositions:

Proposition 1: Knowledge cycling rests on the ability of the individual to acquire, integrate and transfer knowledge to new contexts.

Proposition 2: The individual's ability to cycle knowledge is developed through the recurring process of acquiring, integrating and transferring knowledge to new contexts.

Proposition 3: Knowledge cycling is influenced by the individual's ability to understand the new context.

Proposition 4: Knowledge cycling is facilitated through the scheduled rotation of individuals among problem-solving contexts and client organizations.

Proposition 5: Knowledge cycling is influenced by the organization's ability to understand the client's problem-solving context.

Table 5 illustrates the knowledge cycling process, and its underlying activities for the individual consultant as well as the consulting firm. Moreover, the table illustrates that the context and the individual are key elements in the knowledge cycling process.

Phases	Individual	Organization
Knowledge acquisition	<i>Context:</i> Analyzing the problem-solving context Obtaining knowledge about the technological domain <i>Individual:</i> Becoming a part of the problem-solving situation	<i>Context:</i> Swiftly responding to client needs <i>Individual:</i> Matching client needs with available resources
Knowledge integration	<i>Context:</i> Sharing and applying knowledge obtained in other problem-solving contexts <i>Individual:</i> Broadening the knowledge-bases	<i>Context:</i> Establishing long-term relationships with client organizations <i>Individual:</i> Facilitating on-the-job training Providing formal training for consultants
Knowledge transfer	<i>Context:</i> Transferring knowledge to new organizational contexts <i>Individual:</i> Reflecting on lessons learned from previous projects Searching for new learning opportunities	<i>Context:</i> Identifying client organizations that provide fertile soil for growth <i>Individual:</i> Switching resources for learning purposes

Table 5: The knowledge cycling process: the three primary phases

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DEVELOPING THE ABILITY TO TRANSFER KNOWLEDGE

Paper III illustrates how the IDP affects the mobile engineers' ability to transfer knowledge. The general aim of the IDP is to develop the mobile engineers' professional expertise. The creators depict professional expertise as the understanding of both the technical and social elements of work. As touched upon earlier, liminality is an inherent feature of a consultant's work (Tansley and Tietze, 2013). Hence, the mobile engineers' work situation, in itself, constitutes a liminal position at work. Previous studies have indicated that the consultants' liminal status enables them to transfer knowledge to and among client organizations (Handley et al., 2007; McKenna, 2006). However, Borg and Söderlund (2015) claim that the mobile engineers must first learn to master their mobile and transient work situations, before they can reap the positive effects of liminality, and be able to transfer knowledge effectively.

The analysis of the IDP demonstrates that by bringing together consultants who work in different projects and for different client organizations, the IDP provides the participants with access to novel information. The IDP seminars provided an open atmosphere built on trust where the mobile engineers were not afraid to share their personal experiences freely, which affected knowledge transfer positively (Foos et al., 2006; Levin and Cross, 2004). Throughout the IDP, the participants' liminal work positions (Czarniawska and Mazza, 2003; Tansley and

Tietze, 2013) were emphasized, through discussions revolving around the ambiguities present in consulting work. In order to untangle these ambiguities, the mobile engineers made use of reflection. The mobile engineers reflected on their work experiences during the program, by reading a number of texts, writing their own reflections about the challenges present in their assignments, and engaging in discussions with the other participants. During these discussions the mobile engineers transferred explicit knowledge on organizational practices and processes (Nonaka, 1994; Nonaka and Takeuchi, 1995). Moreover, the participants' tacit knowledge was in part transferred through the process of reflecting on the challenges encountered in their assignments, and sharing work experiences (Goh, 2002; Werr and Stjernberg, 2003). The IDP allowed the participants to cognitively take a step back to survey the liminal dimension of their work, which enabled them to distance themselves from the challenges in their assignments and gain new perspectives on their work.

Based on the analysis of the IDP, Paper III identifies a process which enables the mobile engineers to manage their liminal work situation, and thereby develops their ability to effectively transfer knowledge. The process consists of three consecutive stages: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant. These stages are repeated each time the mobile engineer enters a new assignment.

The first stage, *identifying the core of an assignment*, relates to defining the tasks that lie at the core of the mobile engineers' assignments. As touched upon earlier, the participants reflected on and discussed the ambiguities inherent in their work situation, throughout the IDP. In line with the findings from Paper I and II, the discussions emphasized the need of untangling both the technical and the social elements of the consulting assignment (Borg and Söderlund, 2014). To address these ambiguities the mobile engineers reflected on their role as technical consultants, and discussed the importance of establishing trust, asking the right questions to define the boundaries of their assignment, and creating a role for themselves in the project team (Barley and Kunda, 2006; Borg and Söderlund, 2014). The discussions aided the participants in identifying the tasks that lie at the core of their assignments. Defining the core of the assignment is an important prerequisite for knowledge transfer, as it provides the mobile engineers with an understanding of the skills and knowledge relevant for the current assignment.

The second stage, *broadening the scope of action*, concerns the mobile engineers' roles as inside-outsiders. During the IDP the participants discussed how an outside view and a distance from the task at hand enables them to identify alternative solutions to the problems that they encounter in their projects. In relation to the results from Paper I and II, the participants argued that they can more easily distance themselves from the task at hand than the engineers employed by the client organization, as they frequently move among problem-solving contexts. Thus, distancing oneself from the task at hand, the assignment and the project, arises as an important aspect of consulting work, as illustrated by the discussion below:

Consultant 1: We create value for the clients by shifting among assignments, because it gives us the opportunity to see different angles. I think that that is a healthy turnover.

Consultant 2: But one has to stay long enough to be able to understand and contribute to the project. It takes a while to get started when you enter a new project.

Consultant 3: What do you mean by turnover?

