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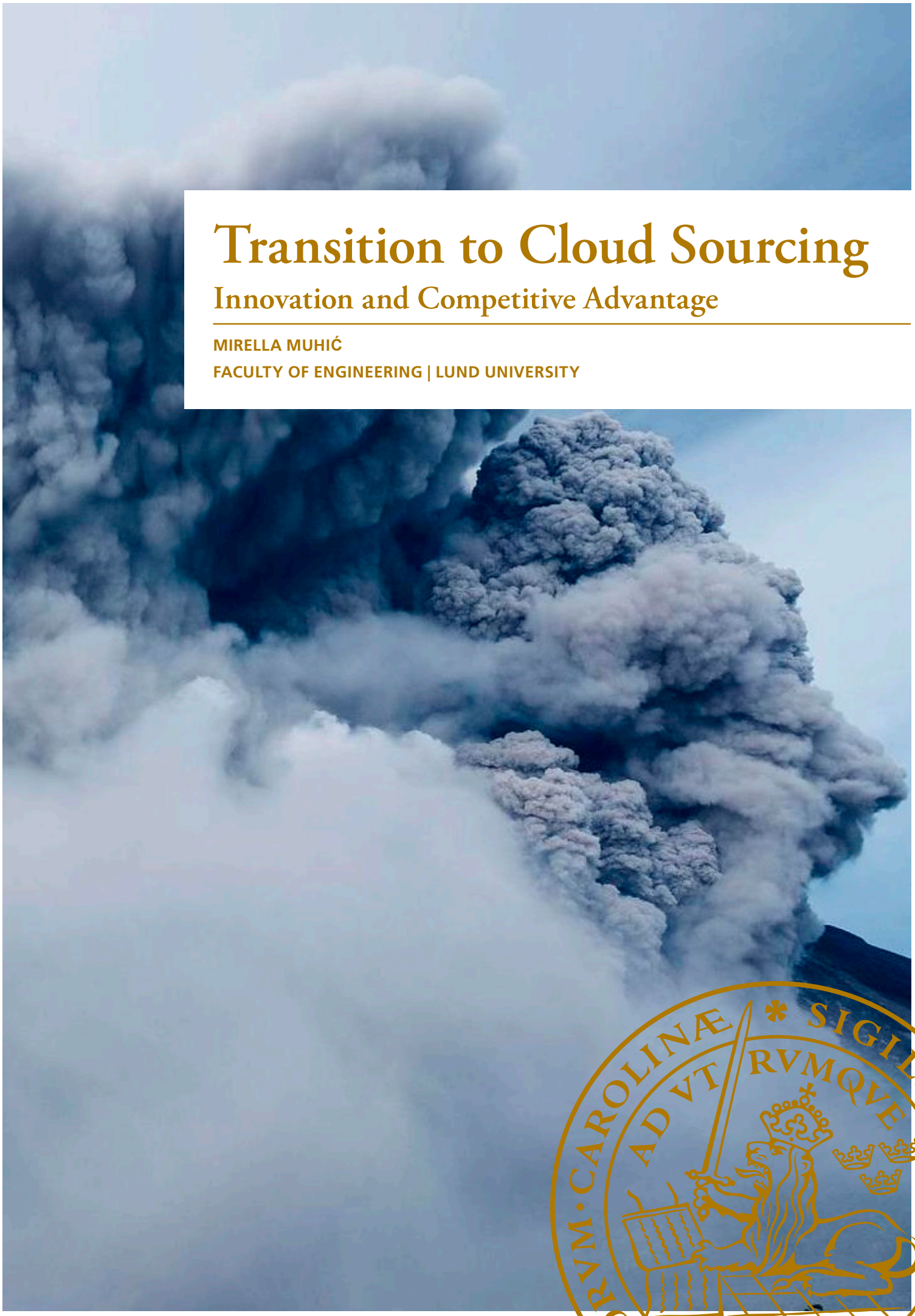

Transition to Cloud Sourcing

Innovation and Competitive Advantage

MIRELLA MUHIĆ
FACULTY OF ENGINEERING | LUND UNIVERSITY

Background

M.Sc.,B.Sc.,in Information Systems, B.Sc.,Business and Economics, Major: Marketing Management.

After graduation I worked for PriceWaterHouseCoopers (PwC) as an IT-consultant with small, big, local and multinational companies performing Data Management Analysis, Fraud Analysis, IT General Controls, IT Governance, and Business Process Analysis. Having this insight into companies core and their IT systems I decided I wanted to pursue my dream from the time I enrolled the International Baccalaureate Diploma Program (graduated in 2007, Katedralskolan, Lund, Sweden), - namely to do research to improve organisational performance. This thirst for knowledge, curiosity and the need to develop science for a better tomorrow has always been a great interest of mine.

Starting off my academic career as a course director, developing courses and lecturing I have long experience of coordinating courses, supervising and examining thesis's as well as lecturing at Lund University both on undergraduate (courses: IT for People, Organisations and Society and IT and Globalisation), and graduate level (Strategic Management and Information Systems).

Research

My research focus is on cloud sourcing, innovation and competitive advantage. As familiar to many cloud computing - storing data, applications and whole IT systems remotely rather than on companies' own premises can reduce costs dramatically and speed up operations. There are many cloud vendors to choose from such as Microsoft Azure, Google Cloud, Amazon Web Services etc, still very few companies actually take the step out in the cloud. The biggest risk is giving up control of the data to someone else using different data centers in remote places, and in worst case face data loss, wiped data, corrupted or even stolen data. Companies that decide to move their IT systems to the cloud are not only cloud sourcing, but they enter a strategic partnership with the other partners involved in the cloud sourcing arrangement. This means that they put the very core functions of their organisation in the responsibility of external cloud providers and cloud brokers which poses certain risks. The problem is if cloud providers actually can understand the business of the cloud customer well enough, and prove that they can do what they say they can do. To cloud source successfully dynamic capabilities must be developed. Seeing cloud sourcing as a longitudinal process the business relationship development becomes an important factor for innovation and competitive advantage.

The fast scalability, flexibility, changes in infrastructure and software, volume etc, gives way to dynamic relationships with partners in cloud sourcing. Cloud sourcing requires constant communication, updates, fast decision making, and readiness for quick changes on the fly etc. In my research I have identified the barriers to cloud sourcing that might explain why the cloud goes bad on some companies but not on others. To understand how to overcome these barriers, create strong business relationships over time in cloud sourcing - that facilitates innovation and competitive advantage - is the essence of my thesis work.

With her research Mirella Muhić wants to contribute to succesful cloud sourcing with focus on innovation and competitive advantage towards cloud continuance. She is especially interested in the business relationship development in cloud sourcing.

This doctoral thesis makes Mirella Muhić a PhD in Innovation Engineering.

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Innovation and Competitive Advantage

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Innovation and Competitive Advantage

Mirella Muhić

LUND
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Abstract

Looking into the topic of cloud sourcing, at first glance it might be seen as an off the shelf pay per use service that is easy and fast to adopt for most companies. Although in practice not all companies succeed with cloud sourcing. Previous research shows that cloud sourcing entails risks especially in the adoption phase in terms of security, trust, data loss, and transparency among others. The challenges faced by cloud customers and in specific larger companies are extensive; and can be all but cost effective. Companies that decide to cloud source need to understand that it is not only a service delivery model, but also perhaps a long term business relationship that can offer benefits beyond the cloud basics (scalability, cost reduction, flexibility). To address these complex challenges, more research is necessary on the barriers to cloud sourcing, capabilities to overcome these barriers and stay in the cloud successfully. The research purpose is to investigate cloud sourcing from the firm client perspective, more specifically the transitioning process from traditional IT outsourcing to cloud sourcing, i.e., the barriers to continuance of cloud sourcing, how cloud sourcing triggers innovation capabilities and its implications for competitive advantage. This is done in order to contribute to the business and management research knowledge of cloud sourcing.

The research is qualitative including interviews, observations and text analysis, based on three studies and reported in five appended papers. The first study is a state-of-art literature review on cloud sourcing phenomenon. Subsequent studies were based on empirical investigations. The second study identified sourcing motives behind sourcing decisions based on a pilot study. The third study expanded those findings through two case studies with cloud customer companies and other cloud partners involved in cloud sourcing relationships.

The cloud continuance process is argued to be a stage-based model enabling different types of innovations implicating various levels of competitive advantage, e.g., depending on how the cloud customer together with the other partners in cloud sourcing manages to develop the business relationship development process. Findings in this research suggest that dynamic capabilities in different forms can sense, seize and transform cloud sourcing into innovations and affect competitive advantage in the long run through new business models, market expansion, and new services. From a practical perspective the research can inform managers about common implementation problems when transitioning to cloud sourcing, and help them prepare for this process.

Key words: Cloud sourcing, Innovation, Competitive Advantage, Cloud continuance, Business relationships

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Innovation and Competitive Advantage

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MADE IN SWEDEN

To the best people I know; Mum and Dad

Acknowledgement

My PhD journey has been full of twists and turns, as one may think it's to be expected. What kept me persistent was willingness to face each challenge with a positive attitude and open mind, skills I have learned from my beloved parents. As a survivor of the longest siege in modern history, the besieged city of Sarajevo 1992-1995, I have realized that with patience, endurance and hard work anything is possible. Since enrolling into the International Baccalaureate Diploma Program (IB world school) at Katedralskolan in Lund my dream was to become a researcher. I have always had a curious mind. My parents would probably call me eternal knowledge seeker. When all odds were against me to complete my doctoral thesis, I kept on going like a true Muhic eager to take on new research endeavours.

With a deep and sincere sense of gratitude I would like to express many thanks to my main supervisor Professor Lars Bengtsson, who with excellent support, invaluable guidance, and invincible inspiration has made the creation of this thesis complete. Throughout my research Professor Lars Bengtsson has provided me with rewarding discussions and great advice. Thank You! My co supervisor Professor Jonny Holmström whose expertise and immense knowledge was invaluable has followed me through the whole PhD journey and helped me see the light in the tunnel. Big Thanks for your great motivation, continuous support, and for believing in me. Many thanks to my other co supervisor Dr. Danilo Brozovic for your insightful comments and encouragement, but also for the hard questions which incented me to widen my research from various perspectives. Thanks for always having time to discuss whenever I ran into a trouble spot or had a question about my research or writing.

I am greatly thankful to Associate Professor Jessica Wadin - for your assistance, invaluable comments, understanding and dedicated involvement in my research process. I would like to thank Professor Fredrik Nilsson for encouraging my research and for insightful discussions. My deepest appreciation goes to Associate Professor Gudbjörg Erlingsdottir for constructive comments, valuable help and warm encouragement. Many thanks to Professor Rikard Lindgren for sharing his exceptional scientific knowledge, providing support and time for illuminating discussions. Expressing my heartfelt gratitude to Professor Thomas Kalling for inspiration and continuous optimism to carry on during the hard times. I received generous support and encouragement from Associate Professor Henrik Pålsson. Professor Jelena Zdravkovic has been of great assistance and guidance, always ready to help me. Thank You!

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None mentioned, none forgotten - There are my wonderful colleagues and friends, who were of great support in deliberating over our problems and findings, as well as providing happy distraction to rest my mind outside of my research. I am immensely thankful and grateful to you All!

Whole-heartedly, I would like to thank my wonderful family for their endless support, wise counsel and sympathetic ear; my beloved Mother and Father for their eternal love, continuous encouragement and compassion, my dear brother Mirza, sister Melisa, brother in law Marcus Ismail and niece Hannah for love, continuous encouragement and unfailing support throughout my years of study and through the process of researching and writing this thesis. This dissertation stands as a testament to their unconditional love and encouragement. This accomplishment would not have been possible without them. You have always been there for me. I love you!

Abstract

Looking into the topic of cloud sourcing, at first glance it might be seen as an off the shelf pay per use service that is easy and fast to adopt for most companies. Although in practice not all companies succeed with cloud sourcing. Previous research shows that cloud sourcing entails risks especially in the adoption phase in terms of security, trust, data loss, and transparency among others. The challenges faced by cloud customers and in specific larger companies are extensive; and can be all but cost effective. Companies that decide to cloud source need to understand that it is not only a service delivery model, but also perhaps a long term business relationship that can offer benefits beyond the cloud basics (scalability, cost reduction, flexibility). To address these complex challenges, more research is necessary on the barriers to cloud sourcing, capabilities to overcome these barriers and stay in the cloud successfully. The research purpose is to investigate cloud sourcing from the firm client perspective, more specifically the transitioning process from traditional IT outsourcing to cloud sourcing, i.e., the barriers to continuance of cloud sourcing, how cloud sourcing triggers innovation capabilities and its implications for competitive advantage. This is done in order to contribute to the business and management research knowledge of cloud sourcing.

The research is qualitative including interviews, observations and text analysis, based on three studies and reported in five appended papers. The first study is a state-of-art literature review on cloud sourcing phenomenon. Subsequent studies were based on empirical investigations. The second study identified sourcing motives behind sourcing decisions based on a pilot study. The third study expanded those findings through two case studies with cloud customer companies and other cloud partners involved in cloud sourcing relationships.

The cloud continuance process is argued to be a stage-based model enabling different types of innovations implicating various levels of competitive advantage, e.g., depending on how the cloud customer together with the other partners in cloud sourcing manages to develop the business relationship development process. Findings in this research suggest that dynamic capabilities in different forms can sense, seize and transform cloud sourcing into innovations and affect competitive advantage in the long run through new business models, market expansion, and new services. From a practical perspective the research can inform managers about common implementation problems when transitioning to cloud sourcing, and help them prepare for this process.

Populärvetenskaplig sammanfattning

Digitaliseringen är en revolutionerande samhällsutveckling, en ny epok som är här för att förändra och stanna för sättet företag arbetar på, organisera sig och utvecklas. Detta speglas givetvis även i övriga samhällsstrukturer där vi ser en allt mer internetuppkopplad verklighet oberoende av tid och rum. Ett av mina caseföretag WasteHeroes har system för att identifiera besökare, avfallsmängd och en uppkopplad smart våg ute på sina anläggningar som är helt molnbaserade. Molnet utgör grunden i den digitala utvecklingen och Internet of Things.

Vad är då det här molnet? Molnet kan beskrivas som en server eller en grupp resurser på internet varifrån man som användare kan nå sina dokument och filer från mobil, dator eller surfplatta under förutsättning att det finns tillgång till internet. Det innebär att man enkelt kan dela filer med andra och därmed underlätta samarbete genom att flera personer arbetar i samma fil eller system i realtid. Back-up på filer sker automatiskt. Delar av ett nätverks resurser, eller till och med hela nätverk kan flyttas ut på nätet och hanteras av ett annat företag. Ofta handlar det om informationssystem som tidigare har varit installerade på datorn, men som flyttas till molnet för att istället köpas som tjänst baserat på hur mycket den används. För mindre företag och start ups som inte har möjlighet att ha egen IT-personal och IT-utrustning kan molnet vara smidigt. Större företag drar nytta av molnet i första hand i att dra ner på IT-administration och därmed krav på att hantera mjuk och hårdvara internt.

Däremot är det en sak att prata om att anamma molnet och en helt annan att faktiskt flytta sina interna IT-system till molnet. Inte alla företag lyckas med att cloud sourca. I motsats till vad många tror handlar det inte enbart om tekniska utmaningar. Att cloud sourca innebär att man ingår i en relation med flera olika molnleverantörer eller partners. Eftersom cloud sourcing kan vara svårare för stora företag med komplex IT-infrastruktur då det är en stor risk att flytta alla system till molnet (data kan gå förlorad, information kan läcka ut etc), är det viktigt att relationen mellan molnpartners fungerar. Cloud sourcing utgör därför även en strategisk och organisatorisk utmaning, men ger också möjligheter till innovationer, som den här avhandlingen fokuserar på. Avhandlingens resultat pekar på att cloud sourcing kan leda till innovationer med implikationer på företags konkurrenskraft.

Vidare ser vi att digitaliseringen driver även industriell produktion mot att bli allt mer internetuppkopplad i vad som kallas ”Industry 4.0”. Där olika produktionsenheter kan kommunicera med varandra i realtid och därmed anpassa produktionen efter situation. Det blir en mer dynamisk produktionsmiljö där alla internetuppkopplade enheter kan kommunicera med varandra, kommunicera med människor, agera och rapportera. Mitt andra caseföretag Quos utnyttjar detta genom att erbjuda molnbaserade tjänster som övervakar och styr industriföretags produktionsutrustning.. Att använda molnet, eller som det kallas i denna avhandling, att cloud sourca har blivit allt ,mer vanligt. Bortsett

från de grundläggande fördelarna (kostnadsfördelar, flexibilitet och skalbarhet) kan cloud sourcing vara en förutsättning för att utveckla innovationer, t ex nya tjänster, nya affärsmodeller och att nå nya marknader som kan ge företaget konkurrensfördelar. Detta har också drivit organisatoriska, strukturella och kulturella förändringar där nya chefsroller skapas så som Chief digital officer (CDO), IT får en mer strategisk och affärsutvecklande roll, IT-avdelningen kommer närmre företagsledningen, aktivt samarbete med olika cloud sourcing partners samt att företagsledningen måste hålla sig a'jour om utvecklingen i molnet och dess möjligheter.

Därför är det avgörande för företag att inte bara klara av övergången till cloud sourcing för att ha kvar sin position på marknaden, utan även för att kunna utnyttja innovationsmöjligheter i samband med skiftet till cloud sourcing. Innovationer som bygger på att företag utnyttjar dynamiska förmågor genom att ha en företagsledning som förstår sig på skiftet vi står inför och inser rollen som cloud sourcing kan ha i att nå kortsiktiga och långsiktiga konkurrensfördelar. Den här avhandlingen handlar just om företags utmaningar och möjligheter vid skiftet från traditionell IT outsourcing till cloud sourcing. Alltså, vilka barriärer som kan uppstå i cloud sourcing som påverkar ett företags möjligheter att dra nytta av dess fördelar. Hur dessa barriärer kan undgås för att komma till nivån där innovationer skapas i samarbete med alla involverade aktörer över tid. På lång sikt även hur potentiell konkurrenskraft kan uppnås. Exempel på en barriär att ledningen på det cloud sourcande företaget saknar en vision och strategi för hur denna övergång ska ske, vilka möjligheter som cloud sourcing kan ge samt hur dessa kan uppnås och utvecklas vidare.

För en framgångsrik implementering av cloud sourcing behöver företag beakta dessa barriärer och utveckla en plan för att hantera dem. Avhandlingen visar att om de lyckas med detta ökar möjligheterna för olika typer av innovationer. Detta inkluderar till exempel nya tjänster och produkter gentemot kunder, inträde på nya marknader samt utveckling av affärsmodellen. En effekt av en framgångsrik innovationsutveckling i molnet kan ge konkurrenskraft på lång sikt.

Denna avhandling har studerat cloud sourcing utifrån ett process perspektiv, utveckling av affärsprocesser i molnet, utveckling av affärsprocess relationer, skapandet av innovationer och potentiell konkurrenskraft. Då cloud sourcing är ett växande forskningsområde med ständig teknikutveckling, krävs fler studier som skapar en djupare förståelse för denna problematik. I avhandlingen poängteras behovet av fler empiriska studier. Ett specifikt område är skiftet av IT-organisationens roll som stödfunktion till att få en strategisk roll.

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Appended papers

Paper I

Title: Relativism in the Cloud: Cloud Sourcing in virtue of IS Development Outsourcing-A literature review

Authors: Björn Johansson, Mirella Muhić

Status: Published in 2017 in International Journal of Information Systems and Project Management, 5(4), 55-65.

Paper II

Title: Sourcing motives behind sourcing decisions exposed through the Sourcing Decision Framework

Authors: Mirella Muhić, Björn Johansson

Status: Published in 2014 in International Journal of Information Systems and Project Management, 2(1), 5-17. Earlier version published as conference proceeding in Procedia Technology. See below on related papers.

Paper III

Title: Barriers to cloud continuance: Evidence from two case studies

Authors: Mirella Muhić, Lars Bengtsson, Jonny Holmström

Status: Submitted to and under review with International Journal of Information Management. Earlier version accepted to the Strategic Management Society Conference in 2018, Hyderabad, India

Paper IV

Title: Dynamic capabilities triggered by cloud sourcing – a stage model

Authors: Lars Bengtsson, Mirella Muhić

Status: Accepted to and presented at INEKA 2019, Verona, Italy were it received Best Paper Award. Under second review round with Review of Managerial Science (Springer). Earlier version of the manuscript has been accepted to and presented at the Academy of Management 2019.

Paper V

Title: Fostering sustainable business relationships in a cloud sourcing context

Authors: Mirella Muhić, Danilo Brozović

Status: Submitted to and under review with Journal of Industrial Marketing Management.

Related papers and publications

Title: *Cloud sourcing–Next generation outsourcing?*

Authors: Mirella Muhić, Björn Johansson

Status: Published in 2014 in Procedia Technology, 16, 553-561.

Abbreviations

CC: Cloud computing

CS: Cloud sourcing

TCS: Trust, commitment and satisfaction

BRDP: Business process development

DC: Dynamic capabilities

IS: Information system

SLA: Service level agreement

ERP: Enterprise resource planning

PDA: Personal digital assistant

RBV: Resource based view

DCT: Dynamic capability theory

CRM: Customer relationship management (system)

Terminology

Backsourcing - Backsourcing is the opposite of outsourcing, i.e. the IT-system was cloud sourced but then taken back to be governed and maintained by internal resources. (Kotlarsky and Bognar 2012).

Cloud Computing - A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. (Mell and Grance 2011).

Cloud – A communications network (wide area network or local area network). The word "cloud" refers to a data center full of servers that is connected to the Internet. (http://www.pcmag.com/encyclopedia/term/39847/cloud).

Cloud sourcing - The situation where an organisation adopts and integrates cloud computing services from one or several external providers. (Schneider and Sunyaev 2016).

SaaS - Software as a service is a software licensing delivery model in the cloud. The software is licensed on a subscription basis on demand. (Armbrust et al. 2009).

IT outsourcing - Outsourcing is defined as the act of shifting some or all of the IT systems to be operated externally by contractual agreement. During the delivery process, the residual rights are owned by the supplier as it owns the required resources for the information systems (IS). Responsibility for delivery rests exclusively with the external supplier, i.e. no governance on the client side during the delivery process (De Looff 1998).

Pre Adoption – This is a temporal phenomenon including planning, contractual agreement, due diligence and everything else that must be done before implementing a new system (Karahanna, Straub, Chervany 1999).

Adoption – Is a temporal phenomenon focusing on the implementation of IT (Venkatesh 2006).

Post Adoption – The post-adoptive phase occurs after an IS artefact has been implemented, made accessible to the user and applied by the user in performing his/her work tasks. It is thus a temporal phenomenon (Shaikh and Karjaluoto 2015).

Cloud Continuance – Since the definition of cloud continuance origins from the IT-continuance literature, that is the reference that cloud continuance in this thesis relies on. It is defined as the outcome of the cloud sourcing and not necessarily a temporal phenomenon. When the user of a system continues its use. (Bhattacherjee 2001).

Partners - A cloud service customer or user is an organisation that uses a cloud service. A cloud service provider makes cloud services available to its customers/users. Basically, the providers are the partners that build cloud-centric products. A cloud service partner (also called an intermediator) supports or supplements a number of cloud computing activities of a provider, customer, or both (Califf et al. 2016). The cloud service provider usually has a third-party vendor that is responsible for data storage and cloud maintenance. All of these are partners in a cloud sourcing arrangement relationship.

Cloud sourcing relationship – the interrelation between different partners in a cloud sourcing arrangement (Califf et al. 2016).

Cloud sourcing arrangement –partners involved in a cloud sourcing relationship (Lacity and Reynolds 2014), such as providers, users, third parties, middle hands, developers etc. The arrangement is determined by the agreements and licenses (Ryan 2011); (Cullen, Seddon, Willcocks 2005, Willcocks, Cullen, Seddon 2007).

“As long as care lasts and love warms, life smiles” Dad

“Dok pažnja traje i ljubav grije, život se smije” Tata

1. Introduction

I present the research background, purpose and questions along with an outline of the appended papers and the remainder of the thesis.

1.1 Prologue

The vision of providing computing facilities to the public like a utility (similar to electricity, telephony, water) was first mentioned by John McCarthy in the early 1960s (McCarthy 1960). Today, cloud computing (Mell and Grance 2011) has begun to make this vision a reality and in the coming years we will probably see computing as something that will be on-demand and easily accessible through a network much like electricity. Many companies have started to use cloud computing and are in the process of outsourcing their IT operations and information systems to the cloud, i.e., cloud sourcing (Schneider and Sunyaev 2016). From a strategic perspective, this poses the question of whether cloud sourcing could enable innovation capabilities and become a source of competitive advantage or whether, just like with electricity, it will be so easily accessible to all companies and have so many advantages that all companies will need to use it, meaning that it cannot be a source of competitive advantage. However, if there are barriers to adopting and continuing to use cloud sourcing, there might be temporary competitive advantages, just like there were for companies that electrified early compared to late adopters. There might also be more enduring competitive advantages if cloud sourcing triggers and enables the company to continuously innovate its processes and businesses, either alone or in collaboration with their cloud sourcing partners.

1.2 Empirical background

Cloud computing can be described as an on-demand network to a pool of scalable and manageable shared IT resources (Mell and Grance 2011) over the internet. In other words it is a technical phenomenon including the hardware and software among other technical features of an information system. Whereas cloud sourcing is the process of

deployment and maintenance of this system which is carried out by several partners coming together (Armbrust et al. 2009). Figure 1 illustrates the arrangement, coordination, and management of cloud infrastructure. It shows the three service models and their requirements and processes from a cloud provider perspective.

