Challenges of outsourcing systems integration - Lessons learned from the public sector

Information Systems Science

Master's thesis

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Purpose of the study
The purpose of this study was to identify the challenges of outsourcing systems integration by examining systems integrator service offered to the public sector. The focus was turned also to organizational and strategic aspects of integration instead of mere technical ones. The challenges were looked from external perspective through transaction cost economics and from internal one through capabilities. With internal challenges the goal was to identify if they relate to the customer, the service provider or if they are shared between the two.

Methodology
The research framework was built based on previous research in the fields of TCE, capabilities, information systems outsourcing and service co-production. The research was conducted as a single case study concentrating on one large systems integration service provider to gain full understanding of the complex research phenomena. The main data collecting was done through semi-structured interviews to enable modifying the questions according to the interviewee. Additional data sources were public reports, newspaper articles, workshop and case company internal material. Furthermore, the research is abductive, which means that some of the theoretical discussions were revised after pilot interviews.

Findings
The key findings of the study include the description of the external and internal challenges of systems integration. The external challenges relate to the characteristics of the service and the transactions, which combined with outsourcing, would require long lasting relationships or elaborate contracts. When the customer is a public organization, long lasting relationships are challenging due to competitive bidding. The internal challenges are due to lack of capabilities. Most of the capabilities required for successful service production are shared between the service provider and the customer because of the co-creative nature of the service. From a skills perspective, interpersonal and communication skills were identified to be more critical than technical skills.

Keywords
Information systems integration, systems integration, capabilities, transaction cost economics

Tutkimuksen tavoitteet

Tämän tutkimuksen tavoitteena oli tunnistaa systeemi-integraation ulkoistamisen haasteita tutkimalla julkiselle sektorille tarjottavaa integraattoripalvelua. Systeemi-integraatiossa huomio kohdistettiin organisatorisiin ja strategisiin tekijöihin pelkkien teknisten seikkojen sijaan. Haasteita tarkasteltiin ulkoisesta näkökulmasta transaktiokustannusteorian avulla ja sisäisestä näkökulmasta kyvykkyyksiä käyttäen. Sisäisten haasteiden kohdalla tavoitteena oli myös tunnistaa liittyvätkö ne asiakkaaseen, palveluntarjoajaan vai ovatko ne jaettuja.

Metodologia

Tutkimuksen viitekehys rakennettiin transaktiokustannusteorian, kyvykkyyksien, informaatioteknologian ulkoistuksen ja palvelujen yhteistuottamisen pohjalta. Tutkimus toteutettiin yhteen suureen systeemi-integraatiopalveluja tarjoavaan yritykseen keskittyvänä case-tutkimuksena. Näin oli mahdollista saavuttaa syvällinen ymmärrys monimutkaisesta tutkimuskohteesta. Aineiston kerääminen toteutettiin pääosin teemahaastattelujen avulla, jolloin kysymysten muokkaaminen oli mahdollista haastateltavan mukaan. Lisäksi aineisto koostuu julkisista raporteista, lehtiartikkeleista, työpajasta kerätystä materiaalista ja case-yrityksen sisäisistä materiaaleista. Tutkimus toteutettiin abduktiivisella otteella, jolloin teoreettisia keskusteluja voitiin tarkentaa pilotti-haastattelujen jälkeen.

Tulokset

Merkittävimmät tutkimustulokset ovat systeemi-integraation sisäisten ja ulkoisten haasteiden tunnistaminen. Ulkoiset haasteet liittyvät systeemi-integraation ja transaktioiden ominaisuuksiin, jotka yhdistettynä ulkoistamiseen vaativat pitkäkestoisen asiakassuhteen tai yksityiskohtaisen sopimuksen palveluntarjoajan ja asiakkaan välille. Kun asiakkaana on julkinen organisaatio, pitkäkestoiset asiakassuhteet ovat kilpailutuslainsäädännön takia haasteellisia. Sisäiset haasteet liittyvät kyvykkyyksien puutteeseen. Suurin osa onnistuneen palvelun tuottamiseen vaadittavista kyvykkyyksistä ja niiden puuttumisesta johtuvista haasteista, on jaettu palveluntarjoajan ja asiakkaan välillä, sillä nämä toimijat tuottavat palvelun yhdessä. Taitojen tasolla ihmissuhde- ja kommunikaatiotaidot nousivat tärkeämmiksi kuin teknologiaan liittyvät taidot.

Avainsanat

Tietojärjestelmäintegraatio,   systeemi-integraatio,   kyvykkyydet,
transaktiokustannusteoria

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1 INTRODUCTION

Major integration efforts are being performed as both the private and the public sector aim to be more competitive in rapidly changing environments. The organizations are facing enormous pressures and they can no longer trust their traditional ways of competing. At the forefront to this is utilizing technology and systems integration. The creation of a fully integrated company with application links to employees, salespeople, and suppliers has become a means of responding to the competitive pressures. (Mische, 2002) In a wider sense, integrated information systems (IS) are seen as a prerequisite for business integration. Thus, companies aim to serve their customers effectively and to do so, they need integrated IS capable of combining information from many sources. (Markus, 2000) However, despite the advantages a systems integration project potentially offers, these projects tend to have a high failure rate (Tuft, 2001).

Previous literature regarding IS integration has largely focused on the technical aspects of it (e.g. Chandra & Juarez, 2009; Markus, 2000). Moving beyond this, it is important to understand that IS integration can be viewed also from other angles besides the technical one: strategic and organizational views as well as a holistic view combining all the aspects have been identified in the literature (Wainwright & Warning, 2004). In some cases, organizations choose to *outsource* integration by for example purchasing enterprise application integration (EAI)-, data warehousing-, or enterprise resource planning (ERP) solutions and other services from the market instead of producing them in-house (Markus, 2000).

The public sector in Finland has been outsourcing IS -development to external partners. These projects are large-scale IS renewal projects and due to the competitive bidding laws, often multi-vendor in nature. The failures of public IT projects have been widely discussed in the media, where the public sector has been criticized for not knowing what it is purchasing and as a result, pouring money into expensive and extensive consultancy services. Also, the public sector is being accused of being too dependent over the large IS providers due their own limited know-how. This has resulted in the stretching of budgets and schedules as well as in complete failures in value delivery. Specifically, critique is directed towards project management, requirements engineering, contracting, and IT management in general. (e.g.

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Aamulehti 12/2008, HS 12/2009). The information systems providers have also gained their share of the critique. For example, the un-ability of the different vendors to cooperate and open up their interfaces and to integrate their systems into an operating entirety has been identified as a challenge (TiVi 3/08).

Outsourcing in itself is a widely studied phenomena within the IS field (e.g. Willcocks & Lacity, 2006). It is expected that by 2011, 58% of a company's information technology (IT) budget is spent on products and services purchased from outsourcing providers, and that 59 % of organizations outsource more IT and business process functions in the future (Willcocks & Lacity, 2006; The Gartner Group, 2009). Outsourcing of IT has both advantages and disadvantages. On the positive side, it allows firms to concentrate on their core businesses, brings cost efficiencies due to providers' economies of scale and experience and creates access to resources. On the other hand, the company's control over the IT -configurations and services diminishes. The loss of control and decreased in-house expertise can lead to a decreasing level of IT -integration, which can reduce the competitive advantage gained from integrated IT. Furthermore, outsourcing is prone to risks like antiquated technology lock-in, high-cost of contractual modifications, unanticipated management and transition costs, and legal disputes. (Bahli & Rivard, 2003; Cullen 2007) Overall, many authors note that the endeavours with IT -outsourcing often bring disappointing results (Bahli & Rivard, 2003; Thouin, Hoffman, & Ford, 2009). Nearly a half of companies are also considering changing their outsourcing partner and over 60% are considering changing or renegotiating outsourcing contracts (Gartner Group 2009).

According to Gonzales (2006), studying the reasons behind the decisions to outsource is one of the most frequently studied topics in the IS field. *Transaction cost economics* (TCE) has been used to analyse IT outsourcing decisions companies make based on the characteristics of the transactions and aspects of human nature (see e.g. Bahli & Rivard, 2003; Lacity & Willcocks, 1995; Thouin et al., 2009). According to Lacity and Willcocks (1995) the unique nature of IT triggers exceptions to TCE but it still remains a valid theory for analyzing IT outsourcing. Other researchers have identified significant deviations and little support for the specific constructs of TCE in the area of IT outsourcing (David & Han, 2004).

Besides TCE, IT outsourcing has been analysed through a capability perspective, which has its origin in the resource based view of the firm (RBV) (Eisenhardt & Martin, 2000; Feeny, Lacity, & Willcocks, 2005; Willcocks, Reynolds, & Feeny, 2007). It is recognized in the literature that companies can acquire new *capabilities* by tapping to the growing IT outsourcing market (Cullen et al. 2007). Previous research (Feeny & Willcocks, 1998; Willcocks et al., 2007) has identified the IS capabilities required from a customer company for both maintaining its' internal abilities and utilizing the existing outsourcing markets efficiently. These capabilities range from leadership to informed buying and architecture planning. Respectively, previous research (Feeny et al., 2005) has identified the capabilities required from the outsourcing partner for successful service delivery. These include for example program management capabilities and domain expertise. Underlying both groups of capabilities can be seen sets of inter-personal, business and technical skills with varying combinations. (Willcocks & Lacity, 2006)

Today, the movement towards *service dominant logic* (SD-Logic) has shifted the focus from the internal service production processes to the shared processes between the customer and the service provider. Here, the customer is seen as the co-creator of value instead of the inactive object targeted by the company. (Vargo & Lusch, 2004) When discussing the capabilities needed for service production, this aspect should be considered and shared capabilities identified.

1.1 Research question and delimitations

IS integration, IT outsourcing, service provider and customer capabilities as well as service co-production have been studied intensively in their own fields. IT outsourcing, specifically in the field of integration services, has received limited attention from the academia. Previous research in the field of IS integration and its challenges has been focused on the technical aspects, which is why this study adopts a more *holistic* view and considers the organizational and strategic views as well through the TCE and capability perspectives. Furthermore, capability discussion currently lacks the view of *shared* capabilities.

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The aim of this study is to combine each research stream to understand what the main challenges of providing systems integration services are from both TCE and capability perspective. Thus the research questions is:

What are the main internal and external challenges of outsourcing system integration?
- *What challenges exist from TCE perspective?*
- *What internal, capability related challenges are identifiable?*
- *By whom should the needed capabilities be possessed by?*

The research question has two perspectives: TCE is used for analyzing on the *external* characteristics of the transaction and the service, the relationship between the service provider and the customer and competitive bidding. Capabilities extend the discussion towards what *internal* capabilities and assets are required to successfully produce the service, and how the lack of these capabilities creates challenges. SD-Logic and relationship marketing theories emphasize customer's role in the service production (e.g. Vargo & Lusch 2004). In this study some of challenges are expected to be *shared* between the service provider and the customer as customers are viewed as value co-creators. IS integration studies are mainly used to understand the different aspects of integration and to point out the most common disconnection points between business and IT.

The study paints a picture of the integration service in a certain time and does take into account the changing nature of the service. The focus is limited to the relationship between the customer and the service provider and thus, does not consider the competitive environment and other environmental factors. The study focuses on the holistic view of systems integration and thus, does not limit the focus to the technical sphere alone. Overall, the focus is directed more towards the business and organizational level where the previous research has concentrated less. Additionally, it can be viewed that customers receive the integration as a service and are less interested in the technical implementation of it and are rather focused on the end results, which further supports the holistic view.

1.2 Methodology

The study was conducted as a qualitative single-case study. Qualitative method was chosen as the goal here is to *find* and *explore* the challenges existing in the service provision (Creswee, 2003). Furthermore, case study method is seen suitable when the research phenomenon is unclear, which is the situation in this study as even the content of the integration service varies (Miles & Humerman, 1994). According to Yin (2003, p.41) single case studies can be used when the case tests, expands or challenges an existing theory. As the goal of this study is to further refine the service provider and customer capability theory presented by Feeny & Willcocks (1998), Willcocks, Reynolds, & Feeny (2007) and Feeny, Lacity, & Willcocks (2005), a single case study method was chosen.

The chosen main data collection method was semi-structured interviews as it allows the modification of the questions in the interviews and thus, makes it possible to gain better understanding of the underlying complex research phenomena (Koskinen, Alasuutari, & Peltonen, 2005, p.105). Additionally, other material in form of public reports, memos, presentations and notes from work-shops were used in the basis of the analysis and they allowe *triangulation,* i.e. the comparison of multiple sources of information, which increases the validity of the study. (Cook and Campell 1979, see Hirsjävi & Hurme, 2009, p. 97)

1.3 Definitions

(Information) systems integration: from a technological perspective, IS integration means the melding of divergent and even incompatible technologies, applications, data, and communications into uniform information technology architecture. Also wider definitions including e.g. organizational aspects have been proposed. Integration may be viewed differently by different organizations and appropriate definitions vary according to situations and projects. (Bajgoric & Moon, 2009 Mische, 2002; Wainwright & Warning, 2004).

Systems integration business: a capability to design and integrate internally or externally developed components: hardware, software and services, while coordinating the activities of internal or external component, subsystem or product manufacturers. Systems integration relates to a wider business model of offering integrated solutions to customers. (Davies,

2004; Hobday, Davies, & Prencipe, 2005) Authors from the technical side use the terms integration and systems integration interchangeably, but in this thesis IS integration relates to the technical matters while systems integration is a wider concept related to offering integrated solutions (Hobday et al., 2005).

Business-IS alignment: The degree to which information technology missions, objectives and plans support and are supported by the business mission, objectives and plans (Reich & Benbasat, 1996).

Capability: a distinctive set of human-based skills, orientations, attitudes, motivations, and behaviours that, when applied, can transform resources into specific business activities (Willcocks et al., 2007).

1.4 The structure of the thesis

The structure of the study is the following. In the second chapter, the theoretical background of the study is discussed in detail in the areas noted in the previous paragraph. From a theoretical perspective the study leans on transaction cost economics, resource based view of the firm and capability discussions, SD-Logic and relationship theories as well as information systems integration research. In the third chapter, the framework of the study is built based on the previous theoretical discussions. In the fourth chapter, the methodology of the study is introduced including the selection of the research method, data gathering and analysis, assessing the reliability and validity of the study. The fifth chapter introduces the case including the case company, the customer and the integrator service. In the sixth chapter the empirical findings are presented in detail. In the last chapter discussion including the theoretical and managerial implications are presented, followed by the conclusions.

2 THEORETICAL BACKGROUND

This chapter introduces the theoretical background of the study. First, the previous literature in the area of systems integration is introduced to gain understanding of its multiple aspects. After this, the main theories used in the study are discussed. These include transaction cost economics (TCE) as well resource-based view of the firm (RBV) and capabilities. Here, the core capabilities of both the outsourcer and outsourcing partner are introduced.

2.1 Systems integration

In this thesis, information systems (IS) integration and systems integration are discussed as separate matters. Authors (e.g. Davies, Brady, & Hobday, 2007; Hobday et al., 2005) claim that *systems integration* is a wider business model used also in the IT sector. It can be defined as a capability to design and integrate internally or externally developed components: hardware, software and services, while coordinating the activities of internal or external component, subsystem or product manufacturers to form a finished product or service (Davies, 2004; Hobday et al., 2005). On the other hand, according to Markus (2000), *IS integration* establishes linkages between different computer-based information systems and databases. The term is relatively young and has been at the interest of the researchers for the past 20 years (Henderson, 1994; Hodge, 1989; Varney, 1996).

