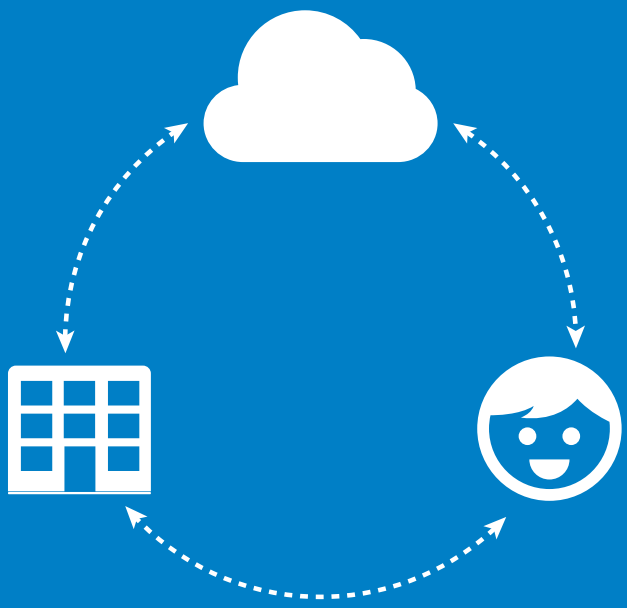
Department of Information and Service Economy

Impact of Cloud Computing on Business Process Outsourcing

Case: Accounting in Small and Medium-sized Enterprises

Aleksandre Asatiani



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Impact of Cloud Computing on Business Process Outsourcing

Case: Accounting in Small and Medium-sized Enterprises

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Abstract

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Abstract

Cloud computing is a model for providing on-demand access to a shared pool of computational resources in a cost-efficient and convenient manner, involving minimal interaction with the cloud provider. Within the last eight years cloud computing has evolved from a promising, emerging technology to a credible alternative for fulfilling organizations' IT needs. Previous research has addressed a variety of issues including cloud sourcing and implementation in organizations. However, there is a gap in our understanding when it comes to the implications of cloud-based information systems on business process outsourcing (BPO).

The objective of this dissertation is to contribute to the understanding of how the introduction of cloud-based-information systems affects BPO arrangements. The context of this research is professional business-to-business (B2B) services outsourcing by small and medium-sized enterprises (SME). This setting is depicted as an outsourcing triangle, which includes a client company, a professional service provider, and a cloud-based information system. The four essays included in this dissertation investigate the implications of cloud computing from the perspective of the three sides of the triangle. The first essay seeks to understand factors behind cloud computing adoption in organizations. The second and third essays investigate the outsourcing patterns of client companies and BPO decision-making in the context of cloud-based information systems. Finally, the fourth essay addresses changes in the organization of professional service providers.

The main theoretical contributions of the dissertation include (1) a revised cloud computing adoption framework, (2) a conceptualization of the outsourcing continuum, (3) an enhanced understanding of transaction costs in the cloud context, and (4) a framework of virtual organization for professional B2B service providers. For practitioners, this dissertation offers a set of guidelines for the implementation of cloud-based information systems in BPO arrangements, and the reorganization of work to suit the technology.

Keywords cloud computing, business process outsourcing, adoption, transaction costs, virtual work, professional services, SME, accounting, information systems, decision making

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First and foremost I would like to express my special gratitude to my supervisor Professor Esko Penttinen. Esko, I do not believe I will ever be able to thank you enough for your enormous commitment to my dissertation, for your wise and timely advise, and for your patience. You have been a great mentor and co-author.

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Helsinki, August 2016

Aleksandre Asatiani

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List of original essays

1. Asatiani, A. (2015). Why Cloud? - A Review of Cloud Adoption Determinants in Organizations. In *Proceedings of the 23rd European Conference on Information Systems (ECIS)*, Münster, Germany, (pp. 1-17).

2. Asatiani, A. & Penttinen, E. (2016). Profiling Outsourcers of Professional Services – An Exploratory Study on SMEs. In *Proceedings of the 24th European Conference on Information Systems (ECIS)*, Istanbul, Turkey, (pp. 1-16).

3. Asatiani, A., Apte, U., Penttinen, E., Rönkkö, M., & Saarinen, T. (Unpublished). Cloud Users Outsourcing Professional B2B Services: An Empirical Study on SMEs.

4. Asatiani, A. & Penttinen, E. (Unpublished). Organizing for Virtual Work – Strategies for Coping Without Physical Space.

Part I: Summary

1 Introduction

Simply put, cloud computing is a model for providing on-demand access to a shared pool of computational resources in a cost-efficient and convenient manner, involving minimal interaction with the cloud provider. The term *cloud computing* emerged around 2007 (Ragalado, 2011). Some expect the cloud to become *the fifth utility* (the other four being water, electricity, gas, and telephony) (Böhm *et al.*, 2011; Buyya *et al.*, 2009). Just as ubiquitous access to electricity revolutionized the manufacturing industry, ubiquitous access to computing through the cloud opens a wide range of opportunities for new services and business models.

Since 2007, interest towards the cloud has been growing rapidly in academic and practitioner literature (Venters and Whitley, 2012). According to the Scopus database, researchers have been consistently publishing thousands of journal articles and conference papers on the topic (see Figure 1). While in the beginning, industry and academia were focused on technological aspects of the cloud, the attention is increasingly shifting towards the business and service-related questions (Hoberg *et al.*, 2012; Marston *et al.*, 2011; Venters and Whitley, 2012). The introduction of the cloud into business activities poses new challenges, for researchers and managers, related to the adoption of cloud-based information systems (IS) and its implications on various aspects of an organization. This dissertation contributes towards addressing these challenges by looking at the implications of cloud computing on business process outsourcing (BPO) arrangements. This research explores the setting of professional business-to-business (B2B) services, where cloud computing has been introduced into the relationship between a client company and a professional service provider/BPO partner. Examples of professional B2B services are accounting, human resources (HR) and legal services, frequently used by companies of all sizes.

In the context of BPO, one of the more interesting characteristics of the cloud is accessibility. Cloud computing has made it possible for multiple parties to simultaneously access data and business applications in real-time, independent of the existing IT infrastructure of these parties (Buyya *et al.*, 2009). As a result, cloud services open up possibilities for collaborative work, with increasing emphasis on the client's needs (Willcocks *et al.*, 2013). The cloud creates a shared space for a client and a professional service provider within a cloud-based information system, which would be typically absent in a more traditional setup using local IT systems (see Figure 2). In traditional outsourcing arrangements, the outsourced tasks are performed in the provider's internal information system. In this case, the client company sends the necessary information to the provider. In turn, the provider delivers a pre-agreed outcome of the outsourced business process. Therefore, while the client company receives the outcomes of the service, the client has

neither access nor ability to influence the process itself. Therefore, in the traditional outsourcing arrangement, there is a little space for transparency or collaboration.

The shared digital space offered by cloud-based IS enables closer real-time collaboration, transparency and work auditability between the client company and the professional service provider (Marston *et al.*, 2011). In this setting, data exchange and processing occurs in a single information system that is equally accessible to both parties. These features of cloud-enabled outsourcing arrangements offer both challenges and opportunities to the client company and the professional service provider. This dissertation addresses some of these challenges, taking perspective of both the client company and the professional service provider. The context of this research is accounting outsourcing in small and medium-sized enterprises (SME). Accounting is a perfect setting for this study. There is a rich body of pre-existing literature on accounting outsourcing, as accounting is one of the most commonly outsourced business processes in SMEs. In addition, there are opportunities to collect high quality data, as companies are adopting cloud-based accounting information systems (AIS) at an increasing rate.

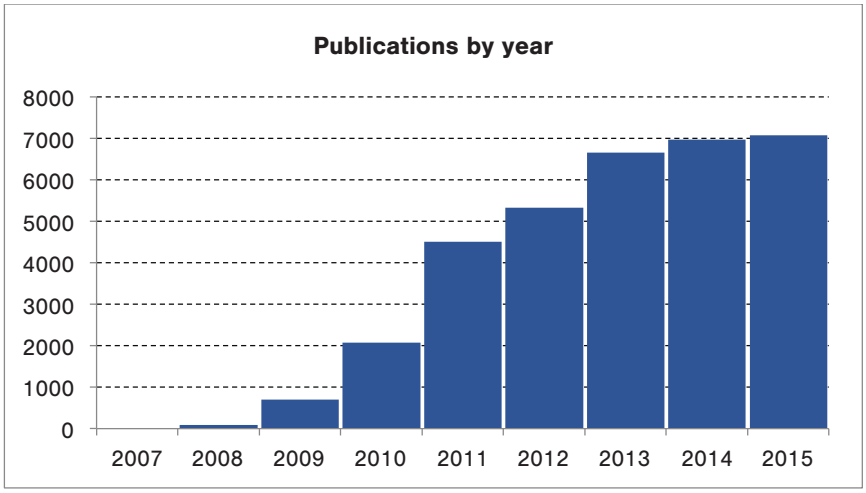


Figure 1. Number of publications on cloud computing, 2007-2015, according to the Scopus database

1.1 Objectives of the dissertation

The objective of this dissertation is to address the outsourcing of professional B2B services in SMEs in the context of cloud computing. The object of study is an outsourcing arrangement, which includes three perspectives: a client company, a professional service provider (e.g. accounting firm), and a cloud-based information system (e.g. accounting information system). There are streams of literature on the technical aspects and business applications of cloud computing, as well as business process outsourcing (BPO). The focus of this research is to address conceptual and empirical gaps in understanding the impact cloud-based information systems have on BPO relationships. This thesis addresses all three perspectives of the outsourcing triangle (see Figure 2), aiming to answer four research questions.

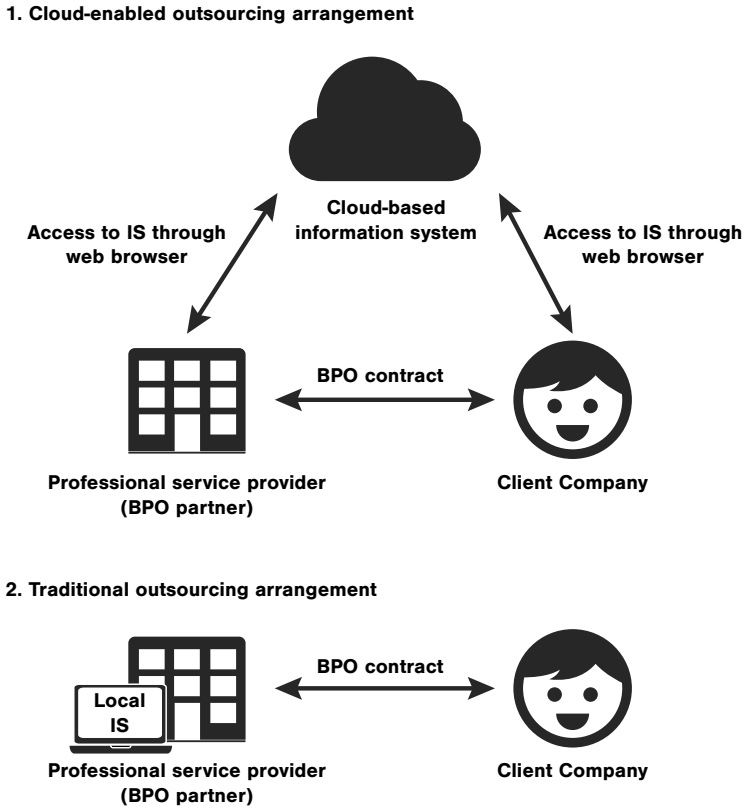


Figure 2. Comparison between traditional and cloud-enabled professional B2B service arrangements

From the information systems perspective, this dissertation addresses cloud computing adoption in organizations. The goal is to provide a generalizable explanation of why organizations – both client companies and professional service providers – adopt cloud computing. This is achieved by analyzing the determinants of adoption used in academic literature to attain a deeper understanding of what really drives organizations to move to the cloud. The research question states:

RQ1: What are the determinants of cloud adoption in organizations? (Study 1)

The client company perspective examines the client's decision-making concerning outsourcing arrangements in the context of cloud computing. This issue is split into two parts: profiling SMEs engaged in BPO, and explaining the influence of cloud-based information systems on BPO. These parts are addressed in two studies. The purpose of the first part is to explore the SME outsourcing landscape, analyze different outsourcing arrangements and produce a framework to describe them. The outcome is a theory for analyzing, as classified by Gregor (2006), outsourcing motivations. The theory maps different BPO arrangements in the context of professional B2B services, and provides foundation for further research. The study addresses the following research question:

RQ2: What firm characteristics and outsourcing motivations distinguish outsourcing patterns in SMEs? (Study 2)

The second part of the issues related to the client company perspective addresses the influence of cloud-based IS on BPO arrangements. Particularly, transaction costs affect outsourcing decisions of client companies using the cloud. The aim is to explain and predict the outsourcing of particular tasks to professional service providers with and without cloud use. Thus, Study 3 tackles the following question:

RQ3: How do cloud-based information systems influence business process outsourcing? (Study 3)

The professional service provider perspective addresses the implications of cloud computing on the internal organization of work for professional service providers. Specifically, Study 4 focuses on virtuality and how virtual organizations operating within cloud-based IS can overcome the challenges associated with the absence of face-to-face interaction. The goal is to produce an explanation theory (Gregor, 2006) to better understand how professional service providers can operate in a virtual working environment. The research question addressed is the following:

RQ4: How do fully virtual organizations cope without common physical office space? (Study 4)

The four studies addressing these research questions are independent, self-contained studies. Therefore, they present different perspectives on the same problem rather than a cohesive, unified research on one particular problem. The goal of the first part of this dissertation is therefore to draw relevant conclusions from each study and address the central issue.

1.2 Key concepts

1.2.1 Cloud computing

Cloud computing is an emerging computing paradigm, which has created a variety of opportunities for both IT and professional service providers (Dhar, 2012; Sultan, 2011). Cloud computing is commonly defined as "*a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction*" (Mell and Grance, 2011). The use of the cloud in business is becoming a more and more widespread research topic, after heavy technological focus during the earlier stages (Hoberg *et al.*, 2012; Venters and Whitley, 2012). Cloud computing consists of a number of key characteristics that have the potential to impact business processes. Location independence and universal accessibility allow for geographically-distributed business operations, decreasing the significance of physical distance between different parties' operating business processes (Iyer and Henderson, 2010; Weinhardt *et al.*, 2009). The cloud has reduced the importance of office-based infrastructure and allowed employees to perform their job independent of location (Johns and Gratton, 2013).

The cloud offers strategic flexibility, due to a lack of hardware constraints, decreased dependence on service providers, and ubiquitous accessibility (Iyer and Henderson, 2010; Marston *et al.*, 2011; Venters and Whitley, 2012). Hidden complexity relates to delegating the burden of IT management to the cloud service provider (Marston *et al.*, 2011; Venters and Whitley, 2012), which allows companies to concentrate on the business component of IT-enabled processes, pushing to reform these processes for higher efficiency. Enhanced

knowledge management, which is enabled by gathering all of the business-related information within one system allows the simultaneous, collaborative work of different parties (Marston *et al.*, 2011; Sultan, 2013; Venters and Whitley, 2012).

In relation to the business aspects, current research focuses on issues such as cloud characteristics (Hoberg *et al.*, 2012; Leimeister *et al.*, 2010; Marston *et al.*, 2011), adoption (Asatiani, 2015; Motahari-Nezhad *et al.*, 2009; Venters and Whitley, 2012; Yang and Tate, 2012), outsourcing (Asatiani *et al.*, 2014; Böhm *et al.*, 2011; Schneider and Sunyaev, 2014), governance (Hoberg *et al.*, 2012), and innovation (Lin and Chen, 2012; Willcocks *et al.*, 2013).

Previous studies succeed in defining the cloud (Marston *et al.*, 2011; Trigueros-Preciado *et al.*, 2013), its technological features (Marston *et al.*, 2011), participating stakeholders (Leimeister *et al.*, 2010), deployment models, and motivations to adopt the technology (Venters and Whitley, 2012; Willcocks *et al.*, 2013). However, more robust research on long-term consequences of cloud use to organizations is lacking. Questions regarding the use of cloud in organizations (Trigueros-Preciado *et al.*, 2013), multi-stakeholder contexts of cloud adoption and use (Schneider and Sunyaev, 2014), managing full-scale implementation of cloud as well as creating value-added services and process innovation (Venters and Whitley, 2012; Willcocks *et al.*, 2013) remain unanswered.

1.2.2 Business process outsourcing

BPO is a type of outsourcing, where a client organization is sourcing business processes through external third parties (Dibbern *et al.*, 2004; Lacity *et al.*, 2011; Millar, 1994). By nature, BPO concerns knowledge-based, information-intensive tasks and is clearly distinct from the outsourcing of physical processes (e.g. manufacturing) (Mani *et al.*, 2010). Moreover, some researchers have argued that BPO should emphasize a strong presence of IT in its processes (Rouse and Corbitt, 2006). BPO has been in the shadow of IT outsourcing for a long time, but the topic has been rapidly growing in popularity for the past 20 years (Lacity *et al.*, 2011). Today, the outsourcing of back-office tasks, such as accounting, is a part of a management routine across different industries and sizes of organizations (Lacity and Willcocks, 2014). The prevalence of the practice has implications on not only outsourcing-related decision-making but also on organizations' capabilities as a whole. Therefore, BPO research addresses the questions of *what* activities to outsource and *why* outsource particular activities (Borman, 2006), more recently extending to *how* can BPO be used to nurture innovation within organizations (Lacity and Willcocks, 2014).

There are two widely used theoretical frameworks for BPO-related decision-making relevant to the context of this dissertation: global service disaggregation and transaction cost economy (TCE). The decision to outsource a particular business task could be evaluated through transaction attributes and the transaction costs associated with these attributes. The two frameworks conceptualize several transaction attributes, such as information intensity, the need for customer contact (Apte and Mason, 1995; Mithas and Whitaker, 2007), frequency, asset specificity, and uncertainty (Alaghehband *et al.*, 2011; Williamson, 1979, 1981). These attributes predict the likelihood of a task to be outsourced, and allow for the comparison of outsourcing arrangements in various contexts.

1.2.3 Virtual organizing

Ever since ICT became commonplace in business, practitioners and researchers envisioned work being liberated from its physical element, allowing people to work remotely, independent of location and office hours. Even before Internet access became ubiquitous,

academics discussed the use of telecommunication technologies to allow employees to work remotely (Nilles, 1975).

Academic studies focus on virtual work through various lenses, such as virtual teams (Bjørn and Ngwenyama, 2009; Dubé and Robey, 2009; Jarvenpaa and Leidner, 1999; Watson-Manheim *et al.*, 2012), remote work (Belanger and Allport, 2008; Scott and Timmerman, 1999), virtual environments (Saunders *et al.*, 2011; Schultze and Orlikowski, 2010), and remote control (Bailey *et al.*, 2012). As research on virtuality progressed, our understanding of the differences between *traditional* and virtual teams shifted from a dichotomous view, where the absence of all face-to-face contact was required for a virtual team (e.g. Jarvenpaa and Leidner, 1999) to a continuum view, where the majority of teams operate in a hybrid environment combining varying degrees of face-to-face contact and remote work (e.g. Chudoba *et al.*, 2005; Griffith *et al.*, 2003). In the context of this dissertation I look at the possibility of the whole organization being organized virtually with no fixed physical space for employees, with a particular focus on outsourcing service providers.

Definitions of a virtual organization vary greatly depending on the context (Larsen and McInerney, 2002). Riemer and Vehring (2012) proposed a taxonomy including three types of virtual organizations: *internal*, *networked*, and *outsourcing*. In this dissertation the focus is on internal virtual organizations. An internal virtual organization is an entity that relies on a network of geographically-dispersed virtual teams and/or teleworking individuals to organize internally (Moller, 1997; Riemer and Vehring, 2012). These virtual organizations heavily rely on ICT for the exchange of information (Breu and Hemingway, 2004; Riemer and Vehring, 2012), in order to compensate for the lack of face-to-face contact (Moller, 1997).