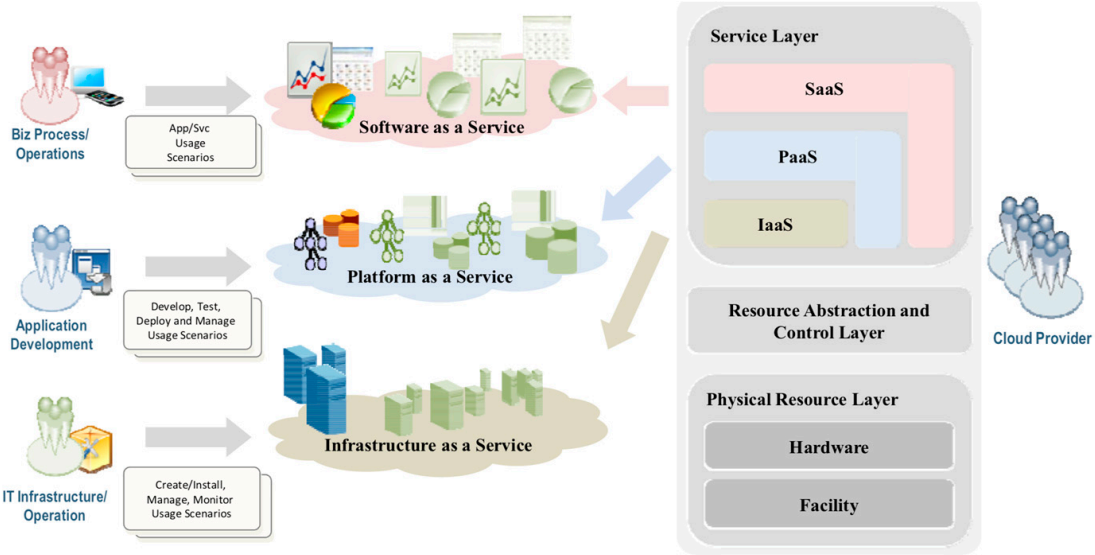

Figure 1: Illustration of cloud computing infrastructure (Mell and Grance 2011)

Software as a Service (SaaS), uses the web to deliver applications that are managed by a cloud provider. Most SaaS applications can be run directly from a web browser without any downloads or installations required. It is a pure web delivery model. Applications delivered are usually some type of information systems or modules of the same; to manage enterprise resource planning, human resources, collaboration, customer relationship management etc. The cloud provider typically manages the applications, runtime, data, middleware, virtualization, servers, storage and networking. It is the traditional apps layer in the cloud including software as a service apps, business services, and business processes on the server side.

Platform as a Service (PaaS), is used for customisation and development of applications providing cloud components to software. This type of application development, testing and deployment is simple, quick and cost effective. Here the cloud provider is responsible for the virtualization, servers, storage, networking, and the PaaS software itself. Whereas the developers manage the applications. Applications using PaaS inherit cloud characteristic such as scalability, high-availability, multi-tenancy, SaaS enablement etc. Basically it is the middleware that manifests in the cloud with app platforms, database, integration, and process orchestration (how parts are integrated or derived from an app server).

Infrastructure as a Service (IaaS), is a self-service model for accessing, monitoring, and managing remote data centre infrastructures, such as compute, storage, networking, and networking services (e.g. firewalls). Instead of having to purchase hardware users can

purchase IaaS based on consumption, similar to electricity or other utility billing. Compared to SaaS and PaaS, IaaS users are responsible for managing applications, data, runtime, and middleware. Cloud providers are responsible for managing virtualization, servers, hard drives, storage, and networking. The cloud customer (the term cloud customer and cloud client are used interchangeably through the thesis), is responsible for updating the IaaS if new versions are released. In summary it is the physical servers, networks, storage, and systems management being virtualised in the cloud.

According to Gartner (Stamford 2019) cloud services worldwide market is predicted to grow 17.5 percent in 2019 to total $214.3 billion, up from $182.4 billion in 2018. The fastest growing market segment will be infrastructure as a service (IaaS), which is forecast to grow 27.5 percent in 2019 to reach $38.9 billion, up from $30.5 billion in 2018 (see Table 1). The second-highest growth rate of 21.8 percent will be platform as a service (PaaS). Research vice president at Gartner Sid Nag says: "At Gartner, we know of no vendor or service provider today whose business model offerings and revenue growth are not influenced by the increasing adoption of cloud first strategies in organizations. What we see now is only the beginning, though. Through 2022, Gartner projects the market size and growth of the cloud services industry at nearly three time the growth of overall IT services" (Stamford 2019).

Roughly a third of organizations see cloud investments as a top three investing priority. Gartner expects that by the end of 2019, more than 30 percent of technology providers' new software investments will shift from cloud first to cloud only. This means that license based software consumption will further decrease, while SaaS and subscription based cloud consumption models continue their rise. (Stamford 2019).

Table 1. Worldwide Public Cloud Service Revenue Forecast (Billions of U.S. Dollars) modified from Gartner (Stamford 2019).

Cloud Service / Year	2018	2019	2020	2021	2022
Software as a Service (SaaS)	80,0	94,8	110,5	126,7	143,7
Platform as a Service (PaaS)	15,6	19,0	23,0	27,5	31,8
Infrastructure as a Service (IaaS)	30,5	38,9	49,1	61,9	76,6

Furthermore, comparing traditional IT outsourcing with cloud sourcing there are some fundamental differences as illustrated in figure 2. Traditional IT outsourcing requires connection of all devices to servers with separate installation of applications on each device. Meaning that updates are much more time costly and therefore not as frequent as in cloud sourcing. On the other hand in cloud sourcing all connections between devices and servers are made through the internet, enabling fast and responsive updates on all devices at once. As can be seen in figure 2, applications, middleware, infrastructure and hardware are at the cloud customer site. Whereas in cloud sourcing all of those are provided by the cloud provider as pay per use services.

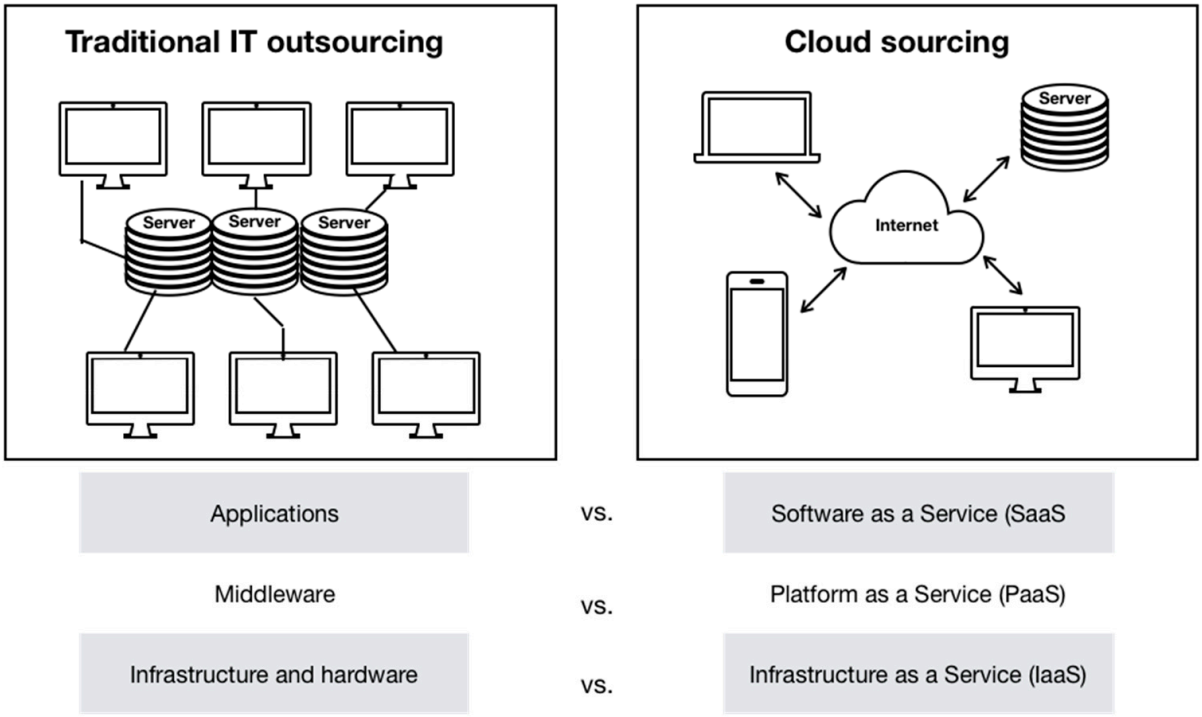

Figure 1.2: Traditional IT outsourcing vs Cloud sourcing modified from (Wang 2010)

Companies that decide to cloud source (to outsource IT resources to the cloud), (Schneider and Sunyaev 2016) do so to either cut costs, have a more flexible and scalable information systems infrastructure or to free up time to focus on their core functions (Armbrust et al. 2009). However, there is another reason which is not attributable to the company itself but rather the rapid development of information systems technologies, where cloud vendors are leading the development and forcing companies to move their systems to the cloud. For instance, the on-premise versions of certain information systems are no longer supported or have been upgraded by their vendors. Thus, the vendor puts pressure on its customers to cloud source instead of having their systems on premise. Not having access to support for on-premise systems means that companies have no choice than to do what the cloud providers impose, which

is to move to the cloud. Usually, cloud providers allow customers a few years to prepare to move to the cloud. For instance, AX dynamics has set 2021 as the last date for offering on-premise information systems. After that, only cloud systems will be provided and supported by the vendors. This leaves the customers with no choice. Whether they want it or not, they have to move to the cloud sooner or later. The companies that decide to cloud source encounter certain problems that can make cloud sourcing a struggle or even a failure. In order to develop and sustain cloud sourcing, it is vital for companies to develop innovation capabilities (e.g. Willcocks and Lacity 2018). Table 1 shows the practical differences between cloud sourcing and traditional IT outsourcing from a practical perspective, and perhaps some of the main arguments for companies to cloud source instead of traditional IT outsourcing.

Table 1.2: Practical differences between cloud sourcing and traditional IT-outsourcing (on premise) taken and modified from Harding (2011)

Characteristics	Cloud sourcing	Traditional IT outsourcing	Comments
Time before service can be accessed	Minutes/Hours	Days/Weeks	Once the cloud computing environment is set up initially, access can be gained faster than in traditional IT outsourcing where lead time is needed for installation, set-up, and configuration.
Capital Expenditure (CAPEX)	Pay per use, Variable	Upfront cost, Fixed	The pay per use model for cloud sourcing reduces or eliminates the large upfront costs incurred in procuring hardware and software in traditional IT-outsourcing
Economies of scale	Yes, for all organisations	Only for large organisations	Cloud sourcing not only provides cost advantages, in procurement of harware and software, it also prvides cost advantages from improved productivity. Traditionally, lessons learned from one environment must be duplicated in other environments but, in cloud sourcing once best practices are applied they benefit all consumers.
Multi-tenacy	Yes	Generally no, but can be found in application hosting	Multi-tenacy properly applied to cloud computing services allows providers to host multiple consumers effectively across shared resources. While it is more readily enabled in IaaS through the use of virtualisation, PaaS and SaaS providers may need to undertake significant re-architecting of their platforms or applications to apply multi-tenacy to these elements as well as to infrastructure. Where this has not been undertaken, consumers may find that their platforms and applications are not as elastic or cost-effective as anticipated.
Scalability	Elastic and automatic	Manual	Cloud computing resources can often be scaled up or down automatically, whereas human intervention is usually needed to add harware and software in traditional IT outsourcing.
Virtualised	Usually	Sometimes	Cloud computing environments are usually virtualised, whereas traditional IT outsourcing environments include a mix of physical and virtualised infrastucture.

A significant amount of evidence suggests that although organisations may have done due diligence in making their decision to move towards cloud sourcing, generating value (Masli et al. 2011) for the partners involved can often be very challenging (Barnett et al. 2013, Sultan 2014, Lee and Kim 2015). These challenges have in my case studies WasteHeroes and Quos in practice shown to prohibit cloud sourcing in several ways – see chapter 3. For example these companies have cloud sourced but did not set clear requirements from the beginning in the service level agreement (SLA) between them and their cloud partners and have therefore faced problems of misunderstanding in what was expected from them. Example of these misunderstandings; cloud based systems can be updated overnight meaning that functionalities of the systems might change. Sometimes this change happens without any prior information, which created problems for the cloud customer Quos. Difficulties in using (Gupta, Seetharaman, Raj 2013, Yang and Lin 2015) the system affects the efficiency and production of the cloud customer company, as it requires extra time for system users to learn the new functions (Hentschel, Leyh, Petznick 2018, Oliveira et al. 2019, Shuaib et al. 2019). Another challenge is to merge all involved cloud partners and make sure that they have the competence to deliver what is expected, interact with each other when needed and be transparent in case something happens, in case of data loss, problems with the system etc. (Schlagwein and Thorogood 2014, Califf et al. 2016, Huntgeburth 2016, Dempsey 2018).

1.3 The problem – cloud sourcing and innovation for competitive advantage

Although cloud computing (Mell and Grance 2011) and cloud sourcing (Schneider and Sunyaev 2016) research literatures might talk about the same artefacts, they do it from different angles. The former is more concerned about "computing" hence holding a more technological perspective on the provision of computing through the exploitation of technical innovations such as virtualization, high–performance networks and data centre automation (Armbrust et al. 2009, Mell and Grance 2011). Whereas the latter is more concerned about "sourcing" hence it involves a socio-technical and strategic perspective which allows third parties to be directly integrated such as different providers and sub providers (Huntgeburth 2016, Dempsey 2018); which if interacted with in the right way can open up for innovations and competitive advantage (Ali, Warren, Mathiassen 2017, Dempsey 2018, Willcocks and Lacity 2018).

Most of the research literature on cloud sourcing focuses on the technical aspects and the implications for the decision to adopt and continue to use cloud sourcing (Schneider and Sunyaev 2016, Cheng 2018, Walther 2018, Hall 2019, Shuaib et al. 2019). The few studies that apply an economic or company strategic perspective on cloud sourcing draw primarily on transaction cost economics (e.g. Benlian 2009, Asatiani 2015). Only a handful of scholarly papers have utilized a strategic perspective on cloud sourcing from

the client/user side (e.g. Willcocks, Lacity, Cullen 2007, Armbrust et al. 2009, Lacity, Khan, Willcocks 2009, Garrison, Kim, Wakefield 2012, Schneider and Sunyaev 2016, Luo et al. 2018, Chang et al. 2019). Willcocks et al. (2007) discuss the strategic implications of cloud computing from an arrangement perspective; Armbrust et al. (2009) highlights the opportunities and benefits of cloud computing; Lacity et al. (2009) looks at the importance of the relationship for the cloud sourcing outcome; Garrison et al. (2012) points out factors for cloud computing adoption; Schneider and Sunyaev (2016) presents how the flexibility of cloud computing is related to internal business processes. More recent studies by Luo et al. (2018) and Chang et al. (2019) look at the relation between cloud sourcing and competitive advantage.

Both innovation and competitive advantage have been central topics for management and information systems research over the years, where innovation has been discussed both as process and product (Nylén and Holmström 2015, Nambisan et al. 2017, Holmström 2018) and the role of IT for creating and sustaining competitive advantage has been elaborated on (Chan, Sabherwal, Thatcher 2006, Bharadwaj et al. 2013).

In relation to traditional IT outsourcing, where the company's IT-services are outsourced wholly are partially on large and long-term contracts, cloud sourcing is on-demand self-service, scalable, virtualized and shared, and priced on a pay-per-use basis (Schneider and Sunyaev 2016, Willcocks and Lacity 2018). While the value of cloud sourcing for the client company certainly is at least as large as for traditional IT outsourcing, the increased accessibility of cloud sourcing makes it less of a rare and hard-to-imitate resource for the client company (cf. Barney 1991), thus a less likely source of competitive advantage. Moreover, cloud sourcing removes many of the technical issues and difficulties associated with the so called back-end of IT-outsourcing, e.g., technical infrastructure, making the technical organization and competence less important from a strategic perspective (Hahn et al. 2013, Hardy 2018, Vithayathil 2018).

Instead the front-end issues of IT outsourcing become much more strategic, i.e., the applications, business model and innovation issues (Legner 2017) Specifically, companies with traditional IT functions often lack capabilities to describe and analyze their function in relation to the company's strategy and business model (Willcocks and Venters 2013, Willcocks, Venters et al. 2013). Moreover, most companies with a traditional IT-function and traditional IT outsourcing typically lack capabilities for product, service and business model innovation (Willcocks and Venters 2013, Willcocks, Venters, Whitley 2013). In addition, traditional IT-sourcing typically mean a 1:1 relationship between the client and vendor (Vithayathil 2018), while cloud sourcing involves several cloud provider companies (cloud broker, cloud provider, cloud sub provider, IT-consultants), requiring a capability from the cloud sourcing client company to interact with and manage an eco-system of cloud provider companies.

From a strategic theory perspective cloud computing is an example of a new technology enabling different kind of innovations and new business models (Teece 2018). New

technologies, like cloud computing, are unlikely to be an enduring source of competitive advantage, as they are generally easy to imitate or easy to acquire if proven valuable (Barney 1991, Teece 2018). Instead, companies' dynamic capabilities to design and transform cloud computing and cloud sourcing into innovations and new business models are more likely candidates as sources of competitive advantage (Teece 2007, Teece, Peteraf, Leih 2016, Teece 2017, Teece 2018). According to the dynamic capabilities theory (Teece 2007) successful , i.e., profitable, business model innovation shares one or several of the following non-imitable characteristics: a) differentiated business model architecture with co-specialized elements, b) complicated process steps, organizational structures, and/or arrangements, c) combinations with (internal or external) complementary assets, d) relationships with external actors, e.g., customers, suppliers, partners, which are unique and/or disturbing to competitors, e) dynamic adaptation of business model elements and architecture, or dynamic adaptation of relationships with external partners and/or, f) strong intellectual property. All of these characteristics, except strong intellectual property, can be used in relation to cloud sourcing.

This thesis is phenomenon driven drawing on several sources of literature in order to understand cloud sourcing; information systems, innovation management, strategic management and relationship marketing literature. These literatures have helped me form a knowledge base on which to build further, and to narrow my scope of research to cloud sourcing, innovation, and its implications for competitive advantage My research focus on a relatively new phenomenon – *transition to cloud sourcing* – which to date has received limited attention from management and business researchers.

As previously discussed most research focus has been on technical aspects of cloud computing rather than business and management related to cloud sourcing, e.g., strategic issues (Luo et al. 2018, Chang et al. 2019, Lang 2019). The more precise character of the extant business and management research on cloud sourcing remain to be established and will be a continuous research challenge as the field develops quite rapidly.

A second research challenge concerns cloud sourcing implications for competitive advantage in relation to other IT outsourcing options. Cloud sourcing being a new type of IT outsourcing has due to its different characteristics from traditional IT outsourcing also different challenges that companies that decide to make this transition need to relate to. Even if the decision behind cloud sourcing has been carefully selected based on the firm's strategic goals; organisations have to consider the strategic value of their resources and capabilities in order to make the right decision in handing over the ownership of their IT to a third party. Even though these insights are known, the area has been scarcely researched (Oliveira et al. 2019). The existing literature focuses on strategic aspects such as cloud computing in relation to innovation (Lin and Chen 2012, Clohessy, Acton, Coughlan 2013, Asatiani 2015, Trevor 2016, Helfat and Raubitschek 2018, Kathuria et al. 2018, Willcocks and Lacity 2018). However, there is still a lack of research on the strategic importance of resources and capabilities for competitive

advantage of cloud sourcing (Bayramusta and Nasir 2016, Senyo, Addae, Boateng 2018).

A third research challenge relates to the process of cloud continuance. This entails the ability of the client firm to not only adopt cloud sourcing but also to continue to use and develop the cloud sourcing over time (Makhlouf and Allal-Chérif 2019, Martins et al. 2019); in order to first reap the basic benefits of cloud sourcing (such as scalability, cost reduction, flexibility etc) and then develop these benefits further into innovations and potentially gain competitive advantage. There are many examples of firms that have cloud sourced and then back sourced not being able to continue cloud sourcing, and thereby never making full use of cloud sourcing (Latamore 2011, Walther 2018). Challenges faced by companies when transitioning from traditional IT outsourcing to cloud sourcing are not well elaborated on in extant research (Hentschel et al. 2018, Shuaib et al. 2019). Although existing research gives us important insights on cloud adoption barriers (e.g. Oliveira, Thomas, Espanadal 2014, Gao and Sunyaev 2019), cloud continuance is still a problematic task and for many companies rather risky (Opara-Martins, Sahandi, Tian 2016). There is a lack of research on an organizational level of barriers to cloud source (Shuaib et al. 2019), and in particular barriers for sustained cloud sourcing (Martins et al. 2019) understanding the cloud continuance process over time.

A fourth research challenge deals with identifying the stages that cloud sourcing firms go through in their business model development, and the challenges they face. Current research highlights personal attitudes, behavior characteristics and leadership support (Ratten 2016) as important factors for cloud continuance, but it lacks in knowledge on the process of how the adoption and continued use of cloud sourcing can trigger development of innovations and competitive advantage of a firm. Firms with traditional IT outsourcing often lack the capability to innovate services, products and business models related to IT sourcing (Willcocks and Venters 2013, Willcocks et al. 2013). Another factor of value to consider is the fact that traditional IT outsourcing typically implies a 1:1 realtionship between the client and vendor. Whereas cloud sourcing entails several cloud partner firms coming together, which requires a capability from the cloud customer to interact and manage all partners. This capability may be of dynamic characteristics, and the lack of thereof can hinder the utilisation of the full potential with cloud computing and the opportunities to develop the cloud customer firm's business model and competitive advantage (cf. Teece 2007, Teece 2017). Nevertheless, if the cloud customer firm is able to sense and seize the opportunities related to cloud computing, it might be able to realign its structures and cultures to gain competitive advantage (cf. Teece 2007, Teece 2017), a research area that is only in its infant stage with need of extensive insight (Luo et al. 2018). More recently Willcocks and Lacity (2018) propose different types of innovations related to cloud sourcing, but they do not perform any systematic study on this and therefore suggest such to be done.

The fifth research challenge considers the need to understand the business relationships in cloud sourcing because of their role in the development of innovations and

competitive advantage (Cullen et al. 2017, Ruey-Jer et al. 2018, Willcocks and Lacity 2018, Chang et al. 2019). More specifically, to understand how business relationships contribute to the development of innovation and competitive advantage in a cloud sourcing context, we need to focus on the business relationship development and factors involved in this process (Egender, Hodosi, Rusu 2018) and what contributes to its success (Morgan and Hunt 1994, Olkkonen 2000, Walter et al. 2003, Andersen and Kumar 2006, Holmlund 2008, Athanasopoulou 2009, Falkenreck 2017). Business relationships remain a limited research area in cloud sourcing literature. While innovation has been discussed in detail in extant research (Fichman, Dos Santos, Zheng 2014, Nylén and Holmström 2015, Nambisan et al. 2017, Helfat and Raubitschek 2018, Holmström 2018) little is known how digital technologies - in this case cloud sourcing - can trigger innovation through sustainable relationships.

1.4 The purpose

The purpose is to:

Investigate cloud sourcing from the firm client perspective, more specifically the transitioning process from traditional IT outsourcing to cloud sourcing, i.e., the barriers to continuance of cloud sourcing, how cloud sourcing triggers innovation capabilities and its implications for competitive advantage. This is done in order to contribute to the business and management research knowledge of cloud sourcing.

1.5 The research questions

Willcocks and Lacity (2018) suggest propositions of innovations supported by cloud computing and cloud sourcing. They discuss the huge amount of effort it takes to make cloud sourcing work, in specific to scale for large organisations - and that deeper critical scrutiny and more empirical work is needed (Willcocks and Lacity 2018). A recent literature review on cloud computing (Senyo et al. 2018) highlights the lack of theoretical underpinnings and empirical studies. Bayramusta and Nasir (2016) calls for more studies on cloud sourcing from a business perspective. Moreover, Kathuria et al. (2018) point out three research gaps on how firms can reap the benefits of cloud computing. The first gap highlights a need to study the interaction between cloud capabilities and its transformative value. This involves a better understanding of how cloud computing influences capabilities of internal functions and external partners. The second gap puts forward a lack of understanding of the relation between cloud computing and firm performance. The third gap points out a need for better insight into

the integration of cloud systems and legacy systems present in existent IT infrastructure, and its importance in business value generation.

As discussed above, there are a number of research problems related to firms' transitioning to cloud sourcing from a management perspective. Firstly, we have a limited understanding of cloud computing and cloud sourcing from a business and management perspective due to limited research in this area. Thus, we need to review current cloud sourcing research in order to understand its strengths and weaknesses. Secondly, one of the management research areas with limited research is strategic management and the relationships between cloud sourcing and competitive advantage. Thus, we need to investigate the sources of competitive advantage compared to other IT sourcing options. Thirdly, the trend of vendors closing down on-premises versions of platforms and software applications forces client firms to cloud source sooner or later. While research on cloud adoption is plentiful, research on cloud continuance is limited and gives only a limited understanding of the challenges involved in continuing to stay in the cloud, and in the long term in surviving as a firm. Thus, we need to investigate the specific barriers to cloud sourcing and how they can be overcome. Fourthly, while the current research on cloud sourcing does identify innovation opportunities related to cloud sourcing, it is rather vague on how these innovation opportunities are identified, captured and integrated into the firm. Dynamic capability theory has been used in other innovation management research to better understand innovation processes. Here, dynamic capability theory will be used to understand innovation processes and its implications for competitive advantage in the transitioning process to cloud sourcing. Fifthly, as described above, transitioning to cloud sourcing is not a process that involves only the client or user firm but, to a greater or lesser extent, also all the cloud provider and the broker firms involved in the cloud sourcing arrangement. Thus, to a large extent innovation processes related to cloud sourcing are due to collaborative efforts and the management of cloud sourcing relationships. This is a rare perspective in current research; thus an exploratory study has been conducted of how cloud sourcing relationships are activated and managed (or not) for innovation.