Consultant 1: If you get a new assignment, then you will get new perspectives on things.

Consultant 4: It is also important to get new tasks within the same assignment; this can also give you new perspectives. (Excerpt from field notes)

The mobile engineers' ability of using their roles as inside-outsiders is important for knowledge transfer, as it enables the mobile engineers to bring new knowledge to their assignments, project and client organizations (Allen, 1977; Argote and Ingram, 2000; Borg and Söderlund, 2015), as also discussed in Paper II.

The final stage, *becoming more self-confident in the role of consultant*, revolves around the mobile engineer's ability to move beyond the "safe-zones" in their projects. During the follow-up interviews the mobile engineers stressed that the IDP made them feel more relaxed and secure in their roles, and taught them how to step outside their "safe-zones" to challenge themselves, and take on greater responsibility in the project and the client organization. The mobile engineers argue that this ability enables them to acquire new knowledge through challenging tasks. Hence, the increased self-confidence allows the mobile engineers to seize learning opportunities (Tempest and Starkey, 2004), and "acquire new knowledge to build on the existing repertoire" (Borg and Söderlund, 2015: 11). The importance of seizing learning opportunities is also emphasized in Paper II.

The three stages discussed above facilitate the mobile engineers in taking advantage of their liminal work situation, and thus enables them to perceive their work as knowledge transfer (Borg and Söderlund, 2015). Table 6 illuminates the three stages of the process, and their underlying activities.

Stages	Activities
Stage 1: Identifying the core of an assignment	Reflecting on the context and the role of an engineering consultant Asking questions in order to identify the core of the assignment Creating a role for oneself in the project
Stage 2: Broadening the scope of action	Distancing oneself from the task at hand Using the role as inside-outsiders Taking initiative to perform task outside the scope of the assignment
Stage 3: Becoming more self-confident in the role of consultant	Moving beyond “safe zones” in the project Taking on greater responsibility in the client organization Seizing opportunities for learning

Table 6: The process of developing the ability to transfer knowledge effectively

The discussion above illustrates that the mobile engineers develop the ability to swiftly enter new organizational contexts, in addition to the ability to cycle knowledge among problem-solving contexts through the IDP, by learning to master their liminal positions at work. During the IDP the participants reflect on their current problem-solving contexts and their roles as technical consultants, which enables them to define the core of their assignments and create a role for themselves in the project team (Borg and Söderlund, 2014). Moreover, by distancing themselves from the task at hand, and making use of their roles as inside-outsiders the mobile engineers can transfer knowledge obtained in other problem-solving contexts to their assignments, projects and client organizations (Argote and Ingram, 2000). Finally, the IDP develops the mobile engineers in becoming more confident in their roles, which allows them to seize learning opportunities to broaden their knowledge-bases and acquire new knowledge (Borg and Söderlund, 2015), which they can transfer to future problem-solving contexts.

CHAPTER 6

CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This thesis addresses a largely unexplored industrial actor which has become increasingly important in a number of technology-based industries, namely the technical consulting firm (Berggren et al., 2011; Teknikföretagen, 2013; von Nordenflycht, 2010). The aim of this thesis is to enhance the understanding of the roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts and client organizations, through a single-case study of one of Scandinavia's leading technical consulting firms.

The findings of this thesis demonstrate that the technical consulting firm has other roles to play than merely solving the problem of numerical and functional flexibility (Atkinson et al., 1984; Handy, 1989; Kalleberg, 2001). The roles of the technical consulting firm and the technical consultants for the transfer of knowledge among problem-solving contexts are illuminated through the capabilities of swift transition and knowledge cycling, as well as through the knowledge cycling process. Swift transition centers on the technical consulting firm's ability of swiftly responding to clients' needs by allocating the right consultants to the clients' projects, and the technical consultants' ability of swiftly entering new assignments in order to add value to the project and the client organization. Knowledge cycling revolves around technical consulting firm's ability of rotating the consultants among problem-solving contexts, at certain points in time, to allow for the transfer of knowledge, and the technical consultants' ability to apply lessons learned to new problem-solving contexts, and develop competence through the mobility inherent in their work situation. In addition to the two capabilities, this thesis develops the process of knowledge cycling, consisting of three phases which correspond to three distinct knowledge processes found prominent during the different phases of a consulting assignment: (1) knowledge acquisition, (2) knowledge integration, and (3) knowledge transfer. Furthermore, the results of this thesis suggest that the ability of swiftly entering new organizational contexts and effectively transferring knowledge both within and among organizational contexts can be developed through formal training. The thesis identifies a process through which these abilities can be developed. The process consists of three consecutive stages: (1) identifying the core of an assignment, (2) broadening the scope of action, and (3) becoming more self-confident in the role of consultant.

The results of this thesis indicate that in order to enable knowledge transfer, the technical consulting firm must be able to organize for the transfer of knowledge among client organizations (Malhotra, 2003). In addition, the technical consulting firm must facilitate the development of individual capabilities to take part in the knowledge integration processes in client organizations (Söderlund and Bredin, 2011), as the success of knowledge transfer in the context of technical consulting to a great extent rests on the competences of the technical consultants (Borg and Söderlund, 2015). In line with this, the findings have demonstrated that the interaction between the firm and the individual level is critical for the formation of the

capabilities of swift transition and knowledge cycling (Felin and Foss, 2005). Moreover, this thesis has illustrated that the respective capabilities are tightly coupled, as it is difficult to achieve knowledge cycling without the capability of swift transition. This applies both to the firm and the individual level. This thesis argues that the link between the two capabilities creates the foundation for the successful organization of engineering knowledge.