2.1.1 Business of comprehensive solutions

Systems integrator is here seen as a prime contractor organization, which is responsible for the functioning of the overall systems and the coordination of the outsourced parts of it (Davies et al., 2007). Hobday (2005) argues that systems integrtor is a core technical, strategic and organizational capability. It has two faces: (1) internal processes the firms develop as they develop and integrate the needed inputs to produce new products (2) external activities of firms as they integrate components, skills knowledge from other organizations to produce more complex products and services. Both have become more strategic and systems integration skills are now central for achieving competitive advantage. (Hobday 2005) In the past, systems integration was seen merely as a technical and operational task included in systems engineering. Today, it is much more as it is seen as a strategic task encompassing

business management at both engineering and senior management level. (Prencipe, Davies, & Hobday, 2003). According to Federica and Prencipe (2008) offering integrated solutions has also taken a strong hold of the IT industry.

Systems integration leads to offering integrated solutions. Integrated solutions refer to a business model that combines products and services into a seamless offering that addresses a customer need (Wise & Baumgartner, 1999). Solutions provider thus takes over risks and responsibilities previously handled by the customer (Davies, 2004). Integrated solutions as a business model have emerged in response to a number of changes in the external environment. The low-cost distribution of products and services is a threat for the traditional players, as customers have begun to request high-value services to be added to products (e.g. Ojasalo & Ojasalo, 2008). Oliva and Kallenberg (2003) have identified three factors, which underlie the trend towards integrated solutions business model: (1) economic factors: services have longer life cycles and larger revenues; (2) market factors: with integrated solutions, companies can satisfy customer demand for more services; and (3) competitive factors: services are more difficult to replicate, and thus a competitive advantage based on services is sustainable.

2.1.2 IS integration

Here the focus shifts from the wider systems integration to IS integration. Today, companies are starting to realize the need to integrate the stand-alone applications to meet business needs (Lam, 2005). The push towards the adoption of complete enterprise-wide integrated systems solutions is becoming a major issue in organisational IS strategies. For example, companies make by massive investments in Enterprise Resource Planning Systems (ERP) extended backwards to the fully integrated supply chain, and forwards with Customer Relationship Management (CRM) systems. (Wainwright & Warning, 2004)

Organizations typically manage a diverse portfolio of information systems applications (Cummins 2002, see Lam, 2005). A large organization can have thousands of applications including, e.g. legacy applications based on older mainframe technologies, specifically tailored applications, commercial off the shelf systems such as Sap R/3 and database management systems such as Oracle. Replacing the legacy applications is not always the best

approach as these applications can be entrenched to the organization's business operations. (Robertson, 1997) Although individual applications may have evolved independently their integration is often critical for supporting broader enterprise-wide business solutions (Jayaram, Vickery, & Droge, 2000).

2.1.2.1 Integrations strategies and domains of IS integration

In a narrow sense, IS integration is concerned with problems related to technical integration, which may occur within and between several information resources including mono-functional systems and devices, operating systems, communication-networking protocols, applications and data (Wainwright & Warning, 2004). Mische (2002) presents a similar view as he states that from a technological perspective, IS integration means the melding of divergent and even incompatible technologies, applications, data, and communications into a uniform information technology architecture. The problems are usually solved by developing specific hardware and software solutions that integrate different platforms or enterprise wide systems like ERP or EAI (Bajgoric & Moon, 2009).

There are multitude of architectures and products in the market designed for IS integration (Chandra & Juarez, 2009). According to Chandra and Juarez (2009), there are three broad integration strategies related to the technical integration: point-to-point, enterprise application integration and enterprise service bus (ESB) integration.

Point-to-point integration refers to integrating each application directly with other applications via an interface module. This strategy is relatively inexpensive, but the number of individual interface modules grows exponentially as more applications are connected with each other's making upgrades and underlying data changes challenging. (Chandra & Juarez, 2009) Enterprise application integration (EAI) refers to "*the plans, methods, and tools aimed to modernising, consolidating, integration and coordination the computer applications within an enterprise*" (McKeen and Smith 2002). EAI approach uses a central hub that houses and executes all the integration logic for the enterprise. The applications communicate with the hub and not directly with each others. Building a standardized data model is necessary to allow changing the applications while using the central hub. ESB approach uses also a central

hub, but it is based on *s*ervice-oriented architecture (SOA)-based middleware whereas EAI is based on a middleware, which does not support SOA. (Chandra & Juarez, 2009)

According to Mische (2004), the reality of IS integration indeed involves many aspects of technology and organizational processes, and the previously discussed technological integration is not enough. Overall, IS integration may be viewed differently by different organizations and appropriate definitions vary according to situations and projects. Zachmann (1987) presented also a view, that there is no accepted definition for IS integration and the word has many different meanings to many different people. Earlier research indicates that the term *integration* is a complex construct that may be classified into technical, systems, organisational and strategic aspects; each considered important when adopting any major integrated IS application. (Wainwright & Warning, 2004) These four domains of IS integration can be seen in figure 1.
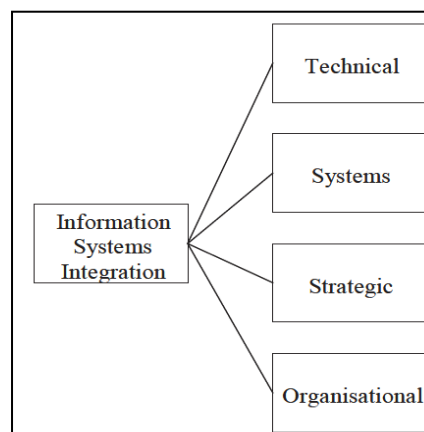
Figure 1: Four domains of IS integration (Wainwright and Warning, 2004)

According to Wainwright and Warning (2004), the technical perspective is very dominant and integration is seen as a goal to make software and hardware artefacts communicate by utilizing appropriate protocols, conventions, and technologies. They continue to note that the strategic view has also received some attention, but the organizational view has been widely neglected. The systems domain tries to encompass the technical, strategic, and organizational systems and claims to provide a more holistic perspective. Here, organizations are seen as complex and adaptive systems, which is in line with the view of integrated IS including bundles of complex interactions of technology, tasks and processes. The strategic aspect relates to the alignment of business and IT strategies of a company. The note that most

systems fail due to the lack of emphasis in dealing with complex organisational factors, while most of the analytical planning and resource emphasis is being directed towards the technical and strategic aspects of the IS integration.

The organizational domain has received little attention from both the research and the practice. As new computer systems may demand changes in e.g. people's working habits, power distribution and create redundancies, many authors claim that the organizational aspect must be taken into consideration (e.g. Allen, Colligan, Finnie, & Kern, 2000; Doherty & King, 1998). In a British study over 60% of IT executives view organizational issues more important than technical issues and only 6% perceived the opposite. Also, no attempt was made to relate the level and complexity of IS -integration with levels of success in dealing with organizational issues (Doherty & King 2001). From an organizational perspective, integration is a highly complex process including integrating people, their ideas, and decision making processes. (Wainwright & Warning, 2004) According to Wainwright and Warning (2004) the study in the organizational domain can be divided in to four spheres: structure, social and historical, power and political, and cultural. They conclude that organizational analysis should take place before technical integration starts. Mische (2004) has similar views as he states that:

"*To effectively integrate and optimize their use of technology and competitive performance, organizations attempting integration must transcend the normal boundaries of technology and address their fundamental business and organizational practices.*"

Mische (2004) continues to note that often systems integration is not a pure technical issue, but it includes many other facets of the organization including applications, data, communications, business processes and how the organization deploys, manages and effectively uses IT for competitive advantage. This shows that business and organizational practices play an important role in achieving integration.

2.1.2.2 Integration states

As IS integration is difficult to define, Mische (2004) proposes that it should be viewed as having states, rather than trying to define it. He bases the argument to the previously

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discussed fact that IS integration can mean different things in different situations. There are four stages of IS integration.

1. Interconnectivity means making various pieces of equipment and technology to work together. Involves sharing peripherals, simple transferring of files, and the creation of common pathways between different components.

2. Interoperability is the ability to make one application and technology function while exploiting the capabilities of both. This is the most common stage of integration.

3. Semantic consistency means the rationalization of data elements, terms and meaning to enable access to data and minimize the potential of errors in human interpretation through creation of standard data definitions and formats.

4. Convergent integration requires the integration of technology with business processes, knowledge and human performance. Systems integration is the enabler of new organizational design and processes. This step has seven prerequisite components of integrations including: (1) technology-, (2) applications and software-, (3) data and data repository-, (4) communications network integration, (5) the design and integration of new business processes with new technical abilities, (6) the embedding of knowledge within new business processes and enabling technologies, as well as (7) the integration of human performance with new processes.

The first three represent a convergence of technology and its status. The fourth describes a convergence of technology and human performances, processes and knowledge, and thus provides a more complete view on IS integration.

2.1.2.3 Prevailing disconnection points and business-IS alignment

After looking into the aspects and states of IS integration, the focus is turned to the common disconnection points, which provides a similar perspective of multiple aspects of IS integration. The disconnection problems at the enterprise level are divided into: (1) technical problems and (2) organizational problems.

The technical challenges are related to hardware and software dimensions of integrating several systems and managing them. Disconnection problems can be identified at several points within client-server platforms, in both the server side and client-desktop side as shown

in figure 2. In the client side integration is needed between desktop operating system and hardware components, application protocols, data communication protocols, application development tools and server operating systems. Additionally, desktop and portable devices need to be integrated as well as desktop and legacy systems. (Bajgoric & Moon, 2009)
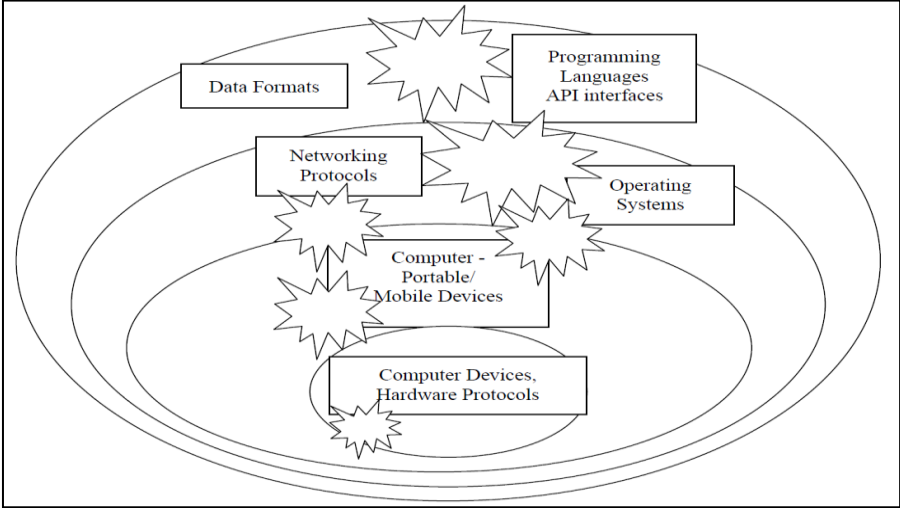
Figure 2: major disconnection points client side – hardware/software levels (Bajgoric & Moon, 2009)

The latter organizational problems relate to problems that occur between IT subsystem and the rest of the organization. This is to say that individual systems cannot be efficient and effective if there is no organization-wide information management. There are four disconnection points, which cause these difficulties, which are shows in figure 3:
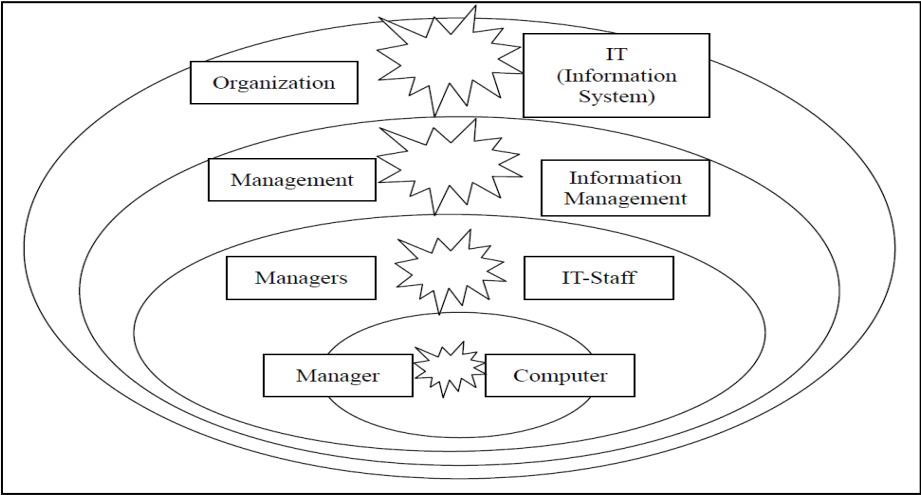
Figure 3: organization-IT gaps: major disconnection points (Bagjoric and Moon, 2009)

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First, there is a disconnection between organizational systems and its IS meaning the coordination between IS and the rest of the organization. Second disconnection point is between organizational management and information management. (Bajgoric & Moon, 2009) Third disconnection exists between IT -professionals and managers, which often speak "different languages" and do not understand each other's (Wixom & Todd, 2005). The last disconnection point can be found between managers and computers, i.e. the fear of computers residing in computer-alienated managers (Bajgoric & Moon, 2009).

Overall, it seems that the organizational disconnection points relate to the lack of IT business alignment within an organization. According to Feeny and Willcocks (1998) building and maintaining IT -business alignment is one of the key nine capabilities a company needs to exploit information technology. There are many definitions for IT business alignment. According to Reich and Benbasat (1996), strategic alignment is "*the degree to which information technology missions, objectives and plans support and are supported by the business mission, objectives and plans*". In this definition, "objectives" refers to the goals and the strategies of an organizational unit.

According to Henderson and Venkatraman (1999), the inability to realize value from IT investments is in partly because of the *lack of alignment* between the business and IT strategies of organizations. Strategies in this sense mean both their formulation, including decisions concerning competitive product-market choices, and implementation, including the structure and capabilities of the firm to execute its product-market choices. This concept of strategic alignment is based on two assumptions: (1) the economic performance of a company is directly related to management's ability to create a strategic fit between a company's market position and the design of administrative structure to support its execution. (2) The strategic fit is dynamic in nature as companies in the market can imitate others and thus, strategic alignment between designing and implementing strategies is a continuous process. This way, it can be viewed as a *dynamic capability.*

Henderson and Venkatraman (1999) propose a strategic alignment model (SAM) comprising of strategic fit between the internal and external domains of strategies combined with functional integration between IT and business. Thus, two types of integration between

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business and IT is required: strategic (the link between business strategy and IT -strategy reflecting the external components) and operational one (the internal links between the two domains). Additionally, researchers (Peppard & Ward, 1999; Ward & Peppard, 1996) have identified a *cultural gap* between business and IT, which is an impediment to aligning the IT function with the rest of the business. It means that IT -people are often technically capable rather than business savvy and that IT -language is not understood in the boardroom like the traditional business language.

2.2 Transaction cost economics

For studying the economic exchanges between integration service providers and customers, the study builds upon the theory of transaction cost economics (TCE). The theory was first introduced by Coase (1937) and became widely known through the work of Williamson (see e.g. Williamson, 1975; Williamson, 1979; Williamson, 1991). Transaction cost economics views firm as a governance structure rather than a production unit, and one of Coase's (1937) early propositions was that firms and markets are alternate governance structures with differing transaction costs.

2.2.1 Major elements of TCE

Williamson (1975, 1979, 1991) identified that costs of a company are comprised of *transactional costs* besides *production costs*. Transaction costs consist of costs of monitoring, controlling, and managing transactions and thus, are synonymous with coordination costs. In general, he argues that transaction costs are lower with in sourcing as companies find it less expensive to monitor, control, and manage their employees than outside vendors. On the contrary, production costs are lower with outsourcing due to mass production efficiencies and labour specialization. Williamson's micro analytical framework rests on the interactions between two main assumptions of human behaviour; *bounded rationality* and *opportunism,* and two key dimensions of transactions; *asset specificity* and *uncertainty*.