This leads to the following research questions:

RQ1: What are the characteristics of the current body of literature on cloud sourcing?

RQ2: Which sourcing options of IS-development can be a source of competitive advantage?

RQ3: What are the barriers for cloud continuance in cloud sourcing firms?

RQ4: How are dynamic capabilities for innovation triggered in cloud sourcing firms?

RQ5: How does collaborative innovation develop in cloud sourcing relationships?

These research questions debouche into the overarching research question: **How can cloud sourcing lead to innovation and what does it imply for competitive advantage?**

1.6 Thesis outline

This thesis consists of a summary of papers (called kappa in Swedish). The aim of the kappa is to present an overall view of the papers, the theoretical framework applied and the methodology used. The contributions are elaborated on in relation to the purpose and research questions of the thesis. The kappa consists of six chapters. Chapter 1 is an introduction to the thesis, providing a background and motivation for this research and presenting the research questions, and how they are related to the five papers. Chapter 2 provides a theoretical background. Chapter 3 presents the method. I have constructed this thesis in three studies; – a, b and c –, which are described in detail in Chapter 3. The three studies have resulted in in five papers which are described in Chapter 4. Figure 1.1 illustrates how the different research questions are related to each paper and study, respectively. It also shows the different theoretical lenses applied in the research process. Chapter 5 provides a discussion of results reconnecting to the research questions. Finally Chapter 6 presents the contributions, implications and future research.

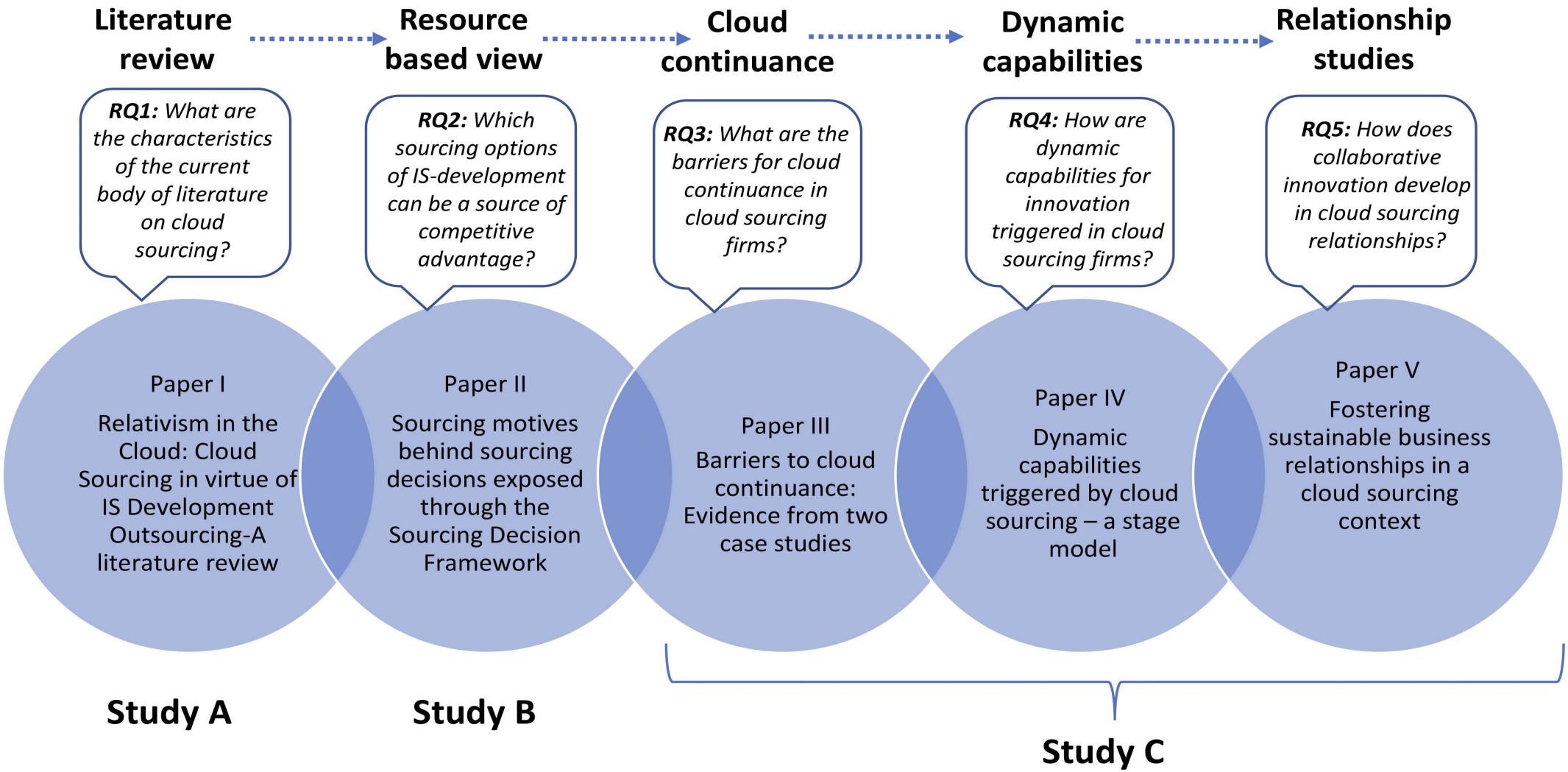

Figure 1.3: Illustration of connections between my papers, research questions, studies and theoretical perspectives

“Science and thought have no limits” Dad

“Nauka i misao nema kraja” Tata

2. Theoretical background

In this chapter, I present the literature that is of direct relevance to my research. A brief introduction to cloud computing is followed by a review of cloud sourcing continuance, followed by a review of research relating cloud sourcing to innovation, competitive advantage and structural and cultural alignments.

2.1 What is cloud computing?

Cloud computing is not a new phenomenon. The core technologies incorporated in cloud computing have been readily available for quite some time (Armbrust et al. 2009, Géczy, Izumi, Hasida 2012). The concept of providing computing facilities to the public like a utility was first mentioned by John McCarthy in the 1960s (McCarthy 1960) when referring to telephony and water, bearing in mind the early stages in computing at the time. The term "cloud" was used in various contexts in the 1990s, and appeared in network diagrams and figures to indicate large networks. Subsequently, the term 'cloud' began to seriously gain popularity after its use by Google's CEO Eric Schmidt in 2006 to describe the business model of providing services across the internet (Erl, Puttini, Mahmood 2013).

The definition of cloud computing used in this thesis is from the US National Institute of Standards and Technology (Mell and Grance, 2011, 2-3) defining it as "*a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction*". The convergence of the following technologies (Shawish and Salama 2014) has contributed to the realisation of cloud computing:

- Distributed Computing: utilized computing capacity from multiple distributed computers to address large computational problems.
- Distributed File System (DFS): allows access to files from multiple hosts via a computer network.
- Virtualization: uses hypervisor or Virtual Machine Monitor (VMM) to establish a virtual layer between the Virtual Machines (VMs) and the underlying hardware.

- Web Services: is a software system designed to support interoperable machine-to-machine interaction over a network.
- Cryptography: cryptographic techniques which implies coding and decoding messages facilitates cloud computing security requirements.

Cloud computing provides an on-demand network to a pool of scalable and manageable shared IT resources (Mell and Grance 2011). Cloud computing can be further characterised by its service and deployment models (Mell and Grance 2011). There are different types of cloud service models, summarized in Table 2.1., including Software as a Service (SaaS), wherein software is hosted remotely and users access IT using a mobile device or web browser (e.g. Salesforce CRM or MS Office Mobile); Platform as a Service (PaaS), wherein a platform for deploying a solution is hosted in the cloud (e.g. Salesforce or Microsoft Azure); and Infrastructure as a Service (IaaS), which entails the provision of servers or storage facilities (e.g. Amazon Elastic Compute Cloud or Dropbox) (Hahn et al. 2012). In addition, there are four deployment models of the cloud: public cloud, private cloud, hybrid cloud and community cloud (see Table 2.2). The public cloud requires the least amount of investment, but may lack data security. The private cloud has less issues with data security since it is private, and the user owns it, and large corporations that already have the virtualisation infrastructure can easily make it work. The hybrid cloud provides the security of the private cloud at the low cost of the public cloud. This is usually an obvious choice for large companies that have variable demand for IT services and can use the hybrid cloud to adapt their demand to certain periods. The community cloud is tailored to a particular industry such as health care to meet their needs more closely than generic clouds (Muller 2012).

In line with the National Institute of Standards and Technology (NIST) there are three different cloud service models (Mell and Grance 2011). Since 2014 ISO/IEC added four more categories namely (ISO 2014): Communications as a Service (CaaS), Computer as a Service (CompaaS), Data Storage as a Service (DSaaS) and Network as a Service (NaaS).

Table 2.1 presents the different cloud service models available with definitions and examples of each. Table 2.2 presents the different cloud deployment models in use.

Table 2.1 Cloud computing service models classification modified (Shawish and Salama 2014, Alsaeed and Saleh 2015)

Service models	Target	Characteristics	Product Type	Example
Software as a Service (SaaS)	B2B *(End users)*	Customers are provided with applications that are accessible any time from anywhere (application functionality rented from a service provider instead of installing and running software)	Web applications and services (Web 2.0)	Salesforce.com Oracle Fortnox *(Gmail Facebook)*
Platform as a Service (PaaS)	Independent software vendors & developers in user organisations	Customers are provided with a platform in the Cloud, for developing and executing applications	Programming APIs and frameworks; Deployment system	Microsoft Azure Google AppEngine Amazon SimpleDB/S3
Infrastructure as a Service (IaaS)	Independent software vendors & developers in user organisations	Customers are provided with virtualised hardware (storage space and computing power) on top of which they can build infrastructure	Virtual machines management infrastructure, Storage management	Rackspace GoGrid Flexiscale
Communications as a Service	End users	Customers are provided with real time interaction and collaboration	Communication applications	Voice over IP (VoIP)/ Videoconference
Computer as a Service (CompaaS)	Independent software vendors & developers in user organisations	Customers are provided with provision and use of processing resources needed to deploy and run software	Processing applications, Database management	Amazon EC2
Data Storage as a Service (DSaaS)	Independent software vendors & developers in user organisations	Customers are provided provision and use of data storage and related capabilities	Storage management	Fidelitone/ Urban Mapping/ Signite
Network as a Service (NaaS)	End users and Independent software vendors & developers in user organisations	Customers are provided transport connectivity and related network capabilities	Network management	Juniper Networks

Table 2.2 Cloud computing deployment models modified (Venters and Whitley 2012, Alsaeed and Saleh 2015)

Deployment models	Characteristics	Example
Private	Used as a means to dedicate hardware components exclusively to customers with the option of locating the cloud internally within the organisation. Access to the cloud is usually through a VPN connection. However, this type of deployment does come at a significant cost	Services may exist off site
Public	Is entirely owned by the cloud provider and their services are less customizable as IT is targeted at a specific group of customers to whom the service is sold. More than one virtual machine may be running on one server in the cloud	Amazon Google
Hybrid	Combines the characteristics of both the public and private cloud. Allows companies to cut costs by operating a system in the cloud while maintaining the security levels of private cloud storage.	Data stored in private cloud and agency database manipulated by a program running in the public cloud
Community	Shared by several organisations and supports a specific community with shared issues. Managed by a third-party organisation	Government or G- Cloud

The flexibility of cloud computing and in particular the SaaS model enables business processes to be offered in the cloud either as a unified packaged solution such as a cloud-based enterprise resource planning (ERP) system, or as a selective process solution that is not tied to a single application – a module of a system which can be used in different application environments (Schneider and Sunyaev 2016). For example, if a company has a complex process for processing its customer relations, this process can be independently linked to other processes in the cloud through SaaS, as well as to existing applications in the company's data centre, thereby ensuring that a consistent process (Armbrust, et al. 2009) exists across the organisation.

2.2 The theoretical development of cloud sourcing

Cloud computing and cloud sourcing are two different phenomena. Cloud computing entails a technological orientation (Yang and Tate 2009, Garrison et al. 2012), whereas cloud sourcing is more sociotechnical (Géczy et al. 2012, Schneider and Sunyaev 2016) in nature. Cloud computing is the technology (hardware, software, virtualisation, data, maintenance, functionalities etc.) behind the decision-making or process of cloud sourcing (contractual agreement, use of system, management support, trust relationships, innovations etc). It is important to highlight that research literature does not explicitly and clearly differentiate between cloud computing and cloud sourcing. Often, they are used interchangeably, which creates confusion over the two terms. There are cloud computing papers published in business journals and conference proceedings (Yang and Tate 2009, Sultan 2010, Sarkar and Young 2011, Venters and Whitley 2012, Yang and Tate 2012, Rieger, Gewald, Schumacher 2013, Schrödl and Bensch 2013,

Willcocks et al. 2013), as well as cloud sourcing papers in computing journals (Jae-Nam et al. 2003, Armbrust et al. 2009, Brynjolfsson, Hofmann, Jordan 2010, Garrison et al. 2012, Andriole 2015, El-Gazzar, Hustad, Olsen 2016). Some authors publish about cloud computing in both business and technical outlets such as Garrison et al. (2012), Garrison et al. (2015). This is not as common on the phenomenon of cloud sourcing which is less explored in technical journals and conferences, as well as generally (Amrit and Van Hillegersberg 2010, Gröh 2012, Repschlaeger et al. 2013, Willcocks et al. 2013, Schneider and Sunyaev 2016). It seems as if cloud computing is perceived as a "safe card" terminology which is used as an umbrella term in lack of more specific definition.

In order to leverage the benefits of cloud computing, companies turn to cloud sourcing, which can be defined as a process by which the deployment and maintenance of IT is outsourced to and provided by one or several cloud service providers (Armbrust et al. 2009) and thus can be seen as a specific variant of the outsourcing of IT resources (Schneider and Sunyaev 2016). In relation to traditional IT outsourcing, cloud sourcing is more flexible and scalable in terms of for instance the decision process and scope (the company can cloud source individual applications (i.e., e-mail) and does not have to commit to entire IT solutions), mixed governance modes (some servers and other equipment are private, others public) and contracts are usage-based and short-term (Schneider and Sunyaev 2016). The differences between cloud sourcing and traditional IT outsourcing on a number of dimensions can be seen in Table 2.3. From the table, it is evident that these two sourcing options differ on all dimensions except mode, which represents the number of vendors and clients involved in the process.

Table 2.3. Comparison between cloud sourcing and traditional IT outsourcing (Schneider & Sunyaev, 2016:4).

	Cloud computing	**IT outsourcing**
Decision process	SaaS: business department as key client	Large outsourcing contracts with high strategic relevance, top management as key clients
	IaaS/PaaS: IT department as key client	Request for information/request for proposal
	Predominantly self-service Vendor selection bound to product selection, product-based decision Online trial evaluations Task responsibilities shifted from provider to customer, for example, for request for proposal evaluation *vs* self-service evaluation	Vendor selection prior to decision on degree of outsourcing
Scope	Standardized software (SaaS) or cloud infrastructures (IaaS/PaaS) created by the provider for an anonymous market	Custom-tailored IT services
	Role of the IT department as service integrator Limited customization	Can include hardware, software, people, and processes (e.g., software development, datacenter operations, desktop maintenance, help desk operations)
Governance mode	Enables new scenarios of outsourcing and governance arrangements due to the variety of service models (IaaS, PaaS, SaaS) and deployment models (private, public, community, hybrid) and combinations thereof Enables the management of building blocks of IT, provided by external providers in the same way as they would be managed in-house Ownership, mode, and degree partially predefined by the selected service and deployment model	Individual configurations of ownership, mode, and degree
Ownership	Outsourced assets totally owned by the provider and its providers	Varies with type and degree of outsourcing Totally owned by the customer Partially owned by the customer Totally owned by the provider
Mode	Single vendor/client or multiple vendors/clients	Single vendor/client or multiple vendors/clients
Degree	Selective outsourcing	Total outsourcing Selective outsourcing

Contractual mode	Short term	Long term
	Usage based	Period based or project based
	High degree of automation and scaling	Individually negotiated
	Minimal up-front costs	Pricing based on business metrics
	Little possibility for negotiation, standardized terms of use	Strategic partnerships for continuous and joint innovation
Environment	Decentralized market Volatile and immature market Uncertain legal issues	Outsourcing market is well established with numerous experienced providers
Broad network access	Critical network dependence Potential bottlenecks, slowdowns, and outages that neither the client nor the vendor can control	Depends on the type of outsourcing (e.g., less critical for software development than for data centre operations)
Resource pooling	Multi-tenant virtualized applications Common code stack Provider-determined upgrade schedule	None

2.2.1 The company's decision to adopt and continuance of cloud sourcing

There are a wide range of factors that have a significant impact on the adoption of cloud sourcing in the research ranging from relative advantage, top management support, firm size, competitive pressure, and trading partner pressure characteristics (Garrison et al. 2012, El-Gazzar et al. 2016) to risk, security and trust in relationships (Low, Chen, Wu 2011). Oliveira et al. (2014) argue that the importance of the identified factors for cloud adoption are heavily industry-dependent. They therefore conducted a quantitative study of 369 manufacturing and service firms in an effort to integrate an understanding of the industry adoption of cloud sourcing driven by the diffusion of innovation theory (Lyytinen and Damsgaard 2001) and the technology organisation and environment framework (Tornatzky, Fleischer, Chakrabarti 1990). Their study assesses the concerns cost savings, relative advantage, complexity, compatibility, technology readiness, top management support, firm size, competitive pressure and regulatory support which resemble the main factors identified in literature.

Post adoption, being the phase subsequent to adoption, is defined as follows: "Post adoptive behaviour occurs after an IT artefact has been implemented, made accessible to the user and applied by the user in accomplishing his/her work activities. This behaviour may be quite different from the behaviour in initial adoption stages" (Recker 2010, 78 in Shaikh and Karjaluoto (2015). Some researchers define the post adoption phase as IT continuance (Bhattacherjee 2001). In relation to cloud sourcing, I have chosen to see cloud sourcing as a process, and therefore equate it with IT continuance.

Previous research on post adoption is based on literature of IT continuance, which resembles the process of cloud continuance; but is not studied as extensively as cloud adoption.

An overview of cloud sourcing continuance literature is given in table 2.4. Two papers are published on B2B, whereas the rest is on Business to Customer (B2C). The two papers (Mirusmonov and Kim 2013, Ratten 2016) that study cloud sourcing continuance in B2B focus on individual users, employees and managers, and related organisational factors.

Table 2.4: Literature summary of papers published on continuance of cloud computing

Paper on Cloud Continuance	Summary of paper
Trenz, M., Huntgeburth, J. C., & Veit, D. (2013, June). The Role Of Uncertainty In Cloud Computing Continuance: Antecedents, Mitigators, And Consequences. In *ECIS* (p. 147).	Quantitative study, survey based, 143 individual users (students) of general cloud storage services using Principal Agent Theory to hypothesise trust, peer adoption, switching costs, information privacy issues, information security concerns, availability concerns, perceived uncertainty, perceived usefulness, perceived ease of use, satisfaction, continuance intention - focused on demographics (age and gender), other cloud storage services, internet use, technology experience, time with service and business or private use for cloud computing continuance.
Ratten, V. (2016). Continuance use intention of cloud computing: Innovativeness and creativity perspectives. *Journal of Business Research*, *69*(5), 1737-1740.	Quantitative study, survey based, 142 survey questionnaires with managers from technology firms in Australia. Social Cognitive Theory - personal attitude, perceived behavioral control, risk, innovativeness, creativity. Concludes that environment and technology acceptance is important in determining continual usage of cloud computing. No support for innovativeness and creativity as cloud computing is integral to organisation's IT rather than being a new technological innovation. Personal attitude is most important, meaning that the use of cloud computing relates to behavioral characteristics. Important for organisational leaders to gain bottom-up support in using cloud computing.
Yang, H. L., & Lin, S. L. (2015). User continuance intention to use cloud storage service. *Computers in Human Behavior*, *52*, 219-232.	Quantitative study, descriptive statistics analysis of 294 questionnaires conducted in Taiwan. Key factors influencing individual users' of cloud storage services studied through Task-Technology Fit Theory. Concludes that cloud storage services as an unstructured task, cloud storage self-efficacy and the opinions of reference groups have significant positive influences on perceived usefulness which impacts users' continuance intention to use cloud storage devices. Privacy protection risks and lack of privacy policy have negative influence on continuance intention.
Benlian, A., Koufaris, M., & Hess, T. (2011). Service quality in software-as-a-service: Developing the SaaS-Qual measure and examining its role in usage continuance. *Journal of management information systems*, *28*(3), 85-126.	Mixed method SERVQUAL and SaaS literature, field interviews, focus groups, card-sorting exercises and two surveys using companies to develop an instrument "SaaS Qual", a zones of tolerance based service quality measurement of SaaS solutions. Concludes that besides reporting, responsiveness, reliability and features, two new factors (security and flexibility) are important for continuance of using SaaS solutions.
Wang, N., Liang, H., Jia, Y., Ge, S., Xue, Y., & Wang, Z. (2016). Cloud computing research in the IS discipline: A citation/co-citation analysis. *Decision Support Systems*, *86*, 35-47.	Knowledge structure of cloud computing research. Citation and co-citation analysis of cloud computing research between 2004-2014. 214 papers from 20 top journals in IS and Management, and 2 prominent international conferences. They identify 41 important papers, and main path analysis reveals three development stages of cloud computing research: incubation stage, exploration stage and burgeoning stage. Co-citation analysis, the principal component factor analysis of the cocitation, mainly identifies six

	major research themes: foundations, SaaS model, security and risk, literature review, adoption, impacts and modeling. Evidence-based analysis method. 18 papers are conceptual, 11 quantitative, 5 literature reviews, 5 modeling and 2 qualitative case studies. Since the Burgeoning stage (2012-2014), 138 papers, the research focus has shifted from conceptual development and exploration to business and technology related issues.
Chen, S. C., Chen, H. H., & Chen, M. F. (2009). Determinants of satisfaction and continuance intention towards self-service technologies. *Industrial Management & Data Systems*, *109*(9), 1248-1263.	Quantitative study. Develops an integrated model to predict and explain the continued use of self-service technologies based on Technology Readiness, Technology Acceptance Model, and Theory of Planned Behavior. 481 surveys from self-service technology users. Structural equation modeling. Concludes that users' satisfaction influences continuance intention, while perceived usefulness, perceived ease of use, subjective norms, and perceived behavioral control simultaneously influence satisfaction. Discomfort and insecurity have no negative influence on continuance intention.
Mirusmonov, M., & Kim, C. (2013). Intrinsic and Extrinsic Motivation Impact on Mobile Cloud Computing Continuance Intention. In *PACIS* (p. 47).	Quantitative study, 550 questionnaires to Korean company employees. Studied the intrinsic and extrinsic motivation dimensions that mobile subscribers experience in relation to proposed expectation-confirmation model. Research model is based on concept of outcome expectations and satisfaction mediators to predict continuance intention. Concludes with enhanced theory on users' continued use of innovation and its application to mobile computing: saying that there is a strong influence from outcome expectations on user intentions - outcome expectancy is more predictive of continuance than satisfaction.
Venkatesh, V., Thong, J. Y., Chan, F. K., Hu, P. J. H., & Brown, S. A. (2011). Extending the two-stage information systems continuance model: Incorporating UTAUT predictors and the role of context. *Information Systems Journal*, *21*(6), 527-555.	Extension of the expectation-confirmation theory of information systems continuance. They add three new predictors identified in the unified theory of acceptance and use of technology: effort expectancy, social influence, and facilitating conditions. Have trust as the key contextual belief in the model. Longitudinal field study of 3159 Hong Kong citizens using electronic government technologies. Concludes that changes in pre-usage beliefs and attitudes through the emergent constructs of disconfirmation and satisfaction ultimately influence continuance intention.
Trenz, M., & Huntgeburth, J. (2014). Understanding the viability of cloud services: A consumer perspective.	Quantitative study of 235 survey responses from students. Looking at effects of perceived uncertainty, perceived ease of use, perceived usefulness, word of mouth, loyalty and willingness to pay in relation to satisfaction on how cloud services can become viable. Concludes that loyalty is the main driver of willingness to pay, while satisfaction is sufficient for word of mouth.
Trenz, M., Huntgeburth, J., & Veit, D. (2015). The Flock in the Cloud-How Social Influence Processes Shape Cloud Service Relationships. In *Proceedings of the 36th International Conference on Information Systems (ICIS)*.	Quantitative study using Social influence Theory and data set of 2011 internet users focusing on how three social influence processes (compliance, identification, internalization) shape cloud users' uncertainty evaluation and behavior before and after the adoption of the service. Concludes by evaluating when and why users rely on services they cannot fully evaluate. Perceived uncertainty has significant impact on continuance intention.