1.3 Structure of the dissertation

This dissertation consists of two parts. The first part includes an overview of the key concepts, methods, results and implications of the thesis. The second part is a compilation of four essays included in this dissertation.

In the first part, following this introduction, Chapter 2 covers methodology issues. First, I present an overview on the overall methodological approach taken in this dissertation. Second, I go through each of the four studies, presenting data collection process and methods used in the analysis.

Chapter 3 consists of a review of the research results. I present the results of each study, followed by a brief summary. Finally, Chapter 4 offers a discussion of both academic and practical implications of this research, as well as limitations and opportunities for further research.

The second part is a compilation of the following essays included in this thesis:

1. Why cloud? - A review of cloud adoption determinants in organizations (Asatiani, 2015).
2. Profiling outsourcers of professional services – An exploratory study on SMEs (Asatiani and Penttinen, 2016).
3. Cloud users outsourcing professional B2B services: An empirical study on SMEs (Asatiani *et al.*, Unpublished).
4. Organizing for virtual work – strategies for coping without physical space (Asatiani and Penttinen, Unpublished).

2 Methodology

The majority of IS research can be associated with one of the following three approaches: positivist, interpretive and critical (Mingers, 2001; Orlikowski and Baroudi, 1991). While in the early stages, IS research was predominantly positivist (Orlikowski and Baroudi, 1991), subsequently, diversity in methodologies was accepted and embraced (Klein and Myers, 1999; Mingers, 2001; Walsham, 1995). Today, diversity in research methods and philosophical viewpoints is considered to be one of the strongest features in IS research (Sidorova *et al.*, 2008; Venkatesh *et al.*, 2013).

When talking about different approaches in IS research, there are two major issues to consider. The first issue is differences in perceptions of reality and the assumptions on how one can study it. In the context of this thesis, I concentrate on differences between positivist and interpretive approaches. The positivist approach assumes existence of fixed relationships which can explain objective reality. The belief in the presence of fixed relationships in reality, in turn, assumes the existence of a unique, best description of each aspect of the phenomenon (Orlikowski and Baroudi, 1991). Positivist research puts forward falsifiable hypotheses, aimed at having a predictive quality. The hypotheses are tested in a structured manner by examining a sample of population through the lens of predefined constructs. The interpretive approach, in contrast, assumes that reality and knowledge are social products, which are impossible to study independently of social actors (Orlikowski and Baroudi, 1991). A major implication of this assumption is the belief that there are no natural laws or fixed relationships to be discovered hidden behind social layers, and the best one can do is to understand intersubjective meanings in social life (Orlikowski and Baroudi, 1991; Walsham, 1995). Therefore, interpretive research does not seek relationships between predefined dependent and independent variables, but rather strives to interpret the phenomenon in a particular social context (Klein and Myers, 1999). In summary, the positivist approach pursues knowledge of objective and replicable patterns, which are present "naturally" in reality. On the other hand, the interpretive approach studies subjective, social reality, which does not exist independently of social actors.

The second issue is whether the positivist and the interpretive approaches, as well as their underlying methods, are compatible in addressing a single phenomenon within a single research project. On one hand, an argument can be made that the positivist and the interpretive approaches are inherently incompatible. The two approaches have some distinct assumptions about reality and knowledge reviewed above, which cannot be held by the researcher simultaneously while studying a single phenomenon. On the other hand, it has been argued that differences between the positivist and the interpretive approaches are largely rhetorical rather than practical (Weber, 2004). Therefore, compatibility is not an issue if a researcher is aware of the purpose and the properties of each approach. Moreover,

methods and epistemological approaches can be viewed as instruments to study various aspects of reality. Therefore, combining multiple methods to tackle a phenomenon would provide more complete, rich, reliable, and diverse results (Mingers, 2001; Venkatesh *et al.*, 2013).

The four essays included in this thesis contain both studies with interpretive and positivist approaches. The methods used in the papers include qualitative, exploratory and confirmatory quantitative analyses. The goal is to understand both subjective aspects of social actors making decisions regarding organizational processes and technology, as well as possible underlying objective factors. *Table 1* provides a summary of the methods and epistemological approaches taken in each essay.

The rest of this chapter provides detailed descriptions of the data collection and analysis methods used in the particular essays.

Table 1. Methodology description.

Study	Epistemology	Analysis	Data collection	Data
1	–	Concept matrices & systematic literature review used by Jeyaraj et al. (2006)	Literature Review	31 empirical studies on cloud adoption
2	Interpretive	Mixed-method: Cluster analysis & qualitative analysis of open-ended answers	Survey	323 SME responses
3	Positivist	Mixed effects logistic regression	Survey and interviews	456 SME responses
4	Interpretive	Multiple case study	Interviews	Accounting companies

2.1 Data collection and analysis

2.1.1 Study 1

The objective of this study was to categorize the adoption factors found in the existing literature and to identify the determinants playing a key role in organizations' decisions to adopt cloud computing. This study is a systematic in-depth literature review, which serves as a theoretical foundation to cloud adoption in organizations. For this review I analysed 31 articles through a two-step analysis, combining concept matrices (Webster and Watson, 2002) and the systematic literature review approach proposed by Jeyaraj *et al.*, (2006)

Data collection. I used empirical results from peer-reviewed articles on cloud adoption for this study. The databases surveyed for the review included AISel, EBSCOHost, Google Scholar, Proquest, ScienceDirect, Scopus, and Web of Science. The following keywords were used to search for relevant articles: "cloud adoption", "SaaS adoption", "IaaS adoption", and "PaaS adoption". A number of filters were applied to the search results in order to ensure only relevant articles were included in the search results. First, publication times were restricted to papers published no earlier than 2007 in case of the "cloud adoption" keyword, and to papers published no earlier than 2001 in case of the keywords "SaaS", "IaaS", and "PaaS" adoption. The rationale for this restriction is the fact that these terms appear in the

academic literature in its current meaning only after the mentioned dates. Second, studies were limited to the social and computer sciences.

In order to ensure a certain quality of the reviewed articles, I defined the following criteria of article selection:

1. Full, peer-reviewed articles published in journals and international venues.
2. Articles that clearly identify adoption factors of cloud computing or associated service delivery models (SaaS, PaaS, IaaS).
3. Articles that study adoption of cloud computing in organizations.
4. Articles that include original empirical studies.
5. Articles that clearly describe methods used to conduct the study.

I performed further selection of articles to be included in the analysis by manually examining each article to ensure all criteria were met. For the final sample I selected 31 articles. The following are the databases and the number of articles included for the review from that database: Scopus (10), AISel (8), EBSCOHost (1), Proquest (3), ScienceDirect (4), Google Scholar (4), Web of Science (0). In addition, one article was discovered using backward search. The share of journal articles and conference proceedings were roughly equal. Topically, most of the venues were related to IS.

Analysis. I conducted a two-step literature analysis. First, I used the concept matrices (Webster and Watson, 2002) to identify and organize adoption factors. All of the studied factors from the analyzed articles were extracted, and grouped by author. Then, through multiple iterations, similar concepts were merged and grouped based on five themes.

In the second step, I used the systematic literature review method developed by Jeyaraj *et al.* (2006). The method allowed me to identify which of the studied adoption factors were supported by findings across the literature. I coded empirically-supported relationships between factors and cloud adoption from the reviewed papers as *positive relationship*, *negative relationship*, or *no relationship.* I then categorized the results of the coding according to the thematic groupings from the first step and presented the results in a single framework.

2.1.2 Study 2

In this study, we explored outsourcing profiles of SMEs, analyzed different outsourcing arrangements and proposed a conceptual framework to describe these arrangements. We used data from a survey among SMEs, and applied cluster analysis to detect outsourcing patterns and organize them into a framework.

Data collection. We gathered the data through an online survey distributed among SMEs based in Finland. The survey respondents were randomly selected from the database of the Confederation of Finnish Industries (Elinkeinoelämän keskusliitto EK ry), an organization that unites 16000 Finnish enterprises. The survey was distributed through an email message containing an invitation to participate in the study and a web-link to the questionnaire. The invitation clarified the purpose of the study and stated that all the responses were strictly anonymous. The message was sent by the Confederation of Finnish Industries and was signed by both the Confederation and Aalto University. In total 2500 questionnaires were distributed. We received 341 completed questionnaires, putting the response rate at 13.64%. Prior to delivering the data to the researchers, the Confederation of Finnish Industries anonymized the data. The data was collected in the period of March-April 2013.

Analysis. We applied cluster analysis to the survey data and interpretive analysis to the open-ended answers. Cluster analyses help to discover *clusters* of data by grouping similar items together, while keeping the items in the resulting groups as dissimilar as possible (Kaufman and Rousseeuw, 2005). Cluster analysis is an empirical method of classification, which makes no prior assumptions on differences in the sample, thus being primarily an inductive method (Punj and Steward, 1983). This feature of cluster analysis fits well with the goal of the study to explore the profiles of SMEs that outsource and their use of cloud-based AIS, based on empirical data.

While cluster analysis has been successfully used in various disciplines, including information systems, the method is treated with skepticism (Balijepally *et al.*, 2011; Punj and Steward, 1983). The criticism of the method is rooted in the limited theoretical application of cluster analysis and high reliance on researcher judgment. Cluster analysis is an atheoretical descriptive approach, and its outcome depends on particular decisions made by the researcher. Therefore, these decisions need to be grounded in external justification (Balijepally *et al.*, 2011).

We tackled both of these issues in this study. First, the study was carefully designed to focus on presenting a discussion, of BPO and use of technology, grounded on a strong empirical basis as opposed to purely theoretical or anecdotal foundations. Therefore, propositions put forward in the study are intended as a basis of future research, rather than a strong theory. To address the second issue, we followed the guidelines of best research practices (Balijepally *et al.*, 2011; Ketchen and Shook, 1996; Punj and Steward, 1983). Namely, issues of variable selection, clustering method selection, and reliability were addressed.

Variable selection. The nature of this study is exploratory. Thus, in order to select variables we used the cognitive approach (Balijepally *et al.*, 2011; Ketchen and Shook, 1996). The variables for clustering correspond to the underlying tasks of the accounting process (see Appendix), which is the context of the study. These variables are rooted in the practice of accounting outsourcing and verified by practitioner experts through interviews.

Clustering method selection. For this study we selected the K-means clustering method. Iterative methods of clustering, such as K-means, are found to perform better than the hierarchical ones (Punj and Steward, 1983), especially when dealing with issues such as outliers (Balijepally *et al.*, 2011) and iterations on initial poor cluster assignments (Ketchen and Shook, 1996). However, iterative methods rely more on the researcher's judgments compared to hierarchical methods (Balijepally *et al.*, 2011). This is due to the requirement of assigning the number of clusters a priori (Punj and Steward, 1983).

Reliability. To address the issue of defining the number of clusters, we tested multiple clustering methods (Balijepally *et al.*, 2011; Ketchen and Shook, 1996). First, we performed hierarchical analysis, prior to K-means, in order to identify the number of clusters assigned by the clustering algorithm. We used Ward's method for hierarchical clustering. The hierarchical clustering algorithm provided a clear three-cluster solution. Then, we tested K-means clustering solutions with two to six clusters. From these solutions, the three-cluster solution proved to be the most reliable and had the best fit for interpretation. Cluster stability and ANOVA tests were used to check the reliability of the cluster solutions.

2.1.3 Study 3

This study addressed the issues of outsourcing disaggregated services and the use of cloud computing in such arrangements. The objectives of the study were to understand how cloud

use influences BPO decisions, what type of accounting tasks companies outsource to the third party, and whether users of cloud-based accounting information systems are different from non-users. To investigate these issues and test our assumptions, we conducted a survey among Finnish SMEs and performed a mixed effects logistic regression analysis.

Data collection. For this study we used questionnaire data from 456 Finnish SMEs. The dataset was a combination of data collected in collaboration with the Confederation of Finnish Industries, and a similar survey conducted among micro-companies (under 10 employees) together with OP-Pohjola Group. OP-Pohjola is one of the largest commercial banks in Finland, used by many SMEs. The data collection procedure with OP-Pohjola was identical to the survey conducted together with the Confederation of Finnish Industries. In the questionnaire distributed to the companies, respondents were presented with a list of 22 tasks related to financial administration and asked to indicate which of these the company had outsourced. In addition, the respondents were asked to indicate which information systems they used to perform these tasks. The respondents were given a list of the most common accounting information systems used in Finland as well as a free-text option in order to include systems that were not covered in the list. Later, the systems were categorized as cloud-based or non-cloud-based.

In addition to the survey, we organized an expert panel. The panel consisted of four top specialists in Finland with broad experience in working in financial administration: one board member of the Association of Finnish Accounting Firms, a development director of the Association of Finnish Accounting Firms, and two owners of accounting firms. The purpose of collecting the data from experts was to rate each of the 22 tasks on five process characteristics (information intensity, need for customer contact, frequency, human asset specificity, uncertainty), derived from existing theories, on a three-point scale (high, medium, low) used by Apte and Mason (1995). The datasets were combined to obtain a single dataset where the unit of analysis was the decision to outsource a process, and these datasets were further nested by firms.

Analysis. The data was analyzed using mixed effects logistic regression using the LME4 package of the R statistical programming environment (Bates *et al.*, 2013). The dependent variable received the value 1 if a firm had outsourced the process, and 0 if the process was not outsourced. The five transaction attributes were incorporated as fixed effects and included a random intercept as a firm-level parameter. The three models were produced by varying the data. In the first model, all firms were included, and in the second and third models, the data was restricted to companies that were not using cloud computing, and those that did use these services, respectively. The results were interpreted first by analyzing whether the transaction attributes or firm-level differences were the stronger determinants for the outsourcing decisions. The analysis shows that transaction attributes were stronger determinants for outsourcing decision compared to firm-level characteristics. *Z*-tests were performed to analyze the statistical significance of the differences of the regression estimates between cloud users and non-cloud users.

2.1.4 Study 4

In the last study, the objective was to analyze how virtual organizations cope without physical space. We conducted a series of interviews for a case study comparing two organizations with radically different modes of organizing their operations: one firm offering physical office space for employees and one firm that operates fully virtually.

Data collection. The two organizations selected for this study operate in the same industry (accounting) and use the same cloud-based information system (CLOUDAIS – a pseudonym). By controlling the task and system, we were able to identify the salient organization-level differences in the ways the two companies approach virtual working environments. Out of the two organizations, OFFICECOM (a pseudonym) had opted for physical space whereas VIRTCOM (also a pseudonym) had decided not to have an office space. OFFICECOM has an office space in downtown Helsinki but gives their employees an opportunity to work remotely from home. However, they require their employees to be present at the weekly company and team meetings. In VIRTCOM, all employees work from home.

Our unit of analysis was an organization. Our objective was to build an organization-level understanding of how OFFICECOM uses physical space and how VIRTCOM manages to operate without a physical space. To analyze these two cases, we conducted a series of qualitative interviews (see Table 2). Semi-structured interviews were conducted face-to-face and over Skype. Each interview lasted between 45 and 60 minutes. We conducted the interviews between November 2014 and January 2016. Interviews included the CEOs and employees of VIRTCOM and OFFICECOM. We recorded the interviews with permission from the informants and later transcribed the recordings for the further analysis. In total, we conducted 18 interviews, in three phases.

Table 2. Data collection phases and informants

Phase	Informant	Company
I. Operations in OFFICECOM and VIRTCOM	Virt. CEO	VIRTCOM
	Virt. Accountant1	VIRTCOM
	Virt. Accountant2	VIRTCOM
	Virt. Accountant3	VIRTCOM
	Office Accountant1	OFFICECOM
	Office Accountant2	OFFICECOM
	Office Accountant3	OFFICECOM
	Office Accountant4	OFFICECOM
	Office Accountant5	OFFICECOM
	Office CEO	OFFICECOM
II. Reasons for using physical space	Office Accountant6	OFFICECOM
	Office Accountant5	OFFICECOM
	Office Accountant1	OFFICECOM
	Office Accountant7	OFFICECOM
	Office Accountant3	OFFICECOM
III. Coping strategies	Virt. CEO	VIRTCOM
	Virt. Accountant4	VIRTCOM
	Virt. Accountant2	VIRTCOM

Analysis. We organized the data analysis in two steps. During the first step we conducted interview phase I and phase II. We transcribed and analyzed the interviews after each interview. Starting with in vivo coding, we constantly iterated and developed different categories. We searched the interview data for cues on motivations for either remote work or office work. Then, we used axial coding to relate the open codes to each other and to build categories. Gradually, clear concepts emerged, which we then connected to pre-existing

theory. This step yielded eight concepts forming the reasons for using physical space even though remote work was given as an option.

In the second step, we analyzed the interview data on VIRTCOM from Phase I and Phase III to search for strategies for coping without physical space. Here, we employed selective coding by taking the eight concepts from step one and searched the interview data for cues on how these concepts were addressed by the remote workers in VIRTCOM.

3 Results

The purpose of this chapter is to present the empirical results of the dissertation. Sections 3.1-3.4 provide the key findings from each of the studies included in the thesis. The research results cover cloud adoption, outsourcing patterns of SMEs, and service provider organization in the context of cloud use. Section 3.5 then summarizes the results.

3.1 Study 1: Why cloud? - A review of cloud adoption determinants in organizations

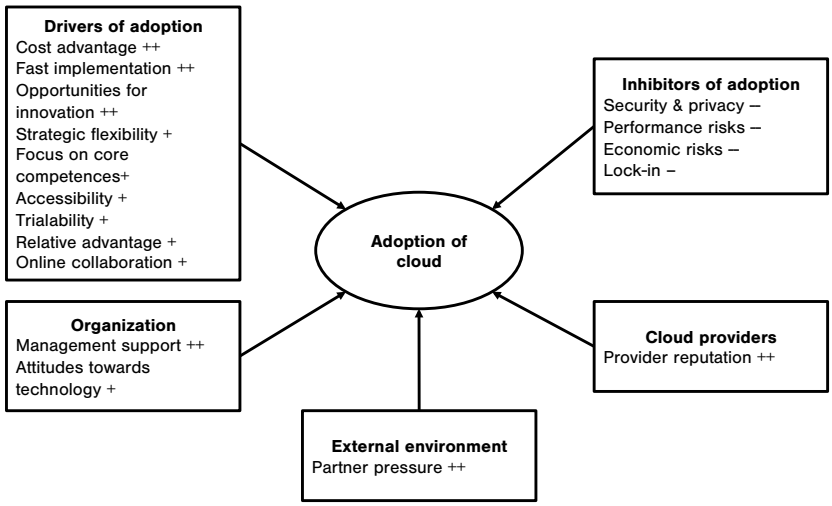
This study was a systematic literature review on cloud adoption in organizations. Cloud computing has gained popularity among researchers and practitioners. As a result, numerous studies were produced in the information systems field addressing cloud adoption. In this review, I investigated the results of the previous studies and formulated a set of empirically supported cloud adoption determinants. The main purpose of this paper was to answer the question: *What are the determinants of cloud adoption in organizations?*

As the result of the two-step literature analysis, I produced a set of cloud adoption factors in organizations (see Table 3). In addition, I generated a set of cloud adoption determinants in organization (see Figure 3), which comprised the factors empirically validated in earlier studies. The adoption factors and the determinants were grouped into five categories: (1) drivers of adoption, (2) inhibitors of adoption, (3) organizational context, (4) cloud provider context, and (5) external environment context. These categories represent the foundation for the cloud adoption framework in organizations (see Figure 3).

Drivers. In this category I have grouped all the factors associated directly with features of the cloud that drive adoption. The most commonly used drivers of adoption in the literature were *cost advantage* and *relative advantage*. This result is reasonable, given that potential cost savings and performance improvements are the most noticeable when adopting cloud. In the reviewed articles, *cost advantage* is sometimes combined with *relative advantage* (e.g. Low et al. 2011), but I kept these two concepts separate, as the former is widely cited as a separate entity. Therefore, in this study, I conceptualized relative advantage to refer to the technological or operational advantages that cloud brings, such as improved usability, quality of a service, or new applications. I found that *cost advantage* was widely utilized and a good predictor of adoption in all studies except one. Contrary to the overall perception, Gupta et al. (2013) find that the cost factor was not on the top of the list of adoption determinants. Nevertheless, the cost advantage of cloud use was very strongly associated with adoption.