Transaction type refers to transaction frequency and asset specificity. Frequency means the number of times a buyer seeks to initiate the transaction and it can be either occasional or recurrent. Thus, the transactions can be transactional, relational or anything in between. Asset specificity discusses the degree of customization of the asset and it ranges from highly

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standardized to highly customized and mixed. It can be a result of site specificity (location), physical asset specificity (degree of customization of the product or service), or human asset specificity (the degree of specialized knowledge required for the transaction). By combining frequency and asset specificity together into a matrix, Williamson creates a framework for categorizing the most efficient governance mechanisms for basic transactions without uncertainty. For example, recurrent transactions and high asset specificity results in insourcing as the assets are specialized to a single user and thus, the production costs are equal with the two alternatives. Transaction costs are lower with outsourcing and thus, the most efficient governance mechanism in this case is hierarchy.

If *uncertainty* exists the situation is different. Uncertainty relates to the uncertainty to which transactions are subject. If a high degree of uncertainty exists the relative appeal to outsource diminishes due to required additional coordination costs. Faced with uncertainty, a company can standardize the transaction, draw elaborate contracts or in-source. *Threat of opportunism* relates to the opportunistic behaviour, e.g. contract violation, of the other party. A high level of uncertainty combined with the threat of opportunistic behaviour of the other party results in information impactedness. Information impactedness means that the first party of an exchange is much better informed than the second, and the second party cannot achieve information parity except at great cost, because the first party will not disclose the information. Information impactedness thus leads to *bounded rationality*, where all information to make rational decisions is not available. Information impactedness will not affect the outsourcing negotiations if parties do not behave opportunistically, the condition of unbounded rationality is achieved or a large number of suppliers exist. When these terms do not hold, in sourcing is the best opportunity. A large number of potential suppliers decreases opportunistic behaviour as rivalry renders it. In the contrary, small number of suppliers increases this behaviour and appropriate contracts need to be developed.

2.2.2 TCE and IT outsourcing

Lacity and Willcocks (1995) note that transaction cost theory has been utilized to analyze IT outsourcing for several reasons: first, transaction cost theory especially addresses sourcing decisions of whether to produce a good or service internally or purchase it from the market. Second, transaction cost theory incorporates the perception that outsourcing decisions are

made based on an economic rationale. In the beginning of new outsourcing contracts there are often anticipated cost savings (e.g. Anthes, 1990; Ross & Beath, 2006). Third, many practitioners use a consistent terminology with transaction cost theory to explain why outsourcing is predicted to cut IT costs. For example, practitioners argue that some parts of IT are most efficiently provided by external vendors because they are commodity services, which translates into a "non-specific asset" in TCE terminology. (see e.g. Carr, 2003; Udo, 2000) Fourth, transaction cost theory has enjoyed an abundance of empirical and theoretical academic attention (see e.g. Bahli & Rivard, 2003; Thouin et al., 2009; Walker & Poppo, 1991). This suggests that other researchers find transaction cost theory to be a useful interpretation of outsourcing reality.

According to Lacity and Willcocks (1995) IT's unique nature of affects the outsourcing decisions as IT and the underlying economics for IT evolve fast, which lead to a high degree of uncertainty. Second, IT has penetrated all business functions, which leads to recurrent idiosyncratic transaction. Third, the switching cost to alternative IT and IT suppliers is high, which leads to a small number of suppliers and thus, increases the risk of opportunistic behaviour. Fourth, customers are usually inexperienced with IT outsourcing, which leads to information impactedness as the provider holds more information.

Even with these characteristics, which strongly suggest in-house production, IT services are often outsourced. According to Thouin et. al (2009), there have been ambiguous results in utilizing TCE in explaining IT outsourcing as some researchers have found significant empirical support for aspects of it, e.g. for asset specificity (e.g. David & Han, 2004). Others state that TCE is not appropriate for analyzing IT outsourcing because of *bounded rationality.* As firms are made up of people who are bounded rational due to imperfect information, a firm's decisions to outsource may not be optimal. Therefore, research using TCE to explain a firm's choice to outsource may not be appropriate because firms do not always choose the best alternative (Thouin et al., 2009).

Authors (e.g. Ring & Van de Ven, 1992) state that TCE's weakness is the failure to consider different types of buyer-seller relationships, e.g. alliances besides pure hierarchies and markets, and the dynamic evolution of governance and transactions. TCE has been utilized to

study close and enduring vertical inter-organizational relationship ties by many authors (e.g. Noordewier, John, & Nevin, 1990; Walker & Poppo, 1991). For example Heide and John (1990) use TCE to analyze, how companies use close relationships as means for safeguarding their investments and adapting to uncertainty. Economists and legal scholars have also explored widely the use of contractual arrangements, e.g. Joskow (1987) investigates the role of asset specificity in determining the length of contracts between electric utilities and coal suppliers. TCE has also been utilized in researching horizontal inter-organizational relationships concerning with companies at the same position of the value-chain (Gates, 1989).

Within this study, TCE is considered applicable when analyzing the costs, transaction type, threat of opportunism, uncertainty and information impactedness. Transaction cost theory provides a potentially useful framework for this study as it focuses on analyzing when, and under what terms transactions occur in markets versus hierarchies. This study benefits from this division as it discusses transactions of public entities that are forced to choose between internal development or transactional purchasing due to the competitive bidding laws. The study investigated the characteristics the transactions and what kinds of challenges they combined with forced competitive bidding create.

2.3 Resource-based approaches and capabilities

The previous chapter presented TCE, which uses *external* factors like transaction type and information impactedness to analyze outsourcing decisions in a given moment. The goal of this chapter is to discuss the *internal* resources and capabilities of a company. The chapter begins with introducing the resource based view of the firm (RBV), which forms the base to the following capability discussion. After this, the chapter will introduce the typical capabilities of both the outsourcing partner and outsourcer.

2.3.1 RBV

The resource-based view (RBV) is an economic theory, which discusses the strategic resources available to a firm. RBV was first introduced by Penrose (1959) but Barney (1991) further formalized it as a theory. The main principle of the RBV is that the basis of a sustained competitive advantage lies in the application of valuable resources, which are at the firm's

disposal (Wernerfelt, 1984). The value of these resources depends on the market context within which the firm operates (Priem & Butler, 2001; Wernerfelt, 1984).

In order to build sustainable competitive advantage these resources need to be heterogeneous and not perfectly mobile (Barney, 1991; Peteraf, 1993). This translates into valuable resources that are neither perfectly imitable nor easily substitutable (Barney, 1991; Hoopes, Hadsen, & Walker, 2003). Thus, resources need to be (1) valuable, which means that a resource must enable a firm to outperform its competitors or reduce its own weaknesses (Amit & Schoemaker, 1993; Barney, 1991). (2) Resources need to be rare, as for a resource to be valuable, it must be rare among current and potential competition. (3) They need to be non-substitutable to increase their value and (4) they need to be in-imitable as competitive advantage can only be sustained if competitors cannot duplicate a rare resource perfectly. (Barney, 1991)

RBV is discussed here because it recognizes the importance of the internal factors of the company, even though, according to critics (Eisenhardt & Martin, 2000; Priem & Butler, 2001), it ignores the capabilities which surround the resources by assuming that they simply "exist". To this extend, the study moves further from the RBV and towards a capability-oriented viewpoint.

2.3.2 The Service-Dominant Logic and relational approaches

According to Vargo and Lusch (2004), RBV has lead to the thinking that firm's resources are mainly tangible, static assets that need action to make them valuable. They call these resources *operand resources.* Resources, which are employed to act on the operand resources, are *operant.* Continuing this, they state operant resources, i.e. knowledge and skills, are the fundamental source of competitive advantage, not static, tangible resources. Adding to this, they acknowledge that companies exist to *integrate and transform competencies* into complex services and the primary task of a company is resource integration (Vargo & Lusch, 2004; Vargo & Lusch, 2006).

RBV also fails to notice the meaning joint exploration and exploitation of resources (Dyer & Singh, 1998). One of the key findings of Vargo & Lusch (2004) is that customer is always *a*

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co-creator of value as they collaborate in service provision by using their resources at least by using the offering. This relational perspective emphasizes the collaborative development of resources by the client and the provider and is one of the starting points of this study. Value co-creation and service co-production have also been widely discussed in the literature (e.g. Etgar, 2008; Prahalad & Ramaswamy, 2003; Ramirez, 1999; Vargo & Lusch, 2004; Xie, Bagozzi, & Troye, 2008). Vargo and Lusch (2004) continue with stating that value co-creation occurs not only between the firm and the customer, but also involves value-network partners. Thus, the focus moves from internal resources of the company in RBV towards acknowledging the importance of the external resources and capabilities of customers and partners.

Another perspective to this discussion is offered by the *relationship marketing view*. Authors have discussed the movement from the exchange perspective to a relationship perspective and how it affects value creation, shown in figure 4 (Grönroos, 2007; Sheth & Parvatiyar, 1995).
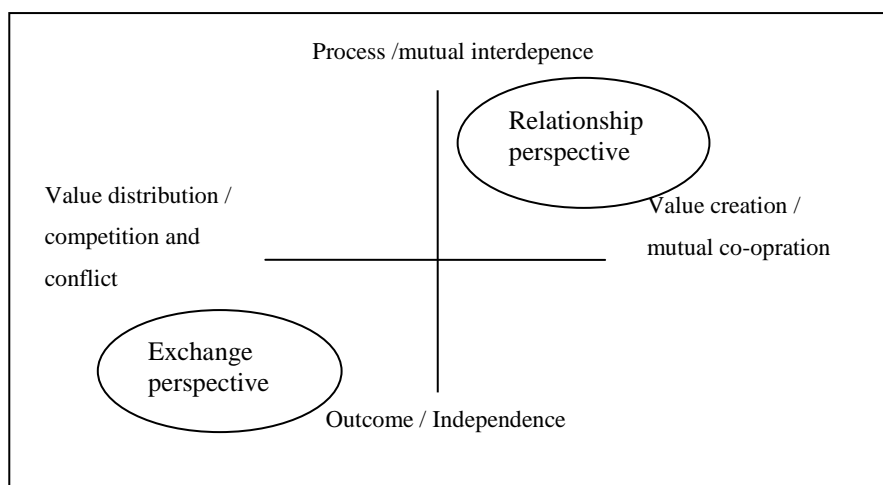
Figure 4: the exchange versus the relationship perspective in the marketing process, modified from Sheth & Parvatiyar (1995) and Grönroos (2007, p. 27-28)

The process of creating value for the customer is different with relationship-oriented perspective and in transaction-oriented perspective. The traditional marketing model is based on the exchange perspective where value is created by the firm. This value is then embedded in the product, which is delivered to the market and exchanged. In the relationship perspective, products are mere facilitators of value and value is created throughout the

relationship, partly in interaction between the customer and the service provider. (Sheth & Parvatiyar, 1995)

2.3.3 Capabilities

Capabilities perspective has become a popular approach to understand and explain the drivers of firm performance (Eisenhardt & Martin, 2000). Capability discussion is seen as an extension to the RBV and it focuses on *intangible* resources instead of tangible ones. It suggests that a firm is a learning organization, which builds and uses assets, capabilities and skills to achieve its strategic goals. (Feeny & Willcocks, 1998; Hamel & Prahalad, 1994; Willcocks et al., 2007) The capacity of an organization to create, extend, or modify its resource base is vital. Whereas the RBV focuses on resource choice, the dynamic capability discussion focuses on resource development and renewal. For example Ranganathan and Balaji (2007) state that the focus of the company should be on identifying and nurturing a set of capabilities that are needed for improving firm performance at the corporate and at the functional level. They continue by explaining that capabilities determine the effectiveness of firm's efforts as they shape the ways in which firm-specific skills, knowledge, technical and human resources and coordinated are managed.

Capabilities form a wide concept and there are multiple ways they can be classified, for example into static and dynamic ones (Teece, Pisano, & Shuen, 1997; Zollo & Winter, 2002). Teece et al. (1997) define dynamic capabilities as "*the abilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments*". Thus, capabilities lie in between the changing external environment and the firm's resources as balancing factors. Dynamic capabilities relate largely to learning as the firm must be able to reconfigure its resources according to new market requirements. The knowledge, which resides in a company, forms its core capability but in order to grow it needs to create new knowledge (Grant, 1996; Sung-Choon Kang, Morris, & Snell, 2007). According to Kang (2007) this new knowledge can be created both inside the company and through inter-organizational co-operation. This is in line with Vargo & Lusch (2004) stating that value-creation occurs internally or with value-network partners. Creating new knowledge is both explorative and exploitative in nature. The first means creating completely new knowledge through ideas and innovations, while the latter means deepening already existing knowledge

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(March, 1991). Learning is affected by both the amount of interaction and the type of trust between the entities (Uzzi, 1997).

2.3.4 Customer IS capabilities

For IS to fulfill its four primary tasks of (1) *eliciting* and *delivering on business requirements*, (2) *ensuring technical capability*, (3) *managing external supply of IS services, and* (4) *governance and leadership*, organizations need to build nine core IS capabilities (Feeny & Willcocks, 1998). The core IS capabilities help the company to utilize the external IT - services market and to maintain its internal abilities. The nine capabilities are: *leadership, informed buying, business systems thinking, relationship building, contract facilitation, architecture planning and design, vendor development, contract monitoring* and *making technology work*. Figure 5 shows the nine core IS capabilities placed in the four domains corresponding to the four primary tasks of the IS function, while Table 1 describes each capability briefly.
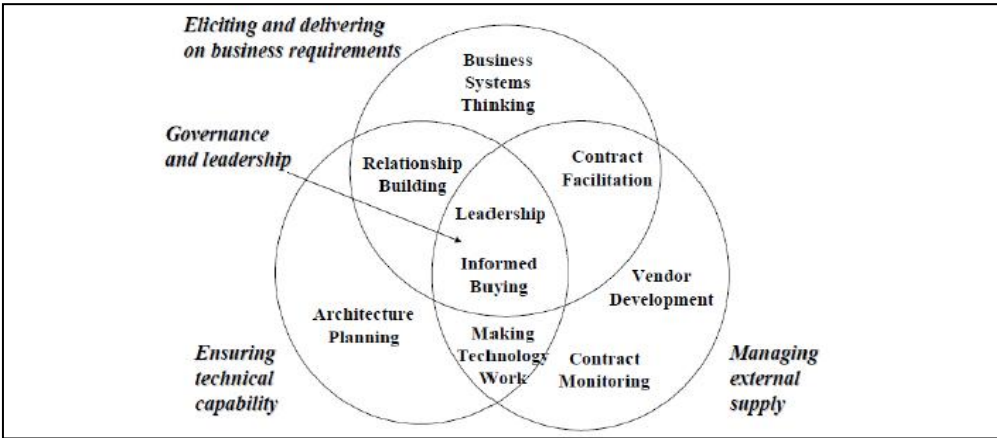
Figure 5: The core IS capabilities of a company (Willcocks et al., 2007)

Table 1: Core IS capabilities of a company (Willcocks et al., 2007)

Capability	Description
Leadership	Integrates the IS efforts with business purpose and activities
Informed buying	Manages the IS sourcing strategy to meet the needs of the business
Business systems thinking	Ensures that IS capabilities are envisioned in every business process
Internal relationship building	Gets the business constructively engaged in operational IS issues
Contract facilitation	Ensures the success of existing contracts for external IT services
Architecture planning and design	Creates the coherent blueprint for a technical platform that responds to present and future needs

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Vendor Development	Identifies the potential added value from IT service suppliers
Contract Monitoring	Protects the business's contractual position, present and future
Making Technology Work	Rapidly trouble-shoots problems which are being disowned by others across the technical supply chain

The authors also identify project management capabilities important but conclude that the importance of individual set of project management skills diminishes as the business systems thinking, leadership and relationship building capabilities grow stronger. This is because IS projects become smaller and the projects become business projects and project management responsibility is transferred to business managers. (Feeny & Willcocks, 1998)

Authors (Lee, Trauth, & Farwell, 1995; Todd, McKeen, & Gallupe, 1995) agree that IS professionals and managers need to demonstrate a mix of skills in three broad areas, which enable the development of the IS capabilities. Each capability described above has different requirements for business, inter-personal, and technical skills (Feeny & Willcocks, 1998):

1. **Technical skills** are especially important in the architecture planning and making technology work areas, but they are important across all core capabilities. This capability develops often over time as a result of experiences and can be defined as "understanding IT capability".