This thesis has made four contributions. First, this thesis has contributed to the understanding of nonstandard work arrangements by focusing on two actors in the triangular work arrangement (Cappelli and Keller, 2013), namely the technical consulting firm and the technical consultants. Second, it has contributed to the literature on professional service firms by offering valuable insights into the nature and the capabilities of the technical consulting firm, and enhancing the understanding of the heterogeneity across professional service firms (Løwendahl, 2005; Malhotra and Morris, 2009). Third, the findings of this thesis contribute to the stream of literature concerning knowledge transfer in client-consultant relationships, which has predominantly focused on knowledge transfer from consultants to clients in management consulting firms (Handley et al., 2007; Werr, 2002), by focusing on knowledge transfer in the context of technical consulting. Finally, this thesis contributes to the literature on knowledge transfer by enhancing the understanding of how formal training affects the technical consultants' ability to transfer knowledge.

FUTURE RESEARCH

This thesis has made several contributions, as depicted above, however it has also opened up new avenues for future research. Below, some suggestions for future research will be given.

The first avenue for future research would be to improve the understanding of knowledge cycling. This thesis has illustrated that knowledge cycling is to a great extent an individual phenomenon, dependent on factors operating on higher levels of analysis. Future research should thus center on gaining greater insight into the factors that facilitate the knowledge cycling process at different levels of analysis, by for example studying team qualities, project dynamics and organizational culture. Moreover, future research should focus on the characteristics of individuals involved in the knowledge cycling process, by studying individual competence, knowledge sharing behavior, knowledge hiding behavior and analytical reasoning. Furthermore, in order to enhance the understanding of the qualities of knowledge cycling, it would be interesting to investigate the type of knowledge being cycled. Such a study could possibly also indicate whether certain types of knowledge lead to larger effects in the client organizations.

The second avenue for future research would be to focus on the third actor in the triangular work arrangement (Cappelli and Keller, 2013), namely the client. This thesis has focused on the technical consulting firm and the technical consultants, however in order to gain a holistic picture of this nonstandard work arrangement, it is important for future research to focus on the client organization. The issue of how client organizations decide which arrangements to use has received limited scholarly attention, and could thus be one direction for future

research. The few studies that have studied this issue indicate that there are different rationales driving the use of nonstandard work arrangements (Houseman, 2001; Kalleberg et al., 2003). Hence, it is important for future research to investigate the practices used by client organizations when hiring technical consultants. Another suggestion for future research would be to investigate the advantages of hiring technical consultants who can master their liminal work positions. In connection to this, it would also be interesting to study how technical consultants are utilized in the client projects, and whether the client organizations have practices to absorb the knowledge that the consultants bring with them.

The third avenue for future research would be to conduct a comparative-case study of a number of technical consulting firms. Based on a single-case study of a technical consulting firm, this thesis has identified two primary capabilities: knowledge cycling and swift transition. In order to validate these findings, a suggestion for future research would be to compare the results of this thesis across different kinds of technical consulting firms. Such a study would follow a multiple-case study design (Eisenhardt, 1989; Yin, 2009), and focus on variables such as: size, strategic orientation, organizational culture, knowledge-bases, individual skills, competence development and client collaboration. The findings of this type of study could perhaps reveal patterns in terms of the development of such capabilities. In addition, such a study could uncover the investments made in developing capabilities both at the firm and the individual level, as the findings of this thesis indicate that organizational capabilities in the technical consulting firm are developed through a dynamic interaction between the firm and the individual level.

REFERENCES

- Allen, T.J. (1977). *Managing the flow of technology*. Cambridge, MA: MIT Press.
- Almeida, P. and Kogut, B. (1999). Localization of knowledge and the mobility of engineers in regional networks. *Management Science* 45 (7): 905-917.
- Alvesson, M. (2000). Social identity and the problem of loyalty in knowledge-intensive companies. *Journal of Management Studies* 37 (8): 1101-1124.
- Alvesson, M. (2011). *Intervjuer - genomförande, tolkning och reflexivitet*. Malmö: Liber.
- Alvesson, M. and Kärreman, D. (2006). Professional service firms as collectivities: As cultural and processual view. *Research in the Sociology of Organizations* 24 203-230.
- Ambrosini, V. and Bowman, C. (2001). Tacit knowledge: Some suggestions for operationalization. *Journal of Management Studies* 38 (6): 811-829.
- Andrews, K.M. and Delahaye, B.L. (2000). Influences on knowledge processes in organizational learning: The psychosocial filter. *Journal of Management Studies* 37 (6): 797-810.
- Argote, L. (1999). *Organizational learning: Creating, retaining and transferring knowledge*. New York: Springer.
- Argote, L. and Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes* 82 (1): 150-169.
- Argote, L., Ingram, P., Levine, J.M., et al. (2000). Knowledge transfer in organizations: Learning from the experience of others. *Organizational Behavior and Human Decision Processes* 82 (1): 1-8.
- Argote, L., McEvily, B. and Reagans, R. (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science* 49 (4): 571-582.
- Ashford, S.J., George, E. and Blatt, R. (2007). Old assumptions, new work: The opportunities and challenges of research on nonstandard employment. *The Academy of Management Annals* 1 (1): 65-117.
- Atkinson, J., O'Doherty, D. and Marlow, S. (1984). Manpower strategies for flexible organisations. *Personnel Management* 16 28-31.
- Barker, K. and Christensen, K.E. (1998). Controversy and challenges raised by contingent work arrangements. In: Barker K and Christensen K (eds) *Contingent work: American employment in transition*. Ithaca, N.Y: ILR Press, 1-20.
- Barley, S.R. and Kunda, G. (2001). Bringing work back in. *Organization Science* 12 (1): 76-95.
- Barley, S.R. and Kunda, G. (2006). Contracting: A new form of professional practice. *Academy of Management Perspectives* 20 (1): 45-66.
- Berggren, C., Bergek, A., Bengtsson, L., et al. (2011). *Knowledge integration & innovation: Critical challenges facing international technology-based firm*. Oxford: Oxford University Press.
- Berry, D.C. and Broadbent, D.E. (1987). The combination of explicit and implicit learning processes in task control. *Psychological Research* 49 (1): 7-15.
- Berthoin Antal, A. and Krebsbach-Gnath, C. (2001). Consultants as agents of organizational learning—the importance of marginality. In: Dierkes M, Berthoin Antal A, Child J, et al. (eds) *Handbook of organizational learning and knowledge*. New York: Oxford University Press.
- Bessant, J. and Rush, H. (1995). Building bridges for innovation: The role of consultants in technology transfer. *Research Policy* 24 (1): 97-114.