Table 3. Categorization of cloud adoption factors

Factors of cloud adoption		
Drivers of Adoption	Inhibitors of adoption	Organizational context
Cost advantage Relative advantage Accessibility Strategic flexibility & adaptability Implementation times Online collaboration Scalability Focus on core competences Trialability Opportunities for innovation Information processing capabilities	Security & privacy Cost unpredictability Complexity Lack of standards in Service Level Agreements (SLA) Technological limitation compared to existing systems Performance risk Lack of control over Resources Required expertise IT governance issues/change management Managerial risk Loss of internal competences Vendor lock-in Low level of standardization Data accessibility	Compatibility & technological readiness Management support Organization size Transaction costs (e.g. uncertainty, asset specificity) Previous experience with cloud Attitudes towards technology Perceived technical expertise
Provider context	Environmental context	
Provider trustworthiness & reputation Provider competences Customer support Economies of scale Location of data	Legal issues Competitive pressure Social influence & peer pressure Shared best practices Partner pressure Regulatory support	



(++) More than 80% of the evidence is positively significant

(+) 60% to 80% of the evidence is positively significant

(–) More than 80% of the evidence is negatively significant

(-) 60% to 80% of the evidence is negatively significant

Figure 3. Cloud adoption determinants based on cloud adoption literature.

Adoption drivers frequently associated with cloud use, such as *accessibility*, *scalability*, *implementation times*, and *online collaboration* were also used across studies. However, the consistency of their use was lower, compared to the top drivers of adoption. Despite low use, findings show that *fast implementation time* and *opportunities for innovation* were good adoption predictors. Some cloud-centric factors, such as *online collaboration*, *strategic flexibility* and *accessibility* also showed predictive power in most of the studies.

Inhibitors. In this category, I included all inhibitors and risks associated with cloud that discourage adoption. Surprisingly, *cost unpredictability* was one of the widely-used factors to analyze cloud adoption-related inhibitors. In light of the finding that cost advantage is one of the biggest drivers for cloud adoption, the presence of cost unpredictability appears paradoxical. This may indicate disagreement on whether the cloud has proven itself a reliable cost reducer. However, it has to be noted that the significance of cost unpredictability in cloud adoption was not supported empirically.

My findings indicate that *security and privacy* issues were one of the most studied. Eighty-two percent of studies analyzing *security and privacy* included in this review found it to be a significant adoption deterrent (e.g. Benlian and Hess, 2011; Gupta et al., 2013; Trigueros-Preciado et al., 2013). Nevertheless, Gupta et al. (2013) highlight that overall, companies were enthusiastic about the cloud, and deemed services secure enough for use, despite ranking cloud *security and privacy* as one of their greatest concerns. Other factors, while showing a high ratio of significance across the literature, were present only in a small number of studies.

The rest of the category is composed of various risks associated with *performance*, *management*, and *SLAs*. Surprisingly, the issue of *vendor lock-in*, discussed in practice-oriented literature (Armbrust *et al.*, 2010; Brynjolfsson *et al.*, 2010) was addressed in only three relatively recent studies (Sarkar and Young, 2011; Seethamraju, 2013; Trigueros-Preciado *et al.*, 2013).

Organization. In the organizational context category, I included factors concerning organizational characteristics impacting the decision to adopt cloud technology. In this category, the most used factors are *compatibility & technological readiness of organization* and *management support* of cloud initiative. As technological limitations in terms of customization and integration present a risk in cloud computing, compatibility of the existing IT with the cloud is highly important. *Previous experience with technology* and *perceived technological expertise* in an organization are less explored. This can be attributed to an overall perception that cloud technologies are easier to develop and maintain compared to in-house IT infrastructure.

However, I found that only *management support* and *attitudes towards the technology* have significant support in the reviewed studies. *Management support* was empirically supported in all studies where it was tested. There was a general agreement, throughout the articles that analyzed the role of *management support*, that the factor significantly contributes to a decision to adopt cloud technology (Borgman *et al.*, 2013; Low *et al.*, 2011; Oliveira *et al.*, 2014).

Cloud providers. As a result of the analysis, a new category related to factors associated with cloud providers emerged. Cloud providers play a distinct role in the decision to adopt cloud technology, as they are responsible not only for the software or service, but also for user data and infrastructure behind cloud services. Organizations have to trust their provider on issues such as consistent performance of the system, sensitive data, and timely implementation of new features. *Provider trustworthiness & reputation* was the most-cited provider-related determinant of cloud adoption. However, it has been empirically tested only in two studies (Heart, 2010; Seethamraju, 2013). Both of the studies found support for the

impact of provider reputation on adoption, although more research is needed on the issue. Amid the discussion of importance of cloud providers, other attributes were mentioned in many of the reviewed articles, but claims concerning these attributes lacked empirical support.

External environment. In this category, I included all factors that affect cloud adoption but are beyond cloud technology features, organizational context or providers. *Legal issues* were widely discussed in reviewed articles. Cloud providers deal with client organizations' sensitive data but sometimes operate under different legislation than their clients. Such an environment intensifies the importance of legal compliance, as there are no established practices at the moment on issues such as ownership of data and privacy.

Competitive pressure was understandably present as more and more companies are planning to adopt cloud technology. Two studies address potential influence of *shared best practices* and success stories as an environmental factor for adoption (Benlian, 2009; Saedi and Iahad, 2013). Success of other companies could be an influential factor in the decision to adopt, but at this stage, convincing examples may be scarce, thus undermining the effect of the factor.

Surprisingly, among the external environment factors, only *partner pressure* was empirically supported, although the attribute was tested only in two studies. While *legal issues* and *competitive pressure* were the most used variables, the results were either controversial or insignificant. In the case of *legal issues*, the reason could be the complexity of the topic, the importance of the research setting, and the vague interpretation of the factor. For example, while some authors see legislation as a supportive factor (e.g. Oliveira et al. 2014), others view it as a hindrance to technology adoption (e.g. Borgman et al. 2013; McGeough 2013).

3.2 Study 2: Profiling business process outsourcers – An exploratory study on SMEs

The first study explored the technology adoption angle of cloud-enabled professional service outsourcing. This study focused on the client company perspective, investigating BPO patterns in SMEs. Our objectives in this study were to profile different types of SME outsourcers, identify firm-level characteristics of different oursourcers, and explore their motivations to outsource. The study answers the following two questions: RQ1 - *What are the common outsourcer profiles for SMEs?* RQ2 - *What firm characteristics and outsourcing motivations distinguish outsourcing patterns in SMEs?*

To answer these questions, we analyzed outsourcing patterns of 323 companies and identified three clusters. The three clusters represent three outsourcer profiles: *low outsourcing companies, selective outsourcing companies, and high outsourcing companies.* After completing the cluster analysis, we characterized each cluster based on the data provided by survey respondents.

Low outsourcing cluster. The first cluster comprises of high turnover, high employee headcount SMEs who prefer to keep the majority of the accounting processes in-house (see Figure 4). These companies have a low adoption rate of cloud-based AIS. We found that the majority of the respondents from Cluster 1 evaluated their competence in accounting processes as high. This suggests that companies in Cluster 1 have a dedicated, professional accountant or an in-house accounting team dealing with the whole process. Therefore, due to the in-house capability, companies in this cluster are less inclined to outsource. The bigger

size of the companies in Cluster 1 would also suggest a large enough scale of accounting to justify a permanent in-house accounting unit.

In this cluster, only 10% of the companies were exempt from mandatory auditing. Nevertheless, the majority of SMEs in this cluster choose to perform voluntary external auditing. Based on the analysis of the open-ended answers and background data, we found that the top motivation factors to outsource accounting are access to expertise, access to resources, time saving, and quality improvements. The typical areas of operation of SMEs in Cluster 1 are the manufacturing and construction industries.

Selective outsourcing cluster. The second cluster comprises companies outsourcing selectively (see Figure 5). SMEs in this cluster are making calculated decisions on what to outsource. Tasks related to reporting, such as payroll, income statements, balance sheets, and taxation are outsourced, while the majority of the tasks directly related to daily operations, such as sales and purchases, various registers, and payments, are kept in-house. Cluster 2 has the highest cloud adoption rate. Twenty-seven percent of the respondents reported using cloud-based AIS to manage their accounting. The majority of SMEs in this cluster are relatively small, with less than 20 employees and less than €2 million turnover.

Cluster 2 also includes respondents with the most diverse accounting competence levels. On average, however, the competence in this cluster is at medium level. Slightly more than half (57%) of the companies eligible for voluntary auditing choose to have a voluntary, external audit. The main motivational aspects to outsource are access to expertise, time saving, and focus on core competences. As in the case with Cluster 1, a large number of companies in this cluster operate in manufacturing, followed by SMEs operating in health and automobile services.

High outsourcing cluster. The third cluster includes eager outsourcers (see Figure 6). SMEs included in Cluster 3 are outsourcing the majority of their accounting, with exceptions such as sales and client registers maintenance, and sales invoice handling. One explanation for these exceptions is that these processes are typically part of daily routines, and occur as a byproduct of other activities (e.g. customer acquisition, a new sale, invoicing). Therefore it is not viable to decouple these processes from company operations and outsource them to a third party.

Companies in Cluster 3 are mid-sized SMEs, both in terms of turnover and employee headcount. Almost a quarter of these companies (24%) are using cloud-based AIS. The majority of the respondents have some practical experience with accounting. This cluster has the smallest ratio of companies choosing voluntary external auditing. The top reasons to outsource are focus on core competences, access to expertise and cost reduction. Typical companies in this cluster are in the manufacturing and service industries.

This study provided us with the outsourcing patterns of SMEs which are outsourcing accounting tasks to external professional service firms. Table 4 presents a summary of the outsourcer profiles, their characteristics, and a set of motivations to outsource. This study also informed us of the level of cloud use across different outsourcing arrangements.

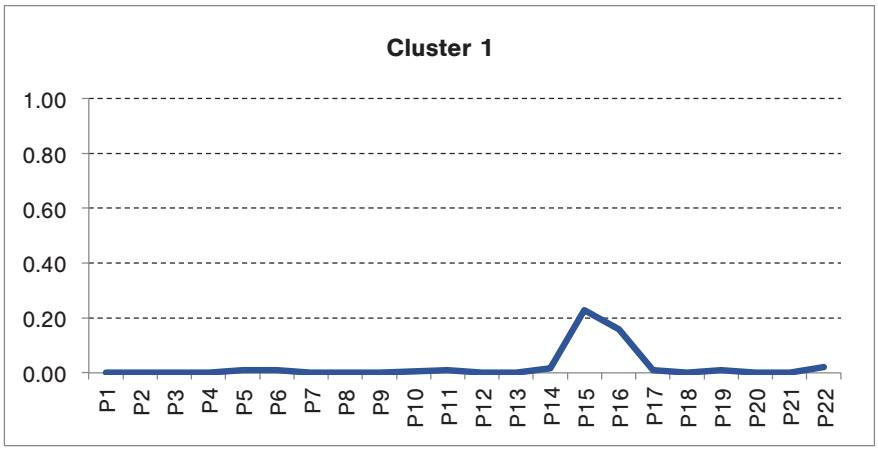


Figure 4. Outsourcing patterns of Cluster 1. The x-axis represents the accounting tasks P1-P22 from Table A1 in Appendix, and the y-axis is the percentage of outsourcers for that specific task in this cluster.

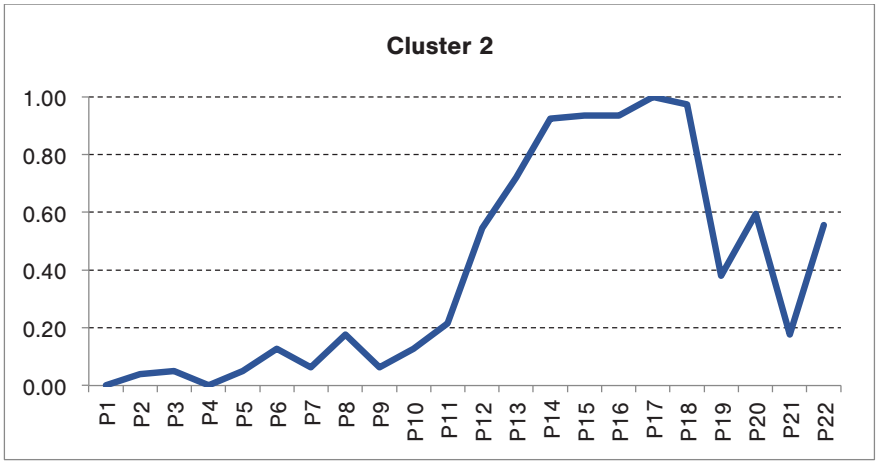


Figure 5. Outsourcing patterns of Cluster 2

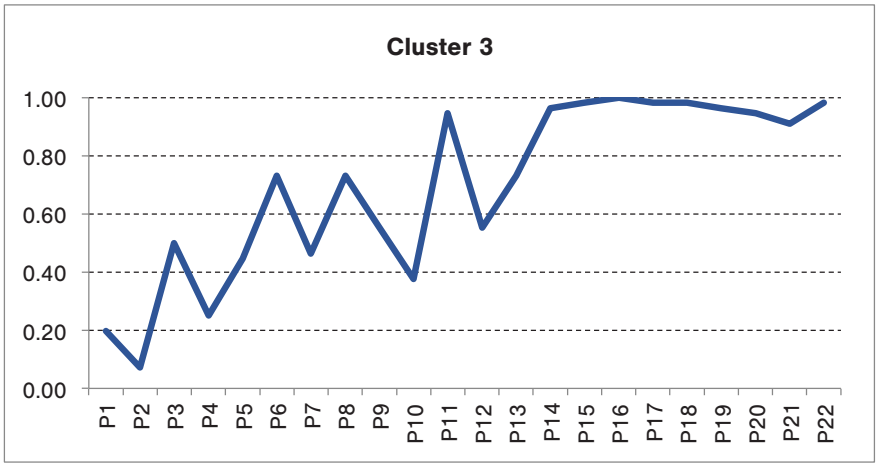


Figure 6. Outsourcing patterns of Cluster 3

Table 4. Outsourcing profiles

Characteristics	Cluster 1	Cluster 2	Cluster 3
Degree of outsourcing	Low	Medium	High
Cloud Adoption	Low	High	High
Competence	High	Medium	Medium
Voluntary auditing	High	Medium	Low
Motivation to outsource	- Access to expertise - Access to resources - Time saving - Quality improvements	- Access to expertise - Time saving - Focus on core competences	- Focus on core competences - Access to expertise - Cost reduction
SME size	Large	Micro/Small	Medium

Moreover, based on the results, we propose the notion of a continuum of outsourcing (see Figure 7): Outsourcing is a continuum, where organizations positioned differently along the continuum pursue distinct sets of objectives. In our study, we have identified three distinct sections of the outsourcing continuum, where the motivations to outsource and the implementation of outsourcing arrangement are drastically different. This view of outsourcing implies that outsourcing arrangements situated on different sections of the continuum should not be treated as a single outsourcing model. Therefore, studying outsourcing without clear identification of the type of arrangement could be counterproductive. This may also explain some of the discrepancies in the research on the performance of outsourcing.

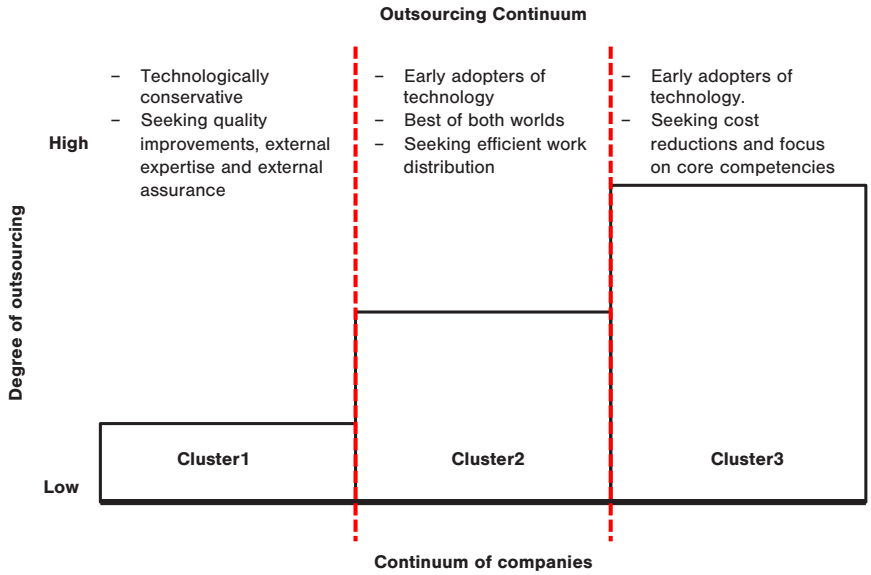


Figure 7. Outsourcing continuum.

3.3 Study 3: Cloud users outsourcing professional B2B services: An empirical study on SMEs

In the third study we addressed the question of how cloud-based IS influence BPO. In order to answer this question, we used two theoretical frameworks: global service disaggregation (Apte and Mason, 1995; Mithas and Whitaker, 2007) and transaction cost economy (TCE) (Williamson, 1979, 1985). These frameworks are based on transaction attributes, which impact the outsourcing decision. We selected five transaction attributes: information intensity, need for customer contact, frequency, human asset specificity, and uncertainty. Hypotheses put forward in this study, as well as the results are summarized in Table 5.

We compared accounting outsourcing settings where cloud-based AIS are used to settings where outsourcing arrangement relied on a service provider using traditional, local AIS. The comparison shows that in a cloud-enabled outsourcing setting, BPO rates were higher, meaning that cloud-user SMEs outsourced more. This explains, in part, the observation of the effects of the five transaction attributes – information intensity, need for customer contact, frequency, human asset specificity, and uncertainty – being smaller for cloud users, compared to non-cloud users. Interestingly, we observe that for cloud users, two of the three TCE constructs, frequency and human asset specificity, have a smaller influence on the outsourcing decision.

Based on these observations, it appears that frequency and human asset specificity play a less restrictive role in the outsourcing decision for cloud users. Cloud systems simplify the management of the information and redistribution of work, thus enabling client companies to outsource a larger variety of tasks, which would have been costly in a traditional setting with local accounting information systems used solely by the accountant.

There are two takeaways for the literature on business process outsourcing and cloud computing. First, we put forward a more thorough understanding of the effects of transaction costs on BPO decisions, particularly in the context of SMEs. The existing literature faces challenges in explaining some of the discrepancies and contradictions in the evidence on the effects of transaction costs, particularly asset specificity, on BPO and ITO decisions (Alaghehband *et al.*, 2011; Lacity *et al.*, 2011). We explained the contradictory results regarding asset specificity. We highlighted the divide between technological and human asset specificity, and described the resource-dependent context of SMEs, and observed changes in the outsourcing market.

The second takeaway concerns the use of cloud computing in outsourcing arrangements. We advance the discourse on cloud use beyond the mere technology adoption (Alshamaila *et al.*, 2013; Asatiani, 2015; Gupta *et al.*, 2013; Oliveira *et al.*, 2014) and IT sourcing issues (Benlian and Hess, 2010; Schneider and Sunyaev, 2014). Our results demonstrated that decisions of cloud-using companies engaged in non-IT BPO were influenced by the technology.