To sum up, the literature review of the theoretical development of cloud sourcing (Wang et al. 2016) shows that cloud sourcing research has evolved through three stages, namely incubation, exploration, and burgeoning. Papers in the incubation stage do not explicitly define the term cloud computing or cloud sourcing and use similar constructs. Papers in the exploration stage mainly focus on the definition, technical features, opportunities, and challenges of the development of cloud computing. Lastly, papers in the burgeoning stage start to address specific research topics. They show that there is very little published on the continuance of cloud computing and recommend more research on the

topic. Building on this literature review, this thesis can be positioned as part of the burgeoning stage and beyond.

2.3 Cloud sourcing - dynamic capabilities and competitive advantage

The dynamic capability theory (DCT) of the firm (Teece 2007, 2018) is a development of RBV (Barney 1991, Wernerfelt 1984). Both theories postulate that valuable, rare and hard-to-imitate or substitute resources and/or capabilities may be sources of a company's competitive advantage. However, DCT assumes that the value of strategic capabilities will erode over time due to the competition catching-up (Teece 2007, 2018). The only capabilities that will be valuable, rare, or hard-to-imitate or substitute over time are the capabilities to develop, re-configure and divest the company's capabilities more effectively than its competitors, i.e., dynamic capabilities (Teece 2007). Dynamic capabilities include the sensing, seizing and transforming capabilities needed to design, implement and innovate the business model (Teece 2018). Dynamic capabilities depend on managerial skills in identifying opportunities, committing resources to the development and refinement of the business model, and making cultural and structural alignments (see Figure 2.1.).

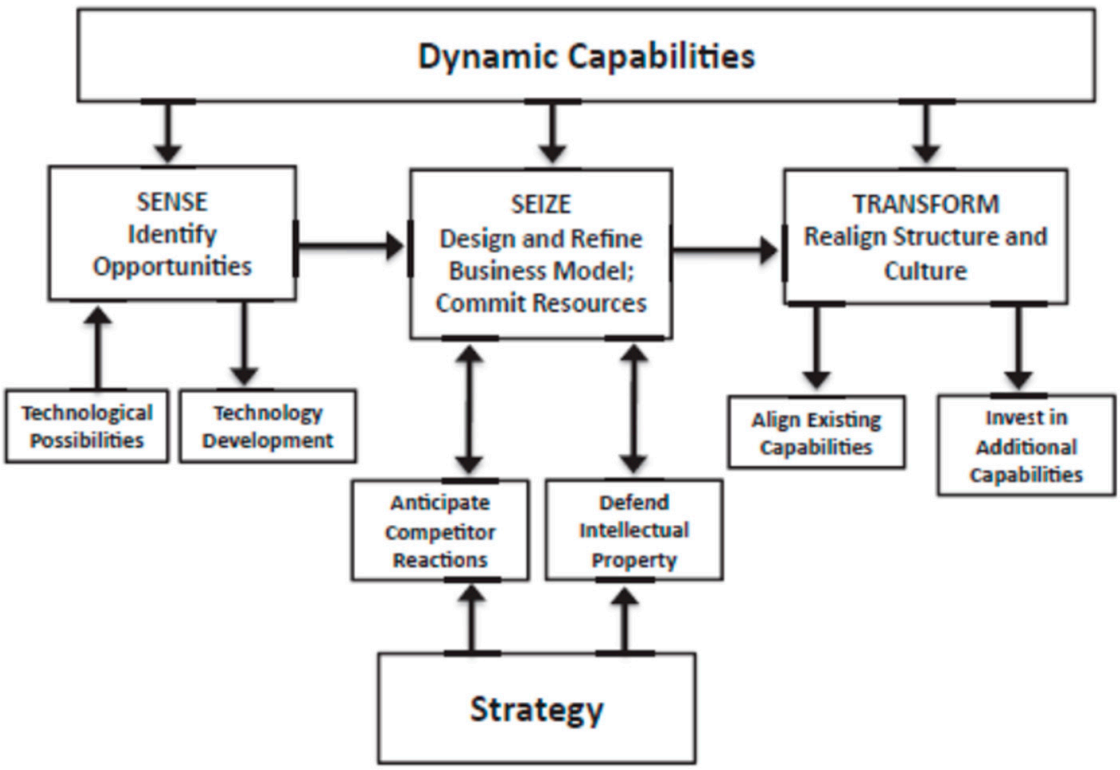

Figure 2.1. Dynamic capabilities, business models and strategy (Teece 2018:45)

The relation between dynamic capabilities and strategy has been discussed extensively but here I adhere to Teece (2018), as shown in figure 2.1., that strategy is the same as competitive strategy, i.e., how the company competes. A common trigger for sensing a business opportunity are the introduction of a new technology like cloud computing. The opportunity of a new way of IT outsourcing, cloud sourcing, may start a transformation process gaining momentum by the company's dynamic capabilities.

Sustained competitive advantage can only be achieved if the value-creating strategy is not copied by a considerable number of competitors, which emphasise the importance of a company's resources being kept indoors as a source of competitive advantage (Barney 1991). Kathuria et al. (2018) argue that resources alone cannot create value and become a source of competitive advantage, as they are only enablers for cloud services. Instead, it is the agile infrastructure and characteristics of cloud computing that provide opportunities to develop new cost-reducing and revenue-generating services and other cloud based solutions that can become a source of competitive advantage (Kathuria et al. 2018). Thus, the agile infrastructure and the flexible and scalable properties of cloud computing underpins the development of innovative or dynamic capabilities (Teece 2007, 2018) that could be a source of competitive advantage.

In general, the dynamic capabilities theory (Teece 2007) asserts that successful business model innovation shares one or several of the following non-imitable characteristics: a) differentiated business model architecture with co-specialized elements, b) complicated process steps, organizational structures, and/or arrangements, c) combinations with (internal or external) complementary assets, d) relationships with external actors, e.g., customers, suppliers, partners, which are unique and/or disturbing to competitors, e) dynamic adaptation of business model elements and architecture, or dynamic adaptation of relationships with external partners and/or, f) strong intellectual property. All of these characteristics, except strong intellectual property, are possible to use in relation to cloud sourcing.

2.4 Cloud sourcing triggering innovation

Innovation has been a central topic for management and information systems research over the years, where innovation has been discussed both as process and product (Nylén and Holmström 2015, Nambisan et al. 2017, Holmström 2018). The innovation concept will here be defined in accordance with the OECD-definition *An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relation* (OECD 2005, 146). A new type of innovation not covered by the OECD definition is business model innovation, which has specific relevance when a new field of technology, such as cloud computing, triggers innovation (cf. Teece 2018). There are many definitions of a business model

but an often cited definition comes from Teece (2010, 172): …*the design or architecture of the value creation, delivery, and capture mechanisms a firm employs. The essence of a business model is in defining the manner by which the enterprise delivers value to the customers, entices customers to pay for value, and converts those payments to profit.* Teece (2018) specifies the key components or elements of a business model into three main categories:

Value proposition: Product & Service, Customer needs, Geography

Revenue Model: Pricing Logic, Channels, Customer Interaction

Cost Model: Core Assets & Capabilities, Core Activities; Partner Network.

In line with this business model definition and with the OECD definition, requiring implemented and new or significantly improved components, business model innovation could be defined as: designed, novel, and non-trivial changes to the key elements of a firm's business model and/or the architecture linking these elements (Foss and Saebi 2017, 216). As examples related to cloud sourcing could be the firm licensing a new service based on software (SaaS) from a partner firm and then offering this as a service to its customers along with its other services. This would be a product innovation. A business model innovation would be a more holistic change to the firm's way of doing business. An example would a traditional taxi company changing to Uber-like services. This would require changes in the booking system, pricing logic, new payment system, new mobile apps, geographic localization system, new customer interaction and so on. And the Uber business model would not be possible without cloud computing and cloud sourcing.

Cloud sourcing represent new forms of flexibility and scalability to innovate products, processes, markets and the company's business model (cf. Teece, 2018). One of the few empirical studies on cloud sourcing and innovation (Willcocks and Lacity 2018) identify three types of innovations supported by cloud computing and cloud sourcing:

- **IT operational innovations:** IT operational, employee roles, technological changes (that do not affect firm specific business processes).
- **Business process innovations:** Changes in specific business processes and how business operates.
- **Business product/service innovations**: Enable market expansion, develop services and products for existing customers.

In terms of how firms will innovate related to cloud sourcing Willcocks and colleagues propose three types of processes (see table 2.5) incremental, architectural and radical innovation (Willcocks et al. 2013, Willcocks and Lacity 2018). Incremental innovations improve processes, reduces cost and replace application programs with subscription licenses, i.e., software as a service (SaaS). Architectural innovations integrates IT and business processes by developing the IT-department's role to become more business

and strategy focused, and facilitate collaboration with third parties. Radical innovations may come from collaboration with third-parties and from internal collaborative work.

Table 2.5: Cloud sourcing as the platform for innovations (Willcocks and Lacity 2018).

Innovation focus	Proposition	Cloud services
Incremental innovation	Cost control through consolidation and virtualization. Direct replacement of Apps with SaaS	Virtualization, Hybrid Clouds, IaaS, SaaS
Architectural innovation	Improvement in business processes; increasing mobility; increasing	Mobilization, consumerization, PaaS, IaaS, SaaS
Radical innovation	Skunk-work IaaS, collaboration (intra- and inter-organizational)	Elasticity, Consumerization, Market based, PaaS, SaaS

In order to understand how collaborative innovation can develop in cloud sourcing, I have illustrated the relations at hand below in figure 2.2. As seen from the illustration all partners involved interact with each other. The cloud computing service models add to this interaction through the involvement of different partners each responsible for a specific service. These relations can be highly complex.

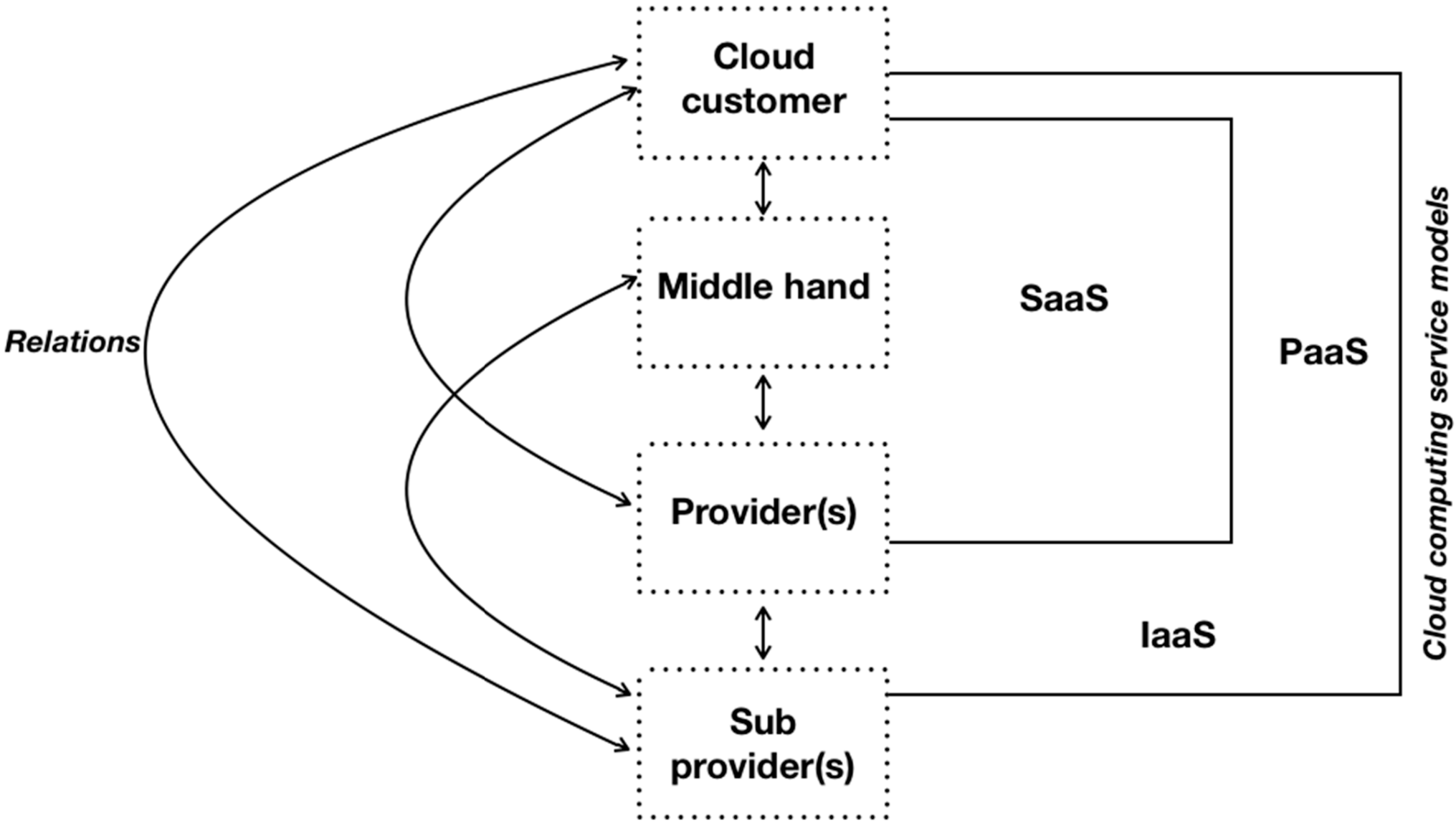

Figure 2.2 Cloud sourcing relationship

2.5 Structural and cultural alignments related to cloud sourcing and dynamic capabilities

The strength of a company's dynamic capabilities depends partly on managerial efforts to make structural and cultural alignments in relation to the technological opportunities and market changes (Teece 2018). The discussion of innovation opportunities related to cloud sourcing by Willcocks and Lacity (2018) is further developed in Vithayathil (2018), who questions the future of the internal IT department with the adoption of cloud computing and cloud sourcing. He juxtaposes traditional IT outsourcing with cloud sourcing and clearly states the differences. Cloud sourcing is different from traditional IT outsourcing that is characterized by (1) a 1:1 relationship between the client firm and vendor; (2) longer duration of contracts; (3) nature of contracts where pricing and terms include the use of incentives, or specific performance directives, or the use of Time-and-Material (T&M) pricing, with such contracts typically being negotiated and customized for the specific client-vendor outsourcing relationship; and (4) the outsourced work is specific and customized for the client. Furthermore, Vithayathil (2018) asserts that cloud computing is different from on-premises, in-house and captive services saying that *"Traditional computing services and IT departments evolved as captive departments grown within the organization that incurred the capital expenditures and operating costs for the IT department. In contrast, cloud computing obviates the requirement for capital and the services are on-demand and metered"* (Vithayathil 2018, 2). In contrast to traditional IT outsourcing, in cloud sourcing the customer pays only for services that are used, for the volume and duration of use. The pricing schedule of the cloud vendors is public and all requirements and terms are stated in the Service Level Agreement (SLA) between the different stakeholders involved in a cloud sourcing relationship. The SLA covers (Vithayathil 2018) quality, reliability and guarantees of availability of resources, their up-time, performance or the responsiveness of the IT resources and other performance indicators.

Cloud vendors usually serve an international market with divergent interests between the cloud vendor and its customers. Most often, the services provided are standardised to satisfy general demand and maximize the cloud vendor's profits or revenue instead of a specific customer's preferences. This means that when updates are made in the system, all customers using the same system will face same updates at the same time. IT systems in the cloud are updated much more frequently (Vithayathil 2018) than those traditionally outsourced IT. This puts pressure on the cloud customer to be open and ready for change in the functionality as well as the interface design of the cloud sourced system, meaning constant learning for the customer, as well as faster development of the system. The cloud vendor applies multi-tenancy and sharing of IT resources to achieve efficiencies (Dempsey 2018). Multi-tenancy means that servers and storage are shared among several cloud customers, whereas in traditional IT outsourcing, the demand for IT services is modelled as a monopoly (Lacity et al. 2009) driven only by a specific customer's demand and their internal use.

The fact that cloud sourcing solutions can be thought of as building blocks of IT (Schneider and Sunyaev 2016), where the IT infrastructure as a service is delivered by one or several cloud vendors, and where application programs of systems such as e-mails, web pages and ERP systems are delivered by different cloud vendors and development platforms by yet other cloud vendors, makes it necessary for the client company to manage many more cloud vendors or third parties than in the traditional IT outsourcing model.

The few studies on cloud sourcing relationships discuss the necessity of building the relationship over time (Dempsey 2018) and that continuance forces success (Walther 2018). Specific research on cloud continuance and discontinuance is sparse and mainly quantitative, looking at the relationship quality (Chou, Liu, Hsieh 2015), trust and commitment (Goode 2018), compatibility and output quality (Cheng 2018), as well as socio-organisational and technology-related factors (Walther 2018). Business model innovation related to cloud sourcing requires strong and creative relationships according to (Willcocks et al. 2013, Legner et al. 2017).

Previous studies on the importance of relationships in IT outsourcing arrangements have focused on the individual thus having the ambition to continue with the organisational unit of analysis (Cullen, Seddon, Willcocks 2005). Cullen et al. (2017) means that it is personal relationships that drive success. Their results suggest that a successful outsourcing arrangement can be derived through the adaptation of well-considered behavioural approaches rather than contracting techniques. This means that the outcome of the cloud sourcing arrangement does not only rely on the SLA, but that relational factors are important in order to identify barriers and why some companies do not remain in the cloud. This covers the softer side of outsourcing management such as trust, commitment, and knowledge sharing. Studies that are more recent have identified managing the relationship between the parties as playing a crucial role in outsourcing outcomes (Lacity et al. 2009, Huber et al. 2013, Lacity and Willcocks 2017). Still, there is not much empirical research focused on the relationship between cloud providers and cloud customers, despite the fact that this would be of high interest in the cloud sourcing area (Wilms, Stieglitz, Muller 2018).

2.6 Further research on cloud sourcing

The majority of studies conducted on cloud computing are technologically related while there is also a dearth of studies on business related issues (Kathuria et al. 2018). Kathuria et al. (2018) point out three research gaps on how firms can reap the benefits of cloud computing and create value. Firstly, there is a need to study the interaction between cloud capabilities and its transformative value, as well as how cloud computing impacts the capabilities of internal functions and external partners. Secondly, there is a lack of understanding of the connection between cloud computing and firm performance, resulting in a lack of guidance for practice. Knowledge about how value is leveraged

from cloud computing through resources and capabilities is rather scarce. Thirdly, the integration of cloud systems and existing legacy systems, and its importance in business value generation from cloud computing, requires more research. Furthermore, there has been an absolute dearth of qualitative research in all domains of cloud computing adoption, including cloud sourcing continuance (Shaikh and Karjaluoto 2015, Bayramusta and Nasir 2016, Senyo et al. 2018). A qualitative research approach may uncover more detailed findings of companies' experiences of how cloud sourcing can be transformed into business and strategic value (El-Gazzar et al. 2016). This thesis's focus is on gap 1 and 2; to study the interaction between cloud capabilities and its transformative value, as well as how cloud computing impacts capabilities of internal functions and external partners (the first gap above) and the implications for competitive advantage, as a proxy for performance (the second gap above).

“Man is as a human for as long as he can master his passions” Dad

“ Čovjek je onoliko čovjek koliko može da savlada svoje strasti” Tata

3. Research design and methodology

The purpose of this study is to contribute to the business and management research knowledge of cloud sourcing. This is done by applying different theoretical perspectives to empirical studies of cloud sourcing in order to understand how cloud sourcing can generate strategic value for the cloud customer company. Each of these theoretical perspectives adds to the knowledge about how innovations develop and may be sustained over time through cloud sourcing. With this research purpose in mind and in view of the nature of this study, I have chosen to apply qualitative methods with an abductive approach, drawing on different theoretical models that best explain a state of events.

My research journey was rather empirically driven. With a passion for business relationships prior to my PhD studies, at the time I worked for PriceWaterHouseCoopers (PwC) in Malmö, Sweden, as an IT consultant with small, big, local and multinational companies performing data management analysis, fraud analysis, IT general controls, IT governance, and business process analysis. Having this insight into the core of companies and their IT systems, I decided I wanted to pursue my dream from the time I enrolled in the International Baccalaureate Diploma Program (graduated in 2007, Katedralskolan, Lund, Sweden), namely to do research to improve organisational performance. This thirst for knowledge, curiosity and the need to develop science for a better tomorrow has always been a great interest of mine. Starting off my academic career as a course director, developing courses and lecturing, I have long experience of coordinating courses, supervising and examining theses as well as lecturing at Lund University both at first cycle level (courses: IT for people, organisations, society and IT and globalisation), and second cycle level (strategic management and information systems). This background sparked my interest in information systems, innovation management, relationship marketing and strategic management literature in order to better understand the cloud sourcing adoption problems that I had encountered during my work. I realised that this was not just a technical issue, but one with more of a relational character involving organisational, structural and cultural change. Table 3.1 gives an overview of my contributions in each of the five papers.

Table 3.1: Overview of my contributions in each appended paper.

	Paper I	Paper II	Paper III	Paper IV	Paper V
My contributions	I am primarily responsible for the literature review, collection of papers, analysis and drawing conclusions. My co-author contributed comments.	I am primarily responsible for the data collection and analysis as well as the writing of the publication. My co-author contributed advice and some writing of the paper.	I am primarily responsible for the data collection and analysis. I shared responsibility with my co-authors for the writing of the publication.	I am primarily responsible for the data collection and analysis. I shared responsibility for the writing the publication with my co-author.	I am primarily responsible for the data collection and analysis. I shared responsibility for the writing the publication with my co-author.

3.1 Epistemological and ontological viewpoints

As a multi-perspective research discipline (with technological, engineering, organisational, managerial, psychological, and societal aspects), innovation can use a variety of research methods (Wood-Harper 1985). The combination of critical realism with the interpretive perspective has been presented as an 'alternative paradigm' in literature on social work research (Morris 2006) and qualitative research in general (Guba and Lincoln 2005). The critical realism approach has been used previously with success in information systems research (Henfridsson and Bygstad 2013).

Since the starting point of this thesis is the philosophy and metatheory of critical realism, its key epistemological and ontological principles are explained as well as how they relate to methodology and the importance of explanation over prediction. It justifies the use of this philosophy in comparison to positivist and interpretivist research philosophies and shows its relevance to the study of innovation. Interpretivist research has been widely applied within the field of strategic management, starting off with among others Klein and Myers' (1999) study of managerial development and understanding human thought and action in organisational contexts. It is important to highlight that critical realism provides an underlying philosophical framework and not a methodological prescription. The question of whether a particular method is appropriate therefore depends on its role within the study design, in which critical realist principles about cause and effect in social systems are embedded, for instance, the integrative approach to social research that allows for a combination of quantitative and qualitative methods within a critical realist framework by Danermark et al. (2002). Moreover, Fairclough (2013) has drawn on critical realism in his version of critical discourse analysis in order to explore language as a constitutive element of social practices that mediate between structure and process. Fairclough (2013) state that this approach does not entail a rejection of hermeneutics, but rather an acknowledgement of the same, saying that hermeneutics by itself cannot provide an adequate explanation for social phenomena (Fairclough 2013).

Taking the critical realist lens, I argue that there is a level of reality below the everyday levels of events and our experiences of them. It is at this level that the mechanisms that drive events in the world exist. In other words, there is a level of reality that is not easily accessible because it is hidden from common view. As Miles and Huberman (1994) expressed it:

"*We look for a process or mechanism, a structure at the core of events that can be captured to provide a casual description of the forces at work…The fact that most of these constructs are invisible to the naked eye does not make them invalid. After all, we all are surrounded by lawful physical mechanisms of which we are, at most, remotely aware".*

The case companies formed as a result of the interaction of human agency with a number of other material agencies, notably technology. Here, I looked at selected case companies and embraced what I experienced from those cases on a nominalist level in trying to answer my research question: **"**How can cloud sourcing lead to innovation and what does it imply for competitive advantage?". This experience could have been subjective and limited, and thus not given me the right picture of reality. Therefore, I needed to look at things that happened and things that were said that I perceived through experiences, namely events. By applying the dynamic capabilities perspective together with the critical realist view, I could carve out the process that describes innovation capabilities. This lead me to the second level of reality, a metaphysical realism where I could confirm that the external world (in this case the cloud customers) has a physical reality with practices, behaviours, statements and narratives around cloud sourcing. Dynamic capabilities helped me here to identify and understand these underlying structures. The critical realist perspective facilitated a more multi-layered explanation (Volkoff and Strong 2013) of the innovation capabilities development process. Matthyssens, Vandenbempt, Bockhaven (2013) show how to translate this epistemological orientation into methodological choices.

However, events do not occur out of nothing; they must have a cause. These causes of events are mechanisms which could be the assumptions that constitute the risk of cloud sourcing. I can only infer mechanisms logically from events. Since it is the generative mechanisms that cause real events then they must be real, which is the third level of reality that I discovered through my research work.

As a result of the nature of the research question that I am asking, and the ontologies and possible theories I anticipated using, my approach is interpretive in nature and relies on inductive and abductive reasoning. Furthermore, I relied on a number of data sources, namely semi-structured and in-depth interviews, to collect nuanced data and data reliant on context, e.g. organisational experience.