- Borg, E. (2014). Liminality at work: Mobile project workers in-between. *Department of management and engineering*. Linköping: Linköping University.
- Borg, E. and Söderlund, J. (2014). Moving in, moving on: Liminality practices in project-based work. *Employee Relations* 36 (2): 182-197.
- Borg, E. and Söderlund, J. (2015). Liminality competence: An interpretative study of mobile project workers' conception of liminality at work. *Management Learning* In Press 1-20.
- Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology* 3 (2): 77-101.
- Bredin, K. and Söderlund, J. (2011). *Human resource management in project-based organizations - the hr quadriad framework*. Basingstoke: Palgrave Macmillan.
- Brown, E.M. and Nathwani, D. (2005). Antibiotic cycling or rotation: A systematic review of the evidence of efficacy. *Journal of Antimicrobial Chemotherapy* 55 (1): 6-9.
- Brown, J.S. and Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science* 2 (1): 40-57.
- Brusoni, S., Prencipe, A. and Pavitt, K. (2001). Knowledge specialization, organizational coupling, and the boundaries of the firm: Why do firms know more than they make? *Administrative Science Quarterly* 46 (4): 597-621.
- Cabrera, E.F. and Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *The International Journal of Human Resource Management* 16 (5): 720-735.
- Cacciatori, E., Tamoschus, D. and Grabher, G. (2012). Knowledge transfer across projects: Codification in creative, high-tech and engineering industries. *Management Learning* 43 (3): 309-331.
- Campbell, B.A., Coff, R. and Kryscynski, D. (2012a). Rethinking sustained competitive advantage from human capital. *Academy of Management Review* 37 (3): 376-395.
- Campbell, B.A., Ganco, M., Franco, A.M., et al. (2012b). Who leaves, where to, and why worry? Employee mobility, entrepreneurship and effects on source firm performance. *Strategic Management Journal* 33 (1): 65-87.
- Cappelli, P. (1999). *The new deal at work: Managing the market-driven workforce*. Boston: Harvard Business Press.
- Cappelli, P., Bassi, L., Katz, H., et al. (1997). *Change at work*. New York: Oxford University Press.
- Cappelli, P. and Keller, J.R. (2013). Classifying work in the new economy. *Academy of Management Review* 38 (4): 575-596.
- Carley, K. (1991). A theory of group stability. *American Sociological Review* 56 331-354.
- Clark, T.A. and Salaman, G. (1996). The use of metaphor in the client-consultant relationship: A study of management consultants. In: Oswick J and Grant D (eds) *Organizational development: Metaphorical explorations*. London: Pitman Publishing, 154-176.
- Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly* 128-152.
- Cooper, D.J., Hinings, B., Greenwood, R., et al. (1996). Sedimentation and transformation in organizational change: The case of canadian law firms. *Organization Studies* 17 (4): 623-647.
- Corbin, J. and Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage Publications, Inc.
- Corredoira, R.A. and Rosenkopf, L. (2010). Should auld acquaintance be forgot? The reverse transfer of knowledge through mobility ties. *Strategic Management Journal* 31 (2): 159-181.

- Creplet, F., Dupouet, O., Kern, F., et al. (2001). Consultants and experts in management consulting firms. *Research Policy* 30 (9): 1517-1535.
- Creswell, J.W. (1994). *Research design: Qualitative & quantitative approaches*. Thousand Oaks: Sage Publications, Inc.
- Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks: Sage Publications, Inc.
- Creswell, J.W. (2009). *Research design: Qualitative and quantitative approaches*. Thousand Oaks: Sage Publications, Inc.
- Creswell, J.W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks: Sage Publications, Inc.
- Criscuolo, P., Salter, A. and Sheehan, T. (2007). Making knowledge visible: Using expert yellow pages to map capabilities in professional services firms. *Research Policy* 36 (10): 1603-1619.
- Czarniawska, B. and Mazza, C. (2003). Consulting as a liminal space. *Human Relations* 56 (3): 267-290.
- Darr, E.D., Argote, L. and Eppler, D. (1995). The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises. *Management Science* 41 (11): 1750-1762.
- Davenport, T.H. and Prusak, L. (1998). *Working knowledge – how organizations manage what they know*. Boston: Harvard Business School Press.
- Davenport, T.H. and Prusak, L. (2005). Knowledge management in consulting. In: Greiner L and Ploufelf F (eds) *The contemporary consultant*. Mason, OH: Thomson, 305-326.
- Davis-Blake, A. and Uzzi, B. (1993). Determinants of employment externalization: A study of temporary workers and independent contractors. *Administrative Science Quarterly* 195-223.
- Denscombe, M. (2010). *The good research guide: For small-scale social research projects*. Maidenhead: Open University Press.
- Denzin, N.K. and Lincoln, Y.S. (2011). *The sage handbook of qualitative research*. Thousand Oaks: Sage Publications, Inc.
- DeWalt, K.M. and DeWalt, B.R. (2010). *Participant observation: A guide for fieldworkers*. Plymouth: Altamira Press.
- DiCicco-Bloom, B. and Crabtree, B.F. (2006). The qualitative research interview. *Medical Education* 40 (4): 314-321.
- Dirks, K.T. and Ferrin, D.L. (2001). The role of trust in organizational settings. *Organization Science* 12 (4): 450-467.
- Dokko, G. and Rosenkopf, L. (2010). Social capital for hire? Mobility of technical professionals and firm influence in wireless standards committees. *Organization Science* 21 (3): 677-695.
- Dubois, A. and Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research* 55 (7): 553-560.
- Eisenhardt, K.M. (1989). Building theories from case study research. *The Academy of Management Review* 14 (4): 532-550.
- Eisenhardt, K.M. and Graebner, M.E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal* 50 (1): 25-32.
- Ekstedt, E. (2009). A new division of labour the "projectification" of working and industrial life. In: Moreau M (ed) *Building anticipation of restructuring in europe*. Bruxelles: Peter Lang, 31-54.
- Ellis, N. and Ybema, S. (2010). Marketing identities: Shifting circles of identification in inter-organizational relationships. *Organization Studies* 31 (3): 279-305.