Table 5. Hypotheses summary

Relationship	Hypothesis	Result	Difference between cloud and traditional AIS users
INFINT + Outsourcing	H1: High information intensity of a task is associated with a higher degree of outsourcing among cloud users.	Supported	Not significant
CUSCON - Outsourcing	H2: Low need for customer contact of a task is associated with a higher degree of outsourcing among cloud users.	Supported	Not significant
FREQ - Outsourcing	H3: Low frequency of a task is associated with a higher degree of outsourcing among cloud users.	Supported	Significant
ASPEC + Outsourcing	H4: High human asset specificity of a task is associated with a higher degree of outsourcing among cloud users.	Supported	Significant
UNCER - Outsourcing	H5: Low uncertainty of a task is associated with a higher degree of outsourcing among cloud users.	Not supported	Not significant

3.4 Study 4: Organizing for virtual work – strategies for coping without physical space

In the last study we focused on the professional service providers – accounting firms. Specifically, we were interested in how web-based technologies, such as cloud-based accounting information systems and online communication tools, impact the way professional service providers organize their internal work. The question we addressed in this study was: *How do fully virtual organizations cope without common physical office space?* The question was based on the paradox which states that virtual work requires physical presence, observed by Dubé and Robey (2009).

To address this question, we closely analyzed two case companies operating in the field of accounting, with and without physical space. We conducted three rounds of interviews with management and employees of both companies, identifying reasons for having centralized physical space and strategies for coping without it. We identified five components causing the paradox, and a set of coping strategies that enable fully virtual operations. The five components were: (1) Work-related face-to-face interaction, (2) Corporate culture and work community, (3) Work and productivity, (4) Organization and leadership, and (5) Technology.

Table 6 provides a summary of our findings, including the five components, reasons to have a physical office space, and coping strategies.

Table 6. Summary of results

Categories	Reasons to have office	Coping strategies
Work-related face-to-face interaction	**Client meetings** – part of customer service; negotiating terms of cooperation; developing customer relationships.	1) Map alternatives of ad hoc meeting spaces, within areas of operation to suit customer needs. 2) Actively use email and social media to communicate with customers, on both formal and informal matters. 3) Structure work to minimize need to meet customers face-to-face.
	Internal meetings - serve as a venue for information exchange between colleagues, dissemination of messages from the management, and discussion of general organizational issues.	1) Recruit highly experienced professionals, who are independent and self-sufficient. 2) Create online knowledge database, and encourage employees to search first and ask colleagues later. 3) Establish clear escalation policy, where issues are solved involving as few other employees as possible. 4) Set up online communication tools, and create rules for using them (e.g. being always available to chat online when working).
Corporate culture and work community	**Maintaining corporate culture** – needed for initiation of new employees; ensuring organization's development direction is shared by all employees.	1) Establish clear and simple corporate values that are shaped and propagated top-down. 2) Emphasize corporate culture in recruitment process, to attract right type of employees; present potential recruits with take it or leave it condition. 3) Hold occasional face-to-face events for all personnel.
	Building community at work – improves employee morale, and creates an environment where employees feel like part of a community working towards common goal.	1) Open online communication tools, used for work, for informal communication. 2) Incorporate social activities into rare face-to-face events.
Work and productivity	**Productivity at office and at home** – maintaining high levels of productivity is challenging in multiple work locations; Home provides a lot of distractions from work.	1) Set clear work tasks, deadlines and expectations. 2) Recruit independent employees with experience with outcome-orientation.
Organization and leadership	**Team leading and independent work** – leadership is required at the workplace in order to effectively organize work and ensure employee development.	1) Set up flat hierarchy where all employees are equal, with no specialization or seniority; eliminate interdependencies. 2) Instead of active monitoring of employee performance, measure employee work based on client feedback.

	Coaching and training co-workers – required for improving employee skills; helps to integrate new recruits.	1) Use remote access and screen sharing applications to help employees solve information systems-related problems. 2) Appoint designated "expert" employee to address questions related to work.
Technology	**Computer equipment and Internet connection** – office offers superior working environment with advanced IT infrastructure.	1) Recruit employees who prioritize mobility and flexible, fragmented work schedule. 2) Provide resources for employees to set up a home office.

Based on the observations, we formulated three components to coping without a physical office space.

First, the approach towards ICT use in organizations is crucial for coping without a common physical space. In order to minimize the need for face-to-face interaction in the work process, an organization needs to take a substitutive approach to ICT use in accomplishing work-related tasks. In this approach, the organization substitutes face-to-face interaction with the functionality provided by information technology. For example, instead of meeting a client to get the client's signature on annual financial reports, the accountant could require the client to use a digital signature and send the digitally-signed reports electronically. As professional B2B services, especially accounting, become increasingly digital, substitutive use of ICT could enable service providers to switch to a nearly fully virtual mode of organizing.

Second, recruitment policies need to be aligned with the goal of converting to a virtual work environment. The virtuality literature argues that the younger generation (millennials) is more adept to virtual working environments (e.g Myers and Sadaghiani, 2010). The conclusion arises from the assumption that the younger generation possesses expertise in new media and groupware technologies, as well as a certain positive attitude towards remote work, which are essential requirements for virtual work (Hertel *et al.*, 2005; Wang and Haggerty, 2009). However, our study indicates that older, more experienced, self-sufficient, and professionally mature employees can perform well in a virtual work environment. While acceptance of technology-based communication channels, such as social networks and smartphone messaging apps, could be positively associated with one's ability to work in virtual work environments, their importance in this context appears to be overestimated.

Nevertheless, we do not claim that older generations supersede millennials in virtual work environments. On the contrary, we propose that the age of remote workers, their overall aptitude of ICT, as well as the intensity of social media use and instant messaging have little influence on the need for physical space, when compared to factors such as self-sufficiency, experience, and professional conduct. Our findings, therefore, elaborate claims related to the benefits of previous virtual work experience on productivity in virtual work environments (Staples *et al.*, 1999). Thus, it is very important for organizations to generate the right set of priorities when recruiting employees for the virtual work environment, in order for organization to cope without a common physical working space.

Third, structuring a workflow towards more standardized business processes enhances the organization's ability to organize work virtually. Commoditization of knowledge, proliferation of IT, and standardization of processes and data are considered to be key enablers for virtual organizations (Mowshowitz, 1997). Our research suggests that the

commoditization and standardization of business processes could advance organizations' capabilities to virtualize, leading to highly virtual organizations with no centralized geographic location. As a result of process standardization, organizations become more outcome-oriented, where delivering an output of the service is prioritized over customization of the service and its value-added components.

This argument raises questions about the suitability of a highly virtual organizing approach to less structured tasks, and the implications of rigid organization on company growth and service development. Standardized service allows for greater levels of virtuality in organizations, but the same approach may hinder an organization's ability to innovate and pivot easily. This could be a major problem for organizational processes related to R&D or growth. Therefore, we argue that the paradox of the need of physical presence in a successful virtual work environment could only be solved for organizations engaged in highly standardized work.

3.5 Summary of the results

Findings of the four essays included in this dissertation emphasize the complex nature of outsourcing arrangements. Parties involved in outsourcing arrangements (a client company and a professional service provider) have a distinct set of interests, motivations, and challenges.

The results of this research provide a holistic picture of cloud computing in outsourcing (Figure 8). The studies included in the dissertation encompass the interaction of a client company and a professional service provider with cloud-based information systems.

SMEs adopting cloud-based information systems are seeking cost savings, ease of IT implementation and management, and ability to concentrate on their core business by streamlining routine, non-core processes. The results also suggest that at least some cloud-using companies are able to use their newfound flexibility to rearrange the outsourcing of business processes to achieve more sophisticated solutions in the form of selective outsourcing.

Professional service providers engaged in highly information-intensive knowledge work can harness the power of online collaboration and digitalization of physical artifacts (such as paper documents and offline credentials). Cloud-based information systems that allow simultaneous access of all stakeholders (e.g. colleagues, clients, auditors), in combination with advanced online communication software, offer professional service providers novel options to organize their work virtually. The results delve into strategies of coping without a common physical work environment, and present the case for organizing services in a distributed fashion.

Finally, the research results provide insights into how work is distributed between a professional service provider and a client company. Our findings suggest that cloud users have greater flexibility in the disaggregation of work, which leads to more flexible outsourcing arrangements. Flexibility in outsourcing arrangements then offers companies an opportunity to align their business processes with their distinct sets of goals and motivations.

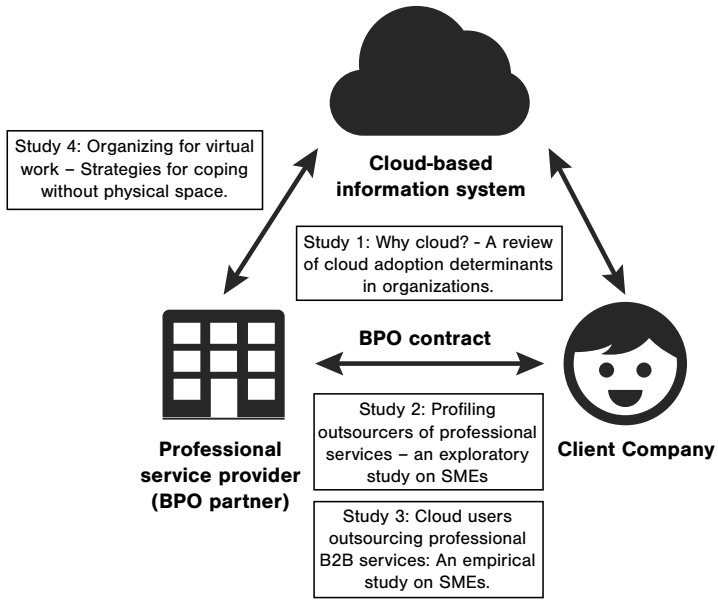


Figure 8. Positioning studies included in the dissertation along the cloud-enabled outsourcing arrangement

4 Discussion and conclusion

Cloud computing has withstood the hype of an emerging technology and has evolved into an established research area with a significant body of literature behind it (Upreti *et al.*, 2016). Over the course of conducting the research for this dissertation, the use of the cloud has also dramatically increased in organizations, particularly in SMEs (Anderson and Smith, 2015). Organizations have started to see the benefits of using cloud computing. As a result, the technology is being introduced into a variety of business processes. On the academic side, the research is becoming more mature, and the cloud phenomenon is more and more related to established theoretical concepts. My work makes a contribution to this development.

The overall contribution of this dissertation is a holistic analysis of the impact cloud computing has on BPO. The contribution of each of the studies can be summarized according to the typology of IS theories by Gregor (2006). Study 1 contributes a type II explanation framework on cloud computing adoption determinants in organizations. Study 2 provides a type I theory on reasons and motivations to outsource business processes to a cloud context. Study 3 builds on these findings to explain and predict (theory type IV) the outsourcing decisions of SMEs. Study 4 presents another explanation theory (type II) on approaches to virtually organizing professional service providers. Next, Sections 4.1 and 4.2 discuss the implications at length. Finally, Section 4.3 discusses limitations and opportunities for future research.

4.1 Theoretical contribution

At the outset of this dissertation, I established the context of the research by depicting the cloud-enabled BPO arrangement in the form of an outsourcing triangle consisting of the cloud-based IS, the client company, and the professional service provider/BPO partner. In Chapter 3, I presented the results of the individual studies addressing the different sides of the triangle. Here, I present theoretical implications from the perspective of this triangle as a whole, rather than from the perspective of each individual study.

The work on cloud-based IS in this dissertation highlights the narrow view of adoption aspects of cloud computing in organizations, supporting the findings from earlier studies (e.g. Schneider and Sunyaev, 2014). Immediate implications of the technology, such as cost savings, efficient implementation, security risks, and attitudes of management dominate the discussion. However, when observing cloud-enabled BPO arrangements, such a limited view of cloud use appears to be insufficient. The absence of long-term organizational and external factors becomes particularly prominent.

In the outsourcing triangle, cloud-based IS serves as a connective fabric in the relationship between the client company and the professional service provider, which shapes the workflow

and work distribution between the two parties. Interestingly, the cloud has a double-edged influence on the relationship. While cloud-based IS help to bring the client company and the professional service provider closer together within the same virtual collaborative space, it also reduces the switching costs for the client company that wants to change its professional service provider. At the same time, switching costs related to changing the information system increase for the two parties as more and more data and processes gather on the cloud infrastructure owned by the cloud provider.

These observations lead to two implications. First, organizations adopting cloud-based IS for the purpose of conducting BPO should reconsider their business processes and their workflow in order to fully benefit from the technology. In other words, the decision to adopt cloud technology, in the context of BPO, should be based on the implications of the technology on the business process in question before considering the generic characteristics of the technology. The second implication is related to the growing role of the IS provider in the context of cloud use. Cloud IS providers are becoming an integral part of not only software development, but also data and business process management. The cloud IS providers maintain full control over the information system at all times, while increasing switching costs for both client companies and the professional service providers. Therefore, the client company and the professional service provider need to consider the long-term implications related to the role of the cloud provider, when adopting a cloud-based information system. This includes the management of the outsourcing relationship and the workflow outside of the boundaries of cloud-based IS.

The part of this dissertation related to the client company investigated BPO decisions within and outside of the context of the cloud, and analyzed the motivations behind a variety of BPO arrangements. The analysis of the empirical data collected for this thesis suggests that selective outsourcing is emerging as an alternative to all-or-nothing outsourcing for SMEs. Selective outsourcing is particularly prevalent in cloud-enabled outsourcing arrangements. Moreover, the findings from this dissertation highlight that selective outsourcing is a heterogeneous concept, highly sensitive to contextual factors.

Two implications are particularly important here. First, selective outsourcing is not a homogenous decision, which can be directly compared to all-or-nothing outsourcing arrangements, as it has been done in previous work (e.g. Dahlberg *et al.*, 2006; Dibbern and Heinzl, 2006). Our findings suggest that the importance of different outsourcing motivations (Lacity *et al.*, 2010, 2011) varies greatly at different points on the selective outsourcing continuum. Therefore, any evaluation of the outsourcing arrangements and their outcomes should be conducted in the context of this reality. In addition, in cloud-enabled outsourcing arrangements, client companies also demonstrate a greater flexibility in outsourcing-related decision-making (Asatiani *et al.*, Unpublished), opening up the potential for dynamic changes in selective outsourcing arrangements at different stages of the relationship. Therefore, selective outsourcing clearly needs to be further conceptualized, incorporating a discourse on flexible outsourcing environments and shifting motivations of SMEs engaged in BPO.

Second, outsourcers' perceptions of transaction costs are changing. SMEs view BPO as an opportunity to outsource uncertain and highly asset-specific tasks. This behavior is contrary to the traditional knowledge regarding the effects of these transaction attributes on outsourcing decisions. The result is an environment where the professional service provider is becoming a trusted collaborator who is closely integrated into the business. As discussed above, the cloud-based IS facilitates this process by bringing together the two parties in a transparent and accessible collaborative space.

This leads to the third part of the dissertation concerning the influence of cloud use on professional service providers and their internal organization of work. As discussed already, professional service providers are experiencing profound changes with the introduction of cloud-based information systems on one hand, and changes in their clients' outsourcing behavior on the other. One particular aspect of these changes addressed in this dissertation is virtual organization.

The combination of the findings concerning the changes in IS and client behavior (Studies 1-3), and virtual work discontinuities literature (Chudoba *et al.*, 2005; Dubé and Robey, 2009; Watson-Manheim *et al.*, 2002) reveals three pillars of organizational change for professional service providers: use of IT, acquiring of human assets, and streamlining of a process (Asatiani and Penttinen, Unpublished). The contribution of the framework is not prescriptive, but rather, explanatory, providing insights into organizing options and their implication on professional service providers.

4.2 Practical implications

Research for this dissertation was conducted with practice in mind right from the start. The essays included in this dissertation focus on decision-making within organizations concerning aspects such as technology adoption, BPO, and the internal organization of work. The following are some highlights of the implications for practitioners to consider.

Decision-makers on cloud computing adoption should focus on the long-term strategic implications of the technology.

A literature review on cloud adoption (Asatiani, 2015) revealed a disproportionate focus on cost and technological aspects of the cloud at the expense of organizational, cloud provider, and external environment factors. As cloud computing becomes more widespread within organizations, managers need to pay more attention to long-term strategic implications of the technology. Particularly, the issues related to the readiness of an organization to adopt the new technology (both from a technological and a process structure perspective) should be emphasized more. As findings from this dissertation suggest, business processes could greatly benefit from the transition to the cloud. However, a mere introduction of the technology would be insufficient without careful planning and insightful decision-making regarding business process reorganization.

Another area to pay attention to would be legal issues and the service provider's location and data handling capabilities. Current academic literature suggests that companies are increasingly concerned with security and privacy issues (Benlian and Hess, 2011; Gupta et al., 2013; Trigueros-Preciado et al., 2013). Publicized scandals related to information leaks and government spying (Electronic Frontier Foundation, 2016) emphasize the importance of this concern. In light of this evidence, managers ought to focus on legal contracts made with cloud providers, especially regarding the movement of sensitive company data, and the ability of the client company to exit the contract without prohibitive switching costs.

Cloud computing could enable better decision-making in BPO by allowing for a larger variety of selective outsourcing options.

Empirical studies on SMEs included in this thesis (Asatiani and Penttinen, 2016; Asatiani *et al.*, Unpublished) indicate that transaction attributes present a smaller obstacle for cloud users in BPO decisions. Cloud users outsource a wider variety of tasks compared to the users of traditional systems. Therefore, practitioners using cloud-based information systems in

BPO relationships may have greater flexibility in choosing which tasks to outsource. This flexibility allows for selective outsourcing opportunities, enabling managers to customize outsourcing arrangements to fit the precise needs of their organizations. Nevertheless, caution needs to be exercised in BPO-related decision-making, as a greater number of outsourcing options increase the complexity of the decision. Managers would need to carefully consider whether the benefits of further disaggregation of a particular business function outweigh the risks related to the complexity of the arrangement.

Cloud computing and automation will change professional service providers' business models, forcing them to switch to customized advisory work at the expense of the services addressing routine tasks.

Overall, the observations from this dissertation suggest that the nature of professional B2B services is radically changing. In the example of accounting, we observe changes in how client companies adopt their AIS and make outsourcing-related decisions, how professional service providers reorganize their work, and how relationships between these two parties are moving to a new level.

Client companies are now more engaged in the process of outsourcing accounting with more context-aware outsourcing decisions and real-time access to the accountant's work in cloud-based AIS. A greater engagement in the process is bound to push the client companies to scrutinize the process more, and demand professional services that not only take care of the basic regulatory requirements of accounting, but also provide value-added features that benefit their businesses in the long term. While cloud-based AIS may lock their users into their software ecosystem, these systems also allow switching between accounting service providers, without the need to migrate their data or disrupt the work of the AIS.

Increasing demands from customers will pressure professional service providers to develop their offerings. The interviews conducted for Study 4 (Asatiani and Penttinen, Unpublished) already suggest that even smaller accounting service providers are shifting towards consulting and advisory services, aiming to evolve from bookkeepers to trusted advisors and chief financial officers (CFO) on demand. However, such a change could prove to be complicated for the service providers. First, the change requires fundamental changes in professional skills, including deeper knowledge of financial administration, legislation, and customer service. Second, the service providers would need to pivot on their business models, and change pricing strategy to harmonize with the shift from offering routine bookkeeping services to providing personalized expert knowledge.

On the other hand, cloud-based AIS offer professional service providers opportunities to organize virtually. Virtual organization has a number of advantages, including the ability to attract the best employees, regardless of their location, flexible and lean work environment for the employees, and costs savings on physical office space. However, professional service providers willing to transform to virtual organizations need to consider their use of ICT, recruitment policies, and workflow planning. In addition, managers would need to evaluate whether the virtual work environment suits their particular service (e.g. R&D and innovation tasks). Study 4 offers a set of actionable coping strategies for virtual organizations.

4.3 Limitations and further research

There are certain limitations to be considered in this dissertation. In the literature review on cloud computing adoption (Study 1), the selection process of the articles to be included in the review could be a subject of debate. I made a number of conscious decisions to limit the

literature search to the fields of business and computer science. I also limited the review to articles explicitly discussing cloud computing and cloud service models (X-as-a-Service), excluding studies in related areas such as Application Service Providers (ASPs). When identifying adoption determinants I excluded exploratory studies and articles that did not establish clear relationships between factors and adoption, which also narrowed the sample for the review. These choices were made in order to improve the comparability of the findings, but I realize that I may have missed some articles that could have been relevant.