2. **Business skills** are needed for at least five IS capabilities: leadership, business systems thinking, relationship building, informed buying, and vendor development. Business skills are more related to understanding and absorbing information, building mental modes, and using those models for exploration.

3. **Interpersonal skills** are especially important in relationship building, contract facilitation, leadership, and informed buying. Authors have identified a lack of these skills amongst the technical employees.

2.3.5 Outsourcing provider capabilities

Feeny, Lacity and Willcocks (2005) identified also the core capabilities required from business outsourcing partner, which are parallel to the in-house IS capabilities introduced earlier. These capabilities are grouped into three domains: (1) *delivery competence,* (2) *transformation competence, and* (3) *relationship competence*. The first is related to how well

the supplier can respond to the client's requirements on day-to-day basis. The second domain relates to how well the supplier can deliver on formal and informal expectations of a customer, regarding providing cost, quality and functionality improvements. Relationship competence means the suppliers willingness and ability for seeking win-win relationships, which will align client and supplier goals and incentives over time. The twelve supplier capabilities, which are gathered under these three domains, include: *organizational design, planning and contracting, governance, leadership, customer development, program management, business management, domain expertise, sourcing, behaviour management, technology exploitation and process re-engineering*.

Figure **6** shows how the capabilities are grouped into domains and table 2 provides a brief explanation for each capability.
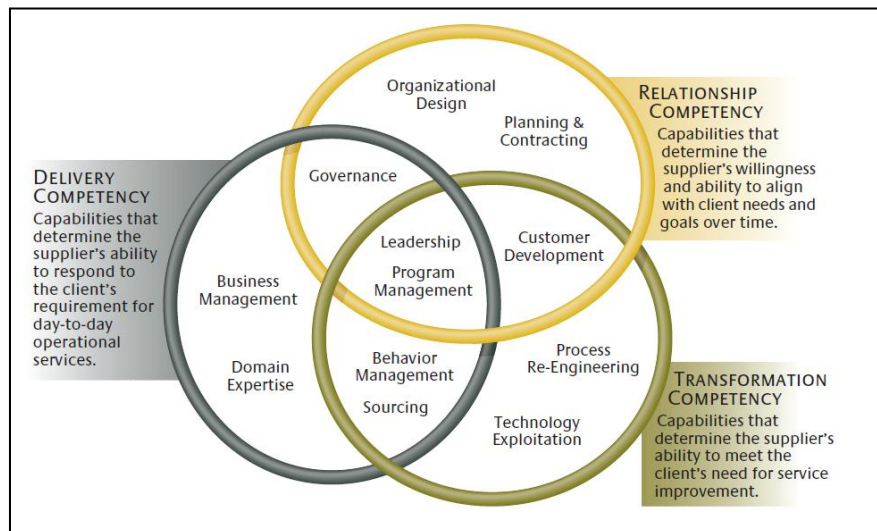
Figure 6: supplier capabilities (Feeny et al., 2005)

Table 2: core outsourcing provider capabilities

Capability	Description
Organizational design	Has the capability to deliver needed resources flexibly
Planning and contracting	Develops and executes win-win business plans, creates contracts with reward sharing
Leadership	Focuses on leading people, supplier's leader has personal relationship with customer leader, assigned program leader has a relationship with client top mgmt
Governance	Implements joint governance mechanisms and reporting processes
Customer development	Has personal contacts with customers to build understanding, works with client managers, creates relationships with end users
Program management	Has program, project and change management capabilities

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Business management	Meets both client service-level agreements and own business plans
Domain expertise	Applies and retains professional knowledge to meet requirements e.g. through employee transfer with customer company
Sourcing	Accesses resources needed to meet service targets
Behavior management	Motivates, manages and trains both internal and customer employees' to deliver superior service
Technology exploitation	Exploits new technologies to transform customer business
Process re-engineering.	Designs and implements changes to service processes to meet targets

Capabilities have also been looked from systems integration and integrated solution perspective. To successfully offer integrated solutions, firms must have both service- and product related capabilities. This implies a movement downstream for product-based firms and up-stream for service based ones. When researching the systems integration business model in the IT -industry Federica and Prencipe identified capabilities required from the integrator (2008). These capabilities have been discussed on a higher level including both technical and business consulting capabilities, operational capabilities, production capabilities and delivery capabilities. They concluded that the capabilities configurations may vary across firms according to their history and goals. For example, the companies that continue to sell their own products, e.g. software, keep the production, operational and delivery capabilities in-house and new capabilities are required for consulting.

3   FRAMEWORK OF THE STUDY

The theoretical discussion was divided into three chapters, which presented different aspects of systems and IS integration, transaction cost economics as well as resource based view of the firm and capabilities. Based on these theoretical discussions, this thesis investigates the external and internal challenges of systems integration from a TCE and capability perspective. This chapter introduces the framework of the study, which is based on the previous theoretical discussions.

From the previous literature on IS integration, the main conclusion is that it is much more than merely a technical task and especially organizational aspects need attention. Overall, systems integration can be viewed as a complete business model for even many manufacturing companies. This is corresponds with the introduced outsourcing partner and outsourcer capabilities, which also included non-technical capabilities like relationship management and leadership. The common disconnection points in the systems integration direct the study's focus also towards examining business-IS alignment.

TCE is used to investigate, which characteristics these transactions have and what challenges they create when combined with competitive bidding. Through capability discussions, the study focuses on identifying, which capabilities are needed from the service provider and the customer when producing the integrator service in co-operation. The study proposes that challenges for systems integration may from the lack of internal capabilities of the service provider and the customer as well as from the lack of shared, inter-organizational capabilities. The framework of the study is shown below in Figure 7.

Provider related challenges

- business management,
- program management
- customer development
- process re-engineering
- behavior management,
- planning and contracting
- technology exploitation
- organizational design
- domain expertise
- sourcing
- governance, leadership

Shared

Shared

Customer related challenges

- , Architecture planning and design
- Management & Contract facilitation
- , Leadership
- Informed buying
- Making Technology Work
- Internal relationship building
- Vendor Development
- Contract Monitoring
- , Business systems thinking

TCE challenges:

TCE challenges:

Figure 7: framework of the study

The framework illustrates the division of challenges into internal and external ones. The external challenges are the arrows in the corners and they include the challenges that the analysis based on TCE will reveal. The internal challenges are shown inside the large dashed bow and they are analyzed using capability discussions. The framework shows that capabilities from each party can become shared capabilities between the integrator and the customer due to service co-production. There might additionally be completely new capabilities and the previously found might not be relevant. This is represented as the empty and the dashed boxes. The study does not focus on the shared capabilities between the IS suppliers and integrator service provider or the customer, as the scope of the study is limited to the shared capabilities between the integrator service provider and the customer. This is why the IS providers are not included to the framework.

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4 METHODOLOGY

According to Silverman, (2006:15) the methodology clarifies the research methods and data sampling, collection and analysis forms used in the research. These areas will be discussed in the methodological section. In addition to these issues, the reliability and validity of the study are assessed.

4.1 Research method and selecting the case

The reasoning method utilized is *abductive*, as some leading theory and premises were set before the study but the theories were also revised when the research proceeded (Hirsjärvi & Hurme 2009, 136). Out of the thirteen conducted interview, first four were pilot interviews where the goal was to gain full understanding of the case company's business logic and to gain aid in developing the research questions further. After this, the research questions were finalized and theoretical discussion was developed further, before conducting the rest of the interviews.

The research was conducted as *qualitative study* because the aim is to find and expose, not to verify existing propositions, which in turn is seen as the goal of quantitative research. Qualitative research focuses on increasing the understanding of a certain area and it is explanatory in nature. (Creswee, 2003, p.22) It is helpful when the research phenomenon is unclear, completely new or little research has been conducted previously, as well as when new hypotheses are formed and when the searched knowledge is explanatory in nature (Creswee, 2003, p.22; Miles & Humerman, 1994, p. 10). Qualitative research does not aim to make statistical generalizations but to describe an event, to understand certain activities or to give meaningful interpretation for a phenomenon (Eskola & Suoranta, 1998; Uusitalo, 1991, p. 80).

The study was further conducted as a *single case study*. Case study is considered to belong to qualitative research stream where the aim is to understand why and how things happen. In reality, the evidence can be qualitative or quantitative in nature and multiple sources of evidence can be used (Eisenhardt, 1989; Yin, 1989). Case study investigates the dynamics

present in single settings and the research can include single or multiple cases (Eisenhardt, 1989). Usually, case studies concentrate on one or a few cases to understand unique phenomenon and providing a many-sided view of it (Eisenhardt, 1989; Halinen & Törnroos, 2005). Thus, the phenomenon is studied in its real-life context and it can be used when the boundaries between the phenomenon and the context are unclear (Eisenhardt, 1989; Yin, 1989). Case study method is also considered the most appropriate one when studying the early phases of new management theory (Eisenhardt, 1989; Yin, 1989). Miles & Humerman (1994) make similar suggestions as they state that case study is suitable when the researched phenomenon is unclear and when the aim is to understand how and why things happen.

The case company was seen as a suitable one as it has wide experience in offering different types of integration services. The management of the company was also interested in supporting the study and allowing data collection. Miles and Humerman (1994) state that multiple case studies are usually considered more convincing than single case studies. On the other hand, Yin (2003, p. 52-53) notes that when concentrating on one case it is possible to get deeper and higher quality information. In addition, multiple case studies may require substantially more resources. Yin (2003, p. 41) further states that single case studies are useful when the case is critical and it tests, extends or challenges an existing theory. This study was conducted as a case study because of the limited prior knowledge on the complex research phenomenon. Case methodology was chosen also because it allows the use of multiple sources of information. Furthermore, single-case study was chosen as it makes it possible to concentrate on one case where a deep understanding of the research area can be acquired. Also, as this study expands and challenges the existing theory of dividing customer and service provider capabilities due to service co-production a single case study method is suitable.

4.2 Data collection

The primary data collection method used was *semi-structured interviews*. According to Koskinen et. al (2005, p. 104-105), semi-structured interview is the most used qualitative data collection method in business studies. Semi-structured interviews are also known as thematic interviews because the interview is based on previously set subjects, *themes*. These themes direct the conversation between the interviewer and interviewee. In semi-structured

interviews, the researcher has set the questions beforehand but their specific form and order may change during the interview. The interviewee can answer them in their own words and digress from the subject and the interviewer can ask specifying and un-planned questions. The strength of semi-structured interviews is that they are free-formed but still controllable by the interviewer. (Koskinen et al., 2005, 105)

When using semi-structured interviews, *discretionary sample* is used instead of a sample (Hirsjärvi & Hurme 2000, p. 58-59). The thirteen interviewees were chosen by the Company X and the researcher to best represent the multiple aspects of the integration service. All of the interviewees had been associated with the integrator service and some of them had acted in the role of integrators. The list of the interviewees is located in appendix 1. The interviews were conducted in Company X premises and they lasted from one to two hours. The interviews were recorded and the tapes were then transcribed. The interview form can be found in appendix 2. The themes shown in the form were discussed with all the interviewees but due to the semi-structured nature of the interviews the outline was flexible and adaptive.

Besides the interviews, data was gathered from public reports, internal material provided by Company X and a work-shop held at Company X. These materials are used to allow *triangulation* to confirm the findings of the interviews.

4.3 Data analysis

Research method literature does not determine one correct way to analyze qualitative data (Hirsjärvi & Hurme 2009, p. 136). According to Eisenhardt (1989) the data analysis is the basic element of case study but it is the least controlled and most demanding part of it. The processing qualitative data includes many phases. According to Hirsjärvi and Hurme (2009, p. 136) it includes both analysis and synthesis. The analysis and synthesis phases are described below in figure 8.
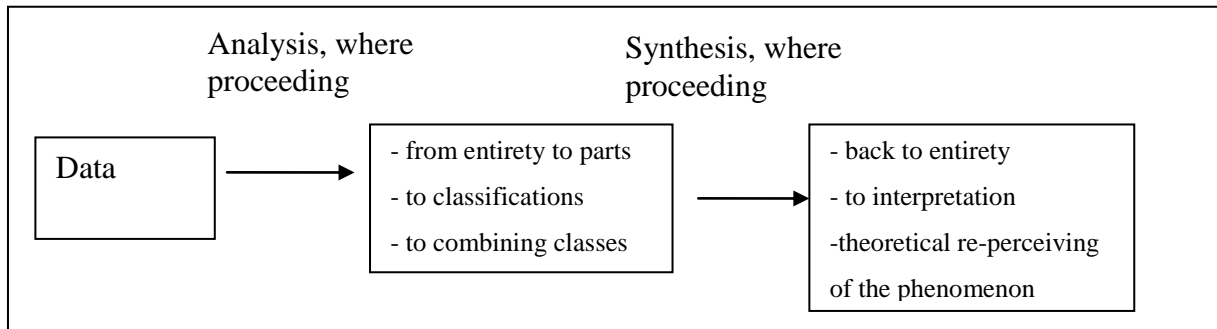
Figure 8: the processing phases for interview data (Hirsjärvi and Hurme 2009, p. 144)

The analysis typically includes reading the material, classifying it into parts, finding commonalities and reporting the results (Hirsjävi & Hurme, 2009, p. 144). The actual analysis here followed these guidelines.

First, the analysis included reading through the transcribed interviews. The next step was making summaries to have an overall picture of the material. After this, the summaries were divided into parts according to the common themes found in them, e.g. customer or co-operation related challenges. The themes were based on the theoretical part and the framework of the study. During the pilot-phase the theory was revised at this point before conducting the rest of the interviews. Later, the interviews were read again and the data was classified under the themes. Then, the classified data was analyzed and divided into more accurate sub-classes to identify the individual challenges from TCE and capability perspectives. After forming the final classes and writing the analysis based on the data, suitable quotations were chosen to demonstrate the validity of the study. The synthesis phase is illustrated in the discussions part of the thesis, where the phenomenon is analyzed from theoretical perspective.

4.4 Assessing reliability and validity

Overall, authors have identified four *reliability* and *validity* criteria, which have their basis in the positivist tradition (e.g. Gibbert, Ruigrok, & Wicki, 2008; Yin, 2009). These include reliability, construct validity, external validity, and internal validity (see e.g. Gibbert et al., 2008). The concepts of reliability and validity presume that the researcher has access to an objective truth. Their origin lies with quantitative research and their suitability to qualitative research has been debated amongst researchers. (e.g. Hirsjävi & Hurme, 2009, p.184-186;

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Koskinen et al., 2005, p.255-256) In short, reliability means the reproducibility of a study while validity concerns if the measures chosen measure what they are supposed to (Mason, 1997).