- Empson, L. (2001a). Fear of exploitation and fear of contamination: Impediments to knowledge transfer in mergers between professional service firms. *Human Relations* 54 (7): 839-862.
- Empson, L. (2001b). Introduction: Knowledge management in professional service firms. *Human Relations* 54 (7): 811-817.
- Felin, T. and Foss, N.J. (2005). Strategic organization: A field in search of micro-foundations. *Strategic Organization* 3 (4): 441.
- Fenwick, T. (2008). Understanding relations of individual—collective learning in work: A review of research. *Management Learning* 39 (3): 227-243.
- Flick, U. (2014). *An introduction to qualitative research*. Thousand Oaks: Sage Publications, Inc.
- Flyvbjerg, B. (2011). Case study. In: Denzin NK and Lincoln YS (eds) *The sage handbook of qualitative research*. 4th ed. Thousand Oaks: Sage Publications, Inc, 301-316.
- Foos, T., Schum, G. and Rothenberg, S. (2006). Tacit knowledge transfer and the knowledge disconnect. *Journal of Knowledge Management* 10 (1): 6-18.
- Foss, N.J., Husted, K. and Michailova, S. (2010). Governing knowledge sharing in organizations: Levels of analysis, governance mechanisms, and research directions. *Journal of Management Studies* 47 (3): 455-482.
- Galbraith, C.S. (1990). Transferring core manufacturing technologies in high-technology firms. *California Management Review* 32 (4): 56-70.
- Gambardella, A. and Torrisi, S. (1998). Does technological convergence imply convergence in markets? Evidence from the electronics industry. *Research Policy* 27 (5): 445-463.
- Garsten, C. (1999). Betwixt and between: Temporary employees as liminal subjects in flexible organizations. *Organization Studies* 20 (4): 601-617.
- Gioia, D.A. and Pitre, E. (1990). Multiparadigm perspectives on theory building. *Academy of Management Review* 15 (4): 584-602.
- Goh, S.C. (2002). Managing effective knowledge transfer: An integrative framework and some practice implications. *Journal of Knowledge Management* 6 (1): 23-30.
- Grant, A.M. and Parker, S.K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *The Academy of Management Annals* 3 (1): 317-375.
- Greenwood, R. and Empson, L. (2003). The professional partnership: Relic or exemplary form of governance? *Organization Studies* 24 (6): 909-933.
- Greenwood, R., Hinings, C.R. and Brown, J. (1990). "P2-form" strategic management: Corporate practices in professional partnerships. *Academy of Management Journal* 33 (4): 725-755.
- Greenwood, R., Li, S.X., Prakash, R., et al. (2005). Reputation, diversification, and organizational explanations of performance in professional service firms. *Organization Science* 16 (6): 661-673.
- Guechtouli, W., Rouchier, J. and Orillard, M. (2013). Structuring knowledge transfer from experts to newcomers. *Journal of Knowledge Management* 17 (1): 47-68.
- Guest, G., MacQueen, K.M. and Namey, E.E. (2012). *Applied thematic analysis*. Thousand Oaks: Sage Publications, Inc.
- Guest, G., Namey, E.E. and Mitchell, M.L. (2013). *Collecting qualitative data: A field manual for applied research*. Thousand Oaks: Sage Publications, Inc.
- Gupta, A.K. and Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal* 21 (4): 473-496.
- Haas, M.R. and Hansen, M.T. (2007). Different knowledge, different benefits: Toward a productivity perspective on knowledge sharing in organizations. *Strategic Management Journal* 28 (11): 1133-1153.