While this dissertation sought to expand the knowledge on the differences between various selective outsourcing arrangements (Study 2), there is a clear need to study this issue further, and gain stronger empirical evidence to draw more sophisticated theoretical conclusions. First, while we have a sizable dataset on SME outsourcing, this study is explorative and, therefore, our propositions presented in this paper need further validation through additional research. Even though this study provides a foundation for new research, our propositions may not be ready to be directly applied in theory or practice without further examination. Second, our data was collected in Finland, where outsourcing and use of cloud computing is more mature than in other markets. Therefore, our findings may be limited in generalizability.

The third study aimed to build a theoretical foundation to understand the influence of cloud on BPO in SMEs. The study contributed to enhancing the understanding of the human asset specificity construct in the context of BPO decision. However, a number of issues concerning TCE constructs in the cloud content need to be clarified further. First, the role of human asset specificity was different from the traditional view of TCE. We proposed to study asset specificity further in different contexts because we believe that this construct is the most context-sensitive of all transaction attributes examined in the paper. Our findings regarding uncertainty were contradictory. Outsourcing highly uncertain tasks is counter-intuitive; thus, further research is needed to clarify this finding. The limiting factor here can also be a problem with the conceptualization of uncertainty, which can be interpreted in many ways. Second, the results show a capability of the cloud to reorganize the work between the client company and the outsourcing provider in novel ways. Efficient disaggregation of the process into smaller tasks is one example of such reorganization. Partial support of our hypothesis showed that the cloud could reduce the importance of some factors affecting a decision to outsource. I suggest that more qualitative work should be done in this field to explore the role of cloud in managers' decision-making processes and the interaction of the system with the characteristics of the decision. Fourth, we only observed the outsourcing arrangements of cloud users at one particular point in time. Further research should therefore address two issues. First, conduct a longitudinal study on cloud users to observe the evolution of outsourcing arrangements. This will help to see whether the effects of cloud on transaction attributes are long-term, and whether these are tied to the properties of the system, as opposed to other factors (e.g. switching service providers, or deployment of a new information system). Second, match the outsourcing arrangements to the performance of the company in order to evaluate the implications of a cloud-enabled BPO on a business. While our study observed the outsourcing arrangements among cloud users, we were not able to judge the effect of these arrangements on the company performance.

The fourth study addressed the implications of cloud computing on the internal organization of work. Whereas we formulated a set of strategies for virtual organizing rooted in theory and empirical evidence, our scope was limited to services composed of highly standardized tasks. Future research could investigate whether a highly virtual organizing model is suitable for organizations involved in tasks that are not as structured. Our study is

limited to two case companies providing accounting services. This allowed us to precisely compare two cases, as accounting services are typically composed of highly structured processes. However, some of the coping strategies may not be suitable for less structured processes such as R&D, product development, or process innovation.

Future research could also perform longitudinal analysis on the challenges and coping strategies of virtual organizations during the different development stages of the company. While we engaged with our case companies for a prolonged period of time over the course of this study, the long-term impacts of virtuality were not addressed, and would require revisiting.

The results of Study 4 suggest that the success of virtual organizations stems from a combination of corporate strategy and technology use. The same ICT tools could be used to complement and also substitute face-to-face interaction. Future research could investigate the interaction between corporate strategy and information technology in the context of virtuality.

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Appendix

Table A1: Accounting processes in SMEs

Code	Process name
P1	Client register maintenance
P2	Product register maintenance
P3	Sending sales invoices
P4	Handling of sales invoices
P5	Sending note of complaint
P6	Sales ledger maintenance
P7	Supplier register maintenance
P8	Receiving purchase invoices
P9	Handling purchase invoices
P10	Handling purchase, travel and other costs
P11	Purchases ledger maintenance
P12	Personnel register maintenance
P13	Basic payroll data maintenance
P14	Payroll calculations
P15	Preparation of balance sheet and income statement
P16	Preparation and sending of VAT
P17	Preparation and sending of annual salary reports
P18	Preparation and sending of annual pension insurance reports
P19	Periodic VAT payments
P20	Salary payments
P21	Payments for purchases, travel and other expenses
P22	Monthly payroll tax payments

Part II: Original essays

Essay 1

Asatiani, A. (2015). Why Cloud? - A Review of Cloud Adoption Determinants in Organizations. In *Proceedings of the 23rd European Conference on Information Systems (ECIS)*, Münster, Germany, (pp. 1-17). Association for Information Systems (AIS). ISBN 978-3-00-050284-2

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Why Cloud? - A Review of Cloud Adoption Determinants in Organizations

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WHY CLOUD? - A REVIEW OF CLOUD ADOPTION DETERMINANTS IN ORGANIZATIONS

Complete Research

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Abstract

Adoption of cloud computing in organizations is increasing at a rapid pace. It is expected that the majority of the organizations in industrialized nations will be using cloud services to some extent in the near future. In this review I categorize adoption factors utilized in the literature and identify determinants playing a key role in organizations' decision to adopt cloud. I analyze both quantitative and qualitative evidence and code relationships between factors and adoption of cloud by systematically reviewing the literature. Findings show underrepresentation of the factors related to organization and external environment in cloud adoption literature. This study contributes a set of determinants of cloud adoption, which serves as a foundation for the future research and advancement of the theories in information systems field.

Keywords: Cloud computing, literature review, adoption, SaaS, TOE, diffusion of innovations

1 Introduction

Cloud computing has been gaining popularity in recent years among both IT professionals and researchers. The number of academic publications on cloud computing has been steadily increasing since the term was first coined (Figure 1). The majority of these publications are still in technical fields (e.g. computer science, engineering), however research on business aspect of cloud is on a rise. At the same time, a recent study released by IDG Enterprise indicates that for 2015 cloud projects are top priority for companies (IDG Enterprise, 2014).

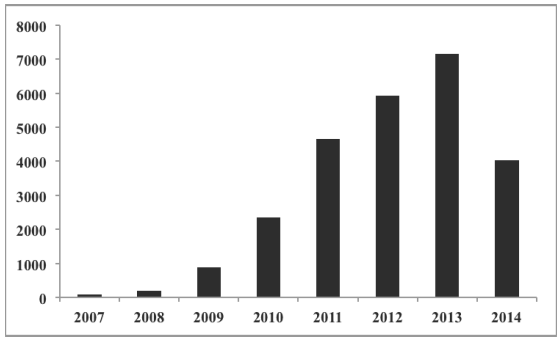

Figure 1. Number of search results on "cloud computing" from Scopus (November 2014)

Popularity of cloud computing suggests that systematization of knowledge is required in order to observe development in the field and guide the future research to address gaps in knowledge. While there are an increasing number of articles on cloud, previous reviews observe a lack of empirical and theoretical depth (Schneider and Sunyaev, 2014; Yang and Tate, 2012). Therefore, the motivation for this review is to recognize theoretically grounded empirical work and provide deeper insights on cloud adoption in organizations. The article identifies determinants of cloud adoption in organizations. I tackle two specific research questions: *RQ1: What are the categories of cloud adoption factors? RQ2: What are the determinants of cloud adoption in organizations?*

I accomplish the objective by observing empirical evidence concerning underlying cloud adoption concepts and the use of theory in related information systems (IS) literature. I reviewed literature in two steps. First, I surveyed 31 peer-reviewed studies for cloud adoption factors and coded them into larger categories. Then I focused on 18 articles, which clearly examined relationships between the factors and adoption in order to highlight empirically supported determinants. I utilized the method by Jeyaraj et al. (2006) to systematically analyze and code relationships, resulting in a list of cloud adoption determinants. This method allowed aggregating results from both quantitative and qualitative studies into one framework.

The findings of the review provide interesting insights into empirical evidence behind determinants of cloud adoption in organizations. The review also provides a base for future research by identifying underrepresented areas of research. This review provides a unique point of view in two ways: (1) the review focuses on cloud adoption in organizational context, separating the technology from the issue of outsourcing (e.g. Schneider and Sunyaev, 2014); (2) the review concentrates on empirical work, specifically analysing evidence behind the claims in the literature, leaving out the conceptual work (e.g. Salleh and Teoh, 2012).

2 Background

2.1 Definition of cloud

For the purposes of this study I employ a definition of cloud by United States National Institute of Standards and Technology (NIST), which states: "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., 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). This definition offers a generic and concise explanation that encompasses essential features of cloud, making it suitable for common cloud-related studies. Mell & Grance (2011) identify key characteristics of cloud, four deployment models and three service models, Software-, Platform-, and Infrastructure-as-a-Service (SaaS, PaaS and IaaS).

2.2 Previous reviews

Cloud literature is growing fast, as adoption of the technology and media attention increase. A number of researchers have addressed the emerging need to systematize outcomes of the studies and provided reviews on accumulated knowledge. The past reviews created an overview of the business perspective of cloud and identified the need for research on specific issues organizations face while adopting cloud.

I would like to highlight some of the reviews in order to establish a context for this study. There are general reviews classifying overall themes of cloud related research (e.g. Hoberg et al., 2012; Venters and Whitley, 2012; Yang and Tate, 2012) and studies providing overview of cloud in specific contexts (e.g. Ermakova, Huenges, Erek, & Zarnekow, 2013; Tsaravas & Themistocleous, 2011). These studies provide a much-needed big picture of cloud research identifying popular themes. A general shift from technical to business perspective is observed in the literature (Hoberg et al., 2012), where adoption is one of the most popular topics (Hoberg et al., 2012; Yang and Tate, 2012). Nevertheless, the aforementioned reviews recognize a need for thorough research into concrete issues, such as adoption, security and deployment of cloud services (Ermakova et al., 2013; Hoberg et al., 2012; Yang and Tate, 2012).

A number of reviews on specific domains contribute to filling the gap, including studies concentrating on cloud adoption (El-Gazzar, 2014; Salleh et al., 2012). These studies identified benefits of the cloud (Salleh et al., 2012) as well as various legal, ethical, technical, and managerial challenges companies face during cloud adoption (El-Gazzar, 2014). Shortcoming of these studies is the lack of systematic analysis of relationships between factors and adoption. I believe this limits understanding of precise effects of the factors on cloud adoption in organizations. The reviews present a categorization of utilized factors, but do not provide analysis of empirical evidence behind relative importance of each factor.

A recently published review on cloud-sourcing decisions and their relationship to IT outsourcing (Schneider and Sunyaev, 2014) tackles aforementioned problem, by utilizing a method by Jeyaraj et al. (2006), used in this study. The authors analyse each individual relationship between independent variables and outsourcing decision. This approach allows improving depth of analysis by not only identifying and categorizing different factors, but also evaluating predictive strength of each variable, based on its previous use.

The goal of this review is to bring similar depth to the issue of cloud adoption in organization, and thus expand the perspective gained from the previous studies. The difference between this review

compared to the work of Schneider and Sunyaev is the perspective. Schneider and Sunyaev approach cloud as a sourcing decision, where organization delegates some of its tasks to the third party, thus rooting in outsourcing literature. This study, on the other hand, analyses adoption of cloud *services,* mainly by approaching the problem through the prism of diffusion of innovation and adoption of new technologies within the organization.

3 Method

I followed vom Brocke et al. (2009) and Webster and Watson (2002) as a guide to structure the literature review, document the process of literature search, and present results of an analysis. I start by defining the scope of this review. This is followed by a description of the process of literature search. The end of this section describes the analysis of literature.

3.1 Defining a scope

Cloud computing is a cross-disciplinary topic involving both technological and organizational/business issues. There are different angles to cloud adoption, such as individual users, organizations, specific industries and services. Therefore, in order to limit a scope of this review I decided to focus on an adoption of cloud computing in organizations. I also formed 5 criteria for the articles to be reviewed in order to guide the literature search: 1) Full, peer-reviewed, articles published in journals and international venues. 2) Articles that include original empirical studies. 3) Articles that study adoption of cloud computing in organizations. 4) Articles that clearly describe methods used to conduct the study. Both quantitative and qualitative studies are included. 5) Articles that clearly identify adoption factors of cloud computing or associated service delivery models (SaaS, PaaS, IaaS).

Cloud computing is a relatively new concept in IS literature and there are not many publications in academic journals related to the topic. Therefore, I decided to include publications from selected conferences, as these venues cover wider selection of current themes, such as cloud computing.

The focus of the review are organizations, thus articles studying adoption on a level of individual consumers are excluded. The review mostly covers articles studying companies, however, studies on other organizations such as universities are also included. I consciously excluded conceptual articles without clearly reported empirical studies, in order to concentrate on the evidence related to an adoption of cloud.

3.2 Literature search

I performed a literature search in following databases: AISel, EBSCOHost, Google Scholar, Proquest, ScienceDirect, Scopus and Web of Science. Keywords used for the literature search were: “Cloud adoption“, “Cloud computing adoption“, “SaaS adoption“, “IaaS adoption“, “PaaS adoption“ and “XaaS adoption“.

After initial general search, I applied number of filters in order to improve the relevance of results. In case of search terms containing “cloud“, I included only literature published in a period from 2007 to summer 2014, as the term “cloud“ in the context of IT appeared in 2007 (Wang et al., 2010). In case of other terms I set limitation to years 2001-2014, for the same reason. I limited the search to social sciences (business, economics, organizational studies etc.) and computer science.

I based further selection of articles, on the manual examination of titles and abstracts from the search results. I applied the principles presented in the Section 3.1 to select articles for the review. I also

focused on adoption articles that included organizational component, and excluded purely engineering papers that covered only technical aspects of cloud implementation. This process yielded 76 publications, which I examined in a greater detail.

After reading 76 articles from initial search and applying the principles defined in the Section 3.1, I selected 31 articles suitable for this review. Remaining articles violated one or more of the stated principles. I examined the databases in the following order (number in parentheses indicates unique articles found in a database): Scopus (10), AISel (8), EBSCOHost (1), Proquest (3), ScienceDirect (4), Google Scholar (4), Web of Science (0). I discovered one article using backward search. Share of journals articles and conferences proceedings were roughly equal. Topically most of the venues were related to IS.

3.3 Analysis

I analysed the literature in two steps, using two methods to complement each other. I used concept matrices in the first step to generate an overview of adoption factors used in literature and create categories. I then used the identified factors and categories as an input for the second step. At this stage I utilized a method developed by Jeyaraj et al. (2006) to synthesize qualitative and quantitative evidence on relationships between the factors and cloud adoption and to identify adoption determinants .

During the first step I analysed 31 articles identified as relevant after the initial search. The goal was to form an overview of adoption factors, used in literature, and categorize them. To accomplish that I set to identify factors used to predict cloud adoption and categorize them. In order to perform an analysis, I utilized concept matrices suggested in the earlier literature (Vom Brocke et al., 2009; Webster and Watson, 2002). In this process I identified over 300 factors and recorded them. I used concept matrices and grouped similar factors together and associated them with corresponding authors and theoretical frameworks. I used inductive approach in the grouping of the factors, forming concepts grounded in the findings of the literature. After initial grouping of factors according to the similarity of the concepts I generated a list of 65 items. I used definitions of factors provided in the literature as a guide for grouping at this stage. After this, I assigned thematic codes to each factor, which resulted in five thematic categories of *drivers*, *inhibitors, organizational context, cloud providers,* and *external environment*. In order to improve this categorization, I discussed the list of factors separately with 3 researchers including a senior IS scholar, one IS and one computer science PhD candidates, working on technology adoption and digital services. I used the outcome of these discussions to review the original categorization. As a result I reduced the list to 43 items, presented in Table 1, as more conceptual connections were suggested between factors.

During the second step, I analysed relationships between cloud adoption and independent variables. The goal of this part of the analysis was to go beyond a simple categorization and create an in-depth understanding of the relationship between factors and adoption. I guided this step by the methodology for literature analysis, introduced by Jeyaraj et al. (2006) and subsequently used in literature reviews of IT, business process outsourcing and cloud sourcing decisions (Lacity et al., 2010, 2011; Schneider and Sunyaev, 2014). The biggest advantage of this method is that it allows analysing empirical results of both quantitative and qualitative studies within the same framework.

For this stage I set two requirements for studies to be included in the analysis: 1) Studies should have clear hypotheses or propositions, with clear direction, regarding relationships between factors and adoption of the cloud. 2) Studies should clearly communicate results of the empirical analysis, whether propositions and hypothesis were supported. After filtering studies based on the two requirements, I included 18 studies out of initial 31. This sample of studies included 41 of 43 variables

identified in the first stage. I examined each relationship between dependent variable (adoption of cloud) and independent variables (adoption factors), 171 in total. Following Jeyaraj et al. (2006), I coded each relationship as: +1 indicating significant positive relationship ($P<0.05$), -1 indicating significant negative relationship ($P<0.05$), or 0 in case of non-significant relationship. For qualitative studies I relied on authors' strength and unambiguity of argumentation to code the relationships. This procedure allowed us to not only answers the question of most frequently used variables to study the problem, but also to determine whether relationships between variables have been empirically validated.

4 Results

In the first step of the analysis I identified factors of cloud adoption in organizations utilized in the reviewed articles. The factors range from generic technology adoption related items, such as *change management* and *relative advantage*, to more cloud specific features, such as cloud-based *innovation opportunities* and cloud-specific *service-level agreements (SLA)*. I present altogether 43 factors resulting from the analysis grouped into five categories. The summary of findings is presented in Table 1.