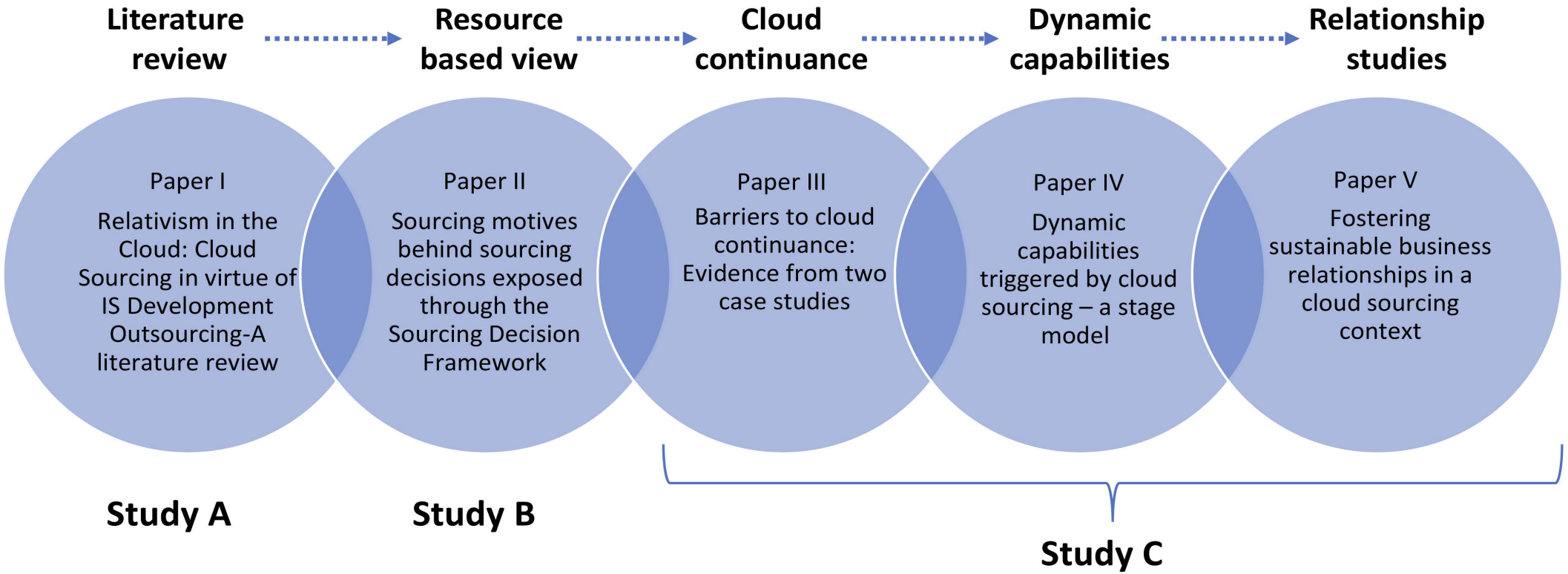

Figure 3.1: This thesis chronological evolution of studies with corresponding theoretical lenses

3.2 Taking an abductive approach

Given the nature of my research objective, an abductive approach appears to be the most appropriate. In contrast to inductive and deductive reasoning, abductive research can explain, develop or change the theoretical framework before, during or after the research process through iteration. The iterative process of abduction moves back and forth between inductive and deductive research in order to explain or understand an empirical phenomenon further. Dubois and Gadde (2002) call this reasoning "*systematic combining*" based on a pragmatic approach to understanding complex social phenomena.

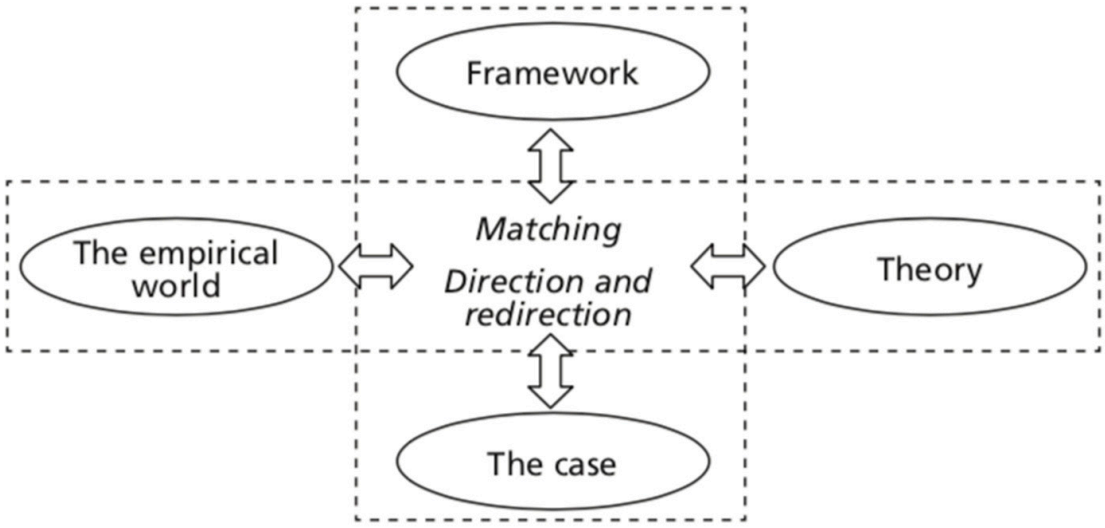

Figure 3.2: Abductive reasoning (Dubois and Gadde 2002)

Consequently, my research approach was iterative and abductive, meaning that I continually reviewed my analytical framework by moving from the empirical material to theory and then back again (see Figure 3.2) (Dubois and Gadde 2002). This helped me match theoretical insights with the reality of the cases and constantly refine my findings. I remained receptive to many possibilities. The longitudinal case studies evolved over time, allowing for the development of a better understanding of the phenomenon.

Abductive reasoning has helped me specifically in the identification of themes, codes, and categories when analysing my data, by providing insights and new understanding, and by linking insights together to generate an order that fits the facts (Dubois and Gadde 2002, Dubois and Araujo 2004).

In general, Paper I provides the first literature study (Study A) presenting the research status on cloud sourcing and confirms the lack of research on the topic. Paper II, based on a pilot study (Study B), gives insights into IT outsourcing and using the resource based view as a theoretical lens to analyse how cloud sourcing can be a competitive

advantage from the static perspective of the resource based theory of the firm. Paper III, based on two longitudinal case studies (based on Study C), is a comparative case study which, through cloud continuance literature, analyses the barriers to cloud sourcing and what it takes to transition to and stay in the cloud. Paper IV is also based on Study C and applies a dynamic capability theoretical framework to understand how cloud sourcing can trigger new dynamic capabilities and transform the company and its business model. Paper V (based on Study C) applies a strategic relationship theoretical perspective to understand how sustainable collaborative innovation relationships are developed in cloud sourcing.

The research process started by conducting a literature review (Study A) and then a pilot study (Study B) in order to identify research problems and research gaps. From there, I commenced the exploratory case studies, collecting data through interviews while still going back to the literature to refine my research questions and to find useful theoretical frameworks. This led me into the second stage, where I conducted another literature review simultaneously with the case studies (interviews, observations and text analysis). As I progressed, my theoretical framework evolved, which directed me to continue with the case studies and to collect more data. This iterative approach, going back and forth between data collection and the literature, helped me to challenge previous literature reviews and to match theory with empirical evidence, which provided further direction.

More concretely, the connection between my five papers and how I applied an abductive approach is elaborated on below.

Study A: The research process started by conducting a literature review to get acquainted with the existing relevant literature to learn about the theories, concepts, methods, and to find the main authors and controversies within different streams of research within the topic (Bryman 2016). Based on this, Paper I was designed to be a systematic literature review to identify (Sandberg and Alvesson 2011) gaps in the research and guide further studies (Webster and Watson 2002) in order to answer RQ1. The literature review confirmed that there is a lack of research on the topic of cloud sourcing.

Study B: Continuing on from the literature review, I decided to develop an interview study to answer RQ2, since that would give me insights into the motivations behind IT sourcing in general. Since the financial sector has traditionally been rather conservative in terms of handing over responsibility for their IT to third parties, I found this to be an interesting pilot study. Interviews were conducted with four large Swedish banks that also operate abroad. The pilot study presented in Paper II concluded that sourcing can be a competitive advantage depending on the resources and capabilities involved, studied through the VRIO framework and RBV (Barney 1991).

Study C: The fact that cloud sourcing as the next generation of IT outsourcing (Muhic and Johansson 2014) is still a risk for many companies, and simultaneously a natural progression into the age of digitalisation, raised new questions. I started to exploratively study why cloud sourcing works for some companies but not for others. That is how I

developed the first empirical comparative case study presented in Paper III, which is based on interviews, observations and text analysis to answer RQ3. This paper identified barriers to cloud sourcing continuance and presents a framework which indicates the connections between the barriers leading to the positive or negative development of cloud continuance.

The findings in Paper III demonstrated a need for a better understanding of certain transformations in the firm, mainly business development activities related to cloud sourcing. Now that I had found the barriers, I wondered how I could explain the business development stages by means of certain capabilities, which would help to answer RQ4. The literature, conducting the two case studies, and my previous papers informed each other iteratively, which led to the development of junctures that managers need to overcome in order to progress to the next stage in the business development process of cloud sourcing. This resulted in a stage-based model of dynamic capabilities triggered by cloud sourcing.

Paper IV has informed Paper V in answering RQ4 through the vision of collaborative innovation discussed within the described stage-based model. This insight evoked a need to study the relationships of cloud sourcing partners and how these collaborative relationships develop as a process over time. Again, this work progressed in line with abductive reasoning, going back and forth between the literature (looking at previous literature studies, and conducting new ones) and the two case studies (interviews, observations and text analysis). This longitudinal process study added to the previous study in answering RQ5: by identifying the different catalysts, sets of catalysts, and triggers that develop a business relationship and potentially can make it a sustainable one, ultimately reaching the advanced phase of competitive advantage with new business models and innovations.

3.3 Literature review – Study A

The literature review was conducted to establish the authority and legitimacy of the research and are the foundation for making a relevant contribution. The goal of the literature review was to point out research issues, and give critical and conceptual discussions of the research problem. The literature review helped me to evaluate the seminal influences on and strong antecedents of my chosen field of study. The literature review demonstrates a clear critical knowledge of the field and identifies the research addressing the gaps in existing knowledge. (Line Dubé 2003, Levy and Ellis 2006, Okoli and Schabram 2010). Obviously, it needs to be sensitive to pertinent literature across a range of different, but allied, disciplines. Since this thesis both uses and enriches existing theory, the literature review is not purposely formal but contains the main dimensions of studies and specifies the different relationships between these dimensions. The concepts and theoretical frameworks found from the literature reviews were used in the data analysis stage as a lens for the analysis.

The literature review was of an inductive nature (Line Dubé 2003) applying the following steps: 1) Selection of appropriate publication outlets; 2) Identification of relevant articles; 3) Creating inductive categories and subcategories based on the content of the articles; 4) Assessing the articles and classifying them into categories; 5) Analysis of the categorized articles to extract trends; and 6) Discussion and recommendations for future research. In order to identify the relevant articles, I used key words such as "cloud sourcing", "cloud sourcing barriers", "cloud sourcing risks", "cloud sourcing success", etc., in either the title, or abstract, or keywords, but also by reading the abstract for relevance. Where no articles were found, I changed "cloud sourcing" to "cloud computing". Search engines used included Google Scholar and EBSCO Business Source complete. The analysed period was not set, but in the search results, cloud sourcing is first mentioned in 2013. The selection and review was done manually. The snowball method implied that additionally I had to look at the reference list of the found papers and use that to trace my way back to the original source (Sandberg and Alvesson 2010).

3.4 Pilot study – Study B

In order to gain insights in the outsourcing of IT, I started off with a pilot study in the financial sector. This helped me understand how cloud sourcing can be a competitive advantage which evoked the need to continue in that direction. In total four banks, three from Sweden and one from Germany were investigated. In the process of finding the interviewees I listed all larger banks in Denmark, Germany and Sweden, and made calls to them. On the phone I was patched through many instances, asking for the professional heading the organisation's IS-sourcing strategies respectively decisions. As preparation for the interviews I conducted pre-interviews with two of the banks that I investigated. Permission was given for recording and transcribing only for one of the pre-interviews. In that way these interviewees helped me find potential cases. Likewise I got the first impression from the organisations and their overall IT strategy. The actual data collection was from four interviewees, all in leadership roles in IS outsourcing decisions: Manager of Strategic Partnerships (IT solutions), Head of Development Infrastructure, Head of Outsourcing and Vendor Management, Head of outsourcing and IT Development. Some of the interviews were conducted during a physical meeting at the company's offices, in particular the meetings with the company from the financial sector in Germany. The interviews in Germany were conducted in German through translation of the questions during the interview. The interviews with the companies from the Swedish banking sector were all conducted via telephone conference using Skype. The reason for this was that the Swedish financial sector companies all have their headquarters in Stockholm and it was therefore more convenient to arrange and when necessary more flexible to reschedule these meetings via Skype. Bank A is one of the largest financial concerns in Europe. It has the largest Internet banking service in the world with around 6 million users, and 260 million transactions each year. The

company has about 12 million banking customers and about 30,000 employees. Bank B, domiciled in Germany, provides a core banking solution that covers all processes in the field of traditional banking business. With its 1,600 employees, it defines its key skills as being in the development and operation of high quality core banking solutions (around 900 employees) as well as the provision of outsourcing services. Bank C is a leading financial institution in Scandinavia with an international presence offering a full range of banking services. It has over 20,000 employees, 6 million private customers and 3,000 corporate customers in the form of large companies as well as financial institutions, and 500,000 small to medium sized enterprises (SMEs). Bank D has approximately 12 million private customers and 900,000 corporate customers and has roughly 30,000 employees.

3.5 Case studies – Study C

The empirical aspect of this research work used case studies. The case study method is especially useful when the researcher wishes to cover contextual conditions (Yin 2015). Surveys can try to deal with the phenomenon of interest and context, but their ability to investigate context is extremely limited. In case study research, there are typically many more variables of interest than just a few data points. In particular, case studies conducted in this research are interpretive in nature, meaning that they investigate a contemporary phenomenon within its real life context when the boundaries between the phenomenon and the context are not clearly evident (Yin 2015).

The advantage of the case study is that the phenomenon can be studied in its natural setting and meaningful, relevant theory can be generated from the understandings gained through observing actual practice. It also allows the questions of why, what and how to be answered with a relatively full understanding of the nature and complexity of the complete phenomenon (Yin, 2015). Case studies are very well suited to the exploratory investigations of this thesis, where several of the variables are still unknown and the phenomenon are not well understood (Benbasat, Goldstein et al. 1987).

Conventional case studies are useful for gaining new and creative insights, developing new theory, achieving a high level of validity with the ultimate users, and increasing the understanding of actual events as well as richer data (Eisenhardt 1989, Yin 2015). Many theoretical contributions are “vacuous”, without much explanatory power (Schmenner et al. 2009) – “too much theory, not enough understanding”. Often, this results in the research having only a small impact (Skilton 2011). Good theory can be relevant and have a high impact, and result in richer managerial findings and implications: “Nothing is quite so practical as a good theory” (Van de Ven 1992, Jahner, Boehmann, Krcmar 2006). As my research topic is centred on one phenomenon and a single research field, it makes sense to conduct case study research; to study the phenomena in its actual settings (Yin 1994, Yin 2015).

Since this is a process study based on a longitudinal case study of cloud sourcing (Yin 1989), I focused on the situated actors and practices that shaped the relationship of the cloud sourcing, which was intended to bring strategic change, to the cloud sourcing company. In particular I sought to offer an account of how cloud sourcing activities developed and why sometimes, despite successful adoption, cloud sourcing was not sustained. Thus, I looked at companies that were already involved in cloud sourcing. These companies were of interest for this study because they have experience of cloud sourcing and of relationships with the different partners involved in cloud sourcing.

Each case study of cloud sourcing consists of a focal customer company and several cloud providing supplier companies that come together to design, develop and deliver the cloud sourcing solution. The focal cloud customers are from two different industries: Quos is the global leader in industry maintenance; and WasteHeroes is a municipally owned waste management company. All the other cloud providing partners were from the IT industry (the providers, sub-providers, intermediaries, etc). The cloud providing partner firms are not limited to operating in a specific country. The study was partly retrospective in the sense that I looked at a cloud sourcing that was already initiated, but also ongoing activities in real-time. Experiences were not always easy to collect, but as the cloud sourcing was still ongoing, observational data in the form of meeting participation, documentary evidence (emails, meeting notes, SLAs) and interviews were available to me.

Table 3.2: Comparison of Quos and WasteHeroes

Company	Quos	WasteHeroes
Type of company	International privately owned corporation operating in 28 countries across the globe	Public Service Company operating only in Sweden and in one municipality
Amount of employees	Approx. 3000 employees	Approx. 300 employees
Start of Cloud sourcing journey	Year 2015	Year 2015
Status by end of year 2018	Successfully cloud sourced all its IT systems within 10 months, and is still running in the cloud	Has cloud sourced 70 % of its IT systems

Quos is the global leader in industrial maintenance with more than 25 years of experience in industrial maintenance management and execution, supporting its customers throughout the entire maintenance value chain. Their mission is to embed superior safety practices and build a true maintenance culture. Quos optimizes maintenance costs and improves plant performance by reducing technical failures and continuously improving productivity, thus maintaining the value of assets. The company is spread across 5 continents, at 71 sites in 28 countries with 3000 employees in total. Virtual teams working 24/7 are common. All systems are in the cloud. Previously, Quos belonged to ABB Full Service, but since 2015 it has been owned by Nordic Capital. It started off its cloud journey in the carve-out in 2015 when no back-end support functions existed. There were no support systems in place and only a few

operational systems. Basically, there was no backbone infrastructure. The time for Quos to stand on its own two feet was short – it needed to be up and running by June 2016. The management decided on an IT Strategic Framework including:

- A standardized and centralized infrastructure at a global level (limited IT at region/site level)
- Lean IT organisation with a minimum of IT applications
- Largest possible degree of outsourcing
- Ensuring critical business application knowledge remained inhouse as well as IT management capabilities
- Scalable IT platforms to support further business growth without major changes
- Variable IT cost base (e.g. pay per use with 3rd parties)
- Set-up and integration with customer environments based on standardized blueprints and playbooks
- Future focus that IT is important for our customers
- They aimed to build a platform and backbone to decrease the time-to-market of additional maintenance services.

By 30 June 2016, 28 countries were up and running in the same cloud structure. The whole ERP system was set up and rolled out in 10 months – with one global template and localisations if needed for legal or compliance reasons. All systems were running (migrated or newly implemented) in Azure. These included a few common standardized support systems such as CRM Sales, Safety & Management, etc., Office 365 email, storage/backup of work-related personal documents on OneDrive, Share Point for sharing documents, Skype For Business, SharePoint and Yammer for Collaboration, Outsourced ITOp with 1st Line Service Desk; and Server Monitoring, Backup and Restore, 2nd and 3rd Line support with an ITO provider or application provider. Talking to their cloud sourcing suppliers, Quos is rather unique in this sense, since none of their other cloud sourcing customers have gone down this route so rapidly and on such a large scale.

In the second case study, WasteHeroes was the focal cloud customer company. It is a Swedish waste management company, 80% owned by public sector organisations, i.e., municipalities. The company has some 300 employees, and uses seven IT systems cloud sourced as SaaS (Software as a Service) since 2015. They have a long relationship with the cloud sourcing suppliers lasting between 3 to 5 years. The current relationship is characterized by frequent communications, common goals, and the partners reporting to each other. Individuals in the relationship are crucial, since they possess specific skills and knowledge. However, there have been problems in the relationships with the cloud vendors, which have not allowed WasteHeroes to move all its IT systems to the cloud. WasteHeroes' aim is to cloud source all IT systems within five years from now. For WasteHeores, cloud sourcing its IT systems implies that its employees will be able to focus on its core business, which is waste management. No longer will they need an internal IT department for the purpose of maintaining the IT systems. The strategic

intent of WasteHeroes' cloud sourcing is a more efficient organisation where the employees can make decisions in real-time on the fly, while managing waste at different stations. Communications between employees has become more frequent as they all have access to the IT systems using their PDAs and can monitor actions and exchange information instantly, no matter their location. To summarise, cloud sourcing has helped to reduce costs, increase flexibility, speed up operations, and improve communications, creating a more efficient organisation and the foundations for future upgrading to the internet of things.

3.6 Data collection and analysis

Data was collected primarily through interviews, onsite observations and reviewing documents as SLAs, internal reports, meeting notes and minutes, presentations, and change orders. In line with Klein and Myers (1999), I strove to include all partners involved in this cloud sourcing relevant for understanding the process. Eliciting data from multiple sources and in various forms allowed me to triangulate my data for authenticity (Yin 1989). Data was collected over a period of one and a half years with follow ups up to two and a half years in total, in several phases. This allowed me to study the changes resulting from the cloud sourcing process over time by comparing past and present practices, i.e. activities and associated sense-makings, values, norms, actions, problems that arose, how problems develop, etc.
In the first phase, I was invited by Quos and WasteHeroes managers to study issues in their cloud sourcing. This worked in my favour, ensuring willingness to cooperate, the availability of multiple sources and the potential for purposeful sampling (Yin 1989, Peppard 2001). Semi-structured interviews were conducted with the different partners (eight in total at WasteHeroes and eleven at Quos) involved in the cloud sourcing, the managers of Quos and WasteHeroes, and users of the cloud system (employees at Quos and WasteHeroes). In addition I conducted onsite observations of meetings between the different cloud providing partners as well as meetings with only Quos and WasteHeroes staff. These observations offered a grounded understanding of the cloud sourcing whilst contextualizing my understanding of the issues that Quos and WasteHeroes faced in their cloud sourcing processes.

In the second phase, data collection focused on understanding the outcomes of cloud sourcing. To this end, I interviewed people with rich insights into the cloud sourcing; notably, all respondents were involved in the cloud sourcing either as partners or users of the cloud sourced systems. Observations from the first phase helped inform my sampling. First I interviewed the Head of IT of WasteHeroes (twice), a WasteHeroes Manager (once), and all their cloud providers once. The process was similar at Quos, starting off with the top management and closing off with them as well. As they were key parts of the cloud sourcing, this offered rich and direct access to the cloud sourcing process and its outcomes and allowed me to elicit data about barriers, innovations and

changes in the companies. Informal talks were held on a regular basis with the Quos and WasteHeroes Heads of IT. This offered key insights into strategic intentions and practices at Quod and WasteHeroes, respectively, and helped validate the early results, increasing the credibility and authenticity of my findings (Miles and Huberman 1994). In addition, onsite observations helped to verify my understanding of the data. Where necessary, post-interview follow-ups were also conducted.

Interviews were typically conducted in offices or adjacent conference rooms. Most interviews were recorded and transcribed verbatim. Interviews on site with the users were conducted on the fly, where high levels of noise prevented audio recording; instead notes were taken. Notes were also taken during recorded interviews and onsite observations. I was invited to have my own office at their headquarters to do observations at Quos for two months, and at WasteHeroes for one month. During this time, discussions with various employees, formal and informal, were conducted to enrich my contextual understanding.

The reason for the decision to do interviews was based on the fact that it is the most frequently applied method in interpretive studies for collecting rich data on individual understandings and experiences (Braun and Clarke 2006). Semi-structured interviews, which make up the base of this research, were an important source of data, (Da Cunha and Orlikowski 2008, Gubrium 2012). This required me to be able to ask good questions and interpret the answers, to be a good listener and to not be trapped by preconceptions, to be adaptable and flexible, to see newly encountered situations as opportunities and not threats, to have a firm grasp of the issues being studied, and to be unbiased by preconceived notions and thus receptive and sensitive to contradictory evidence (Yin 1994, Kvale and Brinkmann 2009). The choice of respondents was based on the identification and validation of key respondents as well as the need for a number of perspectives (questions for which no one person has all the required knowledge; events that may have different interpretations) (Alvesson 2010). I therefore looked for multiple viewpoints. The interviews were recorded, and field notes were taken and company feedback was collected. The data was then checked. The interview questions focused on strategic intentions, provider selection, contractual governance, the transition of work and organisation, ongoing delivery, relational governance, cloud outcomes and overall lessons learned. Kvale and Brinkmann (2009) claim that good interview questions should address knowledge production and provide a good interview interaction. Bearing this in mind, I developed an interview guide that led us through the interview, knowing that the interview researcher is his or her own research tool (Kvale & Brinkmann, 2009).

The reason for the decision to include document collection and analysis (examination of documents found in organisational files, business press, newspapers archives, etc.) and interpretation was to get supplementary research data, to elicit meaning, increase understanding, and develop empirical knowledge (Corbin and Strauss 2008) but also to contextualise the data collected from the interviews and observations. I believed that these documents could provide questions that needed to be asked and open up situations

that needed to be observed as part of the research. They also helped in tracking change and development for the verification of the evidence. The documents that were collected for systematic evaluation included advertisements, agendas, attendance registers, and minutes of meetings, manuals, background papers, books and brochures, diaries and journals, event programmes (i.e., printed outlines), letters, and memoranda, etc.

In line with the abductive process, data collection and subsequent analysis an iterative cycle followed: going forth and back and forth between data and theory to gradually improve my understanding of the phenomena being observed. The data analysis included reading and subsequently coding the transcribed interviews and field notes, looking for statements and activities that offered insights into the process of cloud sourcing and the outcomes in terms of strategic value. The process of qualitative coding is important for climbing the abstraction ladder and generating greater meaning from the transcribed interviews. Through the coding process, emergent patterns were delineated. These patterns were then analysed and abstracted to form thematic categories, *interdependencies*, ends and ideals (i.e. different goals and activities for sustaining the cloud sourcing process), *complicating factors* (i.e. issues that emerge as a result of changes in the organisation, relationship to cloud providers etc), *consequences and compromises* (i.e. how and what they were practically able to cope with, given the situation), and realized and possible benefits and failures (i.e. how the process is slowed down or continued).