- Handley, K., Clark, T., Fincham, R., et al. (2007). Researching situated learning participation, identity and practices in client—consultant relationships. *Management Learning* 38 (2): 173-191.
- Handy, C. (1989). *The age of unreason*. Boston: Harvard Business Review Press.
- Hansen, M.T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly* 44 (1): 82-111.
- Hansen, M.T., Nohria, N. and Tierney, T. (1999). What's your strategy for managing knowledge? *Harvard Business Review* (March-April): 1-11.
- Hargadon, A. and Sutton, R.I. (1997). Technology brokering and innovation in a product development firm. *Administrative Science Quarterly* 716-749.
- Henderson, R. (2013). Industry employment and output projections to 2022. In: Bureau of Labor Statistics USDoL (ed). Washington, D.C., USA.
- Hicks, J., Nair, P. and Wilderom, C.P. (2009). What if we shifted the basis of consulting from knowledge to knowing? *Management Learning* 40 (3): 289-310.
- Hinings, C.B. and Leblebici, H. (2003). Editorial introduction to the special issue: Knowledge and professional organizations. *Organization Studies* 24 (6): 827-830.
- Hislop, D. (2009). *Knowledge management in organizations: A critical introduction*. Oxford: Oxford University Press.
- Hobday, M. (2000). The project-based organisation: An ideal form for managing complex products and systems? *Research Policy* 29 (7-8): 871-893.
- Houseman, S.N. (2001). Why employers use flexible staffing arrangements: Evidence from an establishment survey. *Industrial and Labor Relations Review* 149-170.
- Howitt, D. and Cramer, D. (2008). *Introduction to research methods in psychology*. Essex: Pearson Education Limited.
- Inkpen, A.C. and Tsang, E.W. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review* 30 (1): 146-165.
- Jonsson, A. (2013). Beyond knowledge management—understanding how to share knowledge through logic and practice. *Knowledge Management Research & Practice* 13 (1): 45-58.
- Kacmar, K.M., Andrews, M.C., Van Rooy, D.L., et al. (2006). Sure everyone can be replaced... but at what cost? Turnover as a predictor of unit-level performance. *Academy of Management Journal* 49 (1): 133-144.
- Kalleberg, A.L. (2000). Nonstandard employment relations: Part-time, temporary and contract work. *Annual Review of Sociology* 341-365.
- Kalleberg, A.L. (2001). Organizing flexibility: The flexible firm in a new century. *British Journal of Industrial Relations* 39 (4): 479-504.
- Kalleberg, A.L. (2009). Precarious work, insecure workers: Employment relations in transition. *American Sociological Review* 74 (1): 1-22.
- Kalleberg, A.L., Reynolds, J. and Marsden, P.V. (2003). Externalizing employment: Flexible staffing arrangements in us organizations. *Social Science Research* 32 (4): 525-552.
- Kalling, T. and Styhre, A. (2003). *Knowledge sharing in organizations*. Malmö: Liber.
- Kane, A.A., Argote, L. and Levine, J.M. (2005). Knowledge transfer between groups via personnel rotation: Effects of social identity and knowledge quality. *Organizational Behavior and Human Decision Processes* 96 (1): 56-71.
- Kogut, B. and Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* 3 (3): 383-397.
- Kuhn, T. (1970). *The structure of scientific revolutions*. Chicago: University of Chicago Press.

- Kunda, G., Barley, S.R. and Evans, J. (2002). Why do contractors contract? The experience of highly skilled technical professionals in a contingent labor market. *Industrial and Labor Relations Review* 55 (2): 234-261.
- Kvale, S. (1997). *Den kvalitative forskningsintervjuen*. Danmark: Studentlitteratur.
- Lam, W. (2005). Successful knowledge management requires a knowledge culture: A case study. *Knowledge Management Research & Practice* 3 (4): 206-217.
- Landaeta, R.E. (2008). Evaluating benefits and challenges of knowledge transfer across projects. *Engineering Management Journal* 20 (1): 29-38.
- LeCompte, M.D. and Goetz, J.P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research* 52 (1): 31-60.
- Legge, K. (1998). Flexibility: The gift-wrapping of employment degradation? In: Sparrow P and Marchington M (eds) *Human resource management: The new agenda*. London: Pitman, 286–295.
- Levin, D.Z. and Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science* 50 (11): 1477-1490.
- Levine, J.M., Higgins, E.T. and Choi, H.-S. (2000). Development of strategic norms in groups. *Organizational Behavior and Human Decision Processes* 82 (1): 88-101.
- Lincoln, Y.S. (1995). Emerging criteria for quality in qualitative and interpretive research. *Qualitative Inquiry* 1 (3): 275-289.
- Lincoln, Y.S. and Guba, E.A. (1985). *Naturalistic inquiry*. Beverly Hills: Sage Publications, Inc.
- Lindkvist, L. (2005). Knowledge communities and knowledge collectivities: A typology of knowledge work in groups. *Journal of Management Studies* 42 (6): 1189-1210.
- Lorsch, J.W. and Tierney, T.J. (2002). *Aligning the stars: How to succeed when professionals drive results*. Boston: Harvard Business School Press.
- Løwendahl, B.R. (1997). *Strategic management of professional service firms*. Copenhagen: Copenhagen Business School Press
- Løwendahl, B.R. (2005). *Strategic management of professional service firms*. Copenhagen: Copenhagen Business School Press.
- Løwendahl, B.R., Revang, Ø. and Fosstenløkken, S.M. (2001). Knowledge and value creation in professional service firms: A framework for analysis. *Human Relations* 54 (7): 911-931.
- Maister, D.H. (1997). *Managing the professional service firm*. New York: Free Press.
- Malhotra, N. (2003). The nature of knowledge and the entry mode decision. *Organization Studies* 24 (6): 935-959.
- Malhotra, N. and Morris, T. (2009). Heterogeneity in professional service firms. *Journal of Management Studies* 46 (6): 895-922.
- Malhotra, N., Morris, T. and Hinings, C. (2006). Variation in organizational form among professional service organizations. *Research in the Sociology of Organizations* 24 (6): 171-202.
- Marler, J.H., Woodard Barringer, M. and Milkovich, G.T. (2002). Boundaryless and traditional contingent employees: Worlds apart. *Journal of Organizational Behavior* 23 (4): 425-453.
- Marshall, C. (1990). Goodness criteria: Are they objective or judgement calls. In: Guba EG (ed) *The paradigm dialog*. Newbury Park: Sage Publications, Inc, 188-197.
- Marshall, C. and Rossman, G.B. (1989). *Designing qualitative research*. Newbury Park: Sage Publications, Inc.
- Mason, J. (2006). Mixing methods in a qualitatively driven way. *Qualitative Research* 6 (1): 9-25.