Factors	Articles
Drivers of cloud adoption	
Cost advantage	Alshamaila et al. (2013); Benlian and Hess (2011); Borgman et al. (2013); Feuerlicht and Margaris (2012); Gupta et al. (2013); Hsu et al. (2014); Johansson and Ruivo (2013); Khajeh-Hosseini (2012); Koehler et al. (2010); Lee et al. (2013); Lewandowski et al. (2013); Lian et al. (2014); Lin and Chen (2012); Low et al. (2011); McGeough and Donnellan (2013); Morgan and Conboy (2013); Nkhoma and Dang (2013); Oliveira et al. (2014); Repschlaeger et al. (2012, 2013); Saedi and Iahad (2013); Sarkar and Young (2011); Suh and Chang (2013); Wu et al. (2012)
Relative advantage	Alshamaila et al. (2013); Benlian and Hess (2011); Borgman et al. (2013); Gupta et al. (2013); Johansson and Ruivo (2013); Khajeh-Hosseini (2012); Lewandowski et al. (2013); Lian et al. (2014); Lin and Chen (2012); Low et al. (2011); McGeough and Donnellan (2013); Morgan and Conboy (2013); Repschlaeger et al. (2012, 2013); Saedi and Iahad (2013); Sarkar and Young (2011); Seethamraju (2013); Wu et al. (2012)
Accessibility	Benlian and Hess (2011); Hsu et al. (2014); Johansson and Ruivo (2013); Lee et al. (2013); Lian et al. (2014); Repschlaeger et al. (2013); Saedi and Iahad (2013); Suh and Chang (2013)
Strategic flexibility & adaptability	Benlian and Hess (2011); Feuerlicht and Margaris (2012); Johansson and Ruivo (2013); Nkhoma and Dang (2013); Repschlaeger et al. (2012); Suh and Chang (2013)
Implementation times	Feuerlicht and Margaris (2012); Hsu et al. (2014); Johansson and Ruivo (2013); Lee et al. (2013); Repschlaeger et al. (2013); Seethamraju (2013)
Online collaboration	Gupta et al. (2013); Morgan and Conboy (2013); Sarkar and Young (2011)
Scalability	Feuerlicht and Margaris (2012); Lee et al. (2013); Nkhoma and Dang (2013); Repschlaeger et al. (2013)
Focus on core competences	Benlian and Hess (2011); Seethamraju (2013); Suh and Chang (2013)
Trialability	Alshamaila et al. (2013); Lin and Chen (2012); Morgan and Conboy (2013)
Opportunities for innovation	Alshamaila et al. (2013); Lian et al. (2014); Seethamraju (2013)
Information processing capabilities	Cegielski et al. (2012); Hsu et al. (2014); Johansson and Ruivo (2013)
Inhibitors of cloud adoption	
Security & privacy	Benlian and Hess (2011); Feuerlicht and Margaris (2012); Gupta et al. (2013); Heart (2010); Hsu et al. (2014); Johansson and Ruivo (2013); Lee et al. (2013); Lewandowski et al. (2013); Lian et al. (2014); McGeough and Donnellan (2013); Morgan and Conboy (2013); Oliveira et al. (2014); Repschlaeger et al. (2012, 2013); Saedi and Iahad (2013); Sarkar and Young (2011); Suh and Chang (2013); Trigueros-Preciado et al. (2013)
Cost unpredictability	Benlian and Hess (2011); Feuerlicht and Margaris (2012); Khajeh-Hosseini (2012); Koehler et al. (2010); Lewandowski et al. (2013); Lian et al. (2014); Repschlaeger et al. (2012, 2013); Saedi and Iahad (2013); Sarkar and Young (2011); Seethamraju (2013);

	Suh and Chang (2013); Trigueros-Preciado et al. (2013)
Complexity	Borgman et al. (2013); Lian et al. (2014); Lin and Chen (2012); Low et al. (2011); Morgan and Conboy (2013); Nkhoma and Dang (2013); Oliveira et al. (2014)
Lack of standards in Service-Level Agreements (SLA)	Hsu et al. (2014;) Lee et al. (2013); Nkhoma and Dang (2013); Repschlaeger et al. (2012, 2013); Saedi and Iahad (2013)
Technological limitation compared to existing systems	Dutta et al. (2013); Feuerlicht and Margaris (2012); Lee et al. (2013); Lewandowski et al. (2013); Lin and Chen (2012)
Performance risk	Benlian and Hess (2011); Dutta et al. (2013); Hsu et al. (2014); Lewandowski et al. (2013); Suh and Chang (2013)
Lack of control over resources	Feuerlicht and Margaris (2012); Lee et al. (2013); Lewandowski et al. (2013); Trigueros-Preciado et al. (2013)
Required expertise	Borgman et al. (2013); Koehler et al. (2010); Lee et al. (2013); Suh and Chang (2013)
IT governance issues/change management	Borgman et al. (2013); Feuerlicht and Margaris (2012); Koehler et al. (2010); Seethamraju (2013)
Managerial risk	Benlian and Hess (2011); Dutta et al. (2013); Suh and Chang (2013)
Loss of internal competences	Benlian and Hess (2011); Sarkar and Young (2011); Suh and Chang (2013)
Vendor lock-in	Sarkar and Young (2011); Seethamraju (2013); Trigueros-Preciado et al. (2013)
Low level of standardization	Lee et al. (2013); Nkhoma and Dang (2013)
Data accessibility	Feuerlicht and Margaris (2012); Lee et al. (2013)
Organizational context	
Compatibility & technological readiness	Alshamaila et al. (2013); Borgman et al. (2013); Hsu et al. (2014); Johansson and Ruivo (2013); Khajeh-Hosseini (2012); Lewandowski et al. (2013); Lian et al. (2014); Lin and Chen (2012); Low et al. (2011); McGeough and Donnellan (2013); Morgan and Conboy (2013); Nkhoma and Dang (2013); Oliveira et al. (2014); Seethamraju (2013); Wu et al. (2012)
Management support	Alshamaila et al. (2013); Borgman et al. (2013); Lewandowski et al. (2013); Lian et al. (2014); Low et al. (2011); Morgan and Conboy (2013); Saedi and Iahad (2013); Wu (2011a, 2011b)
Organization size	Alshamaila et al. (2013); Borgman et al. (2013); Low et al. (2011); McGeough and Donnellan (2013); Oliveira et al. (2014); Saedi and Iahad (2013)
Transaction costs *(e.g. uncertainty, asset specificity)*	Alshamaila et al. (20130; Cegielski et al. (2012); Feuerlicht and Margaris (2012); Lin and Chen (2012); Repschlaeger et al. (2013)
Previous experience with cloud	Alshamaila et al. (2013); Lee et al. (2013); Suh and Chang (2013)
Attitudes towards technology	Benlian et al. (2009); Hsu et al. (2014); Lee et al. (2013); Lin and Chen (2012)
Perceived technical expertise	Lian et al. (2014)
Cloud providers	
Provider trustworthiness & reputation	Feuerlicht and Margaris (2012); Gupta et al. (2013); Heart (2010); Koehler et al. (2010); Lee et al. (2013); Lewandowski et al. (2013); Nkhoma and Dang (2013); Repschlaeger et al. (2012, 2013); Seethamraju (2013)
Provider competences	Heart (2010); McGeough and Donnellan (2013); Saedi and Iahad (2013); Trigueros-Preciado et al. (2013)
Customer support	Alshamaila et al. (2013); Feuerlicht and Margaris (2012); Koehler et al. (2010); Lewandowski et al. (2013)
Economies of scale	Lee et al. (2013); McGeough and Donnellan (2013)
Location of data	Feuerlicht and Margaris (2012); Lee et al. (2013)
External Environment	
Legal issues	Borgman et al. (2013); Dutta et al. (2013); Feuerlicht and Margaris (2012); Hsu et al. (2014); Lee et al. (2013); Lewandowski et al. (2013); McGeough and Donnellan (2013); Morgan and Conboy (2013); Nkhoma and Dang (2013); Seethamraju (2013); Trigueros-Preciado et al. (2013)
Competitive pressure	Alshamaila et al. (2013); Borgman et al. (2013); Hsu et al. (2014); Lian et al. (2014); Low et al. (2011); Oliveira et al. (2014); Saedi and Iahad (2013)
Social influence & peer pressure	Benlian et al. (2009); Saedi and Iahad (2013)
Shared best practices	Johansson and Ruivo (2013); Nkhoma and Dang (2013)
Partner pressure	Hsu et al. (2014); Khajeh-Hosseini (2012); Low et al. (2011)
Regulatory support	Hsu et al. (2014); Lian et al. (2014); Oliveira et al. (2014)

Table 1. Categorization of cloud adoption factors

In the second step, in order to improve understanding of the research done on adoption of cloud, I have analysed evidence behind claims in the literature. By applying literature analysis method utilized by Jeyaraj et al. (2006) I analysed 18 studies, which clearly identified and tested, or persuasively argued in case of qualitative studies, relationships between independent variables and adoption of cloud. I used the five categories created on the first step of the analysis to draw a framework for summarizing findings (Figure 2). These findings present determinants of cloud adoption, which proved as relatively reliable predictors, backed up by empirical evidence.

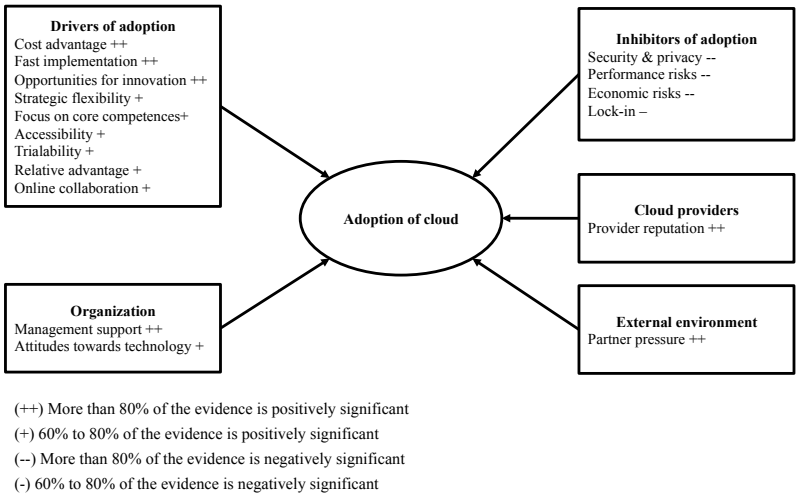

Figure 2. Cloud adoption determinants based on cloud adoption literature.

After coding relationships according to a direction and significance, I followed Jeyaraj et al. (2006), and Lacity et al. (2010, 2011) and marked significant relationships across multiple articles accordingly. Relationships marked with ++, were positively significant in more than 80% of studies, which analysed them. Positively significant relationships with support between 60% and 80% were marked as +. Similarly, negative significant relationships were marked -- and -, for more than 80% and 60% to 80% correspondingly. As the sample of the analysed articles was relatively smaller, compared to the study by Jeyaraj et al. (2006), the findings also include relationships that were studied in less than five instances. However, I excluded the factors that were studied only in one instance.

This analysis of empirical evidence allowed us to look deeper into the adoption factors of cloud. While on the initial sample of 31 papers covered a large variety of factors, which produced a table of 43 items, analysis of empirical evidence showed that only 17 factors had any substantial evidence supporting them (Figure 2). Technology-Organization-Environment (TOE) and diffusion of innovation (DOI) were most-utilized frameworks in the reviewed studies. Therefore, independent variables used in these frameworks are notably present. Next I present the results of the analysis from the both steps described above.

4.1 Drivers

In this category I have grouped all factors associated directly with those benefits of cloud that drive adoption. The most common drivers of adoption, in terms of number of appearances in the literature, are *cost advantage* and *relative advantage*. This result is realistic given that potential cost savings and

performance improvements are the most visible features of the technology. In the reviewed articles, *cost advantage* is sometimes included into *relative advantage* (e.g. Low et al. 2011), however I have divided two concepts, as former is also widely cited as a separate entity. Therefore, in this paper I use relative advantage to refer to technological or operational advantages that cloud brings, such as improved usability, quality of a service, or new applications.

Features frequently associated with cloud, such as *accessibility, scalability, implementation times,* and *online collaboration* were also utilized across studies. However, consistency of their use was lower compared to top drivers of adoption. Some of the articles chose to use one feature, while ignoring others.

Drivers of adoption are the most tested determinants in the research. *Cost advantage* was widely utilized (6 times) and proved to be a good predictor of adoption in all studies except one. Contrary to the overall perception, Gupta et al. (2013) find that cost factor was not on the top of the list of adoption determinants. However, the cost was very strongly associated with willingness of companies to move to cloud. *Fast implementation time* and *opportunities for innovation* were also found to be good predictors, however their use was relatively low (2 and 3 times respectively). Some cloud-centric factors, such as *online collaboration, strategic flexibility* and *accessibility* also show predictive power in most of the studies in which they were utilized.

4.2 Inhibitors

In this category I included all inhibitors and risks associated with cloud that discourage adoption. In combination with cost advantage as most utilized driver of cloud adoption, presence of cost unpredictability in the top of inhibitors is interesting. A discussion on cost benefits could lose credibility somewhat, where estimation of the cost of cloud is problematic. This may indicate disagreement on whether cloud is proven itself as a reliable cost reducer.

Rest of the category is composed of various risks associated with *performance, management,* and *SLAs*. Surprisingly, the issue of *vendor lock-in*, discussed in practice-oriented literature (Armbrust et al., 2010; Brynjolfsson et al., 2010), was addressed in only three relatively recent studies (Sarkar and Young, 2011; Seethamraju, 2013; Trigueros-Preciado et al., 2013).

Inhibitors of adoption include a number of factors hampering adoption of cloud in organizations. There were 4 variables with strong empirical support in the literature in this group. *Security and privacy* issues are the most studied risk factor of cloud (11 times), demonstrating a negative relationship to adoption in 82% of studies. Studies found that cloud security was one of the top barriers for companies to adopt the technology (Benlian and Hess, 2011; Gupta et al., 2013; Trigueros-Preciado et al., 2013). Nevertheless, Gupta et al. (2013) highlight that overall companies were enthusiastic about cloud, and deemed services secure enough for use, in spite of ranking cloud *security and privacy* as one of their biggest concerns. Other factors, while showing high ratio of significance across the literature, were present only in few studies.

4.3 Organizational context

In the organizational context category I included factors describing organizational characteristics that affect the decision to adopt cloud. In this category, the most utilized factors are *compatibility & technological readiness of organization* and *management support* of cloud initiative. As technological limitations in terms of customization and integration present a risk in cloud computing, compatibility of existing IT with a cloud is highly important. *Previous experience with technology* and *perceived*

technological expertize in an organization are less explored. This can be attributed to an overall perception of cloud as being easier compared to developing and maintaining own infrastructure.

From organizational factors only *management support* and *attitudes towards the technology* have significant support in reviewed studies. *Management support* was empirically supported in all 4 occasions in was tested. There was a general agreement throughout the articles that analysed role of *management support*, that the factor significantly contributes to a decision, whether to adopt cloud (Borgman et al., 2013; Low et al., 2011; Oliveira et al., 2014). On the other hand *compatibility*, the other key attribute of DOI, proved to be significant in merely 2 studies out of 8.

4.4 Cloud providers

I created a separate category for factors related to cloud providers. *Provider trustworthiness & reputation* stands out among factors analysed in literature, by number of times it has been utilized. This can be explained how involvement of cloud providers with implementation and delivery of IT services is much greater compared to traditional IT vendors. Organizations have to trust provider on issues such as consistent performance of the system, sensitive data, and timely implementation of new features.

Provider reputation was the most cited determinant of cloud adoption, concerning cloud providers**,** in all studies**.** However, it has been tested only in two studies (Heart, 2010; Seethamraju, 2013). Both of the studies found support for the impact of provider reputation on adoption, although more research is needed on the issue. Other attributes, were widely discussed in many of the reviewed articles, but did not have strong empirical support.

4.5 External environment

In this category I included all factors that affect cloud adoption but are beyond cloud properties, organizational context or providers. In external environment *legal issues* and *competitive pressure* are most researched. Cloud providers deal with sensitive data of client organizations, but sometimes operate in different legislations from clients. Such environment intensifies the importance of legal compliance. As there are no established practices at the moment, issues such as ownership of data, and privacy. *Competitive pressure* is understandably present as more and more companies are discussing adoption of the technology. Two studies address potential influence of *shared best practices* and success stories as an environmental factor for adoption (Benlian, 2009; Saedi and Iahad, 2013). Success of others could be an influential factor, however at this stage of cloud maturity, convincing examples may be scarce, thus undermining an effect of the factor.

Surprisingly, among external environment factors only *partner pressure* was empirically supported, even though the attribute was tested only in two studies. While *legal issues* and *competitive pressure,* were the most utilized variables, the results are either controversial or insignificant. In case of *legal issues* the reason could be a complexity of the topic, importance of the research setting and vague interpretation of the factor. For example, while some authors see legislation as a supportive factor (e.g. Oliveira et al. 2014) others view it as a hindrance to technology adoption (e.g. Borgman et al. 2013; McGeough 2013).

5 Discussion

In the beginning of this study I set to answer two research questions addressing current state of research cloud adoption in organizations. More robust analysis of empirical results in literature allowed us to gain an in-depth understanding of cloud adoption research beyond a simple overview of

literature and identify future trends as well as shortcomings in the research. In the first step of the analysis presented I have answered the first research question by generating 5 thematic categories of cloud adoption factors.

Based on the identified factors and their categorization I applied a literature analysis method presented in Jeyaraj et al. (2006) and synthesized empirical results from the articles to identify cloud adoption determinants. Resulting summary (see Figure 2) answers to the second research question regarding adoption determinants. Next I discuss some significant findings from the review and point out implications for researchers and practitioners.

5.1 Underrepresented categories among adoption determinants

The key finding is a notable underrepresentation of environmental and organizational adoption determinants in the results. Similar to the findings on cloud-sourcing decision determinants (Schneider and Sunyaev, 2014), I found a strong focus on technology characteristics directly related to cloud. Drivers and inhibitors of adoption, which are fully focused on technology aspect of cloud, dominate the literature. The majority of empirical studies used theoretical foundations from the established research on technology adoption, such as TOE and DOI frameworks. At the same time other factors related to organization, and external stakeholders, that are integral parts of these frameworks, were underrepresented.

It is troubling to see the research results skewed towards issues like *cost advantage* and *security,* which are part of mainstream media discourse on cloud at the moment, while seeing established technology adoption factors, such as *complexity* and *compatibility* underrepresented. Even though cloud is a new breed of organizational technology, I believe it would be wrong to assume that variety of other factors affecting technology adoption do not play a role in cloud adoption decision. For example *complexity,* one of the key attributes of DOI was tested in 8 different occasions, however it turned out to be one of the worst predictors, showing significant relationship to adoption just in 2 occasions. Studies attribute inconsistency concerning *complexity*'s predictive power to technological immaturity of cloud, poor understanding of cloud by companies and need for better empirical data (Borgman et al., 2013; Low et al., 2011).

Combined with underrepresented organizational and environmental factors, these results point out to a narrow view of cloud adoption from both researchers and managers. One other explanation for these results is majority of the reviewed studies taking a top-down view of the cloud adoption. 15 out of 18 studies had collected data exclusively from either IT professionals (2 studies) or top management of the company (13 studies). While these actors have high influence on the technology adoption process, other members of organization usually play a role in the process. I argue that the bias towards top decision-maker informants could be responsible for the prominence of determinants such as *top management support* or *partner pressure* and simultaneous absence of more routine organizational and environmental factors.

Nevertheless, as both organizations' view on cloud and academic research mature there is some hope going forward. According to the latest industrial reports, cloud is entering a mature stage, where managers have increasing understanding of the technology and adoption decisions are becoming more sophisticated (Burton and Willis, 2014; Verizon Enterprise Solutions, 2014). Some examples of the latest research show some promise that hyped determinants such as *security*, while still important, might actually have lesser role in the decision than previously thought. Also established adoption factors such as *complexity*, *compatibility,* and *technological readiness*, whose significance is not supported by earlier studies, seem to play increasingly important role in more recent studies (e.g. Alshamaila et al. 2013; Morgan and Conboy 2013; Oliveira et al. 2014).

5.2 Implications for future research

First, I propose to concentrate future research on environmental and organizational adoption factors. One remedy to the problem would be a wider use established frameworks on technology adoption in organizations. From the original sample of 31 articles less than half used frameworks such as TOE or DOI, which consider environmental and organizational factors. Another way to address the problem would be to modify the approach to data collection. Collecting data from a wider variety of stakeholders participating in adoption decision may address this problem. In addition to that more thorough qualitative and mixed-method studies could help future researchers to understand the role of organizational and environmental factors better.

Second, I find that more studies need to take into consideration different contexts of cloud adoption, such as industry and the size of the company. Majority of the articles in this review either concentrate on one narrow context (e.g. technology SMEs) or have not explicitly specified a context or compared different groups. Schneider and Sunyaev (2014) in their review of cloud-sourcing decisions discovered that specific contexts yield mixed results across different studies utilizing the same framework (e.g. transaction cost economics). I believe this also applies to the cloud adoption studies. A recent paper by Oliveira et al. (2014) provides a good example of a study across multiple contexts. The authors analyse adoption across manufacturing and service industries, as well as various sizes of companies, presenting more robust and interesting results. I argue that this approach has a great potential to advance the knowledge on cloud adoption and generate truly generalizable findings that can withstand time.

The third area to explore is the role of factors associated with cloud providers. Initial overview of the articles revealed that researchers attempted to utilize factors such as *provider competences* (e.g. Heart 2010; Trigueros-Preciado et al. 2013) and *location of data* (e.g. Feuerlicht and Margaris 2012; Lee et al. 2013) to analyse adoption decision. However, in the analysis of adoption determinants only *provider reputation* showed empirical support. I argue that further research needs to be done on cloud providers and their impact on adoption decision. I base the argument on the differences in between cloud provider and client organization relationship, and traditional software vendor-client relationship. The differences are rooted in issues related to higher dependence of client organization on the provider as all or most of the software and data is stored and managed by provider. Thus, provider characteristics, such as location of provider's infrastructure, legislation of provider's home country, and ability of provider to ensure uninterrupted, secure service, would play an increasingly big role in adoption decision.

5.3 Insights for practitioners

Findings from this review also provide some insights for practitioners. Takeaway for providers of cloud services is the presented list of adoption determinants considered by current and potential users. The results suggest that providers need to offer users a clear structure to estimate exact costs related to the implementation and use of cloud services, and benchmark them to the current IT arrangements. Providers also need to keep in mind that as understanding of cloud computing evolves in organizations, managers' decision-making is becoming more sophisticated, thus basic benefits such as cost-cutting or rapid scalability will not be enough to satisfy customer needs.