Table 3.3 Gives a brief overview of the different levels of interviews that I conducted at Quos and WasteHeroes with their respective cloud sourcing partners. A full table with all information is provided in the Appendix.

Table 3.3: Interviews condcuted at Quos and WasteHeroes with partners

Company	Interviews	Profile	Location	Interview time mean (hours and minutes)
Quos + Cloud partners (cloud providers, cloud sub providers, middlehand)	35	The whole range from top down (CIO, CDO and CFO to technical staff, HR, strategic management, finances)	Face to face at Stockholm Headquarter + Skype interviews	1h
WasteHeroes + Cloud partners (cloud providers, cloud sub providers, middlehand)	34	The whole range from top down (CIO, CDO and CFO to technical staff, HR, strategic management finances)	Face to face at Malmö Headquarter + Skype interviews	1h

3.7 Reflection on methodological choices and limitations

Reliability and validity (Yin 1989, Yin 2013) cannot be applied to assess my overall research, but I still consider them valuable criteria for my systematic literature review (Paper I and Paper III). For the empirical study, the research rigor enhancement of reliability and validity can be addressed with a predefined research case protocol. A case protocol would indicate from where information is sought, and contains procedures and general rules of use, an interview guide (funnel model – open-ended questions first), etc. However, as the interviews were often retrospective, entirely or in part, I needed to be careful to control for the reliability of the interviewees' recollections and other subjective biases. The other downside of doing two case studies (Marshall, Cardon et al. 2013) is that it might be difficult to determine cause and effect and participants may not recall important events which also may be subject to bias. Furthermore, notes from the interview meetings may not reflect what happened, there is less depth per case than in a single case study, and it is more resource-consuming. On the plus side, multiple cases (Lee and Baskerville 2003) augment external validity and help counter observer bias.

Qualitative data gathering and analysis produce findings that relate to intricate details where values and human experience are relevant. Here, the ability to interpret data is important, and in this the role of the researcher becomes essential (Leedy and Ormrod 2001). Qualitative research is seen as the fit between the findings recorded and occurrences in the natural setting. Yin's (2015) criteria follow an objective worldview which do not always work for more interpretative research. Therefore I found that a fairer way to assess the quality of my research would be to utilise criteria of a more interpretive nature and from this the issue of the importance of "trustworthiness" (Denzin and Lincoln 2011) emerges. Lincoln and Guba (1986) describe this as the truth that can be evaluated through credibility, transferability, dependability and confirmability (see Table 3.4).

Table 3.4: This thesis research quality evaluation

Quality criteria	Overall approach	Data collection	Data analysis
Credibility	Research outcome trustworthiness based on interviewees´ view	Data triangulation; interviews, observations and text	Pattern matching of responses
Transferability	Research methods and context described in detail	Description of the sampling of respondents	Theoretical concepts used as coding scheme
Dependability	Data collection and analysis defined	Case study/interview protocol	Interview study and coding scheme
Confirmability	Reflection on my epistemological and ontological view Chain of evidence	Open-ended questions Data recorded digitally and manually Variety of interviewees´ for chain referral	Interviews transcribed and coded, notes taken

Credibility refers to credible and truthful findings and interpretations, relating to internal validity (Lincoln and Guba 1986, Creswell 2013). In general, internal validity or credibility is very good in case studies as you can often collect detailed and fine-grained data about the studied phenomenon. In fulfilling this criteria, I tried to diminish personal bias in the interpretation of my findings through triangulation of the collected data: interviews, observations and text analysis. I tried to keep discussions iterative when appropriate and identified patterns across interviews. Moreover, I followed up with new interviews later on to confirm my interpretations. I also discussed with my co-authors to further confirm credibility. The second quality criteria, transferability, can be related to the generalizability of the findings to other contexts, termed external validity (Lincoln and Guba 1986, Creswell 2013).

Transferability is achieved with detailed descriptions to cover all the gathered information about the researched context (Lincoln and Guba 1986). In general, the findings from my research, including the literature reviews, show that innovation related to cloud sourcing is not only applicable to the maintenance and waste management industries, but any industry engaged in cloud sourcing. In terms of sampling, as previously discussed, I purposefully selected the companies and respondents (Miles and Huberman 1994, Creswell 2013). The first time I heard of Quos was at a Cloud Confessions conference event in Stockholm, October 2016. I went there with the purpose of getting to know cloud sourcing from a more practical viewpoint. There, I listened to a presentation by Quos' CIO about their 10 month cloud journey which caught my interest to explore more. That is how I got into that company's headquarters and through Quos got in touch with their cloud partners.

My other case company, WasteHeroes, took some time to find; several internet searches, telephone calls, talks with Michael Haglund, CTO for IBM Sweden and with Daniel Akenine (in 2008 he was ranked by IDG as one of "Sweden's top 10 developers/architects" and the same year appointed as National Technology Officer at Microsoft). In the end, I found WasteHeroes as one of the top cloud provider's customers on a website, and my interest in finding out more about this company grew. I had no insider contacts or gatekeepers whatsoever in finding my case companies: all interviewees and encountered staff on site were new to me. It was challenging to gain the trust of those people, who ultimately welcomed me, an outsider, and gave me an office at their headquarters for months, access to informal and formal talks, interviews of my choice, and allowed me to attend their meetings. This was very exciting and rewarding. Both of my case companies look forward to welcoming me again and to presenting my findings after the defence of this thesis. They have shown great interest in my research topic.

Moving on to dependability, which can be related to reliability (to be able to reproduce the results of the study) (Lincoln and Guba 1986), I developed an interview protocol (Maurer and J. H. Tindall 1983) which I followed to ensure that I had answers to my questions. I tried to maintain enough eye contact and nod when appropriate to make the interviewee feel more comfortable. Postural congruence with interviewees is thus something that I thought about when interviewing (Maurer and J. H. Tindall 1983). In

line with the recommendations of Maurer and J. H. Tindall (1983), knowing the context/environment before the interview helped in preparing the interview questions. Focusing on the interviewee, I tried to get concrete/situated information, which requires as little interpretation as possible. I followed up to add precision by asking questions such as 'I'm not quite sure I understood that, did you mean…?', 'Does this mean…?'. I also gave the interviewees plenty of time: sometimes, it takes time to activate one's memory, as some respondents are in the present not in the past. I used gentle prompts?, repeating the last words of the interviewee to bring the interviewee back to the interview. Here, guiding is important to reassure the interviewee. I asked for additional information/questions, etc. The interviews were not finished until I left the interview setting. I followed the recommendation of Charmaz (2014) "No interview should end abruptly after an interviewer has asked the most searching questions or when the participant is distressed". Many interviewees added information once the recording had stopped. Moreover, many interviewees added information once the interview was officially concluded. I had to indicate the end of the interview and thank them for their time and answers. Afterwards, I tried to memorize and find immediately a place to note these 'off-the-record moments' (unless I managed to record them). While it is difficult to control for consistency in answers (Kvale and Brinkmann 2009), it was also important for my development during this research and the way my interpretations evolved and matured during the process. "A research interview is […] a professional conversation; it is an interview, where knowledge is constructed in the interaction between the interviewer and the interviewee." (Kvale and Brinkmann 2009).

The last quality criteria, confirmability, looks at the objectivity in qualitative research (Lincoln and Guba 1986). Since as a researcher I have been rather active and interacted with my respondents (Creswell 2013), it remains difficult to achieve this objectivity. "Intensive interviewing is a way of generating data for qualitative research. It typically means gently guided, one-sided conversation that explores research participants' perspective on their personal experience with the research topic." (Charmaz 2014). However, I believe I have still managed to achieve this to some degree through reflexivity. Early on, I acknowledged and described my initial beliefs and biases in the research process (Creswell and Miller 2000), such as my theoretical assumptions and preconceptions (Alvesson and Skoldberg 2009). During the interviews, I verified my interpretations by going back to the respondents in case of doubt to confirm. I also let the respondents speak freely (within the flexible frameworks of the interview guide, see Appendix) the knowledge gained gave access to further development (Kvale and Brinkmann 2009).

Finally as a researcher it has been a thrilling experience, to let my results lead me forward to a conclusion I had no idea about this thesis would end in. The excitement of applying established theories, and let each help me reveal new knowledge about cloud sourcing has been very satisfying. Not had I from the beginning planned to continue with dynamic capabilities after RBV, and then relationship theories, but my empirical research results have guided the choice and carved the way forward, piece by piece like a puzzle.

4. Summary of appended papers

I present a summary of the five appended papers that make up the main studies in this thesis in this chapter. The title for each paper is presented, followed by a brief background, overview of the research design, findings and main contributions. Please go back to the beginning of this thesis for information about where in the submission process each paper stands.

Paper I

Title: Relativism in the cloud: Cloud sourcing in virtue of IS development outsourcing - A literature review

Cloud computing and cloud sourcing is currently on the agenda in many organizations. Many Chief Information Officers (CIOs) that urge for alternatives to traditional outsourcing are interested in how they can take advantage from cloud computing, by sourcing Information Technology (IT) from the cloud. This paper provides an overview of the research direction of cloud sourcing in the IS field. A literature review based on selected papers from top Information Systems (IS) journals and conferences were conducted. Findings from the review indicate that the attention of cloud sourcing in IS literature has mainly been directed towards security and risk as well as adoption issues, and that cloud sourcing is claimed to be the next generation of outsourcing. Unfortunately, this is where this strong claim ends without any further evidence, which indicate that there is a need for more research on cloud sourcing, especially in the direction of investigating relationships and implications when organizations start using cloud sourcing.
The main contribution of this paper is to provide an overview of cloud sourcing as a phenomenon and how it has been discussed in the IS literature. It gives a direction for further studies.

Paper II

Title: Sourcing motives behind sourcing decisions exposed through the sourcing decision framework

There is no doubt that information systems (IS) are the backbone of today's organizations. Having an initial inspection on sourcing motives in the financial sector it can be stated that resources used in development of information systems (IS) are seen as an important factor for sustained competitive advantage. However, it can be claimed that it depends to a high extent on the application of different sourcing modes. This leads us to a closer inspection on sourcing motives through selected case studies and the following research question: How can motives for sourcing options of IS-development be explained? The empirical investigation on sourcing decisions and the motives behind, in addition to a literature review on sourcing decisions and sourcing options ends in four propositions. These propositions are then used in tandem with the findings from the empirical data for initial development of the Sourcing Decision Framework (SDF). Ultimately, what is at stake here is our framework (SDF) that from the initial development and the first test has shown to be purposive and could be further developed to a useful framework for analysing sourcing decisions and as a guiding tool for decision-makers when deciding on sourcing options for IS-development.

The main contribution of this paper is to increase our understanding of the motives for companies to enrol sourcing, and how these decisions are made. This was done by empirically evaluating previous literature on different sourcing options applying the Resource Based View (RBV) and VRIO framework. In addition to supporting the RBV we developed a Sourcing Decision Framework (SDF) to provide a better understanding of motives for sourcing options and the decision making process.

Paper III

Title: Barriers to cloud continuance: Evidence from two case studies

The drivers and barriers for companies moving their IT-systems from traditional outsourcing to cloud sourcing have been studied extensively in cloud adoption studies. However, there are also indications that cloud sourcing and its benefits are not so easy to implement for companies calling for cloud continuance research. This is one of the first studies of cloud continuance processes at the organizational level contributing to the management and business research literature of cloud computing. In particular we have contributed with: 1) a literature review identifying two types of barriers which includes twelve individual factors which influence cloud continuance, 2) two case studies verifying the existence of ten of these factors as well as identifying an additional type of barrier: management process barrier, i.e., lack of objectives and strategies for cloud sourcing and lack of cloud vendor communication. Our study provides a model of barriers to cloud continuance that could be further explored.

The main contribution of this paper is an extension of the literature on barriers to cloud sourcing from a cloud continuance process perspective. Through empirical case studies and evaluation of existing literature, barriers to cloud sourcing are not only identified, but a conceptual model that describes the barriers and how they influence cloud continuance is developed. The additional type of barrier identified ”management process barrier” builds on and extends previous literature on the topic.

Paper IV

Title: Dynamic capabilities triggered by cloud sourcing – a stage based model

Current research offers with very limited insights on the process of how the adoption and continued use of cloud sourcing might trigger and push the development of innovations and competitive advantage of a firm. Applying an abductive approach, with two longitudinal case studies of cloud sourcing firms, and a theoretical framework based on stage-based models of business development and the dynamic capability view of the firm, we develop a model of stage-based business development path related to the adoption and continued use of cloud sourcing. The model identifies three business development stages characterized by specific types of capabilities. In between the three stages we identify three dynamic junctures that the firm and its managers have to overcome in order to progress from one stage to another. In the dynamic junctures three types of dynamic capabilities were key; sensing, seizing and transformation capabilities, to pass to the next stage. The model contributes to a better understanding of the evolution of dynamic capabilities as well as the evolution of the cloud sourcing firm and the cloud-based business model.

The main contribution of this paper is the understanding of how dynamic capabilities evolve - through the developed model of stage-based business development path related to the adoption and continued use of cloud sourcing. It provides a new perspective to dynamic capabilities being applied in a longitudinal stage -based process model, identifying business development stages that a cloud customer goes through when cloud sourcing characterized by specific type of capabilities.

Paper V

Title: Fostering sustainable relationships in a cloud sourcing context

Previous research on business relationships lacks more extensive insights into the business relationship development process. Thus, the purpose of this article is to provide a comprehensive framework of the business relationship development process and illuminate what makes business relationships more sustainable. The research is conducted in the cloud sourcing context and we base the results on 69 interviews and 50 observations related to two cloud customer companies. The findings reveal an intricate interaction of factors analyzed as catalyzers, catalyzer sets, and triggers within the distinct phases of the process, affecting trust, commitment, and satisfaction, and advancing the relationship toward sustainability.

The main contribution of this paper is a better understanding of how cloud sourcing partners can develop sustainable relationships over time. Moreover it shows that through collaborative innovation cloud sourcing relationships can develop innovations such as new services, products and business models. The paper contributes to extant literature on business relationships through a detailed study of the business relationship development process (BRDP) identifying factors that influence the initiation, development, continuation, and sustainability of business relationships. In addition the role of trust, commitment and satisfaction (TCS) is adapted for each phase along the process. The paper makes also a contribution to the literature on business relationships by the application of the novel context of cloud sourcing.

5. Discussion of results

This chapter reconnects with the outlined research questions in the very beginning of this thesis. In answering the research questions, I clarify the findings and justify the contributions of this research work. Furthermore, I discuss my contributions in relation to previous research.

5.1. Reconnecting with the research questions

The aim of this research is to contribute to the business and management research knowledge of cloud sourcing. In this chapter, I present the key findings in line with the five appended papers of this thesis and highlight the results. In the next chapter, chapter 6, the contributions to the cloud sourcing research are presented and discussed. The structure of this chapter is based on the research questions stated in the introductory chapter:

RQ1: What are the characteristics of the current body of literature on cloud sourcing?

RQ2: Which sourcing options of IS-development can be a source of competitive advantage?

RQ3: What are the barriers for cloud continuance in cloud sourcing firms?

RQ4: How are dynamic capabilities for innovation triggered in cloud sourcing firms?

RQ5: How does collaborative innovation develop in cloud sourcing relationships?

In Paper I, I presented the state of the literature on cloud sourcing, what we know so far. Paper II served as a pilot study in the financial sector, and pointed out an important insight that cloud sourcing as one form of sourcing might be a source of competitive advantage. Paper III developed this insight further by identifying the barriers of cloud sourcing, and as such contributed to a greater understanding of what makes firms struggle with cloud sourcing while other firms may have a smoother transition to cloud sourcing. Paper IV went further in exploring the dynamic capabilities triggered by cloud sourcing by developing a stage model of cloud related dynamic capabilities and

innovation capabilities. The final paper, Paper V, studies the relationships of cloud sourcing partners and how the business relationships develop over time. The development potential of reaching a sustainable business relationship, which may be a source of competitive advantage with new business models and innovations, is exposed. Figure 5.1. illustrates the links between research questions, papers and studies.

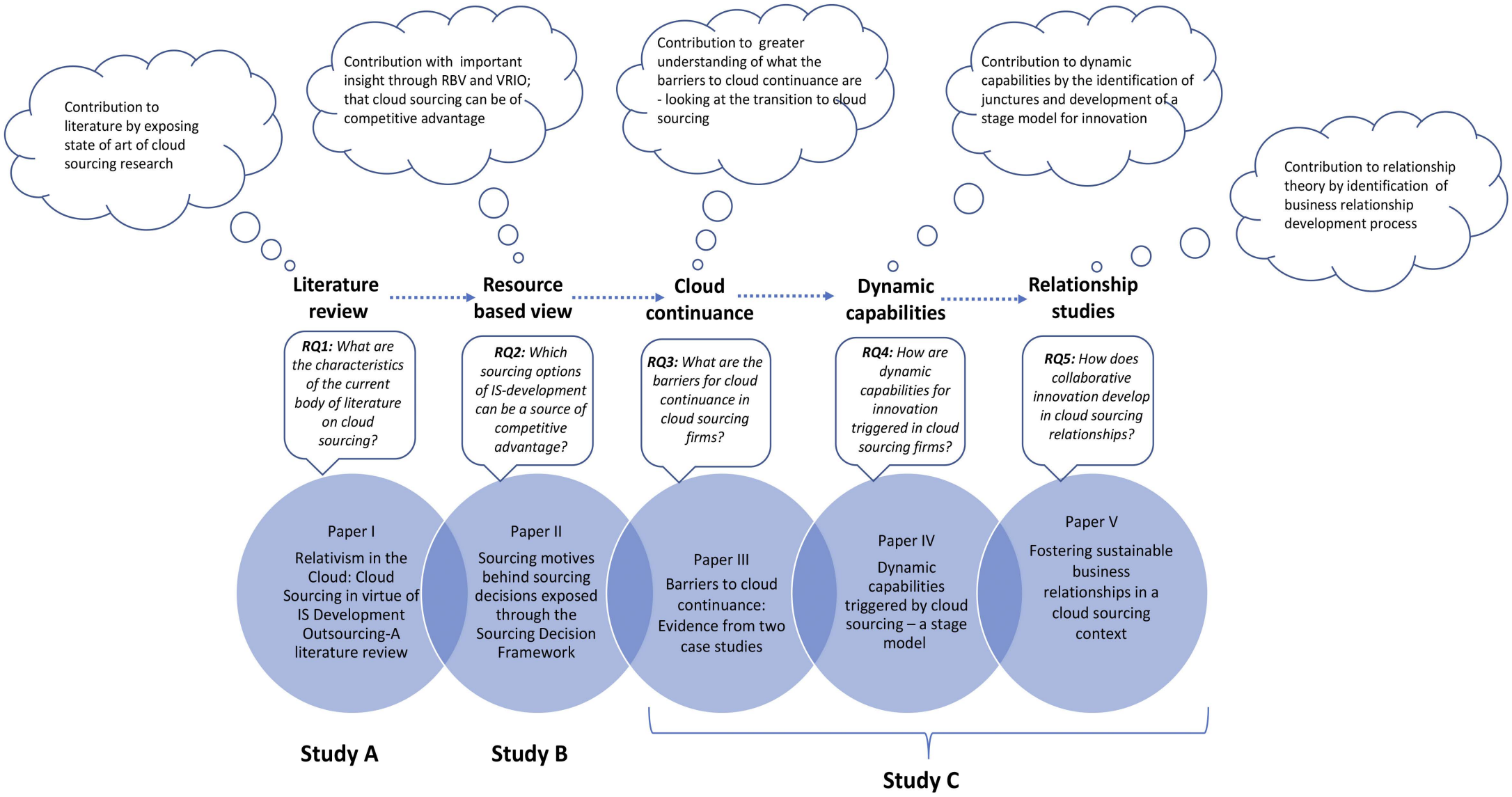

Figure 5.1: Research design and paper contributions

5.1.1 What are the characteristics of the current body of literature on cloud sourcing?

The findings of this paper show that there is a lack of research on cloud sourcing as a phenomenon. The paper identifies current literature of cloud sourcing and categorises the reviewed papers in six different categories; capabilities, research, IS development, strategies, benefit/risks, and other. In addition, it relates cloud sourcing to traditional IT outsourcing with the purpose of discussing cloud sourcing as a new mean of sourcing. This literature review informs my following studies and thereby opens up for more research on cloud sourcing. Looking at the different categories in which cloud sourcing papers have been identified, they could be generalised into the field of strategic management. Albeit, when searching for papers on cloud sourcing in pure management outlets it is rather scarce to get any hits. This could be due to several reasons. Firstly, cloud sourcing per se is a transdisciplinary area that started off from the more technical field of cloud computing, and expanded further into becoming a socio technical field which is well suited for outlets of transdisciplinary character. Since very beginning of the term cloud computing being mentioned in 2007, academic research on the topic has focused primarily on two aspects: technical issues associated with cloud computing, and implications for end users and enterprises using cloud computing. To date, there has been little discussion on how it may affect innovation and competitive advantage. The literature review was performed in 2014 and since then several other research reviews have been published (e.g. Bayramusta and Nasir 2016, Senyo et al. 2018) in the area with similar findings, albeit with finding more contributions in the management research domain. The contribution in relation to later reviews will be discussed further in chapter 6.

5.1.2 Which sourcing options of IS-development can be a source of competitive advantage?

Informed by Paper I, Paper II continues with a pilot study in the financial sector with the aim of revealing sourcing options and their implications (Grover et al. 2018) for competitive advantage. This paper discusses previous sourcing options through the theoretical lens of RBV and the VRIO framework. With that said, it looks at the internal resources and their implications for competitive advantage. Connecting the findings of this paper to cloud sourcing, it is obvious that RBV is not enough in explaining competitive advantage related to cloud sourcing. The reasoning behind this is based on the fact that cloud sourcing has different characteristics from traditional IT-outsourcing as discussed in chapter 2, such as greater flexibility and scalability, which provides a different and more dynamic platform of possibilities and interaction with the technology. RBV is static, and not well equipped to explain the process of when value is created, and how firms can innovate and develop new sources of competitive advantage. The inability of RBV (Kraaijenbrink, Spender, Groen 2009) to explain more dynamic capabilities and their implications for sustained competitive advantage has lead

me to apply the DCT. While RBV has been used as a theoretical underpinning in a few cloud sourcing research studies (Senyo et al. 2018), the rapid development of the technology and its diffusion in industry makes DCT a much better theory choice when studying cloud sourcing from a firm strategic perspective.

Nevertheless, the findings of paper II provide insight to the possibility of cloud sourcing being a source of competitive advantage, and therefore calls for a better understanding of the cloud sourcing phenomenon and how it can be a source of competitive advantage – which is unfolded in the following papers. Applying RBV has helped me to understand how competitive advantage is formed in cloud sourcing in general. Moreover, in firms and industries with very high levels of security concerns RBV might still be an appropriate theoretical frame.

5.1.3 What are the barriers for cloud continuance in cloud sourcing firms?

This question is answered by Paper III were barriers to cloud sourcing continuance are identified and discussed in relation to cloud sourcing firms. The barriers are identified from a literature review (Chen, Chen, Chen 2009, Benlian, Koufaris, Hess 2011, Venkatesh et al. 2011, Trenz and Veit 2013, Mirusmonov and Kim 2013, Trenz 2014, Schlagwein and Thorogood 2014, Trenz and Veit 2015, Yang and Lin 2015, Ratten 2016, Al-Sharafi, Arshah, Abu-Shanab 2017) of cloud continuance factors and two case studies from different industrial contexts and cloud maturity. This gives a more fine-grained understanding of possible barriers that cloud sourcing firms can encounter. It contributes with a framework that identifies and relate these barriers for each case. As discussed in chapter 2, many companies struggle to cloud source. In some instances contextual barriers may be problematic such as hindering laws and regulations, lack of cloud vendor support and lack of competitive pressure. However, different types of organizational barriers seem to cause more problems, especially lack of top management support, lack of relevant IT competence and lack of innovation capabilities. The study also identified a new type of barrier, management process barriers, which consist of lack of objectives and strategies related to cloud sourcing and lack of communication with vendors. This finding is thus an addition to the cloud continuance research. As many of the previous of cloud continuance studies build on cross sectional studies (Schneider and Sunyaev 2016), the longitudinal case studies performed here might be a reason for this finding.

5.1.4 How are dynamic capabilities for innovation triggered in cloud sourcing firms?

The next paper, Paper IV builds on previous papers and develops a stage model of dynamic junctures that need to be overcome by managers; in order to sense, seize and transform in response to innovation opportunities. Applying DCT has helped to understand how innovation capabilities are created and used to innovate. These

innovations are based on dynamic capabilities that are formed in the different stages of the cloud sourcing process. The identified innovations are of three innovation types; process innovations, product/service innovations and market expansion and business model innovation. The stage based model combines three theoretical frames: the DCT (e.g. Teece 2007, Teece 2017), the stage-model (e.g. Romanelli and Tushman 1994) and capability lifecycle stages (Helfat and Peteraf 2003). Based on two case studies we identify a pattern of internal process innovations first, then product/service innovations and market expansion, and finally business model innovation.