- Matusik, S., F. and Hill, C.W.L. (1998). The utilization of contingent work, knowledge creation, and competitive advantage. *The Academy of Management Review* 23 (4): 680-697.
- Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995). An integrative model of organizational trust. *Academy of Management Review* 20 (3): 709-734.
- Maylor, H., Brady, T., Cooke-Davies, T., et al. (2006). From projectification to programmification. *International Journal of Project Management* 24 (8): 663-674.
- McAllister, J. (1998). Sisyphus at work in the warehouse: Temporary employment in greenville, south carolina. In: Barker K and Christensen K (eds) *Contingent work: American employment in transition*. Ithaca, N.Y: IRL Press, 221-242.
- McGrath, J.L. and Argote, L. (2001). Group processes in organizational contexts. In: Hogg MA and Tindale RS (eds) *Blackwell handbook of social psychology: Group processes*. Oxford: Blackwell Publishing, 603-627.
- McKenna, C.D. (2006). *The world's newest profession: Management consulting in the twentieth century*. Cambridge: Cambridge University Press.
- Merriam, S., B. (1994). *Fallstudien som forskningsmetod*. Lund: Studentlitteratur.
- Meyerson, D., Weick, K.E. and Kramer, R.M. (1996). Swift trust and temporary groups. In: Kramer RM and Tyler TR (eds) *Trust in organizations*. Thousand Oaks: Sage Publications, Inc.
- Midler, C. (1995). "Projectification" of the firm: The renault case. *Scandinavian Journal of Management* 11 (4): 363-375.
- Miles, M.B. and Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks: Sage Publications, Inc.
- Moreland, R.L. and Myaskovsky, L. (2000). Exploring the performance benefits of group training: Transactive memory or improved communication? *Organizational Behavior and Human Decision Processes* 82 (1): 117-133.
- Morris, T. and Empson, L. (1998). Organisation and expertise: An exploration of knowledge bases and the management of accounting and consulting firms. *Accounting, Organizations and Society* 23 (5): 609-624.
- Mowery, D.C., Oxley, J.E. and Silverman, B.S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal* 17 (2): 77-91.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science* 5 (1): 14-37.
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: How japanese companies create the dynamics of innovation*. Oxford: Oxford University Press.
- Okhuysen, G.A. and Eisenhardt, K.M. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science* 13 (4): 370-386.
- Oliver, P. (2010). *Student's guide to research ethics (2nd edition)*. Maidenhead, , GBR: Open University Press.
- Patton, M. (1990). *Qualitative evaluation and research methods*. Newbury Park: Sage Publications, Inc.
- Pinnington, A. and Morris, T. (2002). Transforming the architect: Ownership form and archetype change. *Organization Studies* 23 (2): 189-210.
- Polanyi, M. (1966). *The tacit dimension*. Gloucester, MA: Peter Smith.
- Ramirez, M. (2007). Redefining firm competencies, innovation and labour mobility: A case study in telecommunication services. *Industry & Innovation* 14 (3): 325-347.
- Reichardt, C.S. and Cook, T.D. (1979). Beyond qualitative versus quantitative methods. In: Cook TD and Reichardt CS (eds) *Qualitative and quantitative methods in evaluation research*. Thousand Oaks: Sage Publications, Inc.
- Riessman, C.K. (1993). *Narrative analysis*. Thousand Oaks: Sage Publications, Inc.

- Rogers, J.K. (1995). Just a temp experience and structure of alienation in temporary clerical employment. *Work and Occupations* 22 (2): 137-166.
- Rosenkopf, L. and Almeida, P. (2003). Overcoming local search through alliances and mobility. *Management Science* 49 (6): 751-766.
- Rubin, H.J. and Rubin, I.S. (2012). *Qualitative interviewing: The art of hearing data*. Thousand Oaks: Sage Publications, Inc.
- Saldana, J. (2009). *The coding manual for qualitative researchers*. London: Sage Publications Ltd.
- Salvato, C. (2009). Capabilities unveiled: The role of ordinary activities in the evolution of product development processes. *Organization Science* 20 (2): 384-409.
- Sarvary, M. (1999). Knowledge management and competition in the consulting industry. *California Management Review* 41 (2): 95-107.
- Schensul, S.L., Schensul, J.J. and LeCompte, M.D. (1999). *Essential ethnographic methods: Observations, interviews, and questionnaires*. Walnut Creek: AltaMira Press.
- Schilling, M.A. and Steensma, H.K. (2001). The use of modular organizational forms: An industry-level analysis. *Academy of Management Journal* 44 (6): 1149-1168.
- Schulz, M. (2001). The uncertain relevance of newness: Organizational learning and knowledge flows. *Academy of Management Journal* 44 (4): 661-681.
- Shaw, J.D., Duffy, M.K., Johnson, J.L., et al. (2005). Turnover, social capital losses, and performance. *Academy of Management Journal* 48 (4): 594-606.
- Simonin, B.L. (1999). Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal* 20 (7): 595-623.
- Singley, M.K. and Anderson, J.R. (1989). *Transfer of cognitive skill*. Cambridge, MA: Harvard University Press.
- Somaya, D., Williamson, I.O. and Lorinkova, N. (2008). Gone but not lost: The different performance impacts of employee mobility between cooperators versus competitors. *Academy of Management Journal* 51 (5): 936-953.
- Song, J., Almeida, P. and Wu, G. (2003). Learning-by-hiring: When is mobility more likely to facilitate interfirm knowledge transfer? *Management Science* 49 (4): 351-365.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks: Sage Publications, Inc.
- Starbuck, W.H. (1992). Learning by knowledge-intensive firms. *Journal of Management Studies* 29 (6): 713-740.
- Stasser, G., Vaughan, S.I. and Stewart, D.D. (2000). Pooling unshared information: The benefits of knowing how access to information is distributed among group members. *Organizational Behavior and Human Decision Processes* 82 (1): 102-116.
- Steensma, H.K. and Lyles, M.A. (2000). Explaining iJV survival in a transitional economy through social exchange and knowledge-based perspectives. *Strategic Management Journal* 21 (8): 831-851.
- Strauss, A. and Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage Publications, Inc.
- Sydow, J., Lindkvist, L. and DeFillippi, R. (2004). Project-based organizations, embeddedness and repositories of knowledge: Editorial. *Organization Studies* 25 (9): 1475-1489.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal* 17 (Winter): 27-43.
- Söderlund, J. and Bredin, K. (2011). Participants in the process of knowledge integration. In: Berggren C, Bergek A, Bengtsson L, et al. (eds) *Knowledge integration & innovation: Critical challenges facing international technology-based firm*. Oxford: Oxford University Press.

- Tansley, C. and Tietze, S. (2013). Rites of passage through talent management progression stages: An identity work perspective. *International Journal of Human Resource Management* 24 (9): 1799-1815.
- Teece, D.J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy* 15 (6): 285-305.
- Teece, D.J. (2003). Expert talent and the design of (professional services) firms. *Industrial and Corporate Change* 12 (4): 895-916.
- Teknikföretagen. (2009). Teknikföretag och bemanningspersonal 2009 – hur påverkas inhyrningen av konjunkturen? Stockholm, Sweden.
- Teknikföretagen. (2011). Teknikföretags inhyrning av personal 2011– en kartläggning av inhyrningen från bemannings- och konsultföretag. In: Teknikföretagen (ed). Stockholm, Sweden.
- Teknikföretagen. (2013). Teknikföretags inhyrning av personal 2013 – en kartläggning av inhyrningen från bemannings- och konsultföretag. In: Teknikföretagen (ed). Stockholm, Sweden.
- Tempest, S. and Starkey, K. (2004). The effects of liminality on individual and organizational learning. *Organization Studies* 25 (4): 507-527.
- Thompson, L., Gentner, D. and Loewenstein, J. (2000). Avoiding missed opportunities in managerial life: Analogical training more powerful than individual case training. *Organizational Behavior and Human Decision Processes* 82 (1): 60-75.
- Torres, D. (1991). What, if anything is professionalism. Institutions and the problem of change. *Research in the Sociology of Organizations: Organizations and Occupations* 8 43-68.
- Tsai, W. (2002). Social structure of “coopetition” within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization Science* 13 (2): 179-190.
- Tsai, W. and Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal* 41 (4): 464-476.
- Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. *Strategic Management Journal* 17 (S2): 11-25.
- Tywonik, S.A. (2007). Knowledge in four deformation dimensions. *Organization* 14 (1): 53-76.
- Walsh, J.P., Meyer, A.D. and Schoonhoven, C.B. (2006). A future for organization theory: Living in and living with changing organizations. *Organization Science* 17 (5): 657.
- Walsh, J.P. and Ungson, G.R. (1991). Organizational memory. *Academy of Management Review* 16 (1): 57-91.
- van Gennep, A. (1960). *The rites of passage*. Chicago: University of Chicago Press.
- van Wijk, R., Jansen, J.J. and Lyles, M.A. (2008). Inter- and intra-organizational knowledge transfer: A meta-analytic review and assessment of its antecedents and consequences. *Journal of Management Studies* 45 (4): 830-853.
- Webb, W.H., Beals, A.R. and White, C.M. (1986). *Sources of information in the social sciences: A guide to the literature*. Chicago: American Library Association.
- Weick, K.E. (1969). *The social psychology of organizing*. Reading: Addison-Wesley.
- Werr, A. (2002). The internal creation of consulting knowledge: A question of structuring experience. In: Kipping M and Engwall L (eds) *Management consulting: Emergence and dynamics of a knowledge industry*. Oxford: Oxford University Press, 91-108.
- Werr, A. and Stjernberg, T. (2003). Exploring management consulting firms as knowledge systems. *Organization Studies* 24 (6): 881-908.

- Werr, A., Stjernberg, T. and Docherty, P. (1997). The functions of methods of change in management consulting. *Journal of Organizational Change Management* 10 (4): 288-307.
- Wezel, F.C., Cattani, G. and Pennings, J.M. (2006). Competitive implications of interfirm mobility. *Organization Science* 17 (6): 691-709.
- Whitley, R. (2006). Project-based firms: New organizational form or variations on a theme? *Industrial and Corporate Change* 15 (1): 77-99.
- Whittemore, R., Chase, S.K. and Mandle, C.L. (2001). Validity in qualitative research. *Qualitative Health Research* 11 (4): 522-537.
- Whittington, R., Pettigrew, A., Peck, S., et al. (1999). Change and complementarities in the new competitive landscape: A european panel study, 1992-1996. *Organization Science* 10 (5): 583-600.
- Winch, G. and Schneider, E. (1993). Managing the knowledge-based organization: The case of architectural practice. *Journal of Management Studies* 30 (6): 923-937.
- von Krogh, G., Nonaka, I. and Aben, M. (2001). Making the most of your company's knowledge: A strategic framework. *Long Range Planning* 34 (4): 421-439.
- von Nordenflycht, A. (2010). What is a professional service firm? Toward a theory and taxonomy of knowledge-intensive firms. *Academy of Management Review* 35 (1): 155-174.
- von Nordenflycht, A. (2011). Firm size and industry structure under human capital intensity: Insights from the evolution of the global advertising industry. *Organization Science* 22 (1): 141-157.
- Wright, P.M., Dunford, B.B. and Snell, S.A. (2001). Human resources and the resource based view of the firm. *Journal of Management* 27 (6): 701-721.
- Yin, R. (1994). *Case study research: Design and methods*. Thousand Oaks: Sage Publications, Inc.
- Yin, R. (2009). *Case study research: Design and methods*. Thousand Oaks: Sage Publications, Inc.

PART II:

PAPERS

Papers

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