Security and privacy are the most cited inhibitors of cloud adoption. While security trade-offs are not always obvious in some contexts, it is apparent that providers need to consider their practices in order to maintain high standards on this front. Considering that a recent study has reported "unrealistic optimism" regarding IT security risks among cloud providers (Loske et al., 2013), these issues need to be addressed timely in order to ensure long-term success of cloud on a corporate level.

Another interesting finding for cloud providers, is the prevalence of subjective factors in making an adoption decision. Factors like managerial support, peer and competitive pressure, previous experiences, and best practices suggest that currently adoption decisions are based on the perceptions of potential customers, and their overall attitude towards cloud. Considering a prevalent emphasis on provider trustworthiness and reputation I recommend providers to highlight their strong track record with previous customers and demonstrate benefits of cloud that correspond to the perceptions of managers.

For organizations considering adoption of the cloud this paper offers an extensive overview of the factors that cloud adopters need to consider. The findings also suggest that organizations need to look beyond perceived benefits of the cloud, advertised by industry, and simple cost cutting. A more strategic look at the adoption of cloud services in the organization, and their integration with organization's operations, may lead to the better outcomes in a long run.

5.4 Limitations

As any research this review has limitations. First, the selection process of the articles for this review could be debated. I made number of decisions to limit the search of literature to fields of business and computer science. I also limited the review to articles explicitly talking about cloud computing and X-as-a-Service (XaaS), excluding studies in related areas such as Application Service Providers (ASPs). When identifying adoption determinants I excluded exploratory studies and articles that did not establish clear relationships between factors and adoption, which also narrowed the sample for this review. These choices were made in order to improve comparability of findings, however I realize that I may have missed some articles that could have been relevant for this review.

Second, I realize that categorization and coding process is not perfect. Even though I discussed in-depth, the categorization of factors generated as a result initial review with 3 different scholars with understanding of adoption issues, I realize that these are still subjective.

6 Conclusion

In this paper I have conducted systematic literature review on cloud adoption in organizations. The contribution of this work is thus twofold. First, I identified and categorized determinants of cloud adoption in organizations. The contribution to the field is directions for the future research on cloud adoption, supporting overall development of theory in IS field. IS scholars can use findings regarding determinants of adoption in order to construct their studies and advance the knowledge on adoption decisions. Second, I provide practitioners with recommendations regarding development and adoption of cloud services. This review offers valuable insights for both cloud service providers and organizations considering adopting the technology.

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Essay 2

Asatiani, A. & Penttinen, E. (2016). Profiling Outsourcers of Professional Services – An Exploratory Study on SMEs. In *Proceedings of the 24th European Conference on Information Systems (ECIS)*, Istanbul, Turkey, (pp. 1-16). Association for Information Systems (AIS).

PROFILING OUTSOURCERS OF PROFESSIONAL SERVICES – AN EXPLORATORY STUDY ON SMALL AND MEDIUM-SIZED ENTERPRISES

Research

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Abstract

In addition to large corporations, small and medium-sized enterprises (SMEs) increasingly engage in business process outsourcing (BPO) of professional services as they delegate routine processes such as accounting, recruitment and law to outsourcing service providers. In this study, we explore the outsourcing profiles of SMEs and use those profiles to generate four research propositions. Our main finding is that outsourcers are not all the same; the results of the clustering analysis reveal that the three clusters that we identified differ in terms of their motivation to outsource business processes. We find that those companies with low levels of outsourcing primarily seek quality improvements, assurance and external expertise, whereas, those companies with high levels of outsourcing primarily seek cost reductions and the ability to focus on core competences. Cloud use, on the other hand, is primarily associated with a high level of disaggregation of the service. In other words, if the company's strategy is to selectively choose the tasks to be outsourced, in a granular way, then it needs to employ cloud-based information systems.

Keywords: Outsourcing, professional services, financial administration, cloud computing, accounting, accounting information systems, cluster analysis, BPO

1 Introduction

The market for business process outsourcing (BPO) today is significantly different compared to what it was 25 years ago, when big players dominated the outsourcing landscape. Outsourcing of IT and business processes was seen as something meant exclusively for large multinational corporations (e.g. Applegate and Montealegre, 1991). However, the growth of the outsourcing market and the advent of information communication technologies such as broadband Internet and cloud computing have changed the outsourcing landscape. Today, outsourcing has become accessible to smaller market players such as small and medium-sized enterprises (SME) (Everaert *et al.*, 2008), and outsourcing of professional services, such as accounting, is common. On the other hand, technologies such as cloud-based systems make advanced IT systems accessible to SMEs. By transferring the burden of development and maintenance to cloud providers, cloud use alleviates the barriers SMEs typically face when adopting IT (Lacity and Reynolds, 2014). These developments present tremendous market opportunities to SMEs; however, it also presents challenges. Research on outsourcing in SMEs has been lacking, compared to research on large multi-national enterprises (MNE) (Dibbern and Heinzl, 2006; Leimstoll *et al.*, 2008). Currently, practitioners and academics are trying to improve their understanding of the emerging sourcing models and the role of technology in their development (Lacity *et al.*, 2011). Motivated by these challenges, our objective is to explore BPO arrangements in SMEs, and present a discussion on the role of technologies in different outsourcing arrangements. The research questions we address are: *RQ1: What are the common outsourcer profiles for SMEs? RQ2: What firm characteristics and outsourcing motivations distinguish outsourcing patterns in SMEs?* The findings suggest that there are major differences in objectives and motivations to outsource across the spectrum of SME. These differences call for a more in-depth research on selective outsourcing in SMEs, and comprehensive investigation on the role of emerging technologies in outsourcing arrangements.

2 Background

2.1 Business Process Outsourcing

Business process outsourcing, or BPO, is simply defined as "the sourcing of business processes through external third parties" (Lacity *et al.*, 2011). BPO is a relatively new research direction, compared to information technology outsourcing (ITO). Nevertheless, a lot of quality research has been conducted on the topic since the early 2000s (Lacity *et al.*, 2011). As BPO markets grow, and more and more companies are embracing the practice (Lacity *et al.*, 2011), researchers are looking into the characteristics of successful BPO. To that end, factors such as information processing (Mani *et al.*, 2010) and dynamic innovation capabilities (Lacity and Willcocks, 2014) have been found to be bases for BPO success. Cloud computing is seen as a technology contributing to developing these capabilities. However, both academics and practitioners are yet to understand the full impact of the technology on BPO and ITO (Lacity and Willcocks, 2014; Lacity *et al.*, 2011).

When planning BPO, companies face two major decisions: whether or not to outsource a business process in question, and which parts of the process to outsource. Digitalization of information-intensive business functions and the introduction of collaborative cloud-based information systems have facilitated the disaggregation of business processes into smaller, modular tasks, which are distributed between the client organization and the outsourcing partner (Apte and Mason, 1995; Asatiani *et al.*, 2014). As a result, in addition to all-or-nothing outsourcing, an option of selective outsourcing has emerged. Selective outsourcing is defined as a decision to source a process externally, while still maintaining a part of the task internally (Dibbern *et al.*, 2004; Lacity and Hirschheim, 1995). While some researchers have argued that selective outsourcing offers no long-term advantage, compared to total outsourcing in particular contexts (Dahlberg *et al.*, 2006), a substantial body of literature supports the effectiveness of the practice (Dibbern and Heinzl, 2006). Empirical studies have

demonstrated the increasing popularity of selective outsourcing and its advantages to total outsourcing (Apte *et al.*, 1997; Dibbern and Heinzl, 2006; Grover *et al.*, 1994; Lacity and Willcocks, 1998). The major critique of all-or-nothing outsourcing is that it does not allow companies to opt for a precise outsourcing arrangement that delivers maximum value (Lacity *et al.*, 1996).

2.2 Cloud Computing and Outsourcing

Cloud computing enables ubiquitous, on-demand network access to a shared pool of computing resources, released with minimal management effort, and delivered on a pay-per-use basis (Mell and Grance, 2011). Essentially, the cloud delivers three layers of IT: infrastructure- (IaaS), platform- (PaaS) and software- (SaaS) as a service to the users. The accepted definition by the National Institute of Standards and Technology recognizes three service models (IaaS, PaaS, and SaaS) and four deployment models (private, public, hybrid and community) for cloud computing (Mell and Grance, 2011). The main advantages of cloud computing are the low cost of entry, instant access to IT resources, and a pay-per use model fitting to one's current IT requirements (Armbrust *et al.*, 2010; Marston *et al.*, 2011).

Issues of cloud adoption in organizations have been studied extensively (Asatiani, 2015; Ermakova *et al.*, 2013; Upreti *et al.*, 2016; Venters and Whitley, 2012). A review conducted on the cloud adoption literature reports that factors such as cost savings, simplicity, efficiency, and potential for innovation contribute to adoption (Asatiani, 2015; Venters and Whitley, 2012). At the same time, problems related to security, privacy and risks associated with technological failure remain important (Asatiani, 2015; Ermakova *et al.*, 2013).

As the adoption of cloud computing grows (Verizon Enterprise Solutions, 2014), companies are re-organizing around the technology (Oliveira *et al.*, 2014). The outsourcing of both IT and business processes is one of the key opportunities identified in the literature (Böhm *et al.*, 2011; Dhar, 2012; Schneider and Sunyaev, 2014). The prevalence of cloud-based systems in professional services makes BPO of back-office functions, such as accounting, more attractive to companies (Motahari-Nezhad, Stephenson, & Singhal, 2009). By lowering the cost of entry, cloud computing makes outsourcing of IT and business processes more accessible to smaller market players such as small and medium-sized enterprises (SMEs) (Alali and Yeh, 2012; Marston *et al.*, 2011). Access to enhanced information processing capabilities and the ability to work with third parties within the same cloud-based system (Asatiani *et al.*, 2014; Marston *et al.*, 2011) offer opportunities for BPO innovation (Lacity and Willcocks, 2014; Willcocks *et al.*, 2013a, 2013b). In traditional BPO arrangements, both a professional service provider and a client company use separate, disconnected, information systems. In contrast, in the cloud-enabled outsourcing arrangement, both the service provider and the client operate within the same cloud-based IS. In this setting, the data within the system is accessible to the both sides in real-time, thus enabling both sides to observe changes and collaborate on the business processes within the same system (see Figure 1).

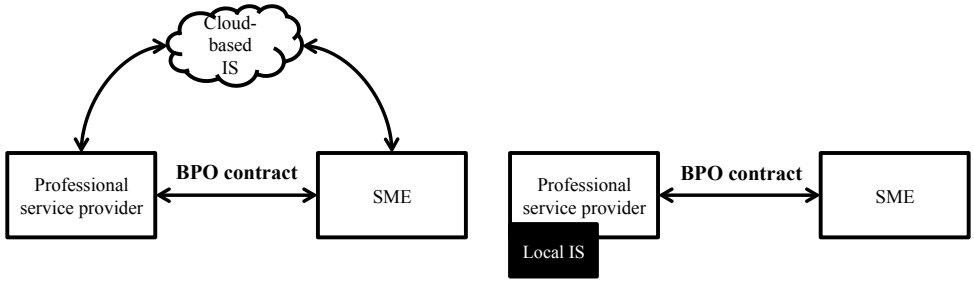

Figure 1. Comparison between cloud-enabled and traditional BPO arrangements

While researchers have stepped up in addressing cloud developments in outsourcing, there remain research challenges in decision-making and the contextual differences of cloud sourcing (Lacity *et al.*, 2011; Schneider and Sunyaev, 2014). Cloud computing is having a profound influence on how companies organize their outsourcing arrangements and provides pressures also on outsourcing service providers to re-design their offerings (Dhar, 2012). Case studies on organizations using cloud services indicate that one of the biggest challenges is to match companies' business requirements with cloud capabilities (Lacity and Reynolds, 2014). Therefore, organizations today face a double challenge when outsourcing business processes, as the arrangement should be aligned to 1) organizational context, and 2) cloud capabilities.

3 Study

3.1 Context

For the purpose of this study, we collected quantitative data on the outsourcing of accounting in SMEs operating in Finland. There are three main reasons for choosing the context of accounting in SMEs for this study. First, accounting is an integral part of any business activity. Large parts of the processes belonging to accounting are regulated by legislation, which means that the process is highly standardized and thus comparable across all companies operating within the same regulatory system. The legal mandate also ensures that accounting is present in all companies, which means that the companies eventually face the question of whether to outsource the function. Due to this fact, the market for accounting outsourcing services is highly developed in Finland, and outsourcing of the accounting processes is common among all companies.

Second, financial processes are highly information-intensive and modular, making them suitable for selective outsourcing. Accounting is a well-defined, documented, and standardized environment. The tasks to be completed are well defined and the actors are clearly distinguished. The accounting process can be divided into five distinct sub-processes: sales, purchases, payroll, payments, and reporting. These in turn can be separated into more granular tasks, which can be allocated between the different actors, the client company and the outsourcing service provider. These properties of accounting make it a good fit for cloud-based BPO.

Third, the adoption of cloud-based accounting information systems (AIS) is growing, making it feasible to collect empirical data for comparing adopters and non-adopters of cloud technology. There are a number of innovative cloud-based AIS providers both locally in Finland (e.g. Procountor, Netvisor) and internationally (e.g. Xero), making such systems accessible to a wider range of companies.

The context of Finland is fitting to this study as the country has a developed market of accounting outsourcing. Accounting outsourcing is an 800M€ industry, with nearly 4300 providers of accounting outsourcing services (Association of Finnish Accounting Firms, 2015a). The total number of active enterprises is 354 081 (Statistics Finland, 2013). There are approximately 20 major accounting information systems providers on the Finnish market. The majority of these are domestic (Association of Finnish Accounting Firms, 2015b). There is an increasing trend among AIS providers to offer cloud-based solutions to their customers. The combination of the factors stated above makes the Finnish context highly suitable for studying BPO and cloud computing.

3.2 Data

To address the research questions, we collected data using an online survey. The survey data include responses from 323 SME representatives from Finland. To define an SME, we used a classification provided by the European Commission, which states that an SME is a company with up to 250 employees and an annual turnover of less than 50€ million (European Commision, 2003). The survey respondents were randomly selected from the database of the Confederation of Finnish Industries, a

business organization uniting 16000 Finnish enterprises. The online survey was distributed through a web-link embedded in an email message. Representatives from the Confederation of Finnish Industries sent the email message to the respondents. In total, 2500 questionnaires were distributed. We received 341 completed questionnaires, putting the response rate at 13,64%. Eighteen cases were excluded from this study as the respondent organizations were bigger than the SME size defined for this study. The data were collected in the period March-April 2013.

The Confederation of Finnish Industries administered the survey and anonymized the responses before delivering the data to the researchers. Therefore, we did not conduct non-response bias analysis. However, we have no grounds to believe that the respondents were self-selected in a way that would impact the survey results.

In the questionnaire, the respondents were asked to answer background questions about themselves personally and their company, as well as questions regarding outsourcing arrangements and use of accounting information systems. In addition, the respondents had an opportunity to provide open-ended responses regarding their motivations for outsourcing. Background questions were used to ensure that the respondents belonged to the SMEs. To investigate outsourcing arrangements, the respondents were presented with a list of 22 accounting tasks (see Appendix I). The respondents were asked to identify those processes which they had outsourced to a third party. This list was based on a document used by the Finnish accounting industry to arrange outsourcing deals between accountants and client companies. This helps to avoid a potential bias caused by miscomprehension of the items in the questionnaire, as the respondents are familiar with the tasks. In order to identify whether respondents used cloud-based accounting information systems, we presented them with a list of commonly used AIS in Finland, as well as a free text option for systems not included in the list. After receiving the responses, we categorized the AIS responses as either cloud-based or locally installed AIS. We conducted the categorization based on publicly available information provided by the systems providers. In addition, we did four expert interviews with accounting practitioners and representatives of the Association of Finnish Accounting Firms to validate the categorization of the systems into cloud-based and non-cloud-based.

3.3 Method

3.3.1 Cluster analysis

In order to identify groups of companies based on their outsourcing arrangements we applied a cluster analysis method to the collected survey data. Cluster analysis is used to find groups in data, based on measurements of selected variables. Cluster analyses help to discover *clusters* of data by grouping similar items together, while keeping items across the clusters as dissimilar as possible (Kaufman and Rousseeuw, 2005). Cluster analysis is an empirical method of classification, which makes no prior assumptions on differences in the sample, thus being primarily an inductive method (Punj and Steward, 1983). This feature of cluster analysis suits the goals of our research as we aim to explore the profiles of outsourcers and their use of cloud-based AIS, based on empirical data.

While cluster analysis has been successfully used in various disciplines including information systems, the method is treated with scepticism (Balijepally *et al.*, 2011; Punj and Steward, 1983). The criticism of the method is rooted in the limited theoretical application of cluster analysis, and high reliance on researcher judgement. First, cluster analysis is an atheoretical descriptive approach, where no certain inferences can be drawn from the sample to the population. Second, the outcome of cluster analysis depends on particular decisions made by the researcher. Therefore, these decisions need to be grounded in external justification (Balijepally *et al.*, 2011). In this study, we make an effort to address both of these issues. First, the aim of this study is purely exploratory. Our goal is to present a discussion of BPO and use of cloud computing grounded on a strong empirical basis, as opposed to purely theoretical foundations. And while we intend to put forward proposals for future research, we do not hypothesize based on the outcome of this research. Second, in order to address the issue of

researcher subjectivity in implementing a cluster analysis, we followed the guidelines of best research practice put forward in prior literature (Balijepally *et al.*, 2011; Ketchen and Shook, 1996; Punj and Steward, 1983).

Variable selection. The nature of this study is exploratory. Thus, in order to select the variables, we used the cognitive approach for variable selection (Balijepally *et al.*, 2011; Ketchen and Shook, 1996). We chose the accounting processes outsourced as variables for clustering (see Appendix I). These variables are rooted in the practice of accounting outsourcing, and verified by practitioner experts through interviews. Because we are looking at BPO patterns of a concrete business function, the processes suitable for outsourcing included in this function are thus valid choices for clustering. As the values to measure whether the process is outsourced are the same across all 22 processes, we did not standardize the variables.

Clustering method selection. For this study we selected the K-means clustering algorithm. Iterative methods of clustering, such as K-means, are found to perform better than hierarchical ones (Punj and Steward, 1983) especially when dealing with issues such as outliers (Balijepally *et al.*, 2011) and iterations on initial poor cluster assignments (Ketchen and Shook, 1996). However, iterative methods rely more on the researchers' judgements, compared to hierarchical methods (Balijepally *et al.*, 2011), by requiring a priori assignment of the number of clusters (Punj and Steward, 1983).

Reliability. To address the issue of defining the number of clusters for the K-means method, we followed the suggestions from the literature (Balijepally *et al.*, 2011; Ketchen and Shook, 1996) to combine multiple methods to define the number of clusters. First, we performed hierarchical analysis, prior to K-means, in order to identify the number of clusters assigned by the clustering algorithm. We used Ward's method for hierarchical clustering. The hierarchical clustering algorithm provided a clear three-cluster solution. We then ran K-means clustering solutions with two to six clusters. From these solutions, the three-cluster solution proved to be most reliable and fit for interpretation. We used cluster stability and ANOVA tests in order to check the reliability of cluster solutions (see Appendix Table A2). In addition, seed points from the hierarchical clustering were used to check the stability of the clusters in the K-means solution. To run the cluster analysis, we used the SPSS 23 software package.

3.3.2 Characterising clusters

In order to characterize the clusters and deepen our cluster analysis, we used the background and open-text responses from the survey. The following background information was used for describing the clusters: industry, use of cloud technologies in accounting, accounting competence of the respondent, employee headcount, and turnover. In addition to this, we observed the eligibility of companies for exemption from mandatory auditing, and whether the companies are audited. Using SPSS we assigned the data to the identified clusters. We used Chi-square analysis to verify differences in characteristics across the clusters.

To analyse the open-text data on the motivations to outsource, we extracted the text responses from the survey and manually coded the responses. The coding resulted in seven motivations to outsource accounting: *access to expertise, time saving, focus on core competences, access to resources, quality improvements, cost reduction* and *digitalization of the process*. We counted the occurence of each code and organized the codes based on the clusters.