The findings include a process view on cloud adoption and continuance stressing the capabilities to exploit cloud sourcing for business and competitive advantages over time. The capabilities to change, the dynamic capabilities, are here key to reap the business and competitive advantages from cloud sourcing. As much of the literature on cloud computing and cloud sourcing concerns cloud adoption and cloud continuance in a static perspective, i.e., based on cross-sectional data at one point in time (Schneider and Sunyaev 2016), this is new finding. Willcocks et al. (2013) reported in their empirical investigation of cloud sourcing and innovation that technological challenges were among the most important challenges. According to our model and empirical findings, the lack of dynamic capabilities combining IT- and business competences through re-aligning structures and internal culture, as well as establishing a good continuous innovation dialogue with cloud providing partners, are more important challenges.

Another finding concerns the IT-function and its capabilities. They are key in the sensing, seizing and transforming of the business development related to cloud sourcing. The IT-function must be able to lead and govern the collaboration with cloud providers, first organizing the routines for handling technology issues and internal process innovations. Then to organize and lead the cloud providers into a more business-oriented path with product/service innovations, geographic expansion and lastly business model innovation. This requires business competence in, or access to, the IT-function as well as more communication and coordination with business functions in the firm.

Finally the findings contribute to a better understanding of the evolution of dynamic capabilities. The stage-based model stress that not all the advantages of cloud sourcing can be exploited and explored at the same time, there is a temporal pattern to this process. Certainly, firms with more developed and strong dynamic capabilities relevant for cloud sourcing might be capable of executing a faster and more thorough process, but there would still be a temporal pattern according to our model. This temporal pattern is a testable proposition in large scale surveys concerning cloud sourcing in non-software intensive firms and the pattern of innovation.

(Willcocks and Lacity 2018) three types of innovation processes: 1) Incremental innovations (reduced costs, direct replacement of Apps with SaaS), 2) Architectural innovations (improvement in business processes; increasing mobility), and 3) radical

innovations (collaborating with third parties, internal skunk-works). The similarity lies in incremental innovations being the most easily accomplished and the greatest difference in Willcocks and Lacity (2018) describing three types of innovation processes while paper IV describes one type of innovation process, albeit it may progress (or even digress) with variable speed. The theoretical underpinning is not clear in Willcocks and Lacity's (2018) study while paper IV very clearly use a combination of DCT and stage-based models. This might be the main difference in explaining the different views on how cloud sourcing leads to innovation.

5.1.5 How does collaborative innovation develop in cloud sourcing relationships?

The last paper, Paper V goes even deeper into the business relationship and desiccates the antecedents of innovation (Caputo and Evangelista 2018, Sousa and Rocha 2019). It provides a model of the business relationship development process that clearly defines each phase of the process, its catalysers, catalyser sets and triggers and how that affects the progress of a business relationship in cloud sourcing. The paper contributes to relationship theory with a better understanding about how these relationships develop over time in the context of cloud sourcing

As seen from paper V, cloud sourcing relations can be rather complex with many factors to consider in order to achieve collaborative innovation such as culture, norms and values. This paper goes into depth in understanding the crucial factors for making cloud sourcing relationships form and sustain over time.

The findings add complexity to the business relationship literature by categorising factors into catalyzer sets, catalyzers and triggers based on their characteristics, abilities and evolvement; to describe phases in a BRDP studying business relationship as a process. The data analysis revealed that factors are catalyzers as they are identified to be sources of BRDP stabilisers; meaning that they are crucial for the formation and existence of a BRDP.

These catalyser sets develop trust, commitment and satisfaction (TCS) along the phases over time, which trigger transition or lead to stagnation across the phases of business relationships in a BRDP. The interplay of catalyzer sets, catalyzers and triggers affect BRDP continuance.

The paper makes several contributions. First, it contributes to the literature in relationship marketing by exhibiting the business relationship process in chronological phases, where catalyser sets make transitions between phases possible and development of TCS which triggers the transitions in any direction over time. The paper is built on previous literature that discusses the importance of factors for business relationship development (Morgan and Hunt 1994, Olkkonen 2000, Walter et al. 2003, Andersen and Kumar 2006, Holmlund 2008, Athanasopoulou 2009, Falkenreck 2017). It is also extended by identifying different categories of factors in the process of BRDP, catalyzer

sets, catalyzers and triggers. Catalyzer sets and catalyzers are crucial for the development of TCS triggers which can transition BRDP along the BRDP model through evolving transition, stagnation, procurable transition and deteriorating transition. TCS triggers can enable or inhibit this process depending on how inhibiting or triggering they are, or in some cases stagnate (no change). Absence of catalyzers prohibits the development of BRDP.

Interestingly, the framework presented in the paper highlights what other authors (e.g. Holmlund, 2008) called the technical dimension or technical factors. These factors emerged during the data analysis across all the catalyzer sets, yet they were most prominent in the initial conditions. A possible explanation for relative importance of these factors in the data is the empirical setting of cloud sourcing, particularly when it comes to competences and contract fulfilment. These factors were previously mentioned and assumed to be existing, but they were not always emphasized.

Moreover, the study is performed in a novel context of cloud sourcing relationships and in this manner provides a fresh understanding of how business relationships can evolve and sustain. Hence, cloud sourcing continuance literature is further developed applying TCS and revealing its complexity as shown by previous studies (Chou et al. 2015, Chou, Chen, Liu 2017, Cheng 2018, Dempsey 2018, Goode 2018, Walther 2018). In theory cloud computing is highly scalable, flexible and on demand enabling development of new services.

5.2 How can cloud sourcing lead to innovation?

Reconnecting to the first part of the overarching research question, how can cloud sourcing lead to innovation, the papers that constitute this thesis expand extant management research on cloud sourcing that highlight it as a source for innovation. The types of innovations that can be developed through cloud sourcing are explored in three of the five papers that constitute this thesis. As discussed above the innovation process related to cloud sourcing is described as a stage-based process with dynamic junctures and stages. In the stages the company has developed and stable routines and ordinary capabilities to perform certain innovation types, i.e., process innovations, product/service innovations and market expansion and business model innovation. In the dynamic junctures the dynamic capabilities appear, either by import of skills, capabilities and knowledge or “awakening” of a dormant skill or capability.

The case studies indicated that once the decision to start the process of cloud sourcing and the technical implementation problems were solved, the dynamic capabilities related to internal process innovations started to work. For example, it was the hiring of an external consultant, a cloud specialist, that proposed cost saving activities of night time shut down utilizing the scalability of cloud sourcing. It was the appointment of an ERP-specialist that solved user problems with the ERP-system or communicated with

the cloud partner if the specialist could not handle the complaint or suggestion. Another example was the appointment and training of super users to train and support other users. These were examples of adaptations and alignments that would enable the process innovate related to cloud sourcing. That could include also developing the competence to replace traditional apps and systems with SaaS-based apps and systems, such as skills in contracting, technical transfer of software and data, communication with vendor and so on.

The next dynamic juncture occurred when products/services and market expansion innovations related to cloud sourcing come up on the agenda. Then new types of dynamic capabilities started to appear. New managers were hired to take responsibility of such innovations. Competence related technologies such as Internet of Things, i.e., sensors, were brought into the firm. The IT-function got access to top management to feed ideas on plans for these types of innovations and get feedback on overall company priorities. New types of meetings were set up with cloud vendors discussing, planning and following up development projects. At some point the company had developed stable routines and capabilities for product/service innovations and market expansion. The final dynamic juncture, identified in one of the case studies, concerned the appearance of dynamic capabilities related to business model innovation. This included the permanent inclusion of the IT-function in the top management team, the vision of fully cloud-based company, the constant search for new third party apps and systems as well as increased interaction and positive collaborative experiences with cloud vendors resulting in trust, commitment and satisfaction. While no company in the case studies had reached the business model innovation stage, one of the case companies were in the process of developing dynamic capabilities to reach that stage.

The stage-based innovation process is stylized in the sense that covers three types of innovation types related to cloud sourcing, companies might be moving both forth and back in the process depending on successful passing of dynamic junctures or not, and circumstances might change that affects the effectiveness of both dynamic and ordinary capabilities. The process is illustrated in figure 5.2. (below after section 5.3.)

5.3. Cloud sourcing as a source of competitive advantage

Starting with a discussion on how different sourcing options relate to competitive advantage in a static RBV perspective in paper II, overcoming (or not) barriers to cloud continuance in paper III and then continue to explore and explain how dynamic capabilities triggered by cloud sourcing may give rise to and sustain competitive advantage in paper IV, and lastly taking a relationship marketing point of view in paper V. The findings of this thesis has implied that cloud computing, in the technical sense, cannot be a source of competitive advantage as the technology and the services related to it are readily available on the market for any company to acquire. Cloud sourcing, as a variant of IT outsourcing, has less potential than traditional IT outsourcing to be a

source of competitive advantage due to its common availability and benefits of scalability and flexibility. More companies can afford cloud sourcing than traditional IT outsourcing due to less or very limited investments in IT infrastructure and IT equipment as well as less investment in application programs. Today, even start-ups and small companies can afford, and probably will in most cases prefer, cloud sourcing. Willcocks and Lacity (2018) has even labelled cloud sourcing as the "great equalizer" between small and large companies.

Thus, the RBV-analysis of IT sourcing in Paper II (Muhic and Johansson, 2017) favouring an internal solution, to make imitation harder of a strategically valuable IT sourcing solution, is less valid in a world with abundant cloud sourcing opportunities. The case studies also indicated that the four banks strived for, and also had achieved, a solution totally based on cloud sourcing. However, in some companies and industries, e.g., with high demand for security or sensitive data, an internal solution might be of strategic value. Nonetheless, overall the findings of this study indicate less strategic value of IT outsourcing solutions with the continued diffusion of the cloud sourcing solutions.

As some prior research have indicated, (e.g. Kathuria al. 2018, Willcocks and Lacity 2018) the strategic value and sources of competitive advantage lies in the capabilities of identifying, developing and integrating cloud sourcing with the business and innovation processes, i.e., dynamic capabilities, to develop and transform the company and its business model (Teece 2018). Paper III identifies a number of contextual, organizational and management process barriers to cloud sourcing, barriers that if not managed and overcome might slow down the cloud sourcing process. The time difference between companies having attained full cloud sourcing and those experiencing a slow process might be quite significant. In the two cases Quos managed to fully cloud source within 10 months while WasteHeroes had reached 70 % cloud sourcing after 3-4 years. While it is hard to draw any certain conclusions from this finding in two random cases, it is probably safe to assume that temporary competitive advantages based on fast adoption of cloud sourcing compared to slow adoption might be in the order of 1-5 years depending on industry (cf. Willcocks and Lacity 2018).

The barrier that seems most difficult to break is the integration of the IT-organization with the top management organization, indicated in both case studies. The evolution of the traditional role of the IT organization from being a support function to becoming a business and innovation function of the company seems farfetched by top management. There is an evolutionary path, described in a stage-based model in Paper IV, to go through where dynamic capabilities evolve to be able to sense, seize and transform cloud sourcing opportunities to innovations. The model describes this evolution in terms of dynamic junctures and stages where sensing, seizing and implementing process innovations comes first, followed by product and market innovations and then finally business model innovations.

Making cloud sourcing relationships with cloud sourcing partners work as a collaborative innovation network is another difficult step in realizing strategic value from cloud sourcing as high-lighted in Paper V. Also this is described as a stage-based process where the partners successively come to commit, trust and be satisfied with one another. This is because of its dynamically organised characteristics, were the relationship between the partners becomes so strong and unique that there is a greater loss in breaking it than continuing the cloud sourcing relationship. The developed innovations imply not only temporary competitive advantage, but also long term competitive advantage in the form of the dynamic capabilities of the cloud sourcing relationship that is able to constantly develop the relationship further, possibly leading to more innovations and sustained competitive advantage.

Taken together the sources of competitive advantage related to cloud sourcing can be summarized in a VRIO-framework as described in table 5.1. Looking at the dynamic capabilities related to cloud sourcing it emphasises the importance of developing and merging IT and business in order to endure competitive advantage. Whereas collaborative innovation with cloud sourcing partners requires external relations that are dynamic and innovation driven in order to reach enduring competitive advantage.

Table 5.1. Cloud sourcing and competitive advantage

Cloud sourcing	Valuable	Rare	Hard-to-imitate	Well organized	Competitive implication
Cloud computing - Technical	Yes	No	-	-	Competitive parity
Cloud sourcing	Yes	Yes, but les over time	Yes, some barriers but manageable over time	-	Temporary advantage
Dynamic capabilities related to cloud sourcing	Yes	Yes, but less over time	Yes, but less over time	Yes, dynamically organized	Enduring competitive advantage
Collaborative innovation with cloud sourcing partners	Yes	Yes, but less over time	Yes, but less over time	Yes, dynamically organized	Enduring competitive advantage

The implications for competitive advantage could be further explored by using the characteristics of inimitability of dynamic capabilities proposed by Teece (2010).

a) *Differentiated business model architecture with co-specialized elements* – Cloud sourcing provides opportunities (and sometimes pressure) to convert traditional software apps and systems to SaaS-based apps and systems. There will also be continuous possibilities to license new SaaS apps from third parties. Willcocks and Lacity (2018) reported that large companies like Procter & Gamble runs about 2000-3000 apps, whereof only some 30 were SaaS-based. However, the number of SaaS-based apps were growing much faster than the traditional apps. Thus, over time there will be an increasing amount of third party developed SaaS-based apps that the companies can license and integrate in their internal processes and/or as new services

towards the customers. The possibility to differentiate the business model architecture with third party or co-specialized elements will be substantial. As long as the company focus only on process innovations related to cloud sourcing the differentiation will be limited and the level of inimitability will be low. Utilizing also SaaS-based apps and systems for product/service innovations, market expansion and business model innovation will increase differentiation and thus the level of inimitability to medium and high respectively.

b) *Complicated process steps, organizational structures, and/or arrangements*

The changing of process steps, organizational structures or other arrangements of developing internal process innovations related to cloud sourcing does not necessarily have to be complicated. As long as cloud based apps only concerns internal affairs the changes might be limited. Users have to get accustomed to more frequent software updates and associated problems but that might not require more than training, some new competence and the organizing of feedback to third party cloud vendors. However, as new products/service apps becomes involved complexity increases as data need to be protected in more ways, new types of regulations and laws need to upheld, interaction between business/marketing and IT-functions need to be increased and so on. Thus, inimitability will go from low level to medium level. When it comes to business model innovation complexity will increase again, as top management needs to be involved, and typically also heavier investments and changing of customer interaction. At this point inimitability is at a high level.

c) *combinations with (internal or external) complementary assets –*

As long as the number of cloud sourced apps and systems are limited and data integration is low the combinations with internal and external providers are limited. As the business model architecture becomes more differentiated the number of combinations with internal and external partners will increase. This will increase the access to more complementary assets but will also be more difficult (contractual, financially, coordinating etc) to manage. A large net or ecosystem of partners will be more inimitable than a limited net of partners.

d) *relationships with external actors, e.g., customers, suppliers, partners, which are unique and/or disturbing to competitors*

A limited number of external partners will be easier to manage than a large amount of external partners. A large amount of external partners will probably require specific relationship managers and resources. To motivate, coordinate and control a large amount of external partners will be more difficult than a limited amount of external partners. While internal process innovations probably only require handling of a limited amount of external partners, product/service innovations, market expansion and business model innovation will require managing a growing number of external partners. The inimitability will go from low, to medium to high level respectively.

e) *dynamic adaptation of business model elements and architecture, or dynamic adaptation of relationships with external partners*

Traditional IT outsourcing often have long, e.g. 3-5 years, contractual agreements between the company and the IT supplier. Updates are infrequent and development work often have to be handled separately. In cloud sourcing updates and changes in apps are much more frequent. The possibility to dynamically adapt to changing circumstances, new customer needs, new related technologies, interoperability with other apps and systems and so on are much greater with cloud sourcing. For instance, a new pricing logic might be integrated into a customer app in a short time. Moreover, new external partners or expanded relationships might be added in a short time. As long as these adaptations only concern process innovations the dynamic adaptation of business model elements and relationships is limited and inimitability is low. However, product/service innovations, market expansion and business model innovation will lead to increased level of dynamic adaptation and relationships and thus to medium and high level of inimitability.

This discussion is summed up into an integrated model (figure 5.2. below) of how cloud sourcing leads to innovation and its implications for competitive advantage.

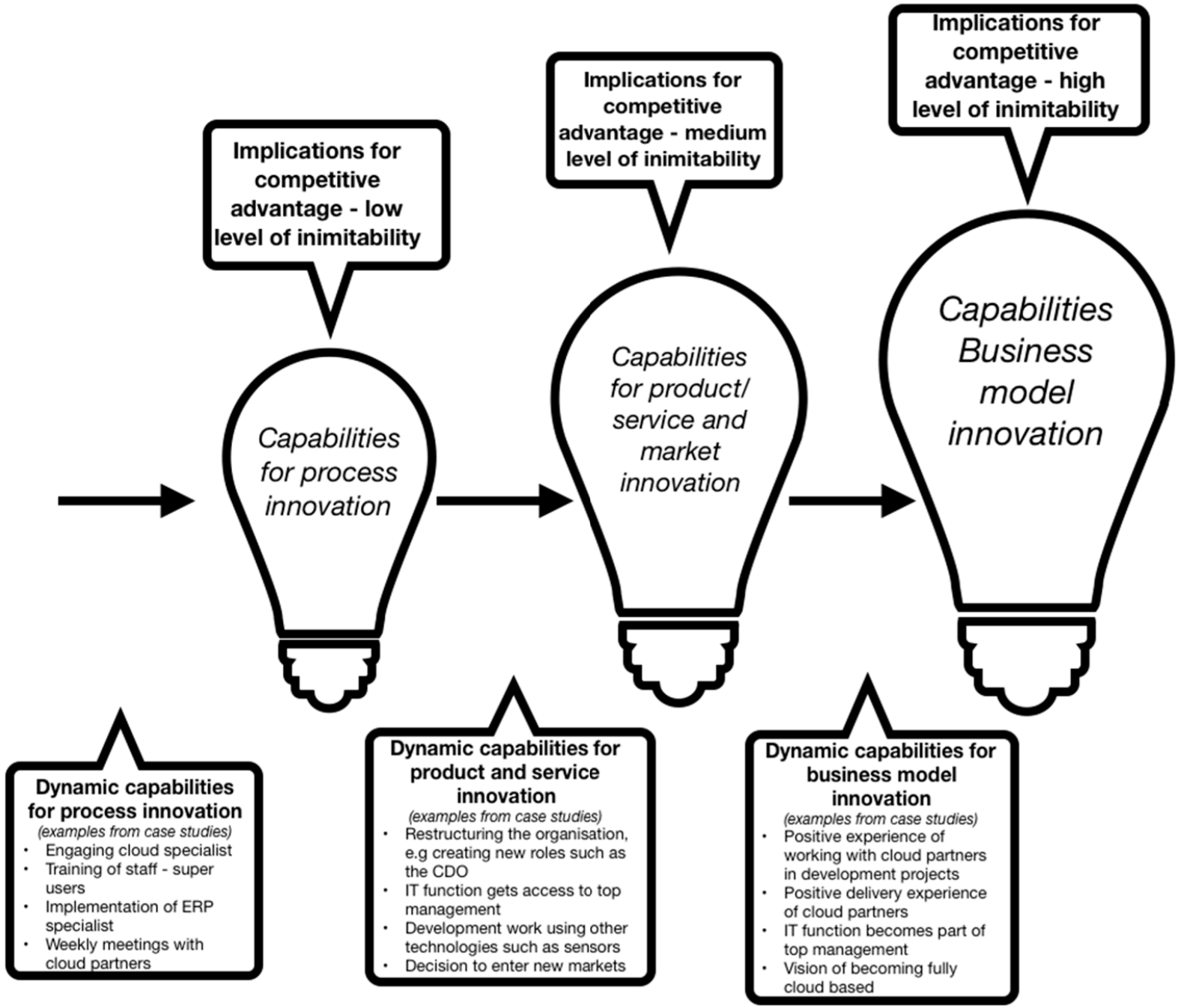

Figure 5.2 Different levels of innovation and implications for competitive advantage

6. Contributions, implications and future research

6.1 Research contributions

This thesis makes several research contributions. First, it contributes by establishing a knowledge foundation through literature reviews in paper I, paper III (on cloud continuance) and in chapter 2 of this summary (kappa in Swedish). In relation to the theoretical development of cloud sourcing by Wang et al. (2016) this thesis adds new knowledge to the burgeoning stage by addressing specific research topics. More specifically it contributes to the knowledge foundation of the transitioning process from traditional IT outsourcing to cloud sourcing which goes in line with Shuaib et al. (2019), i.e., the barriers to continuance of cloud sourcing.

It goes without saying that the literature review performed in 2014 (paper 1) already has diminished in value due to the rapid progress of the technology and subsequent diffusion in industry. However, more recent literature reviews on cloud computing research (Bayramusta and Nasir 2016; Senyo et al. 2018) have confirmed that the majority of research articles in cloud computing still have a technical orientation and are published primarily in technical or information systems journals. The research review by Bayramusta and Nasir (2016) finds that issues concerning cloud computing adoption continues to be the most frequent research area and Senyo et al (2018) finds that most of the cloud computing research lack theoretical underpinnings. Both reviews conclude that research journals in management and organization tend to ignore the topic even though the impact is likely to be immense in the near future and needs further investigation. Thus, some of the identified patterns in paper 1 still seem to be valid.

Second, the thesis contributes to cloud continuance research by constructing a model of barriers to cloud continuance in which a new type of barrier, management process barriers, is identified through two case studies. This is an addition to current research literature in cloud continuance compared to recent papers on cloud continuance by Ratten (2016) and Al-Sharafi et al. (2017). The management process barriers highlight the important roles of management to set objectives and strategies for cloud sourcing as well as organize communication with cloud vendors in an effective manner. The paper also identifies lack of top management support and lack of innovation capabilities as two of the more difficult organizational barriers to overcome in cloud continuance.

A third contribution concerns the theoretical underpinning of cloud sourcing. The research reported in paper IV and V have been theoretically underpinned by DCT and relationship theory respectively. In their review of cloud computing research Senyo et al. (2018) found that 82.5% of their 285 selected papers used no theory. While RBV has been used in a few prior cloud sourcing studies, such as paper II in this thesis and Senyo et al. (2018) finds no studies using DCT. Given the rapid technological development related to cloud computing DCT seems to be a superior theory when researching cloud sourcing from a firm strategic perspective. Another contribution to theoretical underpinnings is made by applying relationship theory in paper V by describing the business relationship process in phases, where catalyser sets make transitions between phases possible and development of TCS (trust, commitment and satisfaction) which triggers the transitions over time in cloud sourcing.

A fourth contribution relates to the longitudinal case studies of cloud sourcing in the cloud continuance process from a business and management perspective. Willcocks and Lacity (2018) are one of the few researchers that have reported results from empirical studies of cloud sourcing, both surveys and deeper case studies. However, the case studies performed here, especially in study c, seem to be more longitudinal in scope than the Willcocks and colleagues have performed.

Fifth, this study contributes to DCT on dynamic capabilities through its application in a new context - cloud sourcing - and developing a stage model in paper IV, that relates innovation types and dynamic capabilities to the cloud sourcing process. Even though the DCT claims to explain the sources for competitiveness in dynamic environments (Teece 2007, Teece 2017), it is a static theory, as we have limited understanding of the evolution of dynamic capabilities themselves (Helfat and Peteraf 2003). By combining the DCT (e.g. (Teece 2007, Teece 2017). with the stage-model (e.g. Romanelli and Tushman 1994) and lifecycle stages (Helfat and Peteraf 2003) a better understanding of the evolution of dynamic capabilities is provided than current main stream research on DCT.

6.2 Practice implications

Transitioning from traditional IT outsourcing to cloud sourcing requires several organisational, structural and strategic changes in order to stay in the cloud and reap the basic benefits of reduced cost, flexibility and scalability. Paper III provides a list of barriers, divided into contextual, organizational and management process barriers, which may inform managers about common implementation problems when transitioning to cloud sourcing. As a reminder the model of cloud continuance barriers is shown below.