Internal validity means that the causal relationships between the variables and the results are well reasoned (Cook and Campell 1979, see Hirsjävi & Hurme, 2009, p.185). Three measures have been proposed to enhance the internal validity: (1) formulating a clear research framework, which demonstrates the causal relationships, (2) pattern matching where the empirical patterns are compared with previous research, and (3) *triangulation*, where multiple sources of data are used to confirm the findings (Eisenhardt, 1989; Yin, 1994, p. 104). All of these methods were used in this study. Triangulation was used when possible as the results of the interviews were compared and complemented with official material received from Company X, public sources and the knowledge gained from a work-shop held at Company X.

Construct validity relates to the question of whether the research uses constructs, which truly represent the researched phenomena. Yin (1994, p.33-35) has proposed three measures to increase the construct validity: triangulation, establish a clear chain of evidence, and having the informants view the draft of the study. In this study, all the three methods were used. Showing the chain of evidence is done by showing the quotations to which the conclusions are based on. Also earlier discussed triangulation was used.

External validity refers to the generalizability of the results to different situations and different contexts (Gibbert et al., 2008; Hirsjävi & Hurme, 2009). The results of case studies can be generalized to theoretical statements, not to a population (Eisenhardt, 1989; Yin, 2003, p. 53). Debate has also emerged between the external validity of single and multiple case studies. Cook and Campell (1979, see Gibbert 2008) state that clarifying the rationale for choosing the case and giving description of the case study context increases the external validity.

If the studied qualities in the study are due to change, reliability in this sense is not a meaningful concept. There is also another way to define reliability; here, two researchers should end up with the same results or they achieve a consensus after discussions. Achieving consensus is seen more reasonable as qualitative data is always under individual

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interpretation. The third way to understand reliability means that two parallel research methods achieve the same results. As interviews are context-related, achieving the same results by using a different method is unlikely. In qualitative study, reliability is better measured by the actions of the researcher, for example the correct transcribing of the material and taking all the material into account. (Hirsjävi & Hurme, 2009, p. 185, 189). Yin (1994, p. 33) further proposes that the reliability can be enhanced by producing a case study protocol, which shows how the study has been conducted to allow the reader to easily follow the researchers thinking.

5 CASE: SYSTEMS INTEGRATION IN THE PUBLIC SECTOR

After discussing methodological issues, the context of the study is introduced. It includes the description of the case company, the customer as well as the content of the service.

5.1 Description of the case company

The case company (from here on called Company X) is a large service company, which offers IT, R&D and consulting services to its customers operating in multiple industries. One of the industries is the public industry, which is the focus of this study. The company is experienced in producing both technical IS integration and consultative, managerial integrator services for the public industry. The interviewees had worked with four different integrator service projects, which all differed from each others to some extent. Integrator services can also drive the supplier company to a situation, where it operates in a *dual role*, being both the integrator and at the same time one of the IS suppliers, which the integrator evaluates and monitors.

5.2 Public organization as a client

The interviewees noted that public organizations differ from the private companies. The differences relate to goals, operating cycle, management style, purchasing behaviour and organizational structures. Instead of aiming to high revenues or efficiency public organizations aim to increase their budget and the number of their employees. The operating cycle is also considerably different between public and private organizations as the public sector's operating cycle lasts for a year, while the private counterpart operates in quarter-economy. This makes long-term development easier and more flexible than in private organizations. On the other hand, decision making is slower in public organizations and the whole process of competitive bidding is long and they are perceived stiff.

A major difference between public and private organizations is their purchasing as legislation forces that public organizations use competitive bidding. Before the strict competitive bidding, Company X was a strategic partner with its clients but current legislation makes it difficult for the client to form strategic partnerships without forming a joint-venture. If

possible, customers sometimes bypass the competitive bidding laws when buying something related to current contracts to ensure that the service remains with a certain provider. This kind of buying behavior has not increased as the customers are very cautious about the complying with the laws. Arranging and evaluating the tenders on the other hand requires strong know-how from the customer.

Another distinguishing feature of the public industry relates to their organizational structure and methods of working. As people are used to working in certain ways and have formed tight silos and groups within their organization, breaking the boundaries to deliver the service effectively is difficult.

5.3 Content of systems integrator service

Overall, the term "*integration/integrator service*" has many meanings and needs further clarification. Technical IS integration and consultative, managerial integrator service are highly intertwined and this thesis does not divide between the two, but is more focused on the non-technical issues, i.e. integrator service. Integrator service combines both management and technical perspectives and both types of consulting are offered to the customers by one or more integrators. It can either last a limited time during IS renewal or be long-term in nature where there is constant reflection over what should be done in the future.

In the official materials the integrator service is well-defined and includes nine areas: developing enterprise architectures (EA), program management support, architecture and technology management, transformation period planning, managing the integration services, systems development support, developing methods, procuration support, and quality management. The interviews or the workshop did not provide such systematic evaluation of the content of the service, but all of the nine parts were mentioned. The interviews revealed that the content of the integrator service is not easily defined and that there are many interpretations for it. There is no specific way of producing the service and it is rather "composed" together on the way and the content and depth of the service depend on the customer and the people producing the service. The service is provided in customer terms and even though there are systematic parts to it, it is very situation based.

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Integrator service is not a "packaged solution". In a practical level, it was noted that the main task of the integrator is to produce speech and paper, which tell what kind of solutions and how they should be produced from a technological perspective to support e.g. invitations to tender. Overall, the resulting guidelines need to be clear as their amount can rise to a substantial level due to the complex nature of the technologies and EA. The integrator service does not often include actual decision-making but it usually includes making documents, which will assist the customer in it. Actual competitive bidding is also usually left for the customer but can also be included in the service. Due to the required close interaction between the integrator and the customer the integrator can be seated to the customer premises. Especially, the managerial and program management related services are often provided in the customer premises and more technical ones from the Company X premises as the technical knowledge resides within Company X.

The public industry in Finland has sometimes outsources the systems integration activities. The secondary material revealed that for example, project A was undertaken by a large public organization aiming at the complete renewal of its information systems. After the competitive bidding, the technology integrator was chosen to provide the following technological integration services when acting as a total responsibility main-supplier: leading the technology project, creating-, up keeping- and developing the technological architecture, quality monitoring and technical support for the application projects, technical integration of the sub-systems, technical support for the transitional stage, managing and monitoring the operational services, technical support for the implementation of the sub-systems as well as delivering, up keeping and developing the technical infrastructure according to the technological architecture. Customer saw the operations of the technical integrator to be critical for the launch and the progress of the project.

From supplier perspective services are seen as a steady source of revenue in a situation where large IS projects are often unprofitable. IS projects are seen as a way to get close to the customer and even if they are unprofitable they can open the door for the profitable, long-term services. Overall, it was perceived that the demand for integration services is likely to grow in the future as technologies and environments become more and more complex.

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6 FINDINGS

According to the secondary data, there are many challenges in producing the integration service. Failures in the integrator service reverberated also to the systems delivery projects, making success critical. Here, TCE related challenges are identified followed by the capability perspective including customer, service provider and shared capabilities.

6.1 External challenges from TCE perspective

The external challenges are analysed here from TCE viewpoint. The discussion is divided into four parts: information impactedness, opportunism, asset specificity and finally uncertainty.

6.1.1 Information impactedness

There is high information impactedness between the service provider and the integrator, which is highlighted by the quote.

> *"It [integrator] oversees the whole thing. It is also the customer's representative there. It is customer's support and safety."* (Interviewee B)

Customers are having large IS -projects in multi-vendor environments where different systems are bought from different suppliers and later on these are integrated to form the complete system. Previously, customers had formed tighter relationship with few chosen IS providers but due to the competitive bidding and internal decision made by the organizations, this is no longer possible. This is why multi-vendor situations are still new to the public sector and they lack capabilities in handling them. Here, customers' responsibilities regarding architectures, system work methods, competitive bidding and managing the entirety are growing, but its capabilities have remained low. This had made the integrator service valuable. It was noted that if customers do not purchase an integrator, they are left alone to wonder how to integrate the result of a project into the overall system.

6.1.2 Opportunism

It was pointed out that customers fear opportunistic behaviour as it for example has raised concerns related to the dual role the Company X occupies when acting both as customer's representative in the form of integrator and as one of the IS -provider. Here, the concern was that the integrator could leak sensitive information, which can be utilized by Company X in the future IS -bidding competitions. The *switching costs* are also high as changing the integrator is challenging: The following quote further highlights this:

> *"It would be very hard for me to picture how someone else could handle this situation, maybe in the long term but how long this transformation stage last... In the short term to take control the whole technology- and information load that exists, which is enormous, it would have taken a long time"* (Interviewee D)

This makes the customer very dependent on the chosen integrator. Additionally, few companies in the market can offer integration services to these large projects as it requires substantial amount of resources, which small companies are lacking. The dependency and lock-in issues are a risk the customer has to take when purchasing integration services.

6.1.3 Asset specificity and frequency

As noted when discussing the content of the integration service, different people produce the service in different ways, it is provided in customer terms and it is highly situation based. Thus, the service is highly asset specific instead of being commoditized. The number of times the customer seeks to initiate the transaction is low as the interviewees noted that customers are often initiating the large IS projects for the first time. On the other hand, the service can last a long time during the whole IS renewal project.

6.1.4 Uncertainty

According to the data, there are two reasons behind the demand for integration service, which relate to uncertainty. First, technology changes fast, which makes it difficult for the customer with limited IT -related capabilities to understand or control it. Also, as the operations have been distributed to the Internet, there are many places where mistakes or service breakdowns

can happen making the situation complex. Thus, to get the overall usability on a high level a substantial amount of work is required.

Second, customers' environment is becoming increasingly networked in nature and thus, difficult to control. For example, interface changes can affect tens or hundreds of organizations, which makes customers worried over securing the functionality of the whole network. Additionally, knowledge and know-how are distributed among companies and people, which creates a need for someone to control it. Thus, the customer looks for someone who is willing to take responsibility over the whole network to administrate it, as shown in the following quote:

> *"It (the customer) is more alone and there are more moving parts, which is when it needs this kind of support person or persons, i.e. the integrator, consult or other entity that can control the new, wider playfield than it [the customer] alone can."* (Interviewee F)

6.2 Internal challenges from capability perspective

After discussing the TCE -related external challenges the focus is turned to the internal ones. The lack of customer, services provider and shared capabilities is a major source of challenges and they risk the success of the service.

6.2.1 Customer related challenges

First, the capabilities and challenges related to the customers will be covered. There are altogether three capabilities required from the customer: management and leadership, supportive organizational structure and informed buying of integrator services.

Management, leadership and commitment
Supportive and committed management is necessary for the service to succeed. Customers' management can create substantial difficulties for the IS -projects. For example, if the top business management is not a part of the IS projects and does not understand IT, they can launch irrational projects, which do not support the IT strategy. Also, authoritarian IT management is a problem as illustrated by the quote:

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"He's management style was very patron-like and when he was not there the whole thing fell apart... It might have made the actual architecture workers passive" (Interviewee D)

Delegating responsibility and power in the organization to skilful people was seen as a solution alongside adequate commitment. It greatly increases the chances of success if there are at least a few powerful people in the customer organization who are committed and whose goal is to take the project through. These people can then communicate further and motivate other people. The development work needs to be supported by the top management and management needs to understand that the development work is an important aspect of the organization's operations alongside law-binding authority actions. The integrator needs authority and power to influence these matters. Additionally, the management needs to be open and allow the integrators to communicate with e.g. their employees and encourage open communication. Strong opposition on the other hand creates additional challenges.

Supportive organizational structure

As discussed earlier, customer organizations are often somewhat stiff and siloed. Overall, the old structures and silo-like thinking hinders the development programs and makes it difficult for the integrator to have organization-wide initiatives and views. For example, the silos can be allowed to make individual decisions with their own budgets. Thus, customers lack an inter-organizational view to the development work. Moreover, the organizations have high change-resistance as people have been doing the same things for a long time and changes are seen as major stress-factors for the employees. On the other hand, during the change programmes, the organizational structure can change too fast as shown in the following quote:

"Different groups of all kinds are born, along the way there were reviewing groups and everything with the weirdest names. The aim was to control the entirety, but the groups themselves did not know what they were doing and what their power was." (Interviewee G)

Informed buying of integrator services

Previously, customers have been unaware of the struggles existing in IS projects as they leaned on a few partnership providers. Currently the customer needs to take responsibility over the entirety as explained by the quote:

"It was a big surprise for the customer of how much work the integration really requires and how much grey areas are left for it to concern." (Interviewee J)

Overall, the main issues are that the customer does not understand it needs the service nor the content of the service. These quotes represent the situation:

"We are going to, could I say, grey areas where the customer does not realize it needs them [integrator services]" (Interviewee B)
"Sometimes it seems that (integrator) is taken too late in the extreme need. Or with too loose groundings, when the program has not been planned and it is unclear of what is actually required." (Interviewee H)
"The customer buys integration service for 400 days and.. they do not know what they need it for and what the benefits are" (Interviewee F)

For example, customers do not understand that they can need management-related services because they want to control the managerial issues themselves, and purchase only technology-related services. Even though the integrator tries to push the service to the customer, public clients face difficulties in changing the contracts once they are agreed upon as budgets had been fixed and decision making is slow.

Both understanding the benefits of the service, and the needs for it vary unit and manager wise. Overall, business units understand the benefits better whereas IT units often see the services too expensive. Still, IT is the main unit who purchases of the services as the integrator often becomes a part of the customers IT management. Overall, interviewees noted that business could be more involved in the purchasing process especially regarding the managerial services because the actual operating methods should be considered, not mere

technology renewal. Understanding the need for the service can be dependent on individual IT managers and changes in the personnel can for example seize the purchasing of the services.

The competitive bidding was seen as challenging with purchasing the integrator service. It was noted that in the public sector it was hard to affect through trust as the bids are given points according to what is written in them. Thus, the points are given according to beforehand set metrics. Only if the prices of the offerings are nearly the same, trust can affect the decisions of the customers. Other interviewee claimed that trust is the main decision criteria when purchasing integration services, compared to price being the main criteria in IS purchases.

Table 3 concludes the three customer related challenges and the capabilities, which are needed to overcome them.

Table 3: Customer related challenges

Challenge/ capability	Description
Management & Leadership	Having supportive and committed management, not too authoritarian
Supportive organizational structure	Crossing silo boarders to have an inter-organizational view
Informed buying of integrator services	Understanding the need for integration services and the benefits it brings

6.2.2 Supplier related challenges

Here, the seven supplier -related challenges are introduced. They include management and leadership, supportive organizational structure, domain expertise and training, sourcing, technology exploitation, dual role management and understanding customer needs.

Management and leadership

On company management level, setting future targets for the integration service is difficult as the interviewees felt that management is yet to understand the potential of the service and has not included its strategy development. In order to develop the service further Company X should focus on internal marketing towards e.g. the sales department. As the IS development projects are often highly competitive and have fixed prices they can result in negative financial gains for the IS providers. Thus, it was seen that Company X needs to shift its focus

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to the integrator services and that the main services would relate to requirements, program management and planning as well as execution monitoring, thus leaving the actual coding and execution to be outsourced. This is possible as the success of the service does not necessarily depend on Company X's control over IS development. The next quote illustrates these ideas:

"This company needs to understand what this [integration service] is about... Make the decision that this is the future strategy" (Interviewee B)

On a similar note, it was proposed that in the future the company should focus more on overall consulting work as this work would remain in Finland as it is done with close proximate to the client. The development work on the other hand was seen to be fleeting to low-wage countries.

Opposing views were also present. It was noted that abandoning planning and execution can be risky as customers often prefers that the integration is done by one of the IS suppliers. If Company X would not be an IS supplier, the integration work could slip away. Thus, remaining in the planning and execution work also received support. In addition, some believed that the plan and delivery of information systems was the right choice as it can lead to consultancy and architecture work. Also, it was pointed out that Company X needs technical experience to be able to do the integration work and that this experience can only be gained by doing the planning and execution work in the IS projects. Thus, the company should remain with the planning and execution rather than opt primarily for the integrator role.

A related challenge in the business management domain is that the employees have limited time to use on internal development due to the high revenue targets. It was seen important that the Company X looked ahead and focused on what it wants to sell in the future, not merely cutting costs, which was seen to be the current goal. Also, it was seen important that the service development work would be someone's responsibility, represented by the following quote:

"In my opinion the integrator service should be someone's responsibility.. I think the integrator know-how is scattered around here." (Interviewee B)

In the integrator service the leadership work is left for the integrator. As noted earlier, the content of the integrator service is dependent on the integrator himself. For example, the integrator can choose to use specialists for making proposals or to include also the customer to this work. The integrator needs to get along with different people and the customer can be very meticulous on who it allows to work as an integrator. This is because customers are cautious about sharing confidential information with the integrator as the integrator communicates with third parties who could utilize it. Thus, strong trust is required between the parties. To achieve this, the integrator needs to be both flexible and firm as illustrated by the quote:

"It will not work if the [integrator] is not reasonably flexible and firm.. to build the credibility, he/she needs to have the courage to tell the customer sometimes, that listen to me, you are going completely to the wrong direction." (Interviewee A)

Supportive organizational structure
The customer had the problem of siloed organizational structure and similar issues had also been present in the supplier side as illustrated by the following quote:

"The worst problem was that we were so siloed and these silos did not communicate with each others. If they did, they sent each others bills" (Interviewee E)

The above quote describes the situation in Company X before recent organizational changes. The new, matrix-like organizational structure was seen as an enabler to communication and also resolver to resource shortage, which the previous silo-structure was not. In the new organization, experts are located in a service line, from which all industries can utilize them. Thus, the supply of expertise is improved.

Domain expertise & training

Unified domain expertise regarding the integration service was seen difficult since there is no common way of producing the service. Additionally, there are few examples on what the service is in practice. Finding the right type of integrator for each situation is important but challenging as the integration work is demanding and requires long commitment. Commitment is important as changing the integrator is problematic due to gained knowledge of the complex projects as well as of customers and their operations. Some suggested that commoditizing the service would diminish these issues as illustrated by the following quote:

> *"It should be more commoditized... We should have identified what we do and what kind of documents are needed. We have a lot but... Then it's nothing more than replacing a part of a machine with a new one. One that can use that machine..."* (Interviewee b)

There is a constant shortage of people with the necessary skills to do integration work. An often proposed reason behind this was that there is no formal training for the integration work. Formal training for the position is also difficult since the service is always dependent on the customer and the integrator: some integrators are more technologically tuned and some more business and project focused.

Sourcing

One interviewee noted that sourcing is important when starting a large program as the resources and know-how need to be available both internally and externally. Externally the resources are acquired as knowledge transfer or personnel from the market. Also, the need for outside expertise needs to be noticed in the beginning of the projects. Finding the right expertise was identified as a bottleneck in the projects. When discussing Company X's partnerships, it was noted that the company has supporting technology and infrastructure suppliers. It also has subcontractor consultants, which are planned to be aligned under a larger company-level contract to cut costs. Sourcing can also be seen related to the strategic direction of Company X: if the focus should be on execution work or not and whether Company X should focus more on consulting and advisory role. If focusing on the latter, sourcing the execution work to low-wage countries was seen likely.

Technology exploitation

Technology has become very complex and different layers have their own experts, making it impossible for one person to understand large entireties like in the past. The movement towards service-oriented architectures is challenging as it makes interfaces and integration more complex. Also, it creates a completely new management layer as someone needs to be responsible for the shared services and ensure their functionality. Besides SOA, the growing interconnection between governmental units was seen as a driver to the growing complexity of the technological integration work. Using completely new and even incomplete technologies is likely to create surprises and thus, it is important to involve someone experienced with that specific technology to the project. Furthermore, how technology is utilized is the most important aspect, thus one should not select too old or too new technology but the key issue is to managing and synchronizing the projects and multiple, virtual test environments.

Dual role management

Dual roles exists when Company X acts both as systems integrator and as IS provider as the integrator monitors the IS providers, supplies them with shared components, and formulates documents directing the development work. Dual role management has three sides to it: (1) IS provider view, (2) Company X internal view and (3) customer view.

From IS provider standpoint there is concern over the neutrality of the integrator towards Company X and other IS suppliers. This gains support also from the secondary data, where the main critique from the customer towards the integrator concerned the quality of the services provided to the different delivery projects.

Dual role problems exist also within Company X. This is because there is a lack of understanding of the integrator's role as a customer representative compared to the role of being a Company X employee. The dual role can be even more demanding internally than towards other IS suppliers. Company X employees have been very critical towards the integrator, as the integrators are strict about being customer representatives and protecting their credibility. As the integrator aims at being credible towards the customer it is very

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cautious about leaking confidential information to Company X other employees. This dilemma is illustrated in the quote:

> *"It is difficult to bow to two directions. If you strive for the customer's benefit, your own people inside the company blame you for not doing your job, and the other way around customers say that you drive your own interest"* (Interviewee C)

One interviewee even noted that the integrators provide Company X with *too little* information and that information provision was one of the weak points of the service. From the individual integrator's point of view, the dual role can also be problematic as the he or she needs to be aware of the role taken at any point in time:

> *"We were also making bids and evaluating them and it is a very confidential situation as I was in quite awkward meetings where I was representing the customer here in our facilities. We would discuss the bid and my colleagues were sitting in the same table. I was in a very schizophrenic role a few times.."* (Interviewee G)

It was pointed out that the dual role brings also doubts from the customer because customers question the neutrality of the integrator in evaluating and monitoring the IS providers. Here it was seen important that the recommendations were made fairly, the integrator must also consider the products and services of other providers and not favour the Company X in any sense. The credibility is built by being equal towards all IS suppliers as shown by the following quote:

> *"Let's say that customer also had doubts from individuals. So we had to always earn our credibility... It clearly came from being equal to all suppliers."* (Interviewee A)

The interviewees understood customers' doubts and saw them understandable in a situation where the integrator has information on a subject that will be under competitive bidding in the

future and the Company X is to participate in that competition. These conflicts of interest were seen problematic. Others viewed this as a part of the service and others stressed that the important matter is to make the customer understand that this is not a problem. Customer can also forbid the integrator from taking part in the systems provision, which removes the issues resulting from the dual-role regarding the customer.

Understanding needs

Understanding customer needs was seen problematic from two perspectives: not knowing them makes it difficult to provide the service and knowing them too well makes Company X's bids too expensive. When selling the integrator service, customer needs can be clarified by first offering the customer a shorter consulting period and offering the actual integrator service after this. In the technical area of the integration service, for example the architectural requirements, the responsibility for discovering customer needs lies with the integrator as the customer itself does not know its needs:

> *"If the customer knew what it needed in this area it would not need the consultant in the first place"* (Interviewee L)

The customer-related expertise was seen both as a blessing and a curse by the integrator in the IS competitions:

> *"Our challenge is that we know the customer needs, we have worked there long and know them well enough, so even if they [needs] are ill-defined we.. know too well what is going on. Competitors do not and then we lose the sale. It becomes too expensive that way."* (Interviewee L)

Service production was also discussed. The service needs to be produced so that the customer can understand it. The integrator needs to be careful not to provide the customer with too technical or theoretical information, which the customer is unable to utilize or understand due to limited understanding. This is important as the integrator is responsible for the solutions it proposes.

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Table 4 summarizes the service provider related capabilities and challenges.

Table 4: Service provider related challenges

Challenge/capability	Description
Management and leadership	Strategic focus to services, management support and selecting the integrator
Supportive organizational structure	Crossing silo borders to enable effective resourcing and communication
Domain expertise & training	Commoditizing the service, adequate training
Sourcing	Effective utilization of internal and external resources
Technology exploitation	Balanced technological choices
Network and dual role management	Managing the network and dual role towards customers, IS providers and internally
Understanding needs	Understanding needs, balancing costs, producing the service in customer terms

6.2.3 Shared challenges and capabilities

In this chapter the shared challenges are clarified. This means that the challenges relate to both the customer and the supplier and that the two parties share the responsibility over them. There are altogether ten shared challenges: informed buying of information systems, contracting and shared-revenue agreements, technology architecture and design, program management, contract monitoring and ensuring value delivery, co-operation development, network management and problem solving, building business-IT alignment, governance and role clarification.

Informed buying of information systems

The customer faces many issues when purchasing of individual information systems. As public organizations have little experience with large IS projects they often lack the understanding of the magnitude of their responsibilities when they enter to competitive bidding in multi-vendor projects. This results in large grey areas in the individual invitations to tender. Furthermore, there is tough price competition between IS providers who thus restrict their offering and lower quality, while charging the true income from alterations. Extra revenue is derived from the upkeep and operational services, which require a lot of work if the system is of low quality.

Being a good buyer who listens to experts and is open was noted as an important feature for a customer. Reducing the importance of price in the bidding competitions is an important

ability for the customer. Thus, the customer should be able to evaluate the quality of the systems and its life-time costs, instead of mere purchase-price. It was clarified that this problem has its roots in the competitive bidding laws: customers are very cautious about evaluating the tenders with other metrics than price because there is a risk of Market Court if other suppliers feel they lost un-fairly. Market Court hinders the project substantially as it might take years to get a decision and the project running again. This obviously creates additional costs to the customer.

The integrator can help the customer with these issues, which makes this a shared challenge. It was stressed that the customers especially need help with the technical requirements appendixes included in the tendering documents. Correct form of these documents ensures that the IS providers are able to offer the right products and solutions to the customer. One interviewee noted that he had never witnessed a perfect document where the provider did not need to wonder what the customer wants. Also, sometimes providing the technical documentation for the customer is not enough: if competitive bidding is left for the customer, the risk is that the customer fails to produce the needed invitations to tender, as it may not understand the technical documentation and the underlying EA. In this case, the IS providers answer with their bids for the asked system, which might not be supportive of the overall EA.

A proposed solution was a negotiation or consultative method where the customer first chooses from three to five suppliers based on applications with whom with it discusses with. During this process the customer's capabilities and understanding increase. Other interviewee thought that the solution to this problem is to include the integrator to the competitive bidding to ensure that the invitations to tender answer to the customer needs. Here, the customer can merely sign the invitations, whereas the integrator can take the lead due to its experience and understanding. The following quote represents this:

> *"They requested the wrong things and also I realized they did not know how to write down what they wanted and little by little I [as the integrator] learned to see what they really wanted"* (Interviewee G)

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One of the interviewees noted that the purchasing abilities have not been developing with every customer and the differences between organizations have grown. This was seen to be dependent on the size of the organization, meaning that the smaller ones are more unaccustomed with IS procurement and have lower abilities, whereas the bigger ones are more advanced.

Contracting and shared-revenue-agreements

Contracting is a shared capability as Company X and the customer form the contracts in co-operation. Overall, contracting is difficult as customers often have difficulties on drafting the appropriate contracts and service-level-agreements and closing a contract can thus last well over a year. It is quite rare that there are shared-revenue-agreements between the integrator and the customer. Only one interviewee told that in a problematic situation they had offered customer an integrator to solve a network service problem and if the integrator would not solve the issue, the customer would not have to pay anything. When the problem was resolved, the customer was satisfied and happy to pay for the service. This sort of "benefit based" pricing is risky as third parties might be unwilling to cooperate causing the service to fail. Thus, a risk premium is necessary.

Technology architecture and design

The technology and architecture issues were discussed mostly at the EA -level. Technology architecture and design was seen problematic due to customers' out-dated technology, lack of foresight and alterations made with limited EA considerations, reflected by the quotes:

> *"The software is out-dated and it starts to become a patchwork and it is hard to tear down or convert to anything."* (Interviewee B)
> *"The whole EA-picture is founded on foresight, the architectures need to planned beforehand and the strategy, the plan, the roadmap of how we move forward."* (Interviewee G)
> *"When adding new technologies and applications to the current one the risk is that these projects do not support the overall architecture of the company."* (Interviewee G)

The integrator can be involved in planning the customer's EA in varying degrees. The secondary data showed that Company X integrator had also received critique for providing too superficial technology-architecture related guidance, tools and procedures. The interviewees felt that customers can learn the importance of the EA-thinking from the integrator, which is why it is a shared challenge. Overall, it takes a long time, from two to three years, to explain the importance of EA to the customer. The problems in the architecture work are related to the competitive bidding, which results in information blackouts as the other end of the system is not discussing with the other and there can be so many parties affecting the overall system:

> *"The individual supplier sees that their responsibility ends where the operation of their application ends, and not to ensure the functionality of the system from one end to another"* (Interviewee I)

With some customers there had been substantial problems with the individual customer organization silos not complying with the planned EA. The problem was that even though the IT management had purchased the integrator for support it did not enforce the EA companywide and silos were allowed to hire their own architects. The quote highlights this:

> *"The project managers bought their own EA-architects from another company. And there we were with the enterprise architecture created by us, and our integrator services and the ones the others had purchased. In the last year we then fitted them together, as they were represented with different concepts, and we tried to fit them together"* (Interviewee G)

This can be seen as an evolutionary model as building an overarching architecture over the large organization at once is challenging. This "silo-architecture" was still not seen as the best method as there were few links between the IT management and the silos and a lot of information resided with the IT management and the integrator.

Program management

Program management itself is a wide concept and almost anything can be placed underneath it. In short it means controlling the customer's program portfolio and the possibly many projects present in a single program to ensure that all the projects support one another and the common goal. The risk of performing them individually is that they drift too much apart from the common goal. Even the program manager can be offered by Company X. As both the customer and the integrator take part to program management, it is a shared challenge.

From the customer perspective program management was described challenging beginning from project planning and management. The root causes are again customers' lacking understanding over the magnitude of a large IS project and limited experience but sometimes also under qualified employees. This creates lack of realism, represented by the quote:

> *"[Customer problems are] underestimating the time, work and own know-how in all aspects"* (Interviewee C)

Furthermore, some customers think that after the architecture plans are clear they can simply begin taking the projects further and thus, fail to see the importance of guiding the work with for example different program offices. Also, if the customer organization is not able to change with the program, it drifts into chaos creating "*fire-fighting work*" for the integrator. This is opposite to the long-term goals of the service aiming to avoid in these kinds of situations in the first place. Additionally, some customers are taking too big leaps instead of managing the projects one by one. Some customers also lack the readiness to make decisions and they lean too heavily on the common planning meetings. This results in too little effort from the customer and trusting the integrator without orientating oneself enough to the matters being decided. These issues are illustrated by the quote:

> *"Those are the most central ones: decision making, preparations and taking responsibility. The one with the responsibility in the end is the agency and the people there... They cannot say that it was the service provider, not us"* (Interviewee A)

Other problems at systems development level in the customers' side relate to the limited input requested from IS suppliers, lack of responsibility over the entirety regarding the actual process of implementation, and lack of adequate testing during the whole development life-cycle. Thus, the customer's control should be strong in guiding the shared working methods and processes as well as systems work methods, as shown by the following quote:

> *"...the problems] relate more to the processes and working methods, there should*
> *be stronger leadership over the entireties."* (Interviewee I)

Contract monitoring and ensuring value delivery

In contract monitoring it is important to develop performance metrics for the integrator service. For example one metric could be the diminishing number of the multi-vendor problems, for example delays. It was stressed that the performance metrics should be different for each case as the service varies. Metrics are also difficult to set beforehand when there is limited information about what the exact problems are. As the integrator service is labour-intensive and constantly charged, the customer sometimes thinks the service is too expensive and has difficulty in identifying the value it creates. The following quote highlights this:

> *"In this kind of a service the basic problem is measuring from the customer side.*
> *In what way the customer can think it has received value."* (Interviewee A)

This received support from the secondary data as well as it shows that customers have evaluated the measures to be favoring of the integrator, as for instance it does not sanction delays. Additionally, sometimes there were no measures at all. To avoid these issues, the metrics should be set in co-operation between the customer and the integrator.

Not understanding the value that the integrator can bring makes it difficult to demand value delivery for the customer. Customer complaints state that the consultants only write down customer's thoughts and do not bring real value. Furthermore, it was seen that customers are becoming more and more cautious on how the integrator spends time and thus, require more clarifications from the integrator in the forms of different reports. One of the interviewees was even concerned about how many actual workdays is used on reporting and the additional costs

it creates for the customers. Thus, the integrator needs to be able to explain the value of the service to the customer:

> *"...today the challenge for the supplier is to show the benefit. To create a common understanding of what the integrator can do"* (Interviewee H)

As this understanding is a prerequisite for the customer to be able to demand value is ensuring value delivery a shared challenge between the integrator and the customer.

Co-operation development

From the vendor's point of view the issues of co-operation development relate to building trust and strong relationships with the customer. Building them is difficult if the wrong integrator has been chosen in the first place. As noted earlier, some integrators are more technical and some more managerial and thus, one person is not suitable for all situations. Changing the integrator in the middle of a project can be problematic as well. The issue is not only the change of the integrator or other important personnel but how this is *communicated* to the customer especially regarding the replacement. This is how the continuity and the trust in the relationship are ensured.

The relationships between the customer and the service provider are highly personalized. It was noted that if the customer's organizational structure changes fast, the service in practice operates through the key personnel and their relationships. Other interviewee thought that the co-operation had become more difficult due to the competitive bidding as customers feel that they are not allowed to openly discuss with single service providers as they think need to talk with all of them. This results in withholding information, which is always challenging.

Network management and problem solving

The integrator work was described to be highly networked in nature and it was noted that the customer often has limited time to nurture its network. Network management includes also connecting to the wider external stakeholders like ValtIT, who is responsible for controlling the IT activities of the whole public administration. The stronger the trust between the integrator and the IS -providers and the better information exchange between the parties, the

better the integrator can fulfil its tasks of being the customer's support. It became clear that the different IS providers have difficulties in their co-operation. For example, if one company had delivered the requirements and another had planned the execution, parties often tended to blame each others. These co-operation problems between the IS suppliers create challenges for the integrator. The integrator services were seen important for ensuring the operability of a multi-vendor situation by some, but contradicting views were also presented described by the quotes below:

"It is strange.. There is some kind of a guilt-factor and they [IS providers] start to blame each other's" (Interviewee B)

"It is evident, that there is sometimes need for co-operation amongst the competitors and it is everyone's benefit when the customer is satisfied, it will not bring anyone benefits or plusses if the customer is unhappy, no matter where the cause lies.. The integrator on the other hand is there to watch how the whole chain works" (Interviewee A)

"The question is about how the services are described and defined, how the interfaces work, how the overall co-operation works and also how contract-wise the thing operates... I think it has more to do with people and the way things are organized... If the customer buys the [integrator] services from us, it might and likely will make it [the co-operation] easier, but it can also be that it does not" (Interviewee G)

The co-operation problems are not due to distrust between the providers but rather because of the competition between them. Thus, competitors are not focused on achieving win-win situation but rather blaming the failures on others and claiming the credit for successes for themselves. The integrator needs to focus on building trust within the network to promote "*common-good-ideology*". The methods used for creating trust were constant communication and meetings where problems and the responsibilities for their corrections were identified. Besides building trust, a solution for the cooperative problems was suggested to be to have one clear main-provider and other smaller ones. It was also seen that an administrative integrator can only support in the customer in problematic of multi-vendor environments and in program management, but that the end-responsibility still remains with the customer.

Dividing the technical and managerial integration between two providers was also seen problematic, as it can result in fewer encounters between the two.

Network management skills were also seen to be important in a situation where the customer does not allow the integrator organization to take part in IS provisions. Here, Company X opts for utilizing its partners to have some control over the situation and ensure that the work is done with high expertise.

Problem solving relates to making technology work and offering customer support. The challenges have their roots in the network management. The secondary data showed that the customer has criticized the integrator for not accepting responsibility over the problems and clarification requests from the delivery projects. The primary interview data on the contrary showed that the integrator can assist the customer in finding and clarifying problems in the systems but the end responsibility remains with the customer. The problem is that in a multi-vendor environment it is not clear who is responsible for faults. Overall, achieving high usability is challenging in a highly networked environment, which creates service breakdowns and dissatisfaction amongst the stakeholders. Clarifying these issues takes a substantial amount of work and testing from the integrator and different IS suppliers. In addition, the players tend to blame each others, withhold information and hide problems making problem solving even more challenging as highlighted by the quote:

> "*The fact is that in this kind of competitive arrangement, where the suppliers in the multi-vendor environment are in active competitive situation, you can't say that "okay, the others withhold information but we won't", in reality everyone withholds information*" (Interviewee I)

These situations have resulted in delays and increased costs to the customer. One interviewee put a lot of weight in following common processes in preventing the problems in the first place:

> "*So many things would be fixed if everyone knew the processes, understood them and acted according to them... We develop technological solutions and sometimes*

I get the feeling that customer A is not getting the benefits... We are lost there somewhere and suddenly someone starts to do something without knowing, that there already exists a solution for it. Plus if there are usability or other problems, we should start from the processes instead of reclaiming individual incidents. Not so, that bosses once a month look that this did not go well or this went quite well" (Interviewee I)

Business-IT alignment

The lack of business-IT alignment in customer organization is an important challenge where integrator can assist. The problems include the possibly differing wants between the two units, difficulties in elicitating requirements from the business, and the limited role of business in IS projects. A special feature in the public industry is the division between the *field,* where the requirements should come from, and *central management*. It was noted that the architecture in the development stage should be centralized, whereas the requirements phase should be de-centralized to include the field.

The data showed that having an IT manager who understands processes and business is really helpful but also rare. In some organizations the process-world is well understood due to IT unit's active role in the process re-engineering. The business side on the other hand can be annoyed with resources being spent on technology due to their limited understanding of IT's importance for the organization's operations. Additionally, the business can overlook the architectural decisions made by the IT department. These issues were not seen so much related to know-how but rather to attitude and narrow perspective:

"..the narrow view of not seeing technology.. Today technology is not used to automate routines but to do completely other things, to improve the operations and that really requires the management as a part of it" (Interviewee F)

The problem with the missing alignment is connected to the success of the integration service. It was said that in some cases the integrator communicated more with the IT department and if the IT department lacked a business view due to the missing alignment, the view the integrator received was incomplete. Also, only a part of the business managers and silo

managers communicated straight with the integrator and thus, the business view was not received from there either. What the integrator could do in its part in these situations is to take initiative towards the business management.

Encounters between IT and business are essential but that in practice the two can be quite far from each others and they often try to avoid one another due to historical working habits. It was noted that the integrator should try to change the old communication and working habits of the customer organization and thus, carry responsibility in building the relationship between the customer's IT and business departments, as further illustrated by the quote:

> "*From their [integrators'] capabilities the shared understanding and vision sort of depend. If it does it well it glues together the difficult, technical IT stuff to the business manager's viewpoint.*" (Interviewee H)

It was pointed out that the integrator can also monitor IT projects to diminish the issue of the projects not supporting the IT strategy. From a wider perspective, customers' IT governance was identified as a challenge. Customers can ne unable to build appropriate IT governance suitable for its own organization and situation.

Governance

The problems in governance were seen to be related to responsibility and power. Overall, customers easily want that the integrator takes a lot of responsibility over governing the projects but on the other hand is unwilling to give power to the integrator, as shown in the quote:

> "*It [customer] wants to keep the power to itself and often we quickly come to realize that power is also money... So we have the responsibility over the decisions but not the power to execute them and then we are in trouble*" (Interviewee C)

There are usually many types of different management groups and meetings where both the customer and the integrator attend. There are also feedback-sessions and meetings amongst

the suppliers, customers and the integrator but they happen mostly in problematic situations and are not continuous in nature. Different groups are responsible for different areas like architecture, program management or budgeting, they change fast, and there are many connections between them. It was stressed that if the connections between the groups are wrong and the groups do not discuss with each others, the governance structure does not work and the integrator service alone cannot fix it. Here, the governance model should be rebuilt. This cooperative nature of governance makes it a shared challenge.

Role clarification

As discovered earlier, there are many interpretations for the integrator service. One interviewee noted that it is important to clarify the roles of the different parties, and what the customer expects from the integrator and the other way around. The secondary data also revealed that overall there can be unclear responsibilities, plans and work in the projects. Continuing this, planning meetings between the customer and the integrator are important tools:

> *"It clarified some things for a while and sharpened the operations, until then, as with all things every time, for a while we noticed that this is how it is supposed to be but little by little slipped back to the normal, old ways.* (Interviewee A)

These meetings are too rare as often the project is in a hurry and the practical issues take the time. Feedback meetings between the integrator and the client are for developing the service further. The problem is also that there is no formal discussion within Company X itself, as to what kind of a role the integrator aims at. An interesting finding is that the role also changes over time and thus, it needs to be re-evaluated from time to time. Another issue in this area is that changing the role from e.g. IS provider to an integrator can be difficult for Company X once one role has been selected.

The problems resulting from lacking role clarification can affect the project further one. For example, the customer can notice during the project that the integrator is disqualified to perform some part of the project as the Company X is one of the IS providers. The secondary data also supports the importance of role clarification. The customer views that in one case

Company X did not act as a total-responsible integrator and partner but rather as a technology consultant. This forced the customer to substantially increase its efforts towards in planning and managing the integrator as well as other operational activities. Role clarification should be done well in advance to avoid making changes in the middle of the project.

Table 5 summarizes the shared challenges and resulting capabilities.

Table 5: Shared challenges

Challenge/capability	Description
Informed buying of information systems	Understanding life-time costs and other criteria besides price
Contracting and shared-revenue agreements	Drafting good contracts in a timely manner, using shared-revenue agreements when suitable
Technology architecture and design	Out-dated technology, lack of foresight, overlooking EA
Program management	Understanding the importance of efficient program mgt, correct estimations
Contract monitoring and ensuring value delivery	Developing metrics and ensuring customer understand the value
Co-operation development	Building trust and strong relationships
Network management and problem solving	Enabling effective co-operation, resolving technology related problems
Business-IT alignment	Aligning business and IT and creating shared understanding between the two
Governance	Balancing responsibilities and power
Role clarification	Creating and up-dating shared understanding over roles and responsibilities

6.2.4 Skills underlying capabilities

The underlying skills behind the capabilities are introduced next. First, technical skills are briefly analyzed, after which the business skills are looked at more closely. Finally interpersonal and communication skills are investigated.

Technical skills

Technical know-how and -understanding differ largely between customers especially as the customers are public organizations. Domain expertise, informed buying of information systems and integration services and architectural design and implementation all require a substantial amount of technical skills. Customers with strong IT management often want to keep the integration in-house instead of outsourcing it. Often the customers do not have highly developed technological understanding. This was seen understandable due to the lack

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of experience of the customers and the fast changing technological environment. The un-attractiveness of the public sector as an employer for the high-skilled and high-waged IT specialists can also be seen as a reason. It is necessary that the customer has some control over IT management and operations as well as understanding of systems development and upkeep. The integrator services can assist the customer in this knowledge acquisition. Also, one of the interviewees noted that the technological parts can in the future be controlled by the customer as it learns, whereas the customer is more and more in need of managerial and business consultancy.

Business skills

Overall, the success of the service is dependent on human factors and not technology. These factors include the co-operation and communication skills and understanding business to ensure that the right projects are started. Business skills relate to the ability to quickly absorb new information and understand business. The lack of business skills relates to management and leadership, informed buying of information systems or integrator services, program management, business-IT alignment and organizational structure. From the Company X's perspective business skills and understanding business relate highly to understanding the importance as services as a business opportunity.

Interpersonal and communication skills

Interpersonal and communication skills are the foundation of the service as customers participate in the service production as the idea of the service is to build it together. These skills are especially important with management and leadership, co-operation development, building business-IT alignment and role clarification but they underlie all activities. Co-producing the service is a good way for the integrator to receive information from the customers regarding for example customer processes. When customers participate in the services and they can learn from the co-operation, as illustrated by the following quotes:

> *"There we also transfer our know-how there and there is also this kind of conversation all the time, so the customer learns and both the customer and the integrator can test their thoughts with the other."* (Interviewee F)

"Consulting should specifically advance in customer terms, it is a shared understanding process." (Interviewee G)

One of the problems of the service is the lack of adequate customer participation, which is necessary in a situation where the integrator does not have complete responsibility over the project. When the customer learns during the service it should take a more active role in the service production. Overall, a shared language and vision, trust and working together are the keys to successful co-operation. The main challenge is not to get the technology to work, but rather the co-operation, which makes communication skills essential. The following quote highlights communication problems:

"When customer X was discussing with the integrator, it did not say we, it said you. And when it is beautifully spoken that we together plan, but at the point when problems arise it is you." (Interviewee C)

Additionally, it was seen necessary that there are changes in organizational communication and interaction skills when developing comprehensive architectures, as the organizations are siloed and used to working in certain ways. It was seen useless for the company to offer advanced solutions "*if people are filled with old ways of working*".

7 DISCUSSION AND CONCLUSION

The goal of this study was to identify the challenges of outsourcing systems integration. These challenges were identified from external perspective by utilizing TCE and internal perspective through capabilities. The study produces both theoretical and managerial contributions, which are discussed first. After these, the conclusions of the study are presented. Finally, the limitations of the study and directions for further research are briefly introduced.

7.1 Theoretical implications

First, the theoretical discussion will focus on the external challenges of the service from TCE perspective. Relational aspects including trust will also be brought up here. Following this, the existing internal challenges from a capability perspective are discussed.

7.1.1 External challenges from TCE perspective

As public customers are often undertaking large IS projects for the first time the purchases are *occasional*. The content of the service varies from one situation to another. This shows that the integrator services are not a commodity services, with low asset specificity and simple outsourcing. Instead, they have *high asset specificity* with high human asset specificity and physical asset specificity. Thus, not all IT services are commodities, a finding which contradicts with the findings of Carr (2003). According to TCE, combining occasional purchases and high asset specificity should result in outsourcing with strict contracts. This is recommended as the occasional production results in high in-house production costs while markets can utilize economies of scale.

In TCE, fear of *opportunistic behavior* refers to the fear of the other party behaving opportunistically, for example contract violation. As there are only a small number of potential suppliers in the market and changing the integrator is difficult, the customers likely perceive a high possibility of opportunistic behavior. The integrator service can also be viewed to have high *uncertainty* as the underlying technology changes fast and the customer is increasingly networked with other organizations making IS projects even more challenging. Also, well-operating information systems are necessary for customers' operations and even

some cases the core of the organization and its services. Thus, integration service can be perceived as having *high risks.* There is high *information impactedness* between the parties, as the service provider has both technical know-how and as the customer relationship evolves, also customer related managerial type information. On the other hand, customer's technical knowledge and experience can be low in the beginning of a project but increase as the service continues.

These results are very similar to the results of Lacity and Willcocks (1995), which stated that IS outsourcing has high information impactedness, high-risk, high uncertainty as well as risk of opportunistic behavior due to few suppliers and high switching costs. On the contrary to their results, integration service is not a recurrent transaction but very occasional. High asset specificity, low frequency, high information impactedness and risk of opportunistic behavior all imply to *in-house production.* Still, integration work is often outsourced. According to TCE, outsourcing in this situation would require *elaborate contracts* or strong, *trusting relationships* between the parties. Public clients often lack the ability to make elaborate and un-ambiguous contracts and competitive bidding makes forming strong relationships challenging. In b-to-g markets the situation is different from b-to-b markets: when considering alternatives a governmental unit has to put the relationship perspective aside as competitive bids are open to all entries. Usually, this leads to competing merely with price. The competitive bidding also makes it difficult to create enduring relationships as the relationship risk ending at the end of every contract cycle. These are enormous challenges for producing the service.

Trust is an important aspect of the service. Even if trust does not affect customer's initial decision when choosing an integrator, trust between the customer and the integrator is necessary order for the service to work. This is in accordance with previous theory: according to Choe (2008) trust becomes vital in long-term co-operation between companies as it decreases *uncertainty*. In this service, uncertainty is high. Choe (2008) notes that if co-operation between parties occurs in traditional market terms, trust is usually low, which is a challenge that is real due to the forced competitive bidding.

7.1.2 Internal challenges from capability perspective

TCE discussion showed that the characteristics of the service imply to in-house production. Still, customers have chosen to buy these services from the market. This is because they do not have the required *capabilities* to perform the integration work in-house and manage the multi-vendor environment. Moving to capabilities the aim was to identify the internal challenges resulting from the lack of capabilities and how they are divided and shared between the service provider and the customer.

The required capabilities from the customers decreased substantially. There were new two capabilities identified: informed buying of integration services and supportive organizational structure. Customer needs to be able to identify the need for the integrator, look for it, evaluate the competing offers with other criteria besides price, and choose one to ensure the success of the service. Customer's organizational design must support the comprehensive service, which is often not the case due to the siloed organization.

From the service provider point of view the amount of required capabilities decreased also. The related dual role management was seen vital for the success of the service. It is also necessary, that the integrator identifies the needs of the customer, which may be unclear to the customer itself in the technical areas, an important capability lacking from previous study (Feeny et al., 2005).

The amount of shared challenges and needed capabilities between the customer and the supplier is not surprising, as the current view is that services are *co-created* between the provider and the customer (Vargo & Lusch, 2004). New capabilities here include informed buying of information systems, network management and problem solving, role clarification and ensuring value delivery. The integrator can and even should assist the customer in purchasing information systems due to the low level of customer expertise and understanding of life-time costs. Indeed, previous literature suggests that the costs of implementing new processes, consultants, training and managerial time may be many times larger than the costs of the technology itself (Brynjolfsson, Hitt, & Yang, 2002). Network management skills were identified to be necessary due to the highly network-nature of the service provision. Role clarification is also vital to ensure that customer and provider expectations are in-line with

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eachothers. Figure 9 summarizes the results of the study by illustrating both the internal capability related and the external TCE related challenges.
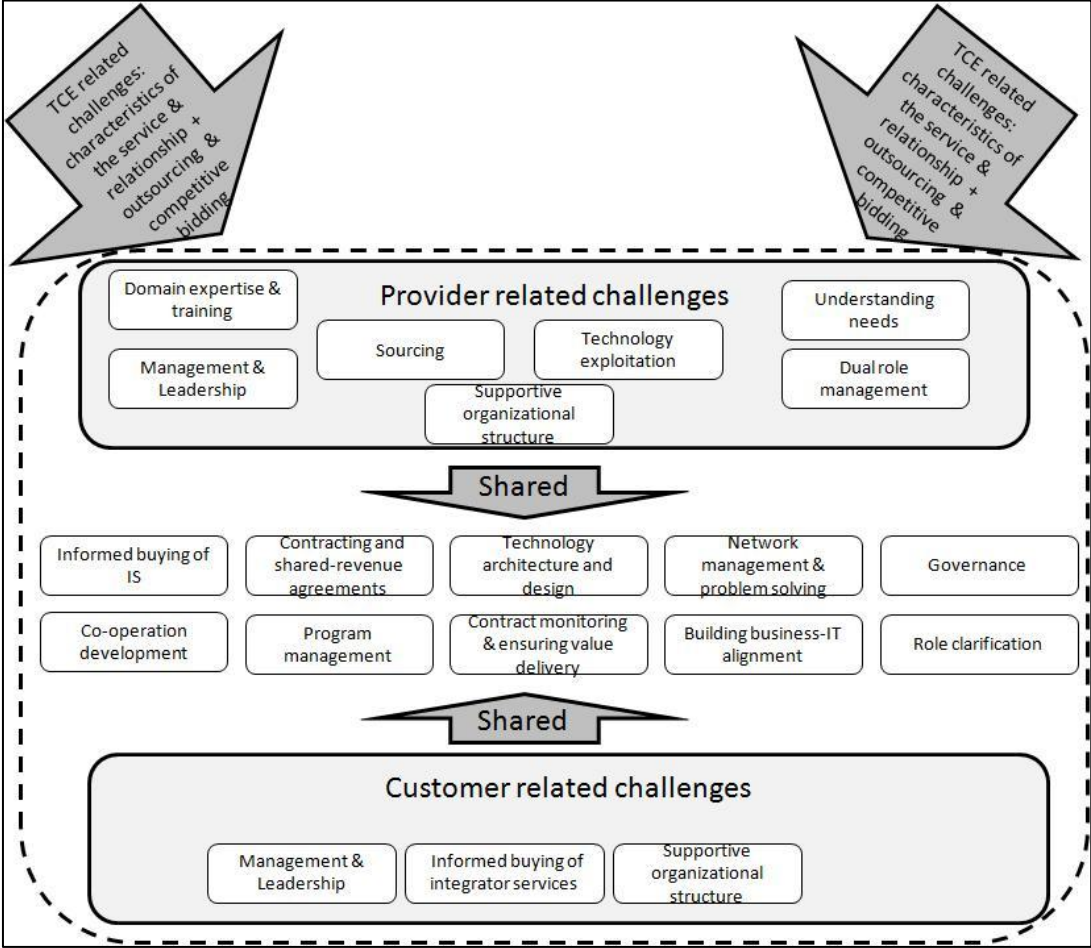

Figure 9: results of the study

The capabilities from each party can change over time. As discussed in the analysis, integrator transfers knowledge to the customer and thus, the customer learns and evolves over time. This also poses a threat for the service provider: according to Ford et. al. (2002) the supplier is likely to have a greater knowledge of the technologies which the offering is based on than the customer. This is also the case with the integrator service. *System maturation* and lasting relationships narrow the gap as the customer learns how to use the technology characteristics and increases the knowledge it has of the system architecture. As the knowledge gap narrows, the customer may begin to perform activities that the system provider has performed in the past (Ford et al., 2002, p. 65; Helander & Möller, 2007). Thus, the supplier should try to upkeep the knowledge gap in order to remain in a strategic position towards the customer

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(Helander & Möller, 2007). Thus, dynamic capabilities are needed from the service provider to be able to combine the needed resources and abilities from the company's repertoire into the service. As Vargo & Lusch (2004) suggested, companies exist to transform competencies into complex services.

Overall, the identified capabilities and their descriptions are strongly aligned with previous theory analyzing the success factors of IS -projects (e.g. Nelson 2007). In his study Nelson (2007) uses McConnell's (1996) classification to list the mistakes under four categories including people, process, product and technology. The majority of the mistakes he found were categorized as either process mistakes (45%) or people mistakes (43%), while only 8% were product and 4% technology related. In this study, the *processes* and *working methods* gained much critique, while the technology was not seen as the main cause of the problems. Product related issues, like adding un-necessary characteristics to the product, are related to the lack of business vision in the development. Nelson (2007) found poor estimation and scheduling to be the number one classic mistake, a point that came evident with the program management capability. The next most common mistake is ineffective stakeholder management, which is also a problem in the integration service due to its networked nature. A few similar mistakes found by Nelson and in this study are insufficient sponsorship, insufficient resources and insufficient management controls. From skill perspective it is not the *technological skills* that are not lacking but rather the *communication* and *co-operation skills*. Technology is an aid, not the main issue.

Similar views can be found of looking at the previous literature on IS integration, which has been highly focused on the technical aspects of it. This study brings much needed variety to the research by looking at the challenges from a wide perspective including both external and internal factors. The results of this study re-enforce previous studies (Doherty & King, 1998; Wainwright & Warning, 2004) suggesting that organizational matters are more important than the technical ones in IS integration. Overall, the study illustrates well the transformation from IS integration to full systems integration. Systems integration was defined earlier as a capability to design and integrate internally or externally developed components: hardware, software and services, while coordinating the activities of internal or external component, subsystem or product manufacturers. The offered service includes all these elements as the

service means designing and integrating internally and externally developed sub-systems, while taking part to the network management as a customer representative. The difference comes from not being responsible for the overall system. In addition, the coordination activities are present: the difficulty to manage the dual-role internally and externally and the required network management skills are a manifest to the coordination Company X needs to do.

Many of the identified challenges can be traced back to the lack of alignment between the business and IT in the customer organization. The previous studies (Feeny & Willcocks 1998, Willcocks et al 2007) suggest that the relationship building capability relates to the eliciting and delivering on business requirements. In this study, it became evident that business-IT alignment is rather an *underlying requirement* for the operation of the whole integration service. For example, it is a requirement in customer development as the integrator may find it hard to build relationships with the customer's business units if the alignment in lacking. It is also needed in the architecture planning and design as the lack of alignment can lead to a partly-optimized enterprise architecture.

7.2 Managerial implications

Managerial implications of the study are diverse. Both customers and service providers should try to carefully analyze the existing capability-base and the underlying skills within their organizations. With these analyses and open discussion about them both parties can have a better understanding of the roles and responsibilities each party should try to assume. This way the expectations would be better aligned and the likelihood of regrettable situations when expectations are not met could be reduced.

Both parties can also utilize the capability analyses as tools for further development. For example a customer who is unwilling to outsource some capability can focus on developing such a capability in-house. When analyzing its existing capabilities the customer can also assess where it mostly needs help in. Without this analysis, the customer can purchase the integration service, or any service, with false ideas of its own capabilities. After the capability assessment the customer can more easily request the right kinds of services from different service providers.

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From the service providers' perspective the study further strengthens the motivations behind the movement towards service business. In this study, services were seen as a steadier and less risky source of income for an IT company compared with the traditional IS delivery projects. Still, moving completely away from the IS deliveries was seen problematic, as these situations often provide the access to the customer and the provision of continuous services. Systems integration can be viewed as a new business model, which IT companies could opt for in the future when more and more of the traditional software development is being off-shored.

The results of the study can also assist the outsourcing provider company in assessing its existing and lacking capabilities. These lacking capabilities can be at the base of systematic training and education of the employees, which in this case was seen problematic due to the varying content of the service. Utilizing the required capabilities as the base of the training, management would be able to form clear areas and guidelines for the content of the training. The study also enlightens the importance of the service provider's organizational structure. As professional services are provided by teams, a silo-like organizational structure hinders the service provision. Thus, managers attempting to move towards services should take a look of their organizational structure and when needed, modify it accordingly. Additionally, it is easier to clarify the technology-intensive service to the customer when using the capability division as a communication tool when selling the service.

7.3 Conclusions

The aim of this study was to identify the challenges of outsourcing systems integration by examining systems integrator service offered to the public sector. Studying the reasons behind the decisions to outsource is one of the most frequently studied topics in the IS field and for example transaction cost economics has been used as an explanatory theory behind these decisions (Gonzales, 2006; Lacity & Willcocks 1995). IT outsourcing has also been widely studied from a capability perspective where both outsourcer and service provider capabilities have been identified (see e.g. Lacity & Willcocks, 1998). The research framework was built based on previous research in the fields of TCE, capabilities, IS outsourcing and service co-production to be able to gain a many-sided view of the complex phenomenon.

The challenges discovered in this study have been identified from external perspective by utilizing TCE and internal perspective through capabilities discussions. With internal challenges the goal was to identify if they relate to the customer, the service provider or if they are shared between the two. As services are co-created between the service provider and the customer, the capabilities can also be shared between the two parties (Vargo & Lusch, 2004).

The key finding of the study is the framework including both the external and internal challenges of outsourcing systems integration. The external challenges relate to the characteristics of the service and aspects of human behavior, which combined with outsourcing, in this case would require long lasting relationships or elaborate contracts. As the customers studied in this thesis were a public organization, long lasting relationships are challenging due to competitive bidding. This makes outsourcing difficult in the first place. The internal challenges exist because of the lack of capabilities held by each party or shared between them. Most of the capabilities required for successful service production are shared because of the co-creative nature of the service. From a skills perspective, interpersonal and communication skills are more critical than technical skills.

7.4 Limitations of the study and further research

It should be noted that the study is based on empirical data gathered from the service provider. Customer interviews were not possible due to the limited length of the thesis and the delimitations made by the Company X. To overcome this shortfall the interviewees included individuals who had acted as customer representatives, i.e. integrators. A more complete picture of the phenomena could have been gained if the customers would have been interviewed as well. Thus, future research could be directed towards gaining the needed customer viewpoint. This kind of study could be used to further verify and enrich the results found in this study.

The new division of capabilities can be used as a base with further research in the area of outsourcing professional and IT services. The results could also be utilized when analyzing the failures in other service outsourcing relationships or IT outsourcing. The results can be

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especially useful with services where the service provider assumes active responsibilities on the customer's behalf.

Further research could be directed towards analyzing how common the systems integration service or business model is in the IT industry both in Finland and internationally. It would be also interesting to know, which capabilities can be discovered in different cases and with different types of customers.

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9   APPENDICES

Appendix 1. interview form (translated into English)

CUSTOMERS

Who are your end customers (segments etc.)?

How do public and private customers differ?

What are the characteristics of an ideal customer?

How have the customers evaluated Company X as an integrator?

How much does the customer take part in producing the service?

Is the customer competent enough to take part in producing the service?

How have the customer relationships evolved (competitive bidding etc.)?

INTEGRATOR SERVICE

What is the role of the service for customers operations?

Is the service easy to sell to customers?

How does the competitive bidding advance regarding both IS and integrator service (from invitations to tender to selecting the winner)?

How intense is the competition?

How does the service differ from competing offers?

What is the ideal future situation for the integrator service?

What are the greatest obstacles in achieving it?

For those who have acted as integrators:

Could you describe the customer case in a timeline?

Did the customer understand its needs behind the service?

What were the biggest problems in producing the service from your viewpoint?

How could these challenges be overcome?

What are the characteristics of an ideal integrator?

NETWORKS

Could you please draw here your own network?

Are the different actors connected to each others? If so, how?

How is the co-operation managed? (written contracts, meetings..)?

How personalized are the relationships?

Is it easy to replace individuals?

Has the network co-operation been easy?

What kinds of problems has there been?

What are the bottlenecks of the network co-operation?

Appendix 2. interviewees

Interviewee A	**integrator,** has worked as an integrator in a long-term customer case
Interviewee B	**sector leader**, has been involved in developing and selling the integrator service
Interviewee C:	**principal business consultant**, has acted as a leader in an integration project
Interviewee D	**consultant**, experience from two integration cases from the technical aspect
Interviewee E	**sales manager,** experience over the integration service through sales activities
Interviewee F	**customer manager**, wide experience with integration services
Interviewee G	**consultant**, has acted as technical integrator
Interviewee H	**customer manager**, has been involved with integrator service through customer projects
Interviewee I	**principal architect**, has wide experience of technical integration
Interviewee J	**EA-consultant, integrator**, wide experience from integrator service, has worked as an integrator in two separate projects
Interviewee K	**project owner**, has been involved in an integrator case