4 Results

Through analysing the outsourcing patterns of the sample of 323 companies, we identified three clusters. After completing the cluster analysis, we characterized each cluster based on the data provided by the survey respondents. The results indicate that the type of industry does not seem to have an effect on how companies outsource their accounting. On the other hand, the other measures seemed to differ across the identified clusters: use of cloud technology (Appendix Table A3),

accounting competence (Appendix Table A4), employee headcount (Appendix Table A5), turnover (Appendix Table A6) and voluntary auditing (Appendix Table A7). For further analysis we used the data from open-ended answers related to their motivation for outsourcing. The results allowed us to create a rich characterisation of the clusters.

4.1 Cluster 1: Low outsourcing, low cloud adoption, high accounting competence, large SMEs with high employee headcount.

The first cluster comprises high turnover, high employee headcount SMEs who prefer to keep the majority of the accounting processes in-house (see Figure 2, where the x-axis represents the tasks P1-P22 in Appendix Table A1, and the y-axis is the percentage of outsourcers for that specific task in cluster 1). These companies have a low adoption rate of cloud-based AIS. On the other hand, the majority of respondents from this cluster reported high competence in accounting processes through daily work experience and education. This suggests that companies in Cluster 1 have a dedicated, professional accountant or accounting team in-house dealing with the whole process, which in turn eliminates the need for outsourcing. The larger size of the companies, both in turnover and employee headcount, also means that the scale of accounting is large enough to justify having an in-house accounting unit. In this cluster, only 10% of the companies were exempt from mandatory auditing. However, the majority of these choose to perform voluntary external auditing. The top motivation factors to outsource accounting are access to expertise, access to resources, time saving, and quality improvements. The typical companies in this cluster are working in the manufacturing and construction industries.

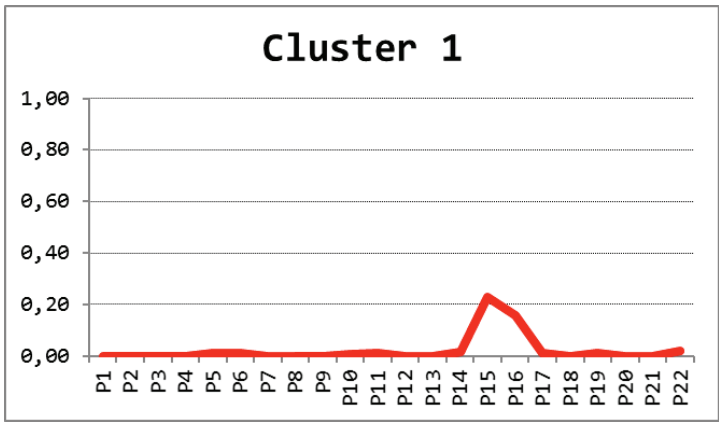

Figure 2. Outsourcing patterns of Cluster 1

4.2 Cluster 2: Selective outsourcing, high cloud adoption, medium accounting competence, micro and small SMEs

The second cluster contains selective outsourcers (see Figure 3). SMEs in this cluster are making calculated decisions on what to outsource. Tasks related to reporting, such as payroll, income statements, balance sheets, and taxation are outsourced, but the majority of the tasks directly related to daily operations, such as sales and purchases, various registers and payments, are kept in-house. This cluster has the highest cloud adoption rate with 27% of respondents reporting the use of cloud-based AIS. The majority of SMEs in the cluster have less than 20 employees and less than 2 million Euro turnover. This cluster also unites respondents with the most diverse competence levels in accounting, but medium competence is still dominant. Slightly more than half (57%) of the companies eligible for voluntary auditing choose to be audited. The main motivation factors to outsource are access to expertise, time saving, and focus on core competences. As in the case with the first cluster, a notable

portion of the companies in this cluster operates in manufacturing, however, companies operating in the fields of health services and automobile-related services are also prevalent.

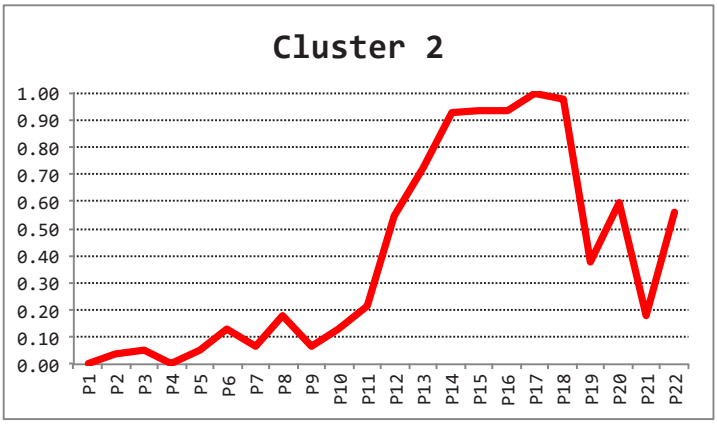

Figure 3. Outsourcing patterns of Cluster 2

4.3 Cluster 3: high outsourcing, high cloud adoption, medium accounting competence, mid-sized SMEs.

The third cluster includes eager outsourcers (see Figure 4). These SMEs are outsourcing the majority of their accounting with exceptions, such as sales and client registers maintenance, and sales invoice handling. These are processes that typically occur within the company on a daily basis and thus are not usually viable for outsourcing. Companies in this cluser are mid-sized SMEs, both in terms of turnover and employee headcount. Almost a quarter of these companies are using cloud-based systems to manage their accounting. The majority of the respondents have some practical experience in accounting. This cluster has the smallest ratio of companies opting-in for voluntary auditing. The top reasons to outsource are focus on core competences, access to expertise and cost reduction. Typical members of this cluster are manufacturing as well as service companies.

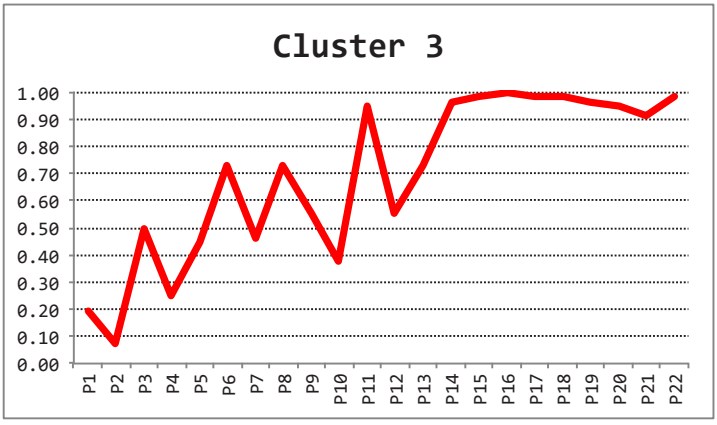

Figure 4. Outsourcing patterns of Cluster 3

4.4 Results summary

As a result of our analysis, we observed three distinct clusters which describe the types of outsourcing arrangements in SMEs. Table 1 presents a summary of the properties of the three clusters.

	Cluster 1	Cluster 2	Cluster 3
Level of outsourcing	Low	Medium	High
Cloud Adoption	Low	High	High
Competence	High	Medium	Medium
Voluntary auditing	High	Medium	Low
Motivation to outsource	- Access to expertise - Access to resources - Time saving - Quality improvements	- Access to expertise - Time saving - Focus on core competences	- Focus on core competences - Access to expertise - Cost reduction
SME size	Large	Micro/Small	Medium

Table 1. Cluster characteristics.

5 Discussion

In this study, we focused on BPO arrangements in SMEs and recent changes in the market brought by new technologies. We used the case of accounting outsourcing for our study. Compared to previous studies (e.g. Everaert *et al.*, 2007), we have taken a more granular approach to analysing the outsourcing patterns. We broke down the accounting function into concrete processes (rather than broad task categories), which correspond to the tasks performed by companies in real life. This allowed us to gain a deeper understanding of the patterns of outsourcing beyond the generic categorizations of total insourcing, total outsourcing and selective outsourcing. In order to grasp these differences, we performed cluster analysis to classify SMEs based on their outsourcing patterns. The classification also allowed us to characterize SMEs based on particular outsourcing patterns, helping us make distinctions between different arrangements on an outsourcing continuum. In addition to cluster characteristics, we observed how outsourcing motivations (Dibbern and Heinzl, 2006; Lacity *et al.*, 2011) are prioritized across outsourcing continuum. Based on the results of our analysis, we put forward four propositions.

5.1 Selective outsourcing continuum

Some earlier literature tends to view selective outsourcing as one option, directly comparing its performance vis-à-vis total outsourcing and total insourcing (e.g. Dahlberg *et al.*, 2006). Other authors measure selective outsourcing as the degree of outsourcing of a particular business function (e.g. Dibbern and Heinzl, 2006). Based on our results, we propose that selective outsourcing instead should be viewed as a continuum (see Figure 5), which exhibits a variety of outsourcing arrangements with distinct characteristics.

In our study, we have identified three distinct sections of the selective outsourcing continuum, where the motivations to outsource and the implementation of the outsourcing arrangement are drastically different. This view of selective outsourcing implies that outsourcing arrangements that are situated on different sections of the continuum should not be treated as a single outsourcing model. Therefore, studying selective outsourcing without clear identification of the type of arrangement could be counterproductive. This may also explain some of the discrepancies in the research on the performance of selective outsourcing. Based on the above discussion, we put forward the following proposition:

Proposition 1: Selective outsourcing is a continuum, where organizations positioned differently along the continuum pursue distinct sets of objectives

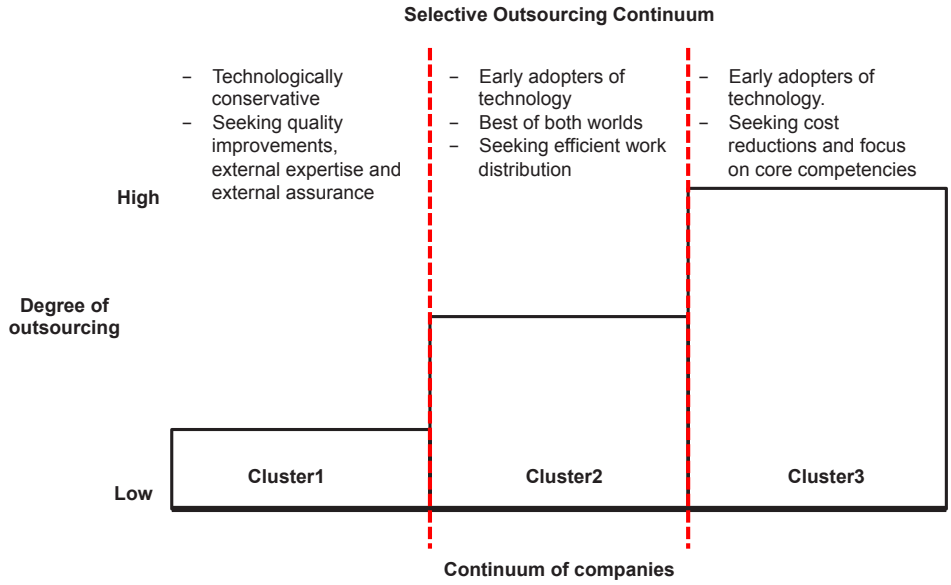

Figure 5. Selective outsourcing continuum.

5.2 Context and motivations to outsource

Earlier studies investigated the decision to outsource business processes, identifying a wide range of motivations to outsource business processes. The most important motivational factors found in earlier literature are cost reduction, access to expertise, focus on core capabilities, business process improvements, scalability, rapid delivery and concern for security (negative effect) (Lacity *et al.*, 2011).

What we find in our exploratory study is that these motivational factors are contextual, in the sense that they are tied to the extent of outsourcing. In other terms, the motivation to outsource seems to be related to the outsourcing strategy. This became evident in our sample, as our clusters portrayed clearly different motivations to outsource. Those companies belonging to the first cluster reported seeking mainly quality improvements and external expertise. Also, they had the highest ratio in using voluntary external auditing. Those companies belonging to the third cluster were seeking cost reductions and the ability to concentrate on core competences.

Our results highlight that different types of companies have different motivations to outsource. Our findings lead us to propose that the motivations at different points on the outsourcing continuum can vary greatly. Such diversity in motivations and goals of outsourcing warrants further investigation of the differences between different outsourcing arrangements. Therefore, we propose the following:

Proposition 2: Companies with low levels of outsourcing primarily seek quality improvements, assurance and external expertise

Proposition 3: Companies with high levels of outsourcing primarily seek cost reductions and ability to focus on core competences

5.3 Selective outsourcing and cloud computing

The connection between cloud computing and outsourcing has been highlighted in prior research (Asatiani *et al.*, 2014; Schneider and Sunyaev, 2014). However, we still lack a full understanding of the impact of cloud-based systems on the decision to outsource.

Our data suggest that particular clusters of organizations have notably higher adoption rates of cloud-based accounting information systems. In our sample, the most extensive use of cloud-based accounting systems was found in the second cluster. In this cluster, the companies select tasks to be outsourced in a very granular way (see Figure 3). Naturally, a cloud-based information system has functionalities that permit this kind of operating mode, where tasks are allocated between the SME and the outsourcing service provider in a granular way, because the data is stored and processed in the cloud, so that it is accessible to both parties in real-time. These findings lead us to propose the following:

Proposition 4: Adoption of cloud-based information systems is related to the level of disaggregation of the tasks to be outsourced

6 Conclusion

The main goal of this study was to explore the profiles of SMEs engaged in different outsourcing arrangements. The secondary goal was to investigate whether the development of information technology and the evolution of the outsourcing market are reflected in the outsourcing decisions of SMEs. By applying a mix of cluster analysis and qualitative interpretation of open-ended answers to the survey responses from 323 Finnish SMEs we identified three outsourcer profiles, and generated four research propositions. Our findings suggest that while a significant share of companies are engaged in *selective outsourcing* to some degree, *selective outsourcing* itself is a continuum which incorporates outsourcing arrangements with highly distinct characteristics, which cannot be analysed within a single framework. The identified outsourcer profiles suggest that motivations and desired outcomes from outsourcing are context-sensitive, with decision properties having different weights in different environments.

6.1 Further research

The four propositions presented in the discussion section above represent major directions for future research. In addition to the proposals, we identified a number of general areas for further research. First, the contextual nature of outsourcing motivations in SMEs needs to be investigated further. As outsourcing is becoming more and more accessible to SMEs, new types of outsourcing arrangements are emerging, where outsourcers do not always pursue a generic set of goals identified in previous literature. The second question to be addressed is the adoption of cloud-based information systems in outsourcing arrangements. While we observe that the adoption of cloud services seems to be higher among companies that outsource the most disaggregated set of tasks, the relationship between the two actions (outsourcing and cloud adoption) remains unclear.

6.2 Limitations

A number of limitations are present in the study. First, while we have a sizable dataset on SME outsourcing, this study is exploratory. Therefore, the propositions presented in this paper need further validation through additional research. While this study provides a foundation for new research, our propositions may not be ready to be directly applied in theory or practice without further examination. Second, our data was collected in Finland, where outsourcing and use of cloud computing is more mature than in other markets and, therefore, our findings may be limited in generalizability. Due to limitations related to data anonymity required by the organization administering the survey were unable to perform all non-bias related tests. This needs to be addressed in the future survey.

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Appendix

Code	Process name
P1	Client register maintenance
P2	Product register maintenance
P3	Sending sales invoices
P4	Handling of sales invoices
P5	Sending note of complaint
P6	Sales ledger maintenance
P7	Supplier register maintenance
P8	Receiving purchase invoices
P9	Handling purchase invoices
P10	Handling purchase, travel and other costs
P11	Purchases ledger maintenance
P12	Personnel register maintenance
P13	Basic payroll data maintenance
P14	Payroll calculations
P15	Preparation of balance sheet and income statement
P16	Preparation and sending of VAT
P17	Preparation and sending of annual salary reports
P18	Preparation and sending of annual pension insurance reports
P19	Periodic VAT payments
P20	Salary payments
P21	Payments for purchases, travel and other expenses
P22	Monthly payroll tax payments

Table A1. Accounting processes in SMEs

ANOVA

	Cluster		Error			
	Square	df	Square	df	F	Sig.
P1	,893	2	,028	320	32,330	,000
P2	,124	2	,021	320	6,010	,003
P3	5,516	2	,056	320	99,180	,000
P4	1,447	2	,033	320	44,087	,000
P5	4,205	2	,061	320	68,593	,000
P6	11,304	2	,068	320	166,736	,000
P7	4,706	2	,058	320	80,916	,000
P8	11,567	2	,070	320	164,497	,000
P9	6,732	2	,058	320	116,309	,000
P10	2,988	2	,071	320	41,837	,000
P11	18,895	2	,057	320	332,962	,000
P12	11,806	2	,104	320	112,997	,000
P13	20,705	2	,084	320	246,717	,000
P14	33,627	2	,033	320	1032,180	,000
P15	20,789	2	,121	320	171,321	,000
P16	25,423	2	,093	320	272,123	,000
P17	37,888	2	,009	320	4094,800	,000
P18	37,562	2	,009	320	4100,233	,000
P19	20,294	2	,070	320	288,430	,000
P20	23,581	2	,068	320	344,928	,000
P21	17,923	2	,050	320	356,851	,000
P22	22,882	2	,076	320	300,207	,000

Table A2. ANOVA table for the cluster analysis

	Cluster Number			
	1	2	3	Total
Non-users	173	62	45	**280**
Cloud users	15	17	11	**43**
Cloud user ratio	*9%*	*27%*	*24%*	***15%***
Total	**188**	**79**	**56**	**323**

Table A3. Share of cloud users across clusters.

Competence	Cluster Number						Total	
	1		2		3			
High competence through education and full-time work experience	122	*64,89%*	20	*25,32%*	11	*19,64%*	153	***47,37%***
Medium competence through work experience	35	*18,62%*	45	*56,96%*	36	*64,29%*	116	***35,91%***
Low competence through theoretical knowledge	14	*7,45%*	9	*11,39%*	4	*7,14%*	27	***8,36%***
No knowledge or experience	9	*4,79%*	1	*1,27%*	1	*1,79%*	11	***3,41%***
Other	8	*4,26%*	4	*5,06%*	4	*7,14%*	16	***4,95%***
	188	***100%***	**79**	***100%***	**56**	***100%***	**323**	***100%***

Table A4. Accounting competence across clusters.

Employees	Cluster Number						Total	
	1		2		3			
1-5	6	*3%*	7	*9%*	2	*4%*	**15**	*4,64%*
6-10	11	*6%*	11	*14%*	7	*13%*	**29**	*8,98%*
11-20	44	*23%*	37	*47%*	17	*30%*	**98**	*30,34%*
21-30	23	*12%*	8	*10%*	9	*16%*	**40**	*12,38%*
31-40	14	*7%*	4	*5%*	7	*13%*	**25**	*7,74%*
41-50	20	*11%*	2	*3%*	1	*2%*	**23**	*7,12%*
51-100	40	*21%*	7	*9%*	4	*7%*	**51**	*15,79%*
101-250	30	*16%*	3	*4%*	9	*16%*	**42**	*13,00%*
Total	**188**	***100%***	**79**	***100%***	**56**	***100%***	**323**	***100%***

Table A5. Number of employees across clusters.

Turnover	Cluster Number						Total	
	1		2		3			
Less than 2 mil €	43	*22,87%*	41	*51,90%*	22	*39,29%*	**106**	***32,82%***
2-10 mil €	88	*46,81%*	29	*36,71%*	29	*51,79%*	**146**	***45,20%***
11-50 mil €	57	*30,32%*	9	*11,39%*	5	*8,93%*	**71**	***21,98%***
Total	**188**	***100%***	**79**	***100%***	**56**	***100%***	**323**	***100%***

Table A6. Annual turnover across clusters.

	Cluster Number of Case			
	1	2	3	Total
Eligible for voluntary auditing	18	8	14	40
Performs voluntary auditing	14	3	8	25
Ratio	77,78%	37,50%	57,14%	62,50%

Table A7. Number of users of voluntary auditing across clusters.

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