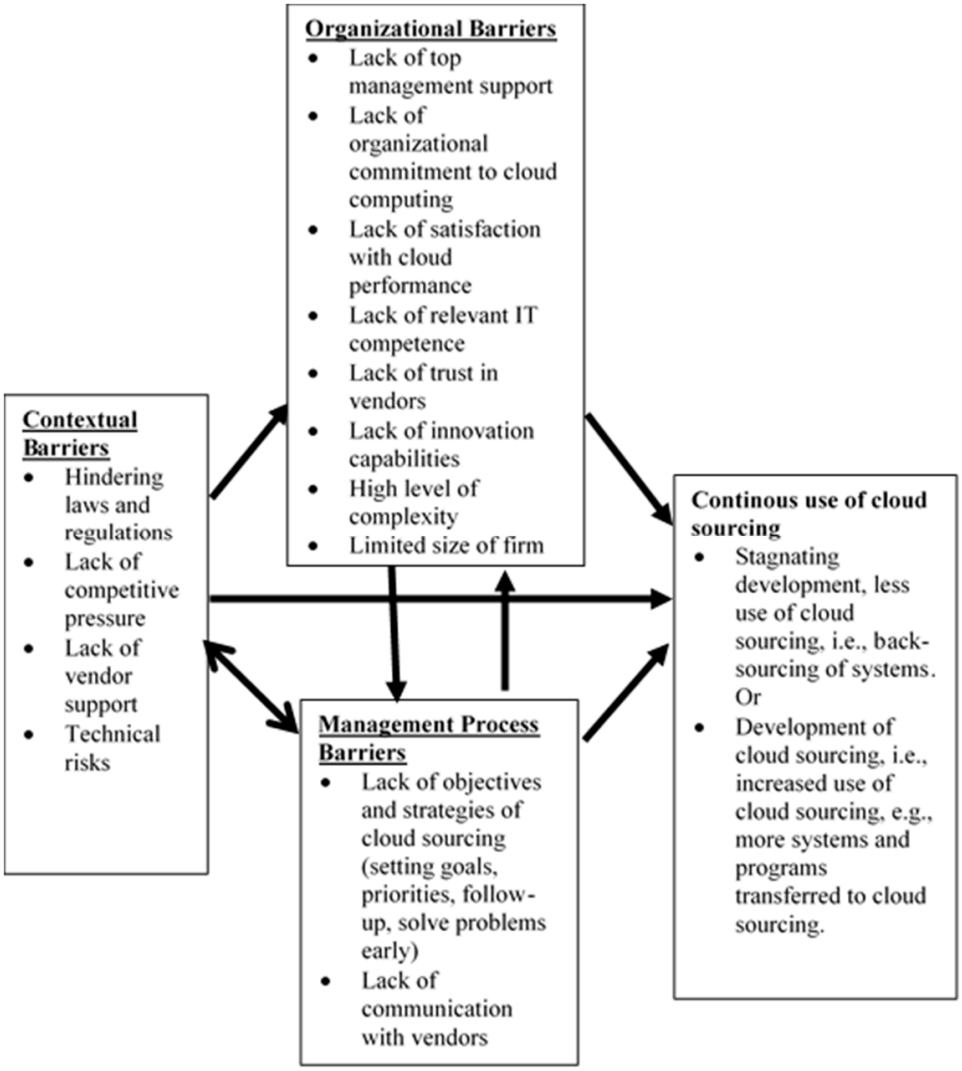

Figure 6.1. Barriers to cloud continuance. Modified from Muhic, Bengtsson and Holmström (2019)

Some general advice related to cloud continuance barriers are for the cloud customer needs to set clear requirements in the SLA, make sure that the cloud provider has the right competence, and reorganising of the internal IT department. To not only reap the basic benefits of cloud sourcing but also reach business advantages that affect revenues, larger changes are required. IT roles need to be restructured and enter the top management in order to take part in strategic decisions regarding the cloud sourcing. Furthermore, to change the business model and reach higher level of innovation with sustained competitive advantage collaboration and leadership with the other cloud partners is crucial. This requires continuous communication, meetings and engagement from all partners including trust, commitment and satisfaction.

Willcocks and Lacity (2018) have listed a number of lessons for managers based on their research of cloud sourcing. Overall their lessons resonate well with the results of this study. Below is selected list of seven such lessons, the ones mostly connected to dynamic capabilities and handling of relationships, with comments based on the studies in this thesis.

Lesson one. It's not just about costs.

Cost savings is often an important driver for transitioning to cloud sourcing. However, scalability and speed are also important. In the long run it is to avoid being outcompeted and the innovation opportunities that are most important.

Lesson two. Don't rebuild silos.

With minor organizational changes and some minor addition of new cloud computing competence to the current functions cloud sourcing might still work with some benefits reaped. But the real advantages of new applications typically requires integration of data and internal and external processes. Thus, business functions need to integrate with IT-functions in order to innovate and manage these new type of applications, either by regular meetings, committees, projects or some more permanent organizational structure.

Lesson three. Enable third-party services

Applications have to be developed so they allow for third-party authentication in order to enable third parties to easily take part in management and development of applications.

Lesson four. Develop new skills and capabilities.

Cloud sourcing demands new skills and capabilities especially in the frontend issues of cloud sourcing, i.e., applications, business model and innovation issues. Thus, persons and teams need to have both technical and business skills and capabilities in order to fully utilize cloud sourcing's potentials. More people will also interact with external cloud providers which will require skills in handling external relationships.

Lesson five. New role - Broker, integrate, exploit

Once applications start to become standardized and interoperable there will be a move from development work as "design, build and run" to "broker, integrate and exploit", that is to have a good overview of the market for applications, analyse their customer value and fit with current business or operations, integrate into current portfolio of applications and capture the commercial benefits.

Lesson six. Embrace innovation through the inevitability of the cloud

A large part of innovation for almost any business in the future will be related to the cloud. These innovations will not work without cloud computing. Thus, businesses which are not cloud based will not have the opportunity to adopt these innovations.

Lesson seven. Learn how to innovate through the cloud.

By seeing cloud sourcing as a learning process, first developing dynamic capabilities for process innovations, and then product and market expansion innovations and lastly for business model innovations the process might be smoother if trying everything at the same time. Successful process innovations will free up staff time to have a stronger

business and strategy focus. It will also allow to focus on potential external cloud providers that may supply new applications related to new revenue sources and at a more mature stage innovate the whole business model.

6.3 Limitations and avenues for future research

An obvious limitation to consider is the fact that a cloud customer can become vendor locked in initiating BRDP with several partners. The development of a model that can integrate and explain these threats and risks, together with the innovation opportunities outlined in the present models, would have been enriching.

In paper I, I identified a whole category of literature on risk apart from the risks of not reaping the benefits of cloud sourcing there are three main risks; security concerns, loosing data and vendor lock-in. Although I have not chosen to continue doing research on risk, it might also be a limitation and perhaps something for future research to look further into. Thus it has not appeared in my cases to be a big issue.

Another limitation is the empirical material. The case studies are limited to a few business sectors, i.e., banks, industrial maintenance and waste management. As more or less all business sectors will face opportunities and threats related to cloud computing this is obviously only a limited selection of business sectors and type of firms. Thus results may be biased due to this limited selection of cases. For instance, cloud sourcing processes for start-ups that are "born in the cloud" are very different from the cases studies presented here, as well as for very large and international firms with large portfolios of businesses (Willcocks and Lacity 2018).

Moreover, the discussion and role of related technologies has not been in focus in the studies. Many cloud applications depend on combinations of other digital technologies, such as social media, mobile internet access, business analytics, Internet of things and robotics (Willcocks and Lacity 2018). Apart from Internet of Things, i.e., sensors, this has not appeared as an important issues in the case studies. However, as applications become more integrated and advanced this might be an issue for future studies.

The findings of this thesis has spurred many more questions that I find interesting and important to be explored. Research suggestions for further development on how to reap the benefits of cloud sourcing involve seeing the evolution of IT into a more strategic role as crucial. The case studies in this thesis have opened up for further studies in this area, but in order to make generalisations the research needs to be scaled up with more case studies and large scale empirical studies in different industries for comparison. This would enrich and elaborate paper III and paper IV in specific. It could also be useful to gain increased knowledge on different companies' management cultures in relation to cloud sourcing transition.

Another area of interest is the integration of IT and business that requires cultural and structural alignment, exploring managements' role in this realisation. Perhaps identifying the decision-making process and governance roles might be a fruitful pathway, to better understand the mechanisms behind the action to cloud source, interact with cloud partners, develop business relationship and increase innovation capabilities.

Moreover, how to overcome the problem of finding the right cloud partners is still an important issue. My research can to some extent shed light on this issue as seen in papers III and V through the identification of barriers and a deeper understanding for the cloud sourcing relationship and what it is that makes it sustain referring to different levels of TCS. Although a cloud partner matching framework would have been even more helpful.

Indeed, I hope to see a stream of practice-based research emerge that investigates the challenges that have only been begun to be explored and overarch the limitations of this thesis.

Cloud sourcing as earlier discussed is not a ready made solution off the shelf that has the same outcome for all cloud customers. Instead it is highly mouldable depending on how it is interacted with and how management can utilise and develop its possibilities through new innovations summarised in figure 5.2. I hope that this insight might give some motivation to cloud sourcing customers' management for higher engagement in the cloud sourcing relationship, and to make it part of the core strategic plan. In addition it would be interesting to see more research on the mouldable characteristic of cloud sourcing and to make a comparative cross case study on a larger scale.

Finally and perhaps most importantly, my case studies show how dynamic capabilities in different forms can design and transform cloud sourcing into innovations and perhaps competitive advantage in the long run through new business models, market expansion, new services etc. This can be seen when relating the different types of innovations from the case companies with the dynamic capability theory (Teece 2007, Teece, Peteraf, Leih 2016, Teece 2017, Teece 2018). Further research, combining cloud sourcing as an innovation enabler with its close integration to practice and strategic management as a more established field may provide new insights and legitimacy to each other and thus can progress jointly. The lack of business and management studies related cloud computing and cloud sourcing identified in this thesis and by other reviews (Bayramusta and Nasir 2016; Senyo et al. 2018) is a real concern as cloud sourcing will have immense impact on almost all businesses in the coming decade.

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Appendix

Interview guide

The aim of the interview guide was to provide a common structure for my case study. I reviewed some of the well known case study papers and text books but did not find any existing template, although Yin (2003) presented an example of a case study protocol. For this reason I constructed my own template based on basic case study methodologies described by Eisenhardt (1989), and Yin (2003). At a high level most of the approaches to case study conduct are quite similar, in spite of the very different philosophical approaches taken by different case study experts. The interview guide table below informs the questions in the agenda for each interview. I will choose the questions that are most suitable to ask each specific respondent (based on their title/role and the time that I have had with that respondent). I will also look at previous questions asked, and which new questions have arisen. These questions will be added in my meeting agenda for the next interview. Notes will be made on this (questions that I asked in addition, that developed after the interview). The agenda will structure the interviews.

Table 1A: Interview guide

1. How many partners are involved?	*1a. Have the partners changed over time?*
2. What does each partner do?	*2a. What does the division of power look like? Who is in charge? How much power?* *2b. What does the division of freedom look like? Freedom of what/whom? How much freedom?*
3. What is your experience of the responsibility among the partners?	*3a. Has it worked out as expected? If not, why not?* *3b. How do the responsibilities of these roles differ?*
4. What is your experience of control among the partners?	*4a. What kind of control?* *4b. Why is the control divided in this way?* *4c. Have you considered any other ways?*

5. What is your experience of trust among the partners?	*5a. What does trust mean for you in this?* *5b. Do you trust each other that what you have agreed upon is fulfilled?* *5c. What is this trust based on?* *5d. What is this trust like in practice? Can you explain.*
6. What is your experience of this whole engagement?	*6a. How has this whole engagement changed over time? Has it changed at all?*
7. What is your experience of the communication among the partners?	*7a. How often do you communicate? Through which means?* *7b. What is your experience of the means through which you communicate?* *7c. Has your communication evolved over time? In what way?* *7d. Why did you enter this engagement? What is it that you give/take?*
8. What is your experience of how you work together?	*8a. What is your experience of the support that you give?* *8b. What is your experience of the support that you get?* *8c. What is your experience of the support that all involved partners provide to each other?* *8d. What is your experience of the involved partners' interests?*

9. What is your experience of the different partners' interests?	*9a. Do you feel that these interests are balanced among you? In what way?* *9b. What is your experience of the goals in this engagement?* *9c. Do you feel that the goals are mutual? If yes, then in what way? If not, then why not?* *9d. Do you feel that all partners involved are working towards achieving a common goal? If yes, then what is this common goal?*
10. What is your experience of sharing resources between each other?	*10a. What resources are shared with the cloud service provider/customer/sub provider/middlehand? Why?* *10b. What is your experience of the economic resources in this engagement?* *10c. Would you consider any other economic resources? If yes, then why?* *10d. What is your experience of the technical resources in this engagement?*
11. What is your experience of following the privacy agreement?	*11a. Would you do it differently if you could? If yes, what would you change and why?* *11b. How does it affect your relationship with the other partners?*
12. What is your experience of the SLA?	*12a. The SLA tries to control the configuration, but what do you do to control the SLA?*

13. What is your experience of how the different partners can work together?	*13a. Is this structure of work between the different partners in any way based on the SLA, Legal, Technical and/or Economic resources?* *13b. What is the outcome of this structure?* *13c. What kind of structure is needed to make it work?* *13d. Would you structure it differently if you could? If yes, then why?*
14. What experience do you have of some kind of "reward" from this engagement?	*14a. What is this reward based on?*
15. What experience do you have of some kind of "reward" for all partners involved ?	*15a. What problems have you encountered? If any, then why? Could you have eliminated those?*

Table 1B - Description of case study interviewees of interviews (cloud customer Quos with partners)

	Participant pseudonym	Company	Position	Profile	Interview time (hours and minutes)
1	**Petra**	Quos	CIO	Face to face at Stockholm Headquarter	1h 4m
2	**Anders**	Quos	IT operation manager	Face to face at Stockholm Headquarter	1h 16m
3	**Carina**	Sintra	Project manager	Skypemeeting, Belgium	1h 6m
4	**Ansi**	Sintra	Electrical engineer	Skypemeeting India, Bangalore	55m
5	**John**	Sintra	Senior Tecnical consultant	Skypemeeting, Wales, UK	54m
6	**Suie**	Sintra	Senior Finance Consultant	Skypemeeting, Singapore	48m
7	**Maria**	IMM Oaxima	Watson IoT Sales	Skypemeeting, Finland	45m
8	**Lina**	Quos	Human Resources	Face to face at Stockholm Headquarter	52m
9	**Tim**	Quos	Environment and Quality manager	Face to face at Stockholm Headquarter	36m
10	**Eddie**	Quos	ERP specialist	Face to face at Stockholm Headquarter	55m
11	**Johnny**	Quos	Senior Vice President Group Strategy and Business Development	Face to face at Stockholm Headquarter	22m
12	**Eddie**	Quos	ERP specialist	Face to face at Stockholm Headquarter	35m
13	**Gary**	Quos	CFO	Face to face at Stockholm Headquarter	47m
14	**Ola**	Quos	CDO	Face to face at Stockholm Headquarter	1h 2m
15	**Eddie**	Quos	ERP specialist	Face to face at Stockholm Headquarter	36m

16	**Ola**	Quos	CDO	Face to face at Stockholm Headquarter	38m
17	**Josef**	Quos	Finance reporting and consolidating	Face to face at Stockholm Headquarter	1h11m
18	**Mark**	Quos	Execution center manager	Skypemeeting, Örnsköldsvik, Sweden	17m
19	**Tamara**	Quos	Accident manager	Face to face at Stockholm Headquarter	15m
20	**Robert**	Freelancer consultant	Cloud Architect	Skypemeeting Canarie Islands	33m
21	**Maja**	IMM Oaxima	Cloud Consultant	Face to face at Stockholm Headquarter	2h 10m
22	**Joakim**	IMM Oaxima	IT magician	Face to face at Stockholm Headquarter	1h
23	**Alexander**	Quos	Controller	Face to face at Stockholm Headquarter	24m
24	**Petra**	Quos	CIO	Face to face at Stockholm Headquarter	1h 5m
25	**Anders**	Quos	IT operation manager	Face to face at Stockholm Headquarter	1h 23m
26	**Danny**	Melsoft	National Technology Officer	Telephone meeting, Sweden	58m
27	**Jay**	IMM Oaxima	Senior Consultant	Face to face at Stockholm Headquarter	1h 15m
28	**Martin**	IMM Oaxima	CTO	Face to Face in Stockholm	27m
29	**Petra**	Quos	CIO	Face to face at Stockholm Headquarter	45m
30	**Anders**	Quos	IT operation manager	Face to face at Stockholm Headquarter	1h 25m
31	**Pranis**	IMM Oaxima	Digital Tranformation leader	Face to face at Stockholm Headquarter	47m

32	**Andi Boul**	**Cognais**	**Delivery Manager**	**Skypecall, Budapest, Hungary**	**10m**
33	**Faris**	Quos	Finance reporting and consolidating	Face to face at Stockholm Headquarter	1h 10m
34	**Faris**	Quos	Finance reporting and consolidating	Face to face at Stockholm Headquarter	4m
35	**Ola**	Quos	CDO	Skypecall, Stockholm Headquarter	35m

Table 1C- Description of case study interviewees of observations

Date	Observation	Stakeholders	Type of observation	Meeting participants	Agenda	Action points
19/9-2017	**Quos and Cognais monthly meeting**	Quos and Cognais	Videoconference from Quos headquarter in Stockholm with Cognais in Budapest and India	Quos Stockholm: Petra, CIO and Anders IT operations manager. Cognais Budapest: Andi Boul, Service delivery manager. Cognais India: Sarkhi Rumi Support integration officer and Dephak Service delivery manager	Quos monthly operations report -action points are discussed and then decided if each action point is open, work in progress or closed and how they will be targeted. The action points are then targeted on the CAB meetings. Risks and challenges are gone through and decided on when they will be discussed on CAB meetings.	There are 3 Abu Dhabi companies with issues regarding the start and resume button in Metalogix. Microsoft needs to follow up on issues with slow system. Unexpected restart of AX-prod SQL 1 back end problem at Microsoft. Droopbox URL virus-email spread. Coganis has blocked the sender and removed the user. Andi from Cognais Budapest leads the meeting, Sarkhi and Dephak Cognais India fills in. Quos Anders points on issues with a ticket log. Andi Budapest replies when it was resolved. Budapest and India Cognais people collaborate. Quos Petra confirms that the support line works well. Is efficient. Cognais Budapest and India presents the status of the systems. Quos Petra and Anders listen and ask questions. Cognais presents changes done during August 2017 as

						well as a back up summary. Petra says "one thing is to plan for patching, and another thing is to actually do the patching. Quos can see Cognais on video, but Cognais cannot see Quos. Quos Anders requests a test environment that is similar to the production environment. RFS test environment with similar functionality or to patch it. Anders will contact Drake to check the cost of making snap shots of RFS similar environment to the production environment. This is the risk perspective. Quos Finland complains on how employees perceive the system it is too slow. 1-2 users are put on site to give feedback. The observation shows strong relationship, trust and understanding of the problems. A willingness to collaborate and resolve problems. Open, mutual communication. Petra leads the meeting to its end.

19/9-2017	**SLA meeting**	IMM Oaxima, Quos	Support integration officers	IMM Oaxima, Canada, Ontario, Rick Hall, Cloud Services Team and Technical client coordinator. Quos, Finland, Tampere, Ani, System Specialist and Quos, Budapest, Hungary, Patrik, System support engineer, Quos, Finland, Tampere, Sam, Business IT-manager, Quos, Sweden, Stockholm, Petra, CIO	To check how the delivered cloud services comply with the SLA. Oaxima 2018 upgrade, response times and availability	Petra asks what is good vs. bad response times? She also asks why there is no availability for the other months? Discussion about response times and availability is a little constrained. Not as relaxed as with Cognais. Petra is alert and asks critical questions. Upgrades of Oaxima 2018 system, plan of action is discussed. Scheduled meetings 2 times/week. Compared to the previous versions of Oaxima the system will be faster.
4/12-2017	**Informal observation**	Quos	On site in the office landscape, Quos headquarter, Stockholm, Sweden		IMM Oaxima needs a new environment with more licenses. Concurrent users are 150.	A problem is that Quos has become locked in to its cloud providers that it is difficult to change even if the SLA is not fulfilled. For instance the proactive support that is promised in the SLA by Sintra is not fulfilled, still it is a service that Quos pays for.

6/12-2017	**AX ERP Architecture meeting**	Quos, Melsoft, Sintra			To discuss critical issues, system performance, topics across functions, CR-S and other main developments/projects.	Decision to have a meeting on Saturday to do a SQL cluster troubleshooting runback, deploy one set up and reinstall —> Need to get back AX up and running
7/12-2017	**CAB meeting**	Quos, Cognais		Anders, Andi Boul, Dephak Hajar, Rashi Sariu, Mitri, Sela, Pat, Umo Shan, Yell Rai, Vivo Mali.	To go through the runbook	Database migration, see excel file "QuosService-CABTracker 07-12-2017".
7/12-2017	**CAB meeting**	Quos and Cognais				
8/12-2017	**Weekly ITO meeting**	Quos and Cognais	Anders, Andi Boul			
9/12-2017	**SQL cluster trouble shooting meeting**	Quos, Melsoft, Sintra, Cognais and Freelancer Robert		12 participants	A problem with the SQL cluster lasts for more than 2 months, has been a problem since September 2017. The SQL cluster is back working so that Biz talk can be connected again. Quos has to ask Melsoft how this happened, why did this SQL cluster suddenly stop stop working? Melsoft needs to go back to its logs in Azzure to know why this problem occurred.	Anders, Robert and all Quos employees listen and control that the runbook SQL troubleshoot problem is solved. The discussion and actions are led by Melsoft and Sintra. Anders and Robert get in the discussion when something is not done properly. They steer the meeting.

14/12-2017	**CAB meeting**	Quos and Cognais				Quos needs to allocate the license costs better, therefore Quos will have a meeting with its finance department to discuss their needs.
15/12-2017	**Weekly ITO meeting**	Quos and Cognais		Anders, Quos and Andi Boul, Cognais		
24/1-2018	**Monthly Governance meeting**	Quos and Cognais		Cognais: Sarki Rashu, Andi Boul, Dephak Hajar, Martin Criss. Quos: Petra and Anders	Quant wants a reduction in price from Cognais. See Quos Service monthly operations report dec 17-2017.	Windows 10 is already installed on new computers. There is a problem with images to be moved, it is not possible remotely (via cloud), a physical interaction is needed, images on usb or CD to reinstall.

Table 1E - Description of case study interviewees of interviews (cloud customer WasteHeroes with partners)

	Participant pseudonym	Company	Position	Profile	Interview time (hours and minutes)
1	**Mattias**	WasteHeroes	IT operation manager	Face to face at Malmö Headquarter	40m
2	**Mattias**	WasteHeroes	IT operation manager	Face to face at Malmö Headquarter	20m
3	**Johan**	WasteHeroes	Area manager	Face to face at Malmö Headquarter	20m
4	**Sandra**	WasteHeroes	Purchasing manager	Face to face at Malmö Headquarter	40m
5	**Henrik**	WasteHeroes	CFO	Face to face at Malmö Headquarter	40m
6	**Jonny**	WasteHeroes	Change manager	Face to face at Malmö Headquarter	1h 10m
7	**Linnea**	WasteHeroes	Work environment coordinator	Face to face at Malmö Headquarter	41m
8	**Joanna**	WasteHeroes	Human Resource	Face to face at Malmö Headquarter	40m
9	**Peter**	Attoie	Project leader and sales manager	Face to face at Malmö Headquarter	1h
10	**Anders**	WasteHeroes	Archiver and registrator	Face to face at Malmö Headquarter	31m
11	**Staffan**	WasteHeroes	Business developer	Face to face at Malmö Headquarter	41m
12	**Jennifer**	WasteHeroes	Communication officer digital development	Face to face at Malmö Headquarter	32m
13	**Mattias**	WasteHeroes	IT operation manager	Face to face at Malmö Headquarter	1h 20m
14	**Henry**	WasteHeroes	Chief operations officer (COO)	Face to face at Malmö Headquarter	22m

15	**Larry**	WasteHeroes	IT and security manager	Face to face at Malmö Headquarter	1h 7m
16	**Roland**	WasteHeroes	Maintainance manager	Face to face at Malmö Headquarter	28m
17	**Mattias**	WasteHeroes	IT operations manager	Face to face at Malmö Headquarter	1h 31m
18	**Carin**	WasteHeroes	Department Manager	Face to face at Malmö Headquarter	51m
19	**Fredrik**	WasteHeroes	IT administrator	Face to face at Malmö Headquarter	25 m
20	**Martin**	WasteHeroes	Finance reporting and consolidating	Face to face at Malmö Headquarter	25m
21	**Mårten**	WasteHeroes	Head of IT	Face to face at Malmö Headquarter	1h 5m
22	**Linus**	WasteHeroes	IT technician	Face to face at Malmö Headquarter	37m
23	**Milan**	WasteHeroes	Operations manager	Face to face at Malmö Headquarter	44m
24	**Jon**	WasteHeroes	Planning engineer	Face to face at Malmö Headquarter	47m
25	**Matilda**	WasteHeroes	Administrative assistant	Face to face at Malmö Headquarter	23m
26	**Maria**	WasteHeroes	Business controller	Face to face at Malmö Headquarter	31m
27	**Cilla**	WasteHeroes	System specialist/Programmer	Face to face at Malmö Headquarter	51m
28	**Anna**	WasteHeroes	Human resource project leader	Face to face at Malmö Headquarter	41m
29	**Calle**	WasteHeroes	IT applications and development manager	Face to face at Malmö Headquarter	52m
30	**Linus**	WasteHeroes	IT technician	Face to face at Malmö Headquarter	33m

31	**Maurius**	WasteHeroes	Environment Manager	Face to face at Malmö Headquarter	29m
32	**Annika**	WasteHeroes	Environmental strategist	Face to face at Malmö Headquarter	25m
33	**Joon**	WasteHeroes	Change manager	Face to face at Malmö Headquarter	1h
34	**Matti**	Oanda	Project manager	Face to face at Malmö Headquarter	1h 27m

Table 1F: Overview of collected documents and observations

Data type	Specified	Total Amount
Documents	Power point presentations Sales material Business strategy Cloud provider reports Monthly and weekly reports SLA Quos and IMM Oaxima Quality Execution Center Ticket System costs for each month IMM Oaxima Quos presentation at Cloud Confessions fall 2016 System infrastructure SLA with Oanda SLA with Attoie Lessons learned from Attoie CAB meeting protocols Cognais Monthly Operations Report Aug'17 Quos SLA IMM Oaxima Quos Annual availability Email conversation with Freelancer Robert Screenshots of the transition to Cloud Screenshot of the SQL cluster trouble shooting meeting Sintra group profile Screenshot of Sintra's consultancy services Screenshot of the second SQL cluster trouble shooting meeting	220
Observations	Meetings regarding cloud sourcing Lunch conversations Conversations at the office Formal meetings Informal meetings	